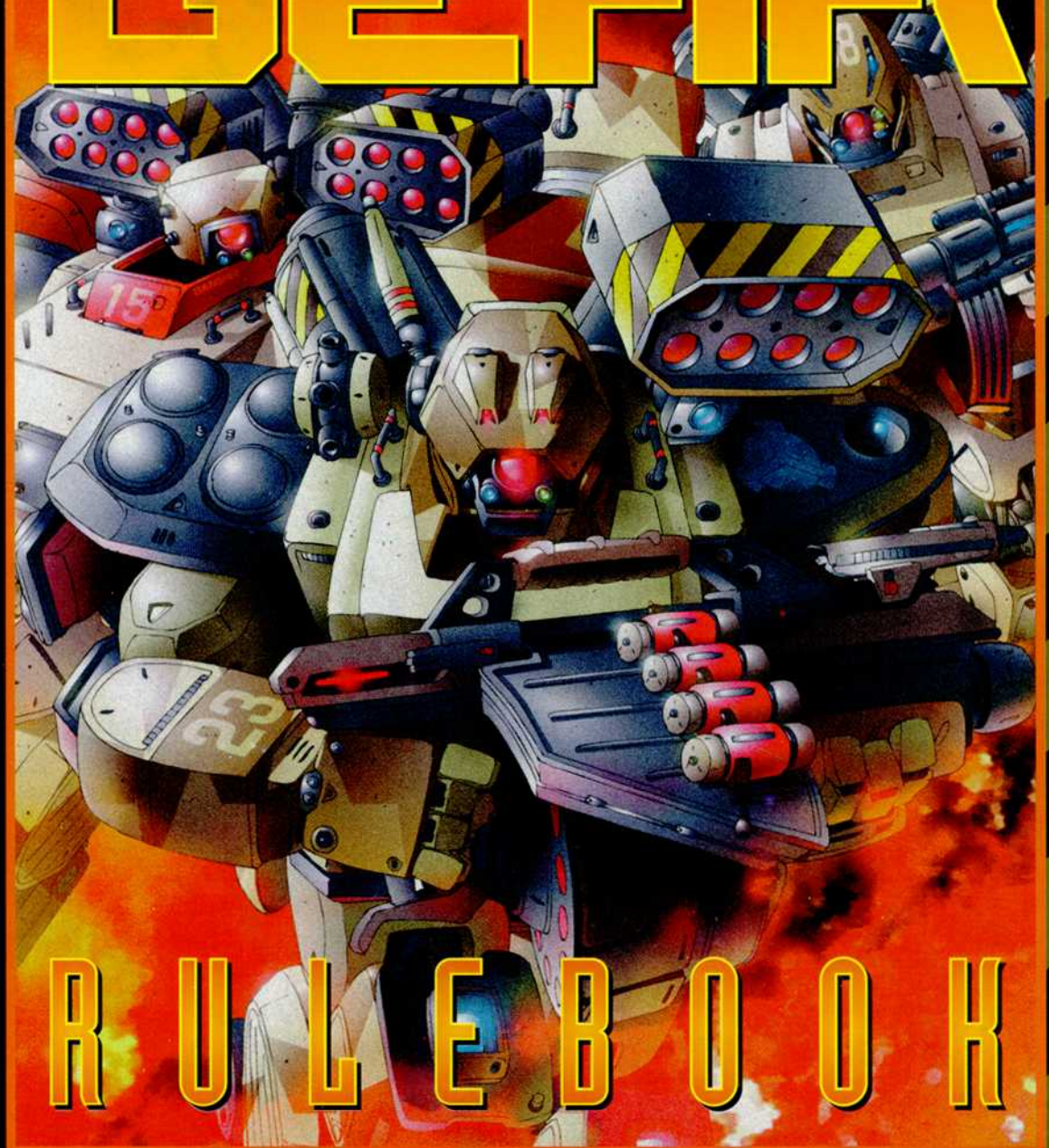
SECOND EDITION

DP9-101

HEAVY GEAR®



RULEBOOK

THE SCIENCE FICTION ROLEPLAYING & TACTICAL GAME

INTRODUCTION • QUESTIONS OF HONOR • TWO GAMES IN ONE • INTRODUCTION TO TERRA NOVA • WHAT HAS COME BEFORE • NEW IN TOWN • LIFE GOES ON • PEACE RIVER SOURCEBOOK • PAXTON SECURITY (PAXSEC) • BADLANDS REVOLUTIONARY FRONT • SILHOUETTE BASICS • CHARACTER CREATION • PERSONAL WEAPONS & ARMOR • EQUIPMENT • THE CHESSPIECE SYSTEM • ROLEPLAYING RULES • HAZARDS • CHARACTER IMPROVEMENT • OPTIONAL ROLEPLAYING RULES • CREATURES • TACTICAL RULES • OPTIONAL TACTICAL RULES • INFANTRY RULES • SILHOUETTE 3D MINIATURES RULES • CAMPAIGNING • ROLEPLAYING CAMPAIGNS • TACTICAL SCENARIO GENERATOR • INTEGRATED CAMPAIGNS • FIELD GUIDE • RUMOR MILL • TECHNOLOGY AND TACTICS • GEARS • CONVENTIONAL VEHICLES • GROUND VEHICLES • AIRCRAFT • STRIDERS • LANDSHIPS • VEHICULAR WEAPONS • CANNONS, ROCKETS & MISSILES • CLOSE COMBAT WEAPONS • BAZOOKAS • LASER WEAPONRY • MAGNETIC ACCELERATION CANNONS • PARTICLE ACCELERATORS • INTRODUCTION

INTO THE EYE OF THE STORM

DREAM POD 9

Official Correspondence #883-JK/332
Captain Hector-Gustav Métivier, Special Colonial Operations
Source: CEF HQ, Hausten
>Enter User ID: ••••••
>Enter Access Code: •••••••
>Retinal Scan Confirmed<
>Identity Confirmed<

Covert Agent 209,

Welcome to your first briefing.

This is a form document. It will serve as primer for the hypnotraining sessions you will undergo during your trip. It contains some critical information which is inconsistent with the New Earth Commonwealth's official propaganda. You may not disclose any part of this document to any party under penalty of death.

The mission you have undertaken will require you to be familiar with the history of the culture you are about to encounter as well as with the specifics of their past and current military technology. It is imperative that we do not repeat the mistakes of the War of the Alliance. Therefore, it is your mission to ensure that we gather appropriate intelligence on the Terranovans and that you establish friendly contacts that will work in our favor in the future.

Remember at all times that although Terranovans are descendants from colonists, they should not be underestimated. Do not make the mistake of thinking they are without education, culture or civilization. After the departure of Earth corporations under the Human Concordat Recall Order, Terranovans were left to fend for themselves on a still inhospitable planet. It is a tribute to their resourcefulness that they were able to thrive in such a short time. Their military capabilities are considerable and they represent a clear threat to our government.

The planet's gepolitical layout is deceptively simple. The northern and southern hemispheres are united under polar confederations that are antagonistic to each other. The desert band around the equator, called Badlands, is home to no more than twenty million independent Terranovans who reject polar rule. They are deceptively strong, and the city-state of Peace River is strongest among them. The city-state of Port Arthur has been founded by one of our stranded officers (Colonel Charles Arthur III) and is home to tens of thousands of our former soldiers and GRELs (see attached file on GREL supersoldiers). Their current affiliation needs to be clearly ascertained, but we expect they might join us against their "fellow" Terranovans if provided with sufficient incentive. Their strong dislike of Peace River — whose Peace River Defense Force was the determining factor leading to our "retreat" ten years ago — indicates that it could be used to goad them into action when required.

Before we proceed any further, we remind you that you have pledged your life to this cause. We therefore entrust you with valuable information and immense responsibilities, as you entrust us with the safety and well-being of your family and friends. Your success is vital to our plans. We know you will not return until your mission is accomplished.

>Click here to continue<



ASTRONOMICAL SITUATION
CLIMATE & GEOGRAPHY
ECONOMY & DEMOGRAPHICS



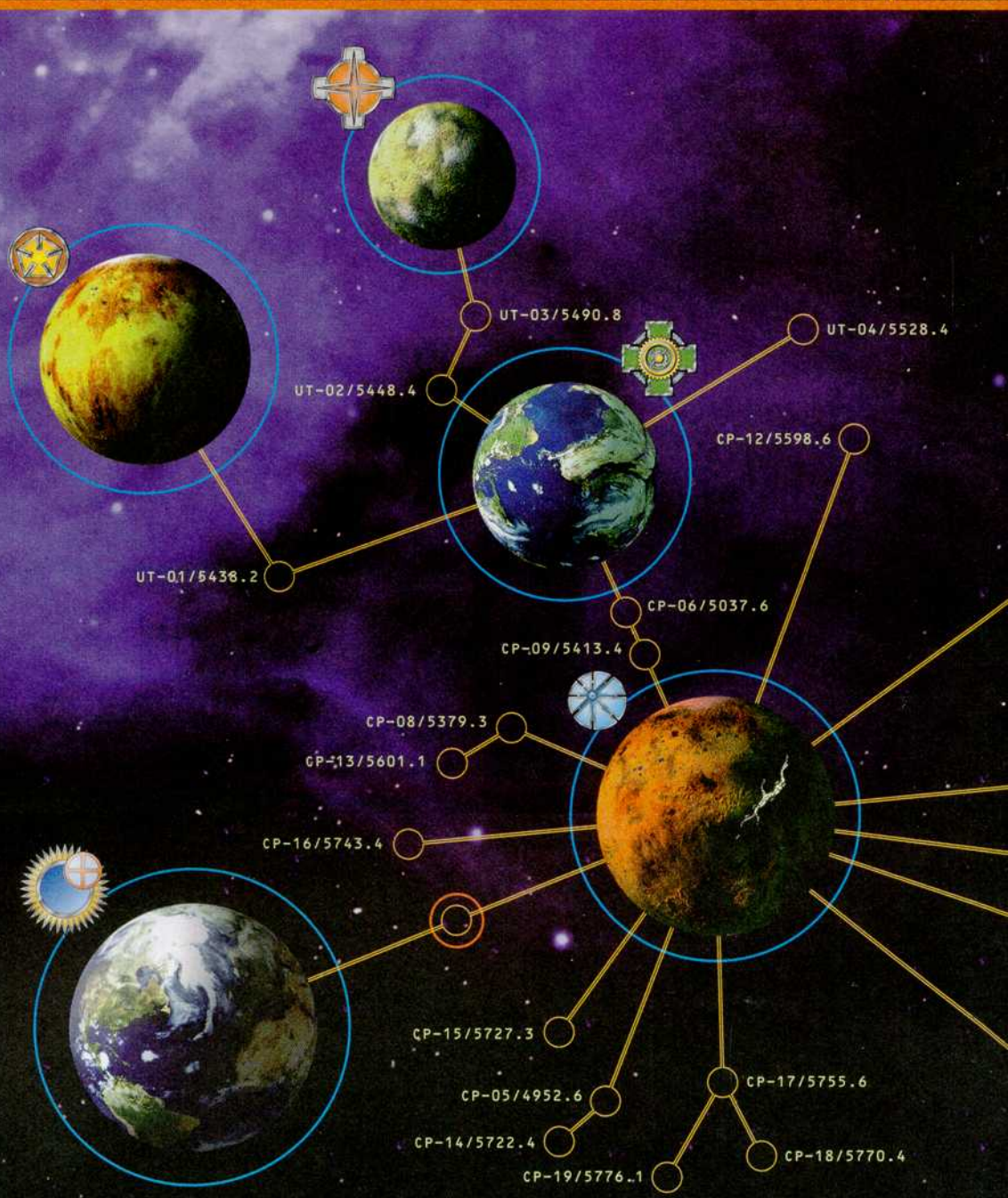
STONEHEADS
CULTURES & RELIGIONS
ARTS & EDUCATION



INDIGENOUS FAUNA
INDIGENOUS FLORA
IMPORTED (EARTH) LIFEFORMS

POLAR CONFEDERATIONS
BADLANDS CITY-STATES
INTERNATIONAL ORGANIZATIONS

INTERSTELLAR WEB MAP



JOTENHEIM

Surveyed in 5491 and colonized in 5510, Jotenheim was the only planet bought by a consortium of private citizens. No major corporation ever managed to get a strong foothold on Jotenheim. Its mountainous surface was colonized by strong-willed adventurers and freeholders. Jotenheim was often called "New Switzerland" because of its canton-style system of government. Jotenheimians were never very friendly to outsiders and little is known of their condition at the time of the colonial fleet's withdrawal.

BOTANY BAY

After ten years of trying, the Earth government finally abandoned all hope of selling this lifeless rock. Rising crime rates across the colonies and Earth itself, combined with a popular anti-capital punishment movement, led the Earth government to establish Botany Bay as a prison planet. Prisoners were forced to mine radioactive ores and grow experimental crops. The military wardens of Botany Bay were notoriously cruel. When Earth's Gateships withdrew, most of the staff and all of the prisoners were left behind on the barren rock. Little is known of their fate.

UTOPIA

Utopia was perhaps the greatest colonial success story, When the planet was initially surveyed in 5435, it was a barren rock. It was purchased by the Wilder-Grosz Group and a massive terraforming project started. Utopia began to live up to its name. Rich mineral deposits and a flow of enthusiastic colonists helped Utopia become the second most influential colony, after Caprice, by 5600. Utopia was preparing to build its own shipyard and its own fleet when the Earth withdrew its support. These plans were apparently scrapped since no Utopian ships are known to have ever visited Terra Nova.

EARTH

After sponsoring the colonization effort under the rule of the Human Concordat, Earth's economy found itself on the brink of collapse and the government had to pull out from the colonies. Now four centuries later, a new governing force has emerged, the New Earth Commonwealth. Ten years ago (fourteen cycles by Terranovan reckoning), it sent the Colonial Expeditionary Forces (CEF) to reclaim the old colonies of Caprice and Terra Nova, claiming that the colonization effort was never repaid and it is the colonies' duty to pay back Earth for its investment. Unfortunately, the CEF was defeated by the Terranovans and their impressive military technology, and its ships have retreated to Caprice, leaving many soldiers and officers behind.

PORTAL

Discovered by the first Gateship to leave Earth's Solar System, Portal is a binary system that contains no inhabitable planets. When a new gate point was discovered leading to Caprice, an automated station called Port Haven was built within a hundred kilometers of the entry gate. It served as a waystation for Gateships travelling between Earth and Caprice. There are few humans working there.

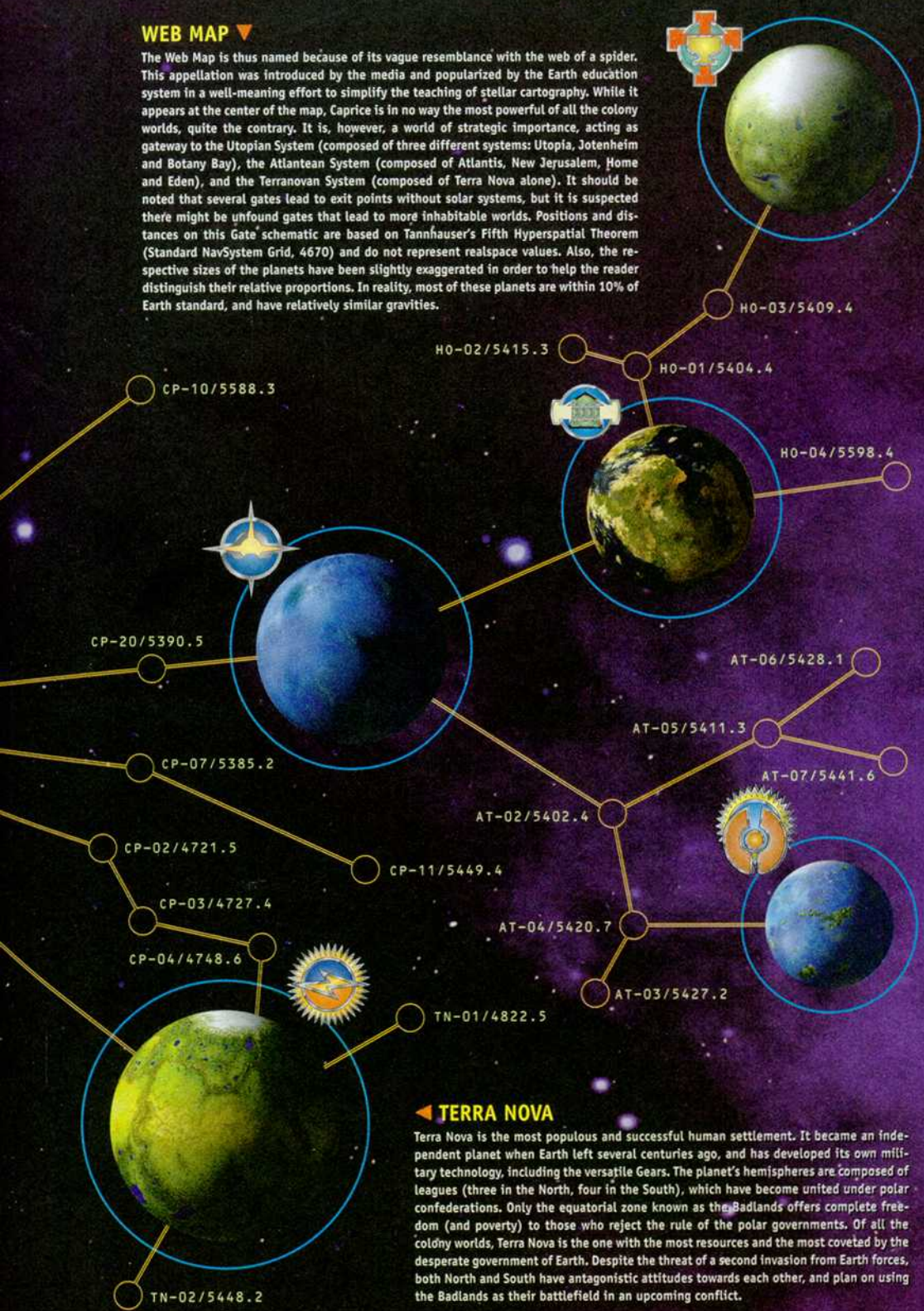
CAPRICE

As a dry, barren planet with an eccentric orbit, Caprice was never a pleasant place, but it has always been a very valuable world. Caprice is located at the nexus point of every major Gateship route ever established by humanity. This ideal location, combined with its rich mineral deposits, helped Caprice become humanity's industrial center. Over half of Earth's Gateships were built in Caprice's shipyards. Unfortunately, this success had a price: Caprice's entire population was concentrated in one gigantic metropolis known as Gommorrah and led by a council of major corporations. A little over ten Earth years ago, the Colonial Exp;editionary Forces came to Caprice. Having no armed force to call their own, Capricians saw in the CEF an opportunity to make a profit and quickly made a convenient alliance with the Earth forces.

INTERSTELLAR WEB MAP

WEB MAP

The Web Map is thus named because of its vague resemblance with the web of a spider. This appellation was introduced by the media and popularized by the Earth education system in a well-meaning effort to simplify the teaching of stellar cartography. While it appears at the center of the map, Caprice is in no way the most powerful of all the colony worlds, quite the contrary. It is, however, a world of strategic importance, acting as gateway to the Utopian System (composed of three different systems: Utopia, Jotenheim and Botany Bay), the Atlantean System (composed of Atlantis, New Jerusalem, Home and Eden), and the Terranovan System (composed of Terra Nova alone). It should be noted that several gates lead to exit points without solar systems, but it is suspected there might be unfound gates that lead to more inhabitable worlds. Positions and distances on this Gate schematic are based on Tannhauser's Fifth Hyperspatial Theorem (Standard NavSystem Grid, 4670) and do not represent realspace values. Also, the respective sizes of the planets have been slightly exaggerated in order to help the reader distinguish their relative proportions. In reality, most of these planets are within 10% of Earth standard, and have relatively similar gravities.



NEW JERUSALEM

The purchase of New Jerusalem by the Roman Catholic Church in 5415 caused quite a bit of controversy. Many consortiums which had placed rival bids for the world argued that the Church had no right to interfere in political and business affairs such as planetary colonization. In 5430, the church won a lengthy court battle over its ownership of the world and began creating its utopia. The final outcome was somewhat less than stunning. At the time of the fleet's withdrawal, New Jerusalem resembled a medieval agricultural nation ruled by a religious technocracy.

HOME

After its discovery in 5395, Home was purchased by Sandrakar-Xia Interworld. SXI, led by its visionary president Ferrin Tynes, dedicated itself to creating a truly independent colony. SXI was the only colony-owning corporation to move its headquarters and primary facilities to their colony. When Earth withdrew, Home was a prosperous colony of fifty million inhabitants with a strong domestic economy.

ATLANTIS

With 97% of its surface covered by water, Atlantis could only be described as a water world. The planet was surveyed in 5392 and purchased by the Kincaid Aquapharm Consortium a year later. The planet was rapidly terraformed and Earth life forms were introduced by 5421. Atlantis' domestic economy rapidly diversified, but like most of the colony worlds, its foreign trade was limited to a few products: pharmaceuticals and seafood delicacies. While Kincaid Aquapharm owned the planet, the colony was governed by a participatory democracy. There are indications that Atlantis was coveted by the CEF, but it is unknown at this time if it was captured or not.

EDEN

When it was first surveyed in 5428, Eden was in the first stages of developing Earth-like life. Terraforming techniques accelerated the process, turning Eden into a lush garden world. When Udunar Corporation, Eden's owner, collapsed, the residents of the planet took advantage of a legal technicality to buy out the rights to the world for a pittance. Since the new owners could not agree on any form of government, a form of cooperative anarchy evolved. Eden became a paradise world so lush that the inhabitants did not even have to work if they did not wish to do so. Although emigration to Eden rose rapidly, the prohibitive costs of space travel through the planet's Gate prevented the planet from becoming overpopulated.

TERRA NOVA

Terra Nova is the most populous and successful human settlement. It became an independent planet when Earth left several centuries ago, and has developed its own military technology, including the versatile Gears. The planet's hemispheres are composed of leagues (three in the North, four in the South), which have become united under polar confederations. Only the equatorial zone known as the Badlands offers complete freedom (and poverty) to those who reject the rule of the polar governments. Of all the colony worlds, Terra Nova is the one with the most resources and the most coveted by the desperate government of Earth. Despite the threat of a second invasion from Earth forces, both North and South have antagonistic attitudes towards each other, and plan on using the Badlands as their battlefield in an upcoming conflict.

HELIOS PLANETARY SYSTEM

ARES

Ares is an anomaly within the Helios system. A frozen planet far from the warmth of the local star, it nonetheless exhibits signs that it may have once been much warmer. Its reddish color comes from long chain organic elements, much like those that were found on Titan (a moon of Saturn). The presence of what looks like the remnants of an enormous impact crater suggests that the planet may have occupied a position closer to the system's sun, possibly as a satellite of Zeus. The orbit, however, is far too circular to be the product of a collision. More likely, the organic molecules developed following the heat of the impact. There are no current settlements on Ares apart from a few scattered science stations.

HERMES

Hermes bears a remarkable resemblance to Mercury — hence the name. It is a burning ball of rocky material that is continuously scorched by hard radiations. It has no atmosphere save for the thin, transient blanket of hydrogen ions brought over by the solar winds. The crust is composed of silicate and heavy minerals, but the harsh environmental conditions make mining operations unprofitable. There are currently no permanent settlements on Hermes save for a few automated stations.

HADES
2660 M Km

ARES
1330 M Km

POSEIDON
780 M Km

ZEUS
380 M Km

TERRA NOVA
148 M Km

HERMES
58 M Km

ZEUS

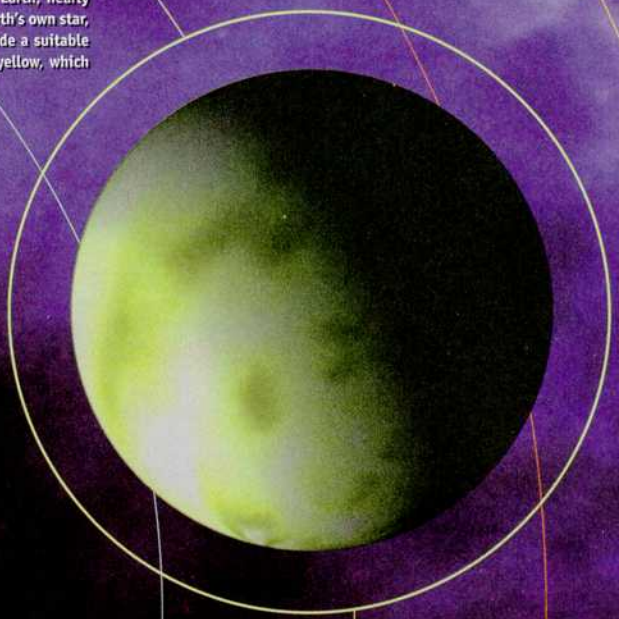
Zeus, third planet in the Helios system, has been named for its majesty and its appearance that is similar to Sol system's gas giant. Slightly smaller and lighter than Jupiter, it is a typical jovian planet with a dense atmosphere composed mostly of light elements such as hydrogen and helium, with some traces of noble gases. Zeus is surrounded by twelve main satellites and a score of asteroids moonlets, with two more asteroid groups in its Trojan points. The planet and its moons form an important part of the off-world resources of Terra Nova and house a number of naval bases, shipyards and gas mining facilities.

HELIOS PLANETARY SYSTEM

HELIOS SOLAR SYSTEM

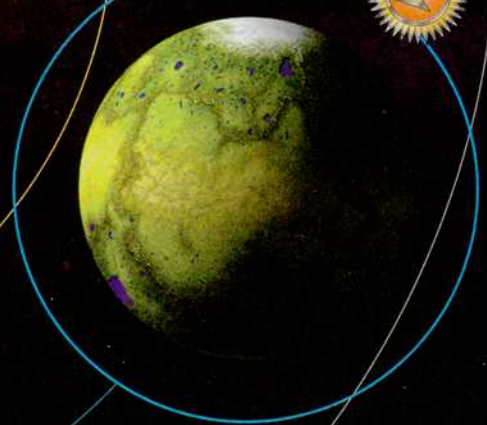
The Helios system is very similar to Sol's. The inner planets are rocky, the middle ones are gas giants surrounded by tiny moons and the outer planets are composed of frozen liquids and gases. There is no asteroid belt, but several large asteroid groups follow the gas giants along their orbits. The Oort cloud lies well beyond the outermost planet.

The system's sun is a sub-giant, non-variable G5 (yellow) star officially catalogued as Eta Trimenia, but commonly referred to as Helios. Helios lies far away from Earth, nearly 3980 light years toward the northern galactic core. Although larger than Earth's own star, Sol, it is colder (average surface temperature 5200 K) and can thus provide a suitable environment for humans in its "life support zone." Helios glows a dull yellow, which places it in the same spectral class as Sol (G class).



POSEIDON

Thus named because of its bluish-green color, Poseidon is the second gas giant in the Helios system. It is very similar to Zeus but on a smaller scale, and is composed of much the same chemical elements. The planet has five main moons, none of which offers particularly valuable resources to exploit. The ring around the planet was caused by the destruction of an errant ice moon long ago, and is frequently mined for water by deep space expeditions. Poseidon is also flanked by two asteroid groups in its Trojan points, but they are too far away for practical exploitation.



TERRA NOVA

Terra Nova orbits along the inside of the star's life support zone, making the temperature hot but bearable in both hemispheres. Only in the equatorial belt do temperatures rise high enough to become dangerous to unprotected humans. Since Terra Nova's orbit is only slightly elliptical, and since the planet has only a 3° axial tilt, the seasonal temperature differences are very minor; Terra Nova's winters are only 5 °C cooler than its summers.

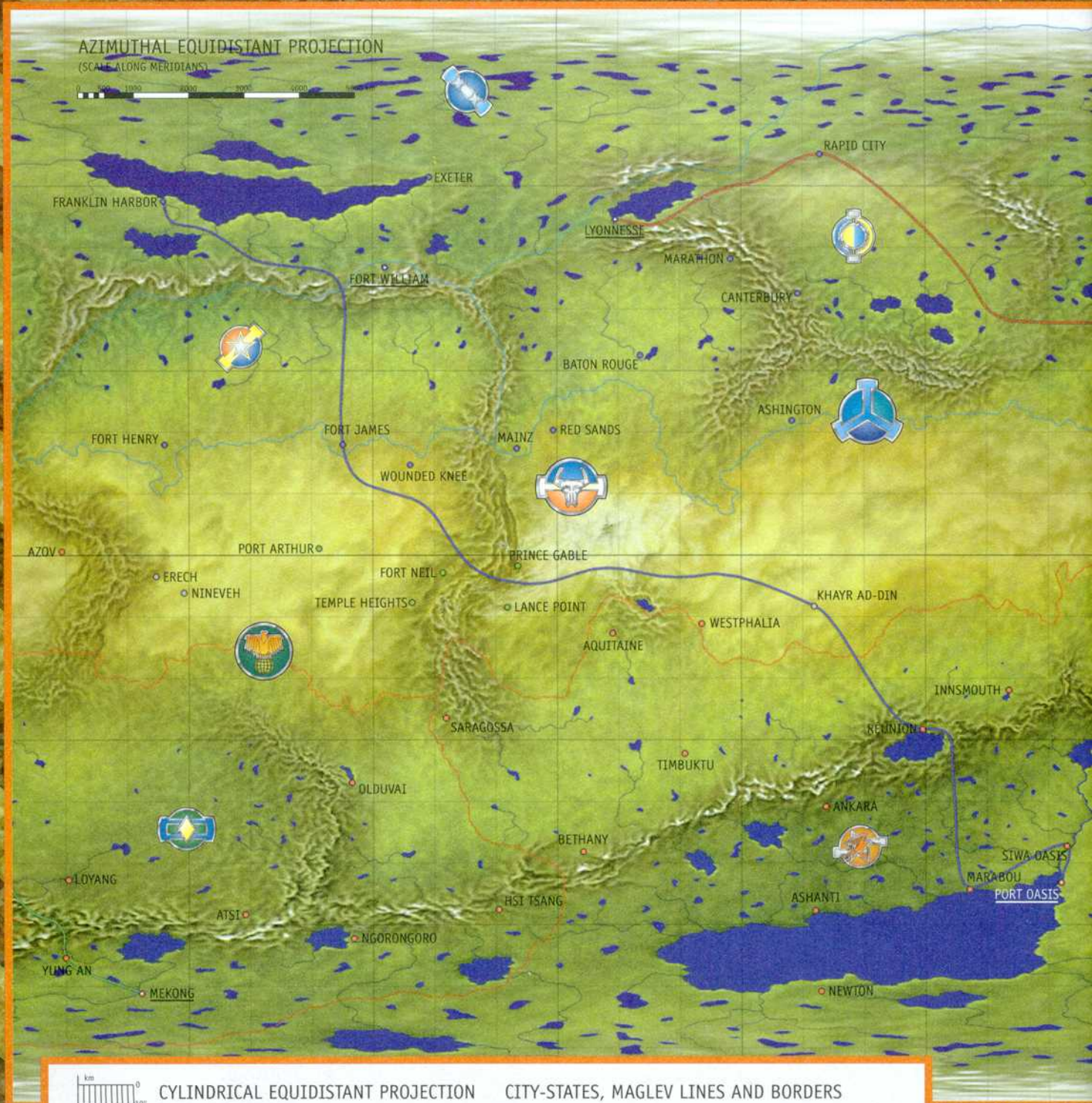
Terra Nova is orbited by three moons. The largest, Hope, is only slightly smaller than Earth's Moon and circles Terra Nova at a sluggish pace, completing an orbit once every 24 Terranovan days. The other two moons, Faith and Charity, are small chunks of ice and rock that were probably captured by the planet's gravitational field a long time ago.

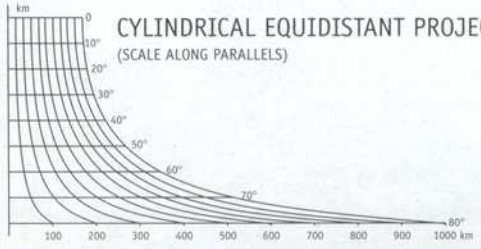


HADES

Tiny Hades is the outermost planet of the Helios system. It may have formed from the gas remnants of the system, or it was a large asteroid that was captured so long ago that its orbit has stabilized over time. A deeply frozen ball of gases, it holds little interest to the Terranovans. The icy soil is harder than rock, and the planet receives so little solar energy that nuclear generators are the only practical energy source. Hades is too far away to serve as anything but a deep space survey station, and as such is home to only a few scattered installations.

TERRA NOVA WORLD MAP





CYLINDRICAL EQUIDISTANT PROJECTION
(SCALE ALONG PARALLELS)

CITY-STATES, MAGLEV LINES AND BORDERS

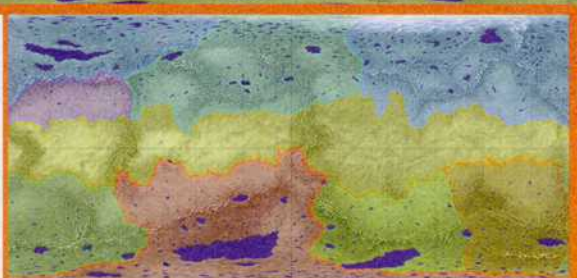
- CNCS CITY-STATE
- CNCS CAPITAL
- AST CITY-STATE
- AST CAPITAL
- NUCOAL CITY-STATE
- INDEPENDENT CITY-STATE
- ALPHA MAGLEV
- BETA MAGLEV
- GAMMA MAGLEV
- NORTHERN BORDERS
- SOUTHERN BORDERS
- STANDARD WATER COLOR

TERRA NOVA WORLD MAP



TERRANOVAN POLITICAL BORDERS

- NORTHERN LIGHTS CONFEDERACY
- UNITED MERCANTILE FEDERATION
- WESTERN FRONTIER PROTECTORATE
- BADLANDS
- SOUTHERN REPUBLIC
- MEKONG DOMINION
- HUMANIST ALLIANCE
- EASTERN SUN EMIRATES



TERRANOVAN LEAGUES



NORTHERN LIGHTS CONFEDERACY

The society of the Northern Lights Confederacy is driven by a sense of moral superiority. This haughtiness springs from the widespread belief in the teachings of the militant Sorrento Revisionist sect. The Norlights often seem to be on a perpetual crusade to ban all they perceive to be morally questionable, which can seem to be just about anything.

Paradoxically, Norlights also profess a deep respect for the democratic political process. They accept freedom of expression as a basic unalienable right. Of course, nothing prevents others from using their freedom of expression to publicly denounce a person who expresses inappropriate views.



UNITED MERCANTILE FEDERATION

Mercantilist life is dominated by the belief that there is no such thing as a free lunch. Every person or group is expected to earn their keep, including the government. Capitalism and competition are central to their world view. Wealth is accepted as the essence of power and the measure of a person's worth.

Mercantilists are somewhat amused by the Norlight infatuation with religion. They accept the Revisionist faith, but are not often motivated by it. Mercantilists hold conservative socio-political views, but are extremely pragmatic when discussing economic issues.



WESTERN FRONTIER PROTECTORATE

Westerners are defined by the clan they belong to. They are loyal to the family above all else, even above the Protectorate itself. The clan is the primary factor in determining what social status and occupation the individual will have. Their inflexible social network tends to produce individuals with arch-conservative political views.

The rigidity of Western society has also produced a strong youth counter-culture which is radically liberal. These youths lash out against their elders using biting social critiques and anarchist political views. Yet, these youths retain many of the values of their elders, especially the strong emphasis on the family's honor and reputation.



SOUTHERN REPUBLIC

The most valuable possession of any Republican is his individuality. They take great pride in being different from every other person in existence. While most foreigners view their society as a form of contained anarchy, Republicans find personal strength in their social diversity. They believe this diversity provides a constant renewal of ideas and concept, preventing their society from stagnating.

The only universal political view held by Republicans is their belief that their league's imperialism is beneficial for all the parties involved. This belief is ingrained into them as children and is almost unshakable. Republicans act in a paternalistic manner, often interpreted as egotism and condescension, and are honestly shocked and confused when other Southerners are offended by their attitude.



MEKONG DOMINION

The Mekong people are best described as being eternal pragmatics. Mekongs believe that the ends often do justify the means and have very few scruples about using whatever method is necessary to achieve their goals, though most will not cross into illegality. To the Mekong citizens, material wealth is not a goal in itself, but the social power that wealth brings is very respected.

Mekong social views are equally pragmatic. They believe the old axiom, "you only live once" and savor life's pleasures at every opportunity. By Northern standards, the Mekong people are utterly corrupt and without morals. This is a flawed conclusion, however. The Mekong simply have a different system of morality based around certain rules of polite behavior and the means of gaining and losing face.



EASTERN SUNS EMIRATES

Easterners are best classified into three groups: upper, middle and lower class. Each social group is clearly defined by birth and does not mingle with the other. Moving up in society is absolutely unthinkable.

Upper class Easterners are complete hedonists and sensationalists. They live for the moment and most are completely amoral. To them, the world is a toy to be played with and the lower classes are merely brutes whose purpose is to facilitate the lifestyle of the upper class. Middle class Easterners are taken from their families during early childhood and brought up in a radically pro-emir environment. Not surprisingly, they are fanatically devoted to their rulers. They truly believe in the emirs' right to rule, gladly helping to suppress "traitors" who rise up against their masters. Lower class Easterners have little choice but to struggle onwards through their daily lives, hoping to avoid the attentions of their masters. Most of them are very passive, preferring to vent their frustrations through bloodsports.



HUMANIST ALLIANCE

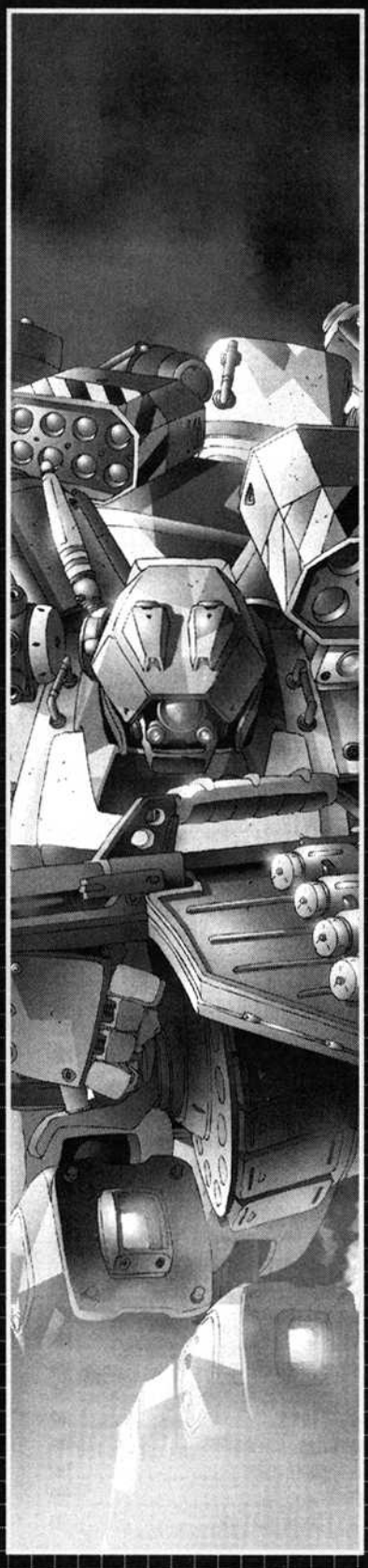
Humanist society also divides into three main groups. Preceptors take the role of benevolent father and mother figures. They are pensive and diplomatic, but capable of swift action when time is short. Preceptors prefer diplomatic solutions to problems set before them.

Protectors are perceived as strong elder brothers and sisters. They are naturally emotional, but display firm self-control in times of crisis. Protectors are very physical when expressing anger or affection, and are generally uncomfortable when forced to rely upon language alone.

Commoners are often referred to as younger brothers and sisters, the ones who need to be cared for by other, more responsible members of the society. Humanist commoners tend to follow this ideology, sometimes acting much like oversized children. They are both emotional and physical, but are socially conditioned to dislike violence.

SECOND EDITION

HEAVY GEAR®



Second Edition Rulebook - Coming of Age

About two and a half years ago at the time of this writing, we released the first edition of the Heavy Gear Rulebook. When the first printing sold out within six weeks, we breathed a collective sigh of relief. It was going to do well. Over those last two years, however, our concern has grown. Gradually, the first edition was becoming old and obsolete. Even the supplements looked better than the main rulebook. It felt odd.

Late in 1996, Activision contacted us to turn Heavy Gear into a computer game. Just recently, it has come out all across America. As if on cue, we (finally) released the first storyline book. The timing seemed perfect. Heavy Gear (the game) had grown beyond the pages of the first edition. We needed to repackage it. Thus the new edition.

So what has changed? Very little, actually. The initiative system has been improved. The rules have cleaned up and clarified, but the game engine remains the same. Everything stays 100% compatible. Read it again: 100% compatible.

Sections we added: a hefty world background chapter; a Peace River sourcebook; and a complete chapter on campaigning (including some random scenario generators). Sections that are gone: the Heavy Gear Fighter rules; the army listing chapter; the mini-module at the end; and the vehicle construction system (affectionately called the VCS).

Removing the VCS was not an easy decision, but it was the best thing for the game. The VCS is a detailed, advanced option for the Silhouette system that takes up a fair amount of space without being strictly necessary to either tactical or roleplaying games. Also, the roleplaying usefulness of the first edition was extremely limited since virtually no source material was included. The VCS was therefore removed to make more space for source material. It isn't gone forever, however, and will find temporary shelter on our web page (www.dp9.com) until it is republished somewhere else.

With this coming of age, Heavy Gear is literally beginning anew. We hope you'll join us and stick around for a while — it's about to get really exciting.

INTO THE EYE OF THE STORM

DREAM POD 9

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Dream Pod 9 Team

WRITERS	PHILIPPE A BOULLE JEAN CARRIÈRES ÉLIE CHAREST GENE MARCIL GUY-FRANCIS VELLA MARC A. VÉZINA
CONTRIBUTORS	HUGH H. BROWNE BRENT CARTER, ET AL. BRIAN FAUGHNAN CHRIS HARTFORD ANDREW J. LUCAS JOSHUA MOSQUEIRA ASHEIM JASON P. PRINCE
COPY EDITING	PHILIPPE A BOULLE JEAN CARRIÈRES TYLER MILLSON-TAYLOR MARC A. VÉZINA
ART DIRECTION	PIERRE OUELLETTE
LAYOUT	JEAN-FRANÇOIS FORTIER PIERRE OUELLETTE
COVER & INTERIOR ART	GHISLAIN BARBE NORMAND BILODEAU JEAN-FRANÇOIS FORTIER CHARLES-EMMANUEL OUELLETTE PIERRE OUELLETTE
MARKETING & SALES	STÉPHANE BROCHU ROBERT DUBOIS
SILHOUETTE DEVELOPMENT	MARC A. VÉZINA
SILHOUETTE DESIGN	JEAN CARRIÈRES ÉLIE CHAREST GENE MARCIL STÉPHANE I. MATIS MARC A. VÉZINA
PLAYTESTERS	Ghislain Barbe, Pieter J. Bouwman, Johathan Bezeau, Élie Charest, Charles Collin, Christopher Corcoran, Michael Corcoran, Dave Corriveau, Robert Dubois, John Garrison, Nicolas Gendron, Bryan Hoppe, Brian Laxson, Ben MacIntyre, Prabal Nandy, John Prins, Alexandre Racine, Shane Saathoff, Tyler Millson-Taylor, And many others

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DEDICATION TO ALL THE BELIEVERS OUT THERE WITH THE VISION, THE FAITH, AND THE DETERMINATION TO MAKE THEIR DREAMS COME TRUE.

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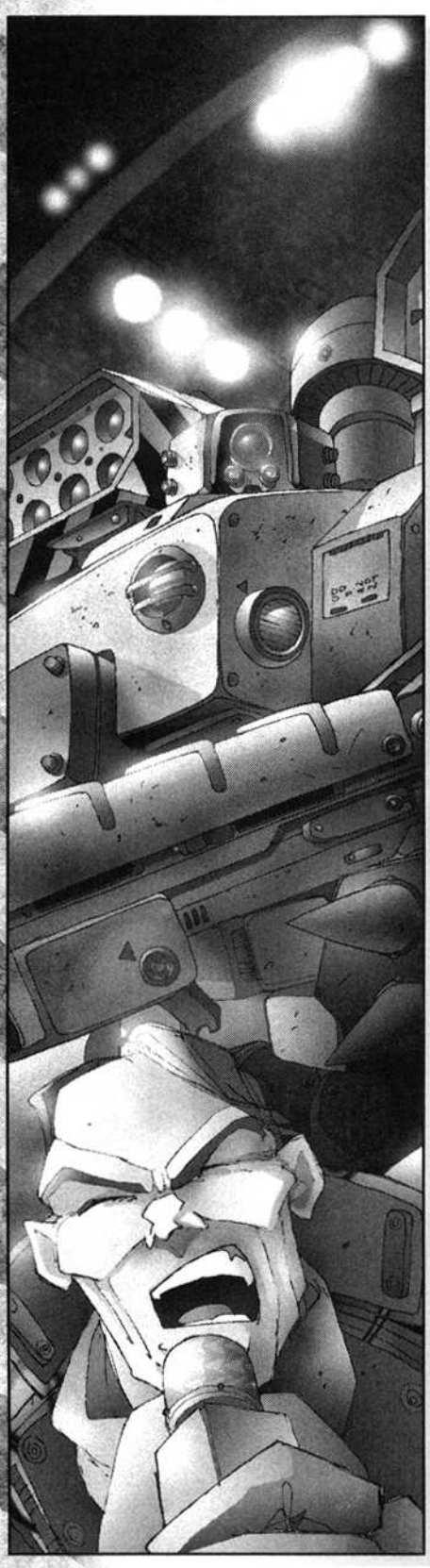
The use of the male gender throughout this manual should in no way imply the exclusion of the female gender or suggest that the game is intended exclusively for a male audience. It is our hope that female gamers will find this book just as interesting as their male counterparts.

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QUESTIONS OF HONOR



"Ten shun!"

Danghen and Maena Jarak snapped to a salute with practiced ease. The colors of the Confederated Northern City-States crept up the base's flagpole. It was Foundation Day, TN 1928, and the twins were about to transfer to an elite Northern Guard pilot training program in the Western Desert. They were already Gear pilots, and now they were going to become Duelists.

"Feeling good, sis?" Danghen asked once the flag was raised and the assembled soldiers dismissed.

"Better than ever." She cracked a smile and they split up to get their equipment. She turned around just before Danghen was out of sight. "Together forever, bro?"

"Forever."

...

All-Points Bulletin: Northern Guard Military Police

25 Spring TN 1933

Be on the lookout for Duelists Danghen and Maena Jarak, AWOL from the 17th and 33rd Gear regiments. Sgt. Danghen Jarak fled from the 17th regiment on 22 Spring while field testing a Gear prototype code-named Hunter XMG. Ranger Maena Jarak, twin sister of Danghen, fled from regimental base in Western Desert two days later in possession of a Grizzly Gear. Both fugitives are highly skilled pilots and are charged with desertion, theft of military property, being absent without leave and are suspected of treason. Consider them armed and dangerous.

cc: Northern Guard Intelligence Service, Norlight National Police

...

"Any luck, Danghen?" Maena Jarak couldn't see her twin brother, but she knew he was in the crowd somewhere, listening in on their personal comm channel and looking for Naed.

Sitting in the cockpit of her massive Grizzly Gear, she scanned the assembled audience. As she looked left and right, the war machine's neural net computer oriented the armored head module to mimic her movements. The input from the main omnicamera was routed directly to her helmet's virtual reality HUD.

Her Gear was standing in an old industrial cooling pit, maybe thirty meters across. Eight-meter ferroconcrete walls lined the arena, with makeshift seating surrounding it. There were at least 150 people here to watch (and bet on) the fight about to begin. Maena's opponent was facing her. The pilot went by the name of Cross and used a refitted Jäger Gear. Lighter and faster than her lumbering Grizzly, but much less powerful.

This illegal dueling pit was like many others across Terra Nova, hiding from the authorities but operating close to where the public lived. In this case, they were fighting in a disused underground factory in the Badlands city-state of Peace River. The metropolis was the most powerful independent power on Terra Nova, surviving in the equatorial desert between the North and South by selling arms to both sides. But polar agents operated in Peace River and it was not very safe for two fugitives to be here — Maena wanted to get this over with.

"Danghen? Are you listening to me?" She finally picked him out in the crowd. She followed him with her low-light sensor system as he moved slowly about the darkened assembly of gamblers and hustlers.

"Still nothing, Maena, but he'll be here. He's a man of his word." Danghen whispered the words, not even turning to look in her direction.

Naed Stamens, the man he was looking for, was another Northern Duelist the Jaraks had trained with. Naed had agreed to a secret meeting with them because he wanted to understand why the twins had left. Danghen had left his unit and not looked back, but the opinion of other Duelists meant a great deal to him and so there they were, looking for help and acceptance in the middle of danger. Maena was dueling to raise the money they needed to get smuggled back out of Peace River. Honor above all, Danghen had always said.

"Ladies and Gentlemen!" The booming voice of the announcer brought a hush to the crowd. "For your enjoyment tonight, we present a battle to dazzle the senses. An epic clash between titans of the battlefield. Cross, the killer from the South, will face off against Banshee, the beautiful warrior queen of the desert."

Sweet Prophet, Maena thought, flicking some switches with annoyance. Picking a handle like Banshee invited a certain amount of hyperbole, but this guy was overdoing it. She tried to ignore him and focus on the battle to come.

Her NNet reported most systems green, although the fire-control computer subroutines were still acting up, registering ghost lock-ons. The NNet must have picked up a bad habit. It shouldn't make much of a difference here — the duel was close-combat only — but on the battlefield it could be a real pain. Maybe even a deadly one.

"Wish me luck, bro." Even when they were apart, Maena always said it before going into battle. She didn't really expect a reply. She got one anyway.

"You don't need it, Maena."

He didn't understand, he just didn't. Maena didn't need luck to win, she needed it to avoid killing her opponent. She didn't need any more deaths weighing on her conscience. She whispered a quick prayer just as the announcer shouted a resounding "Fight!"

Cross' Jäger may have been faster, but in the close quarters of the pit there was only so far he could run. He zipped around and was able to land a few vibroblade hits before Maena adapted to his style and anticipated his moves. Once she did that, the fight was as good as over. She waited for her opportunity and then delivered a devastating blow to the Jäger's right shoulder, twisting and cracking the armoplast covering and incapacitating the arm — without harming the pilot, which was tricky. She followed with a lighter blow to the Gear's head, cracking its omnicamera and stunning Cross. She hoped that he would only have a headache and not a skull fracture. She was about to pick up his entire Gear and slam it down when light flooded into the large chamber and a strident amplified voice echoed around it.

"Peace Officers! You are all under arrest!"

Oh great. Maena knew that Danghen and her couldn't afford to be brought in. The Peace Officers were the cops in Peace River, but one background search would turn up the Jaraks' record and they would be turned over to the Northern embassy. That was not going to happen.

"Maena," Danghen's voice was quick and harsh — giving orders. "I've found Naed. Get out of here and meet me back at the caravan. C'mon, go!"

Maena turned her Grizzly around and headed for the large flow channel that served as an access to the pit. Switching to the heavy treads in the Gear's feet, she accelerated rapidly. Her sensors picked up two Gears — Paxton Warriors manufactured in Peace River — blocking the channel thirty meters down. She kept going.

"Stop! We will be forced to open fire!"

Maena jerked on the controls a fraction of a second before they followed through on their threat, forcing her Gear to skid and dodge the incoming fire. A few autocannon shells still



QUESTIONS OF HONOR



hit, but they ricocheted off her heavy armor. Before the Warriors could adjust their aim it was too late. Leaning her Gear so that the heavy, reinforced shoulder ram-plate led the charge, she slammed into the leftmost Warrior. She twisted her Gear's torso to the right as the enemy fell, tossing him onto his partner. Both Warriors collapsed on the ground. By the time they got up, she was down into the maze of old channels and irrigation tunnels that Danghen and she had scouted the day before.

Thank Mamoud Paxton builds things big, she thought as she moved her Grizzly through the massive disused tunnels. Unlike many from the North, Maena didn't wear her faith on her sleeve. But she still felt the Prophet's eyes on her. Her brother had never understood that.

It took Maena four grueling hours to dodge Peace Officer patrols and make it back to the warehouse where the caravan's vehicles were parked. Danghen and Maena had hooked up with a group of Badlands traders and hid their Gears in the massive Longrunner and Barnaby transports they used. It had cost them dearly to get to Peace River, but it was worth it — or so Danghen had said.

Maena tapped a few keys on her comm system and sent an encrypted signal to the military lock they had added to one Barnaby. When the large rear door opened, she slowly walked her Grizzly in and sat it in its berth. She wearily went through the shutdown checklist, exited the cockpit and activated the encoded lock on the Gear.

Moments later, Maena moved across the large warehouse/garage to the street entrance and took a peek down the streets. It was the early hours of the morning and the Prospects — Peace River's roughest neighborhoods — were relatively quiet. She paused for a moment, taking a deep breath as she realized how tired she was. There seemed to be no Peace Officer vehicles in sight, but she was still careful when she crossed the street to the next garage. She headed toward the Longrunner where she and her brother shared a small sleeping cubicle.

"Maena." Naed was standing near the truck. She hadn't seen him in about three cycles, but he was hard not to recognize. A member of the Blue Crescent order, his head was shaved bald and a sky-blue crescent tattoo marked his forehead. He wore a black goatee and shaded glasses. He was alone.

"Where's Danghen?" She glanced around quickly to make sure this wasn't a trap and approached him.

"They took him in, Maena. I'm sorry." It was the first time Maena had seen him without his United Mercantile Federation Army uniform, but his formal tone was still there. Naed was always a bit of a stuffed shirt.

"Damn it! What are you doing here, then?"

"He told me where you were staying before they took him in. I don't think they know who he is yet, though, so we might be able to get him out. I came to find you."

"How are we going to get him out?"

"I've been here for a few seasons and I know some Peace Officers. If we're very careful, we can get him out without being noticed." He looked around, just as nervous as Maena. Maybe more. "But we need to get going. I've got a car."

"Okay, Naed. Just give me a minute to change." Maena still had her pilot's webbing on — a little too conspicuous. She opened the electronic lock, walked in and closed he door behind her. She stripped quickly and threw on street clothes — desert pants, a tank top and a barnaby-leather jacket. She caught a look of herself in the cubicle's small mirror. She looked just as exhausted as she felt, but that couldn't stop her now. She made sure her shoulder holster was properly strapped and cocked her 9mm automatic, putting the safety on and slipping it in. Fugitives could never be too careful.

QUESTIONS OF HONOR

"Let's go." She locked the door and headed out of the garage toward Naed's car. "So what are you doing in Peace River?"

"Looking." He inserted his key card into the security slot and punched in a quick combination. The low and sleek private car purred to life as the doors on either side slid open. "You remember Lyssara?"

"Your wife? I... uh... had heard through the grapevine that you had separated."

"Yes, we did." He told the story slowly, seeming to hesitate before revealing any more about himself. "She had a lot of... problems while I was away training with you and Danghen. She decided she needed to find herself and went to Marigold."

"Why Marigold? What could she possibly want with paranoid gold miners lost in the middle of the Badlands?"

"Hm. I guess you don't know this, but the city also houses the first and largest Blue Crescent commune. Lyssara said she needed to stay there, to reach harmony again. When I got back to the North, she was already gone." He paused, overcome with emotion. "I accepted that."

"She still there?"

"No. Last cycle she wrote to tell me she was ready to come home, to start our life again. To say I was overjoyed would be an understatement."

Maena bit back a comment. Naed probably meant it, but it was just the tone he used... Like it was something rehearsed. He pulled around a large transport truck.

"She left for home last Summer. That was the last I heard from her."

"Rovers?" Desert bandits had become a real epidemic in the Badlands since the War of the Alliance. They preyed on lone travelers like great dawgs on lone springers.

"Maybe. I'm still looking for leads. Some people in the Guard are helping me out and they were able to arrange for a leave from the army." He swallowed. "I'd almost be happy just to find a body now. It's not knowing that's driving me mad."

Maena didn't know what to answer and was too exhausted for pleasantries. They continued in silence for almost twenty minutes, Naed maneuvering his car through a series of underground express roads under Peace River's habitation core. They took a turn off on the second terrace — an upper middle-class neighborhood — and emerged onto surface streets after a few minutes. The day's first few rays were streaking across the desert east of the city, the sky slowly going from a dark purple to a deep red.

"Maena, can I ask you something?"

"Depends on the question." Naed hadn't turned to look at her and she continued looking out the window as well. She didn't want to have this conversation, but she sensed it was unavoidable given the circumstances.

"Why did you do it? Why desert?" When she didn't answer immediately, he pressed on. "With so much fighting going on in the Badlands, it's pretty serious to take off. Some would call it treason."

"I don't see you in uniform." She meant to say it calmly. It came out defensively, like a child. She was almost too tired to care.

"I'm on leave. I didn't go AWOL or steal military hardware." Naed took a second to compose himself. "I'm sorry, Maena. I'm not here to moralize, I just want to understand you. To understand why."



QUESTIONS OF HONOR



"I guess it's a matter of honor." Maena almost choked on the word, so important to her brother and most other Duelists, but now almost repulsive to her. "Danghen felt—"

"But, Maena. Why did *you* leave?"

That's the big question, she thought but didn't say. How could she explain that she had left because her brother did? She had joined the Guard because of Danghen, she had become a Gear pilot because of Danghen and now she was a fugitive because of Danghen. That's what it had always been like — he was the great brother, the man of honor, the archetypal hero. She always seemed to follow his lead; she hated that.

"Same reasons," she said at last with little conviction.

"But what about your duty? To the North? To your regiment? You were a Duelist for Kolos' sake, not a green recruit."

"I know." She wanted to scream, but could only manage silence. It was all about duty — just duty to family rather than country. A duty that was strangling her. "I know."

They continued on without speaking, Naed guiding his car through the beginnings of rush hour traffic. The shift change was approaching and many Paxton workers were making their way to the industrial sector underground or the massive executive tower that overlooked the entire city-state. Naed tried a few more times to broach the topic with Maena, but she ignored him, looking out at the streets. She played things over and over in her mind, trying to find words that would explain to him why she had left country and uniform behind. Words that would explain it to her as well.

"I had to make a choice," she finally said as Naed pulled into a garage complex. She turned to look at him, trying to keep her voice strong and even. The words just felt empty. "He's my twin, my other half. That's more important to me than a flag. It has to be."

Naed stopped the car in the middle of the garage and sat in silence for almost a full minute. Maena watched him and he watched back. The high-efficiency electric engine made a light humming sound, but Maena had long ago tuned that out. She just tried to pierce his calm demeanor, to see what he was thinking. She felt he was judging her, but she refused to speak first.

"I guess it is." Naed looked saddened by that, as if her own decision weighed heavily on his soul. "I wish things could have been different."

It was then that Maena noticed the car behind them. Her heart sank. She had been concentrating so much on Naed's reaction that she had gotten distracted. She was furious with herself.

"What's happening here?" She knew, of course, but she wanted to hear it from him. And she wanted to gain a second or two more time. She glanced in the rearview and saw a tall woman approaching. She had long blond hair, tied in a long braid. "Who's that?"

"Her name is Ceritto. She's with Northern Guard Intelligence." He wasn't looking at her when he spoke, perhaps too embarrassed by his betrayal of friendship. "She's here for you, Maena."

"Where's Danghen, Naed?" Exhaustion was lifting quickly as adrenaline kicked in.

"She already has him. She picked him up after we made it out of the duel."

"Get out of the car."

"What are you — " He had turned to look at her at last, and saw the 9mm craddled in her lap. It was pointing at him, and the safety was off. "Maena, don't make matters any worse. Please, let —"

QUESTIONS OF HONOR

"Just get out, Naed. I don't want to shoot you but I will." She hoped he would mistake the tremor in her voice for anger. A second passed and Maena thought she would have to follow through on her threat. More blood, but what choice did she have? Ceritto was almost to the car. Then he pushed his door open and got out.

Maena moved quickly, reaching over, closing his door and locking it. She shifted into the driver's seat and slammed on the accelerator. Ceritto had her gun out by then and barely hesitated. Maena ducked when the first round shattered the rear windshield, but she didn't take her foot off the pedal.

Taking a sharp right, Maena sought the cover of concrete pillars and dividers. She slammed on the breaks and jerked the steering wheel, pulling the car into a screeching bootlegger turn that burnt rubber off the tires and left a black trail on the asphalt. She gunned the engine again and accelerated back the way she had come. In combat, Maena had never believed in stealth.

She took the corner altogether too fast and barely maintained control. Ceritto and Naed were surprised to see her back but neither was phased for long. Naed — unarmed — jumped for cover. Ceritto stopped in her tracks and opened fire, emptying her pistol before diving aside to avoid getting run over.

Maena thanked the Prophet she didn't get hit, although the windshield was shattered and her engine sounded less than healthy when she pulled to a stop beside Ceritto's car. She popped open her door and covered the meter and a half to the other car's driver window with her gun drawn.

"Get out, now!" The driver looked stunned. He should have been reacting, she realized. He should have peeled out as soon as Ceritto opened fire. This glass had to be bulletproof and yet he wasn't moving. She yanked open the door — which should have been locked — took a step forward and then understood.

"Hi, sis."

Her brother was holding a screwdriver to the driver's throat. Maena noticed the bruising on his face and the faraway look in his eyes and knew he had been drugged. But he was still conscious enough to keep the driver in line. "Hello, Danghen."

Ceritto's first shot hit the bulletproof glass in the driver's door. The glass became a spider web of cracks, but stopped the round aimed squarely at Maena's head. More shots followed, hitting the window and door.

Maena quickly yanked the driver out of his seat, jamming her weapon between his teeth and down his throat to stop him from trying anything. She then jumped in and slammed Ceritto's car into reverse. The windshield took several more rounds, but the reinforced glass held.

"Take the underground expressway. We need to get to the Gears and bail out of here."

"Fine." Of course she knew what they had to do. Why did he have to assume she needed guidance? Why couldn't she tell him that it bothered her? "You all right?"

"I'll be fine... I can't believe Naed betrayed me. I was convinced that I could count on his word of honor."

"I'm okay too," Maena answered even though no one had asked. She then got onto an expressway toward the Prospects. Driving through a kilometer-long tunnel at 120 kph with a cracked windshield was not the safest thing to do, but they had little choice. She used the rearview mirrors extensively, looking for tails, but didn't see any.

"They may be following." Danghen was on the back seat, looking out the rear windshield. "Keep your eyes open."



QUESTIONS OF HONOR



They ditched the car ten blocks from the garage complex and proceeded on foot, through alleys. Naed knew where they were sleeping, but — according to Danghen — not where they kept their Gears. That wouldn't last long, but they hoped to get into the desert before Ceritto could track them.

They made it to the warehouse that hid the Barnaby transport without incident. Danghen moved quickly to the huge truck and began working to bypass the driver's lock system. Apparently stealing from the caravan was not quite dishonorable in his book. Maena went into the back to check on their Gears, finding both her Grizzly and her brother's Hunter XMG prototype right where they had left them.

She took a second to sit and slip out of her jacket, and her head swam with fatigue. Her heart was tired too, tired of running and tired of following. The thumping of a Gear's heavy mechanized feet in the warehouse snapped her out of her reverie.

"Danghen! Maena! Come on out." It was Naed's voice, amplified by the speaker system in his Nemesis Jaguar, a high-performance dueling Gear. He had them cold.

"You're a disgrace, Stamens!" Danghen must have gotten out of the Barnaby's cab. Maena looked through a vision slit in the armored transport, she could see him standing boldly a few meters in from of the sleek Gear. The disdain was clear in his voice.

"I came to you as a friend. You disgraced your name by betraying me, by turning me over to Ceritto and her killers. You're no Duelist. You're just a lapdog for Intelligence goons."

Maena moved to the back of the Barnaby and walked out, getting a clearer look at her brother. The Jaguar automatically trained its massive autocannon rifle on her. Danghen didn't seem to notice.

"I'm a disgrace, Jarak?" Naed's voice boomed both with artificial amplification and with anger. "I didn't leave my unit behind. I didn't steal from it and spit on the flag I swore an oath to. Doesn't that mean anything to you?"

"A country that treats us like cattle doesn't deserve loyalty."

He really didn't understand, Maena realized. Danghen was lost in his world of honor and warrior codes. Exhaustion gave way to anger, and anger to action. It was time she stood up for what she had done, not what *he* had. It was time he understood.

"Honor is about respect," Danghen continued. "Honor is—"

"— meaningless." She said it loudly and frankly, feeling a mix of fear and elation at finally speaking her mind. The adrenaline rush was back, although she could barely move.

"What?" Danghen looked shocked.

"You wanted to know why I left, Naed." She ignored her brother and looked directly at the Gear's glowing sensor eye. In his VR headset, it would appear to Naed that she was looking him in the eyes. "I did it because I couldn't believe the lies anymore."

"What lies?"

"The ones I told myself. About defending my country, about fighting the good fight, about being a Duelist, a guardian of honor." It was all coming out now. "I realized it was all a scam. The good fight is over, it ended fifteen cycles ago when our parents kicked Earth off of Terra Nova. Now it's all about power and wasted lives.

"I grew up on stories about brave soldiers and living to protect my league." She looked at Danghen then; he had told her those tales. "What I found was generals and presidents who couldn't resist sending us off to the slaughter. These people were going to turn me into a murderer, to plunge a planet into a bloodbath for the sake of their egos. I won't be part of it."

QUESTIONS OF HONOR

"We are soldiers, Maena." Naed sounded hesitant, maybe trying to convince himself rather than her. "War is part of what we do."

"But I'm a human being, too, for Mamoud's sake. Every act of violence — even when necessary, even when honorable — leads to more violence. Every death leads to more death. I won't participate in a global slaughter just so someone else can win an election or make a million more marks. I was being used, just like you are."

"Excuse me?"

"They're never going to let you go, Naed. Do you really think Ceritto and her bunch are going to help you find Lyssara? That is who got you your leave, right? The people who were helping you find her?"

Naed said nothing and the silence answered her question.

"This isn't about a prototype or a super-weapon, Naed. This whole manhunt is because they're afraid others will join us. They want one of our own, a Duelist, to bring us in. To prove that their way is right, that we're criminals for not wanting to die to line their pockets, that honor is on their side."

"Who are you trying to convince, Maena?" Naed's voice was stronger now. "Are you arguing with me or trying to prove to yourself that you're not just following your brother's lead? Would you have left without him, Maena?"

That hit home. "I... I don't know. But I did leave, and I don't regret it. Maybe it took Danghen leaving for me to finally decide, maybe it took this little stand off for me to tell him this, but that doesn't matter. I made my decision, not Danghen and not you."

"And what about duty? Honor?"

"They're just ways to make us into killers. I'm talking about right and wrong." She looked about to include Danghen in her next comment. "The both of you can keep talking for cycles about honor and you'll never notice how much blood is on your hands. I notice."

She walked forward, so that she was less than two meters from the tip of Naed's autocannon. If it fired, the concussion alone would probably kill her.

"Now you have to make a decision. I'm not going back and neither is Danghen. You can let me go or you can pull that trigger. Doing your duty now means having my blood on your hands." She walked forward another step. "I've made my choice. Make yours."

Maena didn't move. Naed's Gear stood stock still, but his shallow breathing was picked up by his comm system and provided an undercurrent to the moment of tension. Maena was aware of Danghen, nervous and quiet — not used to being out of the spotlight.

"Go," was all Naed said. His Jaguar lifted its weapon and started rolling slowly backwards on the wheels in its feet. When he was out of sight, Maena activated the mechanism to close the Barnaby's bay door and made her way to the cab. Danghen was already inside and had finished overriding the security lock.

"Stamens never understood," said Danghen as if that closed the whole topic.

Maena drove out onto the street in silence, waiting until her brother was lost in his own thoughts before half whispering an answer. "Neither have you. Neither have you."



INTRODUCTION

1.1 - TWO GAMES IN ONE



Heavy Gear is the first science fiction universe designed as both a roleplaying game and a tactical game from the get-go. If you know what these types of games are, skip this section altogether. If you are unfamiliar with the concepts of roleplaying and wargaming, you need to first get acquainted with both of these game styles.

Roleplaying is a form of interactive storytelling in which a director (called the Gamemaster, or GM) prepares a story and its various threads, and guides a group of Players (usually from 3 to 6) through their meanderings. Each Player has a character (called a Player Character, or PC) with its own set of Attributes (natural talents) and Skills (acquired or learned talents). During the game sessions, the Players are encouraged to create interesting personalities for these characters and act out their decisions and reactions to the settings and situations described by the Gamemaster. When the PCs participate in several sessions, the latter combine to form a campaign, that is a continuing series of adventures much like TV episodes. Roleplaying requires very little strategy — it mostly emphasizes problem-solving and acting.

Wargaming consists of simulating battles on a hypothetical or historical battlefield. In **Heavy Gear**, it usually entails pitting infantry or armored vehicles against each other using technical rules to resolve combat. Much like chess, wargames require both strategy and tactics to win, although some dice rolling is involved to simulate the unknowns of real-life combat. Wargaming requires no Gamemaster, only players who have roughly equivalent forces to fight with and a set of rules which apply to everyone equally. Wargames require a great deal of strategy and creative thinking, but little problem-solving and no acting skills.

Roleplaying does not have winners or losers. Player Characters may live or die, but winning or losing has little to do with that. The goal of the game varies for each character, although the Gamemaster may set a tentative campaign goal for himself. In wargaming, the situation is more clear cut. When the game is over, there should be one Player left standing — he's the winner, everyone else loses to a varying degree.

Heavy Gear, as we said above, is a hybrid game. This rulebook contains the rules for both wargaming and roleplaying. We provide character creation rules and a general background for the world characters will evolve in. We also provide complete tactical rules, vehicles and weapons to allow wargamers almost unlimited flexibility in their combat scenarios. This book has a lot of everything for all types of gamers. You can use it to roleplay, to wargame or to do both. You, the gamer, are in charge.

1.1.1 - The Storyline



The world of **Heavy Gear** provides gamers with an intricate background. It differs from many other games because it also features a complex overarching storyline that does not reveal itself in the beginning. When historians look back at Earth's history, they uncover a wealth of events and personalities which give the world a vibrant life of its own. It is Humanity's fate to splinter between groups of conflicting interests and to fight for limited resources. On Terra Nova, the world at the center of the **Heavy Gear** story, it is only natural that strife occur.

Heavy Gear is a large-scale story, with a beginning and an end. It is possible for players to find themselves drawn into the events that shape the story. Clues are scattered throughout the various books, in game information, Non-Player Characters' backgrounds, quotes and suggestions. Some are obvious, others well hidden, but they all help to move the story forward in an exciting way. Each league sourcebook, army list and supplement shows the current date, sometimes in A.D. dating, sometimes in Terranovan reckoning. The back cover of each book features a digital timepiece (what is referred to as the Timewatch™ system) that indicates the position of the book within the storyline.

The story of Heavy Gear will not be told through novels, however, but through a special series of books which Dream Pod 9 will release on a regular basis. These core products, called Storyline Books, feature media clippings, transcripts of conversations and various snippets which tell one story through numerous points of view. Almost invariably, they will end on some climatic event which will radically change the political or geographical landscape of Terra Nova.

The story begins here and now, in this very rulebook and is expanded on the various supplements and sourcebooks already available. **Storyline Book One: Crisis of Faith**, now available, picks up where this book and other supplements leave off and brings the story of **Heavy Gear** forward by two cycles. A new era has just begun...

INTRODUCTION TO TERRA NOVA - 1.2

The story begins in A.D. 6132 on a distant planet called Terra Nova, a world colonized by Earth during the 52nd century by Terrans from Earth. Terra Nova is one of the nine inhabitable planets discovered by Mankind during its dynamic renaissance after a terrible ice age. While the new world resembles Earth in many respects, it features indigenous life forms (of no more than animal intelligence) that represent an all-too-real threat to the unprepared colonist. Still, much of the Terranovan flora and fauna are edible and make survival of the human race in this inhospitable world possible. After so many centuries on this world, part of Mankind has indeed found a new home.



Despite its similarities to Earth, the former colony has a very different calendar. Days last 36 hours, not 24, and a complete year (called a "cycle" on Terra Nova) is around 168 days. One Terran year is equal to roughly 1.4 cycles. Tougher living conditions have slightly shortened the average Terranovan lifespan and forced people to mature much faster than on Earth. The term teenager, while referring to someone younger on Terra Nova than on Earth, is still someone between 12 and 18, but in cycles rather than in years. An young adult is still someone between 20 and 30. An elderly person is still someone above 70.

Leagues of Terra Nova - 1.2.1



Terra Nova is also far more arid than Earth. There are no continents; most of the water is hidden in a series of underground tunnels called the MacAllen Network. The planet is divided into three regions: the mountainous and temperate northern hemisphere, the luxuriant and tropical southern hemisphere; and the Badlands, which stretch out as a thick desert band about 1000 kilometers north and south of the equator. The city-states from the North have united into three leagues (the Northern Lights Confederacy, the United Mercantile Federation and the Western Frontier Protectorate), which together compose the Confederated Northern City-States (CNCS). The Southern city-states form four leagues (the Southern Republic, the Mekong Dominion, the Eastern Sun Emirates and the Humanist Alliance) united under the flag of the Allied Southern Territories (AST). The CNCS and the AST have radical cultural and political differences which often put them at different ends of the spectrum. Conflicts between North and South are frequent.

The Badlands - 1.2.2



The Badlands, unlike the polar confederations, are fractious, and form no political entities to speak of. Only one city-state in the Badlands is truly respected by the polar confederation for its power and prestige: Peace River, a city built around Paxton Arms, the planet's most important weapons manufacturer. Paxton Arms remains neutral in the North-South conflicts, providing weapons and equipment to everyone indiscriminately. Almost on the other side of the planet, around the equator, a new coalition (NuCoal) of small city-states has recently been formed around Port Arthur and Prince Gable, the seat of the NuCoal Council of Trade. While NuCoal does not have a military component, the Arthurian Korps ensures that it comes to no harm and that its territory is respected by the polar confederations. Both Paxton Arms and the NuCoal are forces to be reckoned with, and while they have no formal alliance, political experts have advanced that they would likely coordinate a defense effort for the Badlands in the event of an interpolar war.

There are several other city-states in the Badlands, most of which serve as refuge for renegade soldiers or simple civilians fleeing the constraints of life in the hemispheres. Notorious among those cities, Khayr ad-Din — often referred to as the "Trash City" because it was built in the middle of a trash dumping area in the Badlands — has become the city where ex-Gear pilots go to become Duelists in the arenas. The rest of the Badlands is either populated by nomad bands of traders, by bandits known as rovers, by hard-boiled homesteaders, or by the mysterious Sand Riders, who live in the acidic sands of the Great White Desert.

The War of the Alliance - 1.2.3



In TN 1454 (A.D. 5790), an Earth-first government pulled back all its resources from the various colonies, leaving them to fend for themselves. In TN 1913 (A.D. 6118), it returned in force with the Colonial Expeditionary Force, strong with 400,000 highly trained men and supersoldiers (the GRELs), with the intent of reconquering those colonies. The CEF expected little resistance, having assumed that Terra Nova would have been devastated by the departure of Earth many centuries ago. It never expected a planet with a strong technological civilization, and it certainly did not expect to encounter Gears, the characteristic humanoid combat units of Terra Nova. In TN 1917, after four cycles of warfare, the CEF retreated to another colony world, defeated. Thus ended the War of the Alliance, so named because it allied North and South against the invaders.

After fifteen cycles of détente following the war, the power brokers of Terra Nova are restless once again. The ever-present border wars between the two superpowers are escalating at an alarming rate. Politicians and generals are feeding the public inflammatory rhetoric. Rumors of hidden nuclear arsenals being mobilized are spreading like wildfire. The inhabitants of the planet hold their breath as the two political juggernauts lock horns with each other once again.

1.3 - WHAT HAS COME BEFORE...

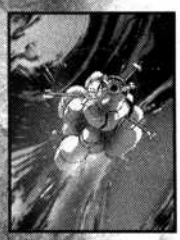


Terra Nova's past is our future, a long tale of Humanity's quest to find a home in the stars. This quest began when the home world seemed to do its best to eliminate humans from its face. Around A.D. 2400, six thousand years of civilization were about to be swallowed by a blanket of ice descending toward the equator. After a frantic (and fruitless) race to counter the coming Ice Age through technological solutions, and after several near-miss ecological disasters, everyone on the planet realized the fight was pointless and moved toward the warmer climates of the equatorial countries to wait out the new Ice Age.

Cultures were born and died during the rush toward the equator and old racial differences were largely broken down by global mixing. Millions died in the Emigration Wars, as overburdened equatorial countries did their best to keep refugee convoys from entering their borders, and still the ice continued to creep forward. Brutal warlords sprung up with frightening regularity, but this period also saw some great social experiments. The socialist utopia of Greater Samarkand stood as the pearl of Earth until it collapsed under its own weight.

Great technological advances were made, especially in the field of genetic engineering, resulting in the design of the fabled Prime Knight warriors in Kir Arya, a small country nested between warring giants. That success, however, was short lived and Prime Knights were killed to the last during the 24th Crusade that also destroyed the fledging Kir Aryan society. Ultimately the population of Earth could only wait, one generation after the other, for the ice to retreat. It finally did in the 44th century, and brought a new hope with it.

1.3.1 - A New Age of Discovery



In A.D. 4318, Professor Markus Tannhauser wrote his masterpiece, "Principia Universalis." His Unified Theory explained time-space discontinuities and their potential as gateways to the stars. Suddenly, this opened a wealth of new possibilities. As the Ice Age came to an end, a Second Renaissance on Earth marked the beginning of Humanity's return to space. A few centuries later, an exploration ship discovered Caprice, an Earth-like planet that could (barely) support human life. Almost a century later, Terra Nova was discovered and a colonization effort began soon after.

The first colonists were sent by corporations and worked for the duration of their contract before returning home. Over time, however, many among them were enthralled by the beauty of this new world and chose not to leave Terra Nova when their contracts expired. They instead settled down on a piece of land, sometimes given resources by the corporation that hired them to help them out. After two centuries, many corporations put together support programs to help the new colonists get organized — it was advantageous for them since they had become "locals" and were no longer eligible for the outrageous wages paid to imported labor. An increasing number of workers built their homes all over Terra Nova, and over the course of the following centuries, the planet became one of the more successful colonies established by Earth.

1.3.2 - The Colonization Effort



While the corporations contributed a fair share to the colonization effort, it was the Earth government itself that absorbed the lion's share of the expense. After centuries of investments, Earth's population was split on the topic of colonization. Some believed that investing in the colonies was a smart move in the long run, since the colonies would some day repay Earth tenfold for its initial investment. Others felt that the colonies would never show any gratitude and claim their independence as soon as they were self-sufficient. In the end, Earth leaned towards that second option and decided to abandon all the colonies. By the end of the 58th century, the home world had pulled all its ships and resources away from the colonies and left them to fend for themselves. Thus began what would be called the Age of Isolation.

The period that immediately followed Earth's departure became known as the Reconstruction. The remaining Terranovans scrounged through what Earth had left behind to find the resources to survive and rebuild some semblance of society. The resources being limited, several brutal confrontations erupted over territories and scavenging sites. In the midst of this chaos, Yuri Gropius rose and fought to unite several neighboring towns into one city-state. By late TN 1479, Gropius was elected mayor of the city-state which was to later bear his name. In TN 1482, he spearheaded the effort to unite several neighboring city-states into the first Terranovan league, the Humanist Alliance.

During those times, elsewhere in the Badlands desert, a pacifist named Mamoud Khodaverdi rose and laid the foundations of what would later become Revisionism, the most important religion on Terra Nova. In his later years, he moved to Massada with his trusted companion, Nathani Reiss. After Mamoud's death, his son Jakob and Nathani disagreed on the principles behind Revisionism. Jakob remained in Massada to continue his father's work while Nathani moved to Sorrento in the North and founded his own branch of Revisionism. The schism between both branches remains to this day.

Age of Alliances - 1.3.3



Some forty cycles after the foundation of the Humanist Alliance, several northern city-states followed suit and formed the Northern Lights Confederacy (TN 1525). Almost on cue, several more alliances were formed in the following cycles: in the north, the Western Frontier Protectorate (TN 1527) and the United Mercantile Federation (TN 1551); and in the south, other leagues were forming: the Southern Republic (TN 1545), the Mekong Dominion (TN 1562) and the Eastern Sun Emirates (TN 1492). On the interstellar scale, limited contact was maintained with the other colonies. Unfortunately, each colony had its own problems and was largely unable to help its neighbors. Over time, most Terranovans began to ignore the other colonies' existence in their day-to-day lives.

In the South, in view of the Southern Republic's recent expansionist history, the Mekong Dominion signed an alliance with its neighbor to avoid unnecessary (and unprofitable) bloodshed. The Southern Republic, its western borders secure, unleashed its armies onto the Humanist Alliance and the Eastern Sun Emirates. In TN 1681, the Allied Southern Territories — mostly a facade confederation controlled by the Southern Republic — united the hemisphere.

In the North, unity came more slowly. In TN 1669, the NLC and the WFP attempted to invade Pioneer (in the UMF), only to be repelled by a regular military force complemented by makeshift combat walker units built from construction vehicles. The UMF victory demonstrated the validity of combat walkers and led to the design and production of the first Gear, the Hunter, in TN 1678. The expansionism of the South and its sudden unification became a great concern for the northern leagues. In the NLC, discussions began about the unification of the northern hemisphere, but the United Mercantile Federation resisted the idea. When the UMF lost its Merchant War to the AST in TN 1688, unification finally became a possibility; it became a fact in TN 1692 with the foundation of the Confederated Northern City-States.

St. Vincent's War - 1.3.4



A cold war began between the polar confederations soon after the formation of the CNCS. While there was no outright conflict, both Northern and Southern forces clashed on a regular basis in the Badlands, fighting over resources, territory and allegiance. Caught in the middle with no military power to protect themselves, Badlanders were the helpless victims of the two giant superpowers. Tensions grew between North, South and the Badlands, and the stage was set for the first interpolar conflict, St. Vincent's War. While fighting over the wreckage of a pharmaceutical cargo ship (the St. Vincent), Northern and Southern forces unwittingly released a virus into the atmosphere which caused the St. Vincent's Plague and killed 5% of the children on Terra Nova. The resulting conflict lasted six cycles before the economies of both confederacies collapsed and an uneasy peace was restored. With their economies at an all-time low, all borders were closed while the confederations attempted to rebuild their resources.

More than helping the development of Gears and warfare in general on Terra Nova, the St. Vincent's War also cemented the polar confederacies and strengthened their respective patriotic sentiments. A sense of national identity emerged and contributed to the embitterment which has since then plagued North-South relations.

The War of the Alliance - 1.3.5



The 18th and 19th centuries were mostly a period of cold war that gave some measure of peace to the Badlanders. There were several bloody skirmishes both internal and external to the polar confederacies, but in comparison to the St. Vincent's War, it had very little effect on the Badlands themselves. New rivalries emerged, however, and several factions working on either side were about to sell out their own. The stage was set for a new interpolar war.

In TN 1913, Earth resurfaced after centuries of silence. When 400,000 soldiers and GREL supersoldiers were dropped on the surface of Terra Nova, the former colony realized that Earth had come to reestablish its hold on the planet. In a historic move, both polar confederations put their quarrels aside and joined forces to repel the Colonial Expeditionary Force (CEF). This union between North and South gave the conflict its name: the War of the Alliance. After four cycles of intense warfare and destruction, the intervention of Paxton Arms — which had remained neutral in the conflict — turned the tide in favor of the Terranovans with its Peace River Army and sent the invaders back to Caprice, where they had a base of operations. The cooperation between North and South helped forge some friendships between high officials. Despite their cooperation during the War of the Alliance, however, old rivalries resurfaced and the interpolar relationship cooled down once more.

In the Badlands, Paxton Arms established the Paxton Protectorate, a "safe zone" where Peace River's new Defense Force would protect residents from bandits and marauding polar armies. While the AST and CNCS largely respected these new boundaries during the early cycles of détente, it is now more theory than fact. Paxton Arms does not have the resources to forcefully maintain this zone and Northern and Southern forces no longer hesitate to take up "strategic positions" in the region. Nonetheless, many in Peace River feel it is Paxton's responsibility to protect the whole of the Badlands.

NEW IN TOWN



"Watch it!"

Gil jumped left at the last minute and the desert bike roared by; it missed him by a whole ten centimeters.

"Are you okay?" Paran Mek helped Gil back up to his feet and brushed him off a bit.

"Yeah, I guess. Things always like this here?" This was Gil's first visit to Port Arthur and it showed. Paran and he were walking through the markets near the GREL neighborhoods, the designated housing for the tens of thousands of Earth supersoldiers stranded on Terra Nova after the War of the Alliance. These cloned warriors were easy to recognize: tall and bald, their skin had a purplish hue.

"Oh, that's just a bunch of Minervas blowing off some steam." Paran started moving as he spoke. He wanted to get to the bar, where he and Gil had some business to take care of.

"Minervas? Those are the pilots, right?"

"Yeah, they can take pretty much any vehicle and make it dance like a ballerina. Pretty impressive, if you're in to that type of thing." Paran stopped and whispered to Gil. "Personally, I think they're a little screwed up in the head, though."

"What do you mean?"

"Well, see these GRELs were made in vats to be living weapons, right? And now they've been stuck here for almost twenty cycles." The two began walking again. "They haven't been doing what they were made to do so they get a little stir crazy. Just look at that Isaac-class technician over there."

In front of a merchant's stall, one of the slim GRELs was busy examining a standard dataglove for sale. Gil noticed that he had already taken the thing apart and was using a precision tool to manipulate its innards. He seemed to be doing the same thing over and over again.

"He'll be there for another hour, I'm sure." Paran continued to speak as they made their way to the bar, pointing out the various GREL classes as he went. "Look at those Morgana commandos. I wouldn't want to get on their bad side."

Three of the tall, slim, deadly and identical women were keeling in a semi-circle. As one, they were methodically assembling and disassembling their assault rifles. They did it quickly, efficiently and in almost complete silence. Only the look at their eyes showed that they were itching to use them. Paran and Gil walked uncomfortably close to them as they entered the bar.

"What about the trooper types? I hear they're the nastiest out there."

"You mean the Mordreds? Yeah, they can get pretty violent, but they have their uses. Take Soldier Niklas over there." Paran pointed across the bar at a mountain of genetic superiority. The GREL's purple head seemed way too small for the mass of muscle he called a body. "He's found a place for himself as my... assistant."

Niklas smiled at Gil and cracked his knuckles. It sounded like bones breaking.

"Now, Gil, let's talk about that money you owe me."

THE NORTH - 2.1

The northern hemisphere of Terra Nova was settled in the early days of colonization. Its relatively temperate climate, plentiful rivers and large forests made it attractive for corporate and private colonists. The Port Aurora spaceport was built as the second major entry point to Terra Nova and eventually grew into Valeria-Port Aurora, the most populous city-state on the planet.

After the chaos of Reconstruction, the North eventually settled into the Confederated Northern City-States (CNCS). This alliance includes three different member leagues: the Northern Lights Confederacy (NLC), United Mercantile Federation (UMF) and the Western Frontier Protectorate (WFP). Though they share many cultural traits, the Northern leagues each have their own way of doing things and have clashed in the past.

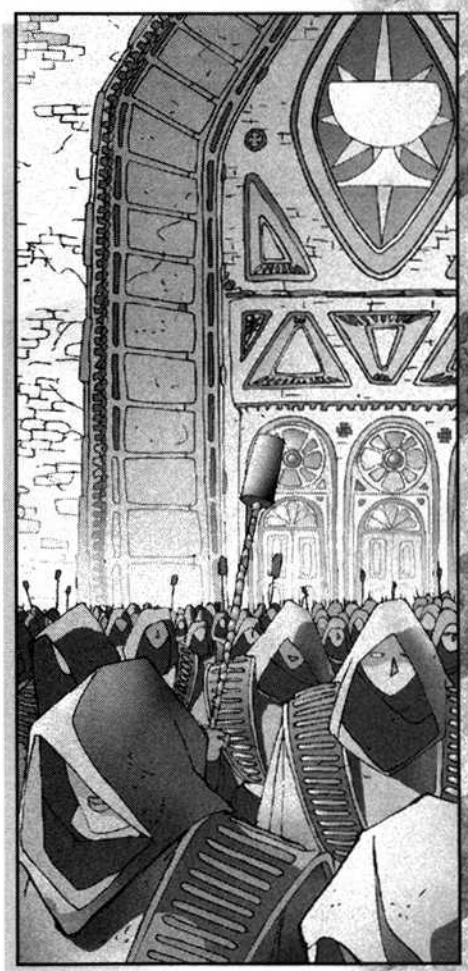
Over its 250 cycles of life, the CNCS has also established several protectorates in the deserts of the Badlands. Timmins in the Western Desert, Red Sands on the Cajun Plains and Wounded Knee on the edge of the Barrington Basin each send a single representative to the Inner Council in Valeria. The protectorates are quite diverse: Timmins is an industrial town with a reputation for low-quality knock-offs, Red Sands produces glassware, and Wounded Knee is a smuggling den controlled by ruthless cartels. In TN 1929 a protectorate was also established over Massada, the historical center of Revisionist faith, but this is officially only an accord for defense purposes — Massada has no representation in Valeria and is not considered part of the CNCS.

All the member states send representatives to an Inner Council in Valeria, where the Norlight Confederacy maintains the most seats, followed most closely by the Mercantile Federation. Councilors are usually named by the national governments (sometimes with public consultation) and are seen as relatively distant by the public. The only CNCS officials to achieve recognition across the hemisphere are Chief Justice Winston Stark, who chairs both the Inner Council and the Supreme Court, and Grand Marshal Victoria Edden-Smythe, who commands the military.

More information on the North and its member-leagues can be found in the sourcebook **Life on Terra Nova**.

Northern Life - 2.1.1

Terra Nova's northern hemisphere is a land of fertile plains and rich temperate basins, cut by tall mountain ranges. While there is a great deal to separate Northerners from one another, from national cultures to geographic location, outsiders often look upon them a as unified whole. Indeed, they all share a great deal.



Most Northerners speak Human Anglic, a derivative of Anglo-Saxon languages and the standard language of business in the northern hemisphere. In the Norlight Confederacy, religious ceremonies are performed in Indo-Arabic, since it was the language spoken by Mamoud Khodaverdi, the Gentle Prophet. In addition to speaking Anglic, residents of the Western Frontier Protectorate have also adopted Equatorial Hispanic, an Ice Age tongue which resembles a collage of ancient Spanish, English and Portuguese.

Northerners have a standard currency, the mark. Though most daily transactions are electronic in nature, hard currency is also available for use in smaller communities (or for shadowy dealings). The notes have a standard size (15 cm x 7 cm) and are often referred to as "rainbow money" because the bills progress along the colors of the light spectrum.

The North has its rough edges as well. Almost the entire Northern border with the Badlands is made up of a series of fertile plains and although political treaties fix these borders on the map, actual markings on the ground are very tenuous and the enforcement less than adequate. Many ranchers, traders and farmers make their living right on this frontier, leading a rugged rural life away from the conveniences of the cities.

Since the War of the Alliance, the Northern frontier has become very rough. The mammoth amounts of military hardware left scattered around the Badlands has increasingly found itself in the hands of rovers, smugglers, bandits and other unsavory individuals. The Northern Guard and league police forces are hard pressed to strictly control the huge land border, so isolated communities are often subject to raids or harassment. While individual rover gangs pose a threat in the area they target, a more general problem is growing from a power struggle among the smugglers of Wounded Knee. The cartels control huge networks and the Forzi and Kolson families are locked in a bloody conflict for lucrative Northern routes.

The scattered communities that are established in homesteads in the savannahs just outside of the leagues can also suffer from the problem of unwanted Northern attention. The Peters Clan from Fort James, for example, has been locked in a long term conflict with the independent community of Karlton Ranch. These Badlanders have few people they can turn to if their Northern neighbors decide to impose their will.

◆ Revisionism

The strongest social movement in the North is Sorrento Revisionism. The national faith of the Norlight Confederacy, it also has a great many adherents in the UMF and WFP. The church was founded by Nathani Reiss, lifelong companion to Mamoud Khodaverdi, after the Gentle Prophet's death. While Mamoud's original faith remains strong in the desert holy city of Massada (and is known as Massadan Revisionism), the Sorrento church holds sway across the North.

Revisionists believe that the world is the reflection of a Gentle Spirit that either created or is reality as a whole. The manifestation of this Spirit's will in the physical plane and in the hearts and minds of humans is called the Gentle Word. Mamoud and his Followers have guided those who would listen to act according to this Word. Peace, harmony and love support the Word, while discord, violence and death undermine it. Unlike Massadan Revisionist who are total pacifists, however, members of the Sorrento Church recognize the righteous use of force. If force is used to put an end to violence or oppression, then it is righteous and an act of peregrination (the Revisionist term for bettering the world). At times this has led the Sorrento Church and its followers to excess, including at least one religiously motivated massacre in the early days of the NLC.

In the last thirty cycles, Second Follower Thor Hutchison, the leader of the Sorrento Church, has led his faith through a fundamentalist revival that has placed emphasis on traditional Revisionist values and the importance of the church in the NLC and CNCS as a whole. Hutchison helped guide Northerners through the war with inspiration speeches and has led many to believe that the church should have a greater role in the running of political affairs. Unfortunately, this has meant growing intolerance towards non-Revisionists. These problems are the gravest in the Norlight Confederacy, but Revisionist upswings in both the UMF and WFP are causing similar concerns. Hutchison's agenda is aided by a shadowy group of supporters known as the Prophet's Shield.

◆ Pilgrimage Routes

One of the obligations of Revisionism is pilgrimage. At least once in their lives, all Revisionists must travel to Massada to visit the holy city. Pilgrimage to other important religious sites, such as Sorrento itself, Valeria (where Nathani helped form the NLC) and the desert communities visited by Mamoud and Nathani is also encouraged. This means that a large number of Northerners made the dangerous journey into the Badlands every cycle, making themselves vulnerable to attack. The Northern Guard and Norlight Armed Forces try to defend pilgrims but this is not always possible. There exists, however, a group of Revisionist monks called the Order of Dorothea that is dedicated to this very principle. The Dorotheans are responsible for security in Sorrento itself, but also maintain citadels along many important pilgrimage routes. The sight of the monks' characteristic fighting staff is taken a good sign by many Northerners.

◆ The Northern Guard



Each of the three Northern leagues has its own standing army, but they also cooperate to form the Northern Guard. During peacetime, the Guard is a separate entity from the national armies and is deployed to defend borders with the Badlands and in the equatorial deserts themselves. In times of war, all three national armies are integrated into the Guard under a unified command structure. Although there are differences in philosophy and training among the different armed forces, this integration necessitates a certain harmonization.

Historically, the peacetime Guard has been relatively weak and the integration of the national armies has meant a virtual annexation of the United Mercantile Federation Army and Western Frontier Protectorate Army to the more numerous Norlight Armed Forces. Ever since the War of the Alliance, however, the Guard has become more and more independent. It now has its own traditions and recruits many people directly into it.

The Guard is commanded by a Mercantile woman, Grand Marshal Victoria Edden-Smythe, and few people feel she is a Norlight pawn in any fashion. Edden-Smythe is a hero of the War of the Alliance and has a strong reputation across the hemisphere and the globe. Although not a Norlight, she is known to be a supporter of Reverend Hutchison and his fundamentalist agenda.

The Guard also serves the CNCS as a central structure for any and all hemispheric paramilitary activities. The Northern Guard Space Service has jurisdiction over much of the North's orbital and system-wide assets and the Northern Guard Intelligence Service (NGIS) serves as a coordinated intelligence and special operations bureau for the hemisphere as a whole. Of course, each league maintains at least one intelligence agency of its own and rivalries continue, but the NGIS often leads the pack.

The Guard has many elite units, but arguably the most famous is the 7th Gear Regiment, known as the Cat's Paws. The Paws are a special forces unit that uses cutting-edge Gears for surgical strikes and commando operations. The Paws were responsible for some of the most vital missions during the War of the Alliance and continue to fight in skirmishes with the South. The Paws are currently stationed in Zagazig in the NLC and are commanded by Colonel Stacey Diggs. Diggs is a respected soldier but has a knack for making political enemies in all the wrong places.

Northern Lights Confederacy - 2.1.2

The largest of the three Northern leagues, the Northern Lights Confederacy was born on a wave of missionary zeal in the dark days of Reconstruction. The Gentle Prophet Mamoud Khodaverdi was born on the Irrian Plain in what would become the NLC. When his life long follower Nathani Reiss and his son Jakob split after his death in TN 1507, Nathani returned North to the hamlet of Sorrento and began spreading the Gentle Word of Revisionism. The whole region was at that time caught in a bloody cycle of civil war and many were receptive to the unifying words of Second Follower Nathani. After Nathani personally settled the conflict between the twin cities of Valeria and Port Aurora, they (along with Petropolis and Smolensk) joined with Sorrento to form the NLC. Over the following decades many other cities were integrated whither through negotiation or religiously motivated conquest. Eventually, the NLC would come to sponsor the birth of the CNCS in response to the threat of the Republic and its vassal states in the Allies Southern Territories.

Today, the Northern Lights Confederacy remains arguably the most powerful league in the North. Like the rest of Terra Nova it suffered during the War of the Alliance, but its territory was only briefly occupied. Under the leadership of war-hero Anders Von Breslau, the NLC was able to recover quickly. The borders with the Badlands have been rather wild since the war, however, with well-armed bandits and smugglers becoming a real problem. The interior is more peaceful and quite diverse. Corporate-owned towns like Petropolis and Kossuth share space in the House of Congress with religious strongholds like Sorrento and quiet towns like Exeter. This diversity is often overlooked by outsiders, who see Norlights as stuffy religious conservatives. The league also includes Sesshu, an enclave of artistic expression and (according to some) decadence, and the wild sports town of Innsbruck. The latter hosts the annual Death Track 1000, the planet's top Gear race that attracts tourists and elite pilots from across the North. Nevertheless, the league has a strong religious streak that has long defined it as a nation. The rise in Revisionist fundamentalism, however, has created many social upheavals in Valeria and across the NLC.

More information on the NLC can be found in the **Northern Lights Confederacy Leaguebook**.

Vital Statistics

Founding Date:	**TN 1525**
Method of Government:	**Representative Democracy**
Head of Government:	**President Kathë Adjanni**
Member Cities:	**Valeria-Port Aurora (capital), Exeter, Franklin Harbor, Innsbruck, Kenema, Kossuth, Livingstone, Petropolis, Sesshu, Skadi, Smolensk, Sorrento, Yele, Zagazig**
Population:	**34.1 million**



History of Leadership

The Northern Lights Confederacy is generally considered the leading power of the North. The largest of the three leagues, it has the biggest army and is usually at the head of diplomatic initiatives. As the heart of Sorrento Revisionism, the NLC is also often thought of as the "soul" of the hemisphere. It was the NLC that led the charge to unify the hemisphere (despite a long-standing conflict with the UMF) and the CNCS and NLC share Valeria as their capital.

Up until the War of the Alliance, the leadership of the North was generally in Norlight hands and the Northern Guard was largely seen as an annex to the Norlight Armed Forces. The Earth invasion changed much of that. Field Marshal Anders von Breslau, commander of the Terranovan forces, went on to become Norlight president but put a great deal of emphasis on cooperation across the region. He placed a Mercantile general (Victoria Edden-Smythe) in command of the Guard and took steps to ensure that it became a truly independent military entity. Some Norlights resent this loss of status for their league and diplomatic tensions between the UMF and NLC are on the rise again.

Church and State

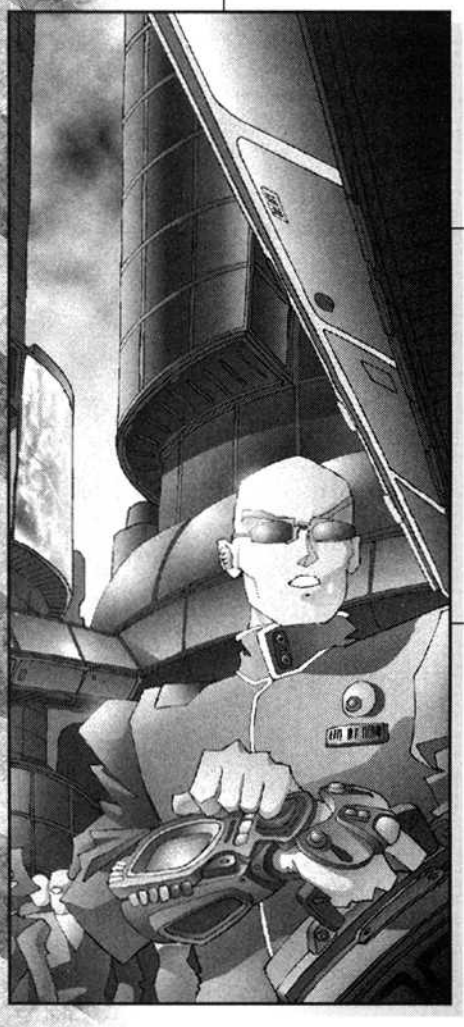
Sorrento Revisionism is the glue that holds the Norlight Confederacy together, but it is now starting to break it apart. Second Follower Thor Hutchison — leader of his faith — has led a charge for a renewed fundamentalism and brought the church squarely into the political arena. Using the Prophet's Shield, a shadowy group of allies within and without the church, Hutchison has strengthened his faith's position and made himself a key to political success in the North. Unfortunately, this has led to a new streak of intolerance. Norlights of other faiths find themselves victims of discrimination and those who feel the state should be free from religious influence are branded as radicals and extremists. Behind closed doors, the battle lines between church and state are being drawn. CNCS Chief Justice Stark is Hutchison's most persistent foe, while Norlight President Adjanni is increasingly caught in the middle.

2.1.3 - United Mercantile Federation

The second largest and wealthiest league in the North, the United Mercantile Federation is a counterpoint to the NLC. While the Norlight Confederacy was born out of religious fervor, the UMF was built on corporate will. While the first steps toward the UMF were taken in response to the rise of the NLC and WFP, the new league soon became a corporate entity and used corporate methods to expand its power base. Internally, the UMF made citizenship a monetary issue, granting votes to those willing to pay (including corporations). This revenue serves as the state's sole revenue base, making taxation a straight trade-off for representation. Externally, the UMF proceeded to accomplish takeovers in surrounding city-states, using military might and aggressive diplomacy hand in hand. One common tactic was to assure targeted city-states that they could maintain their internal social system. Before the formation of the CNCS, the UMF was considered the most powerful and aggressive state in the North because of its aggressive tactics and well-equipped army. Gears, optical NNets and many other cornerstones of Terranovan military technology were originally developed in the UMF.

The most powerful UMF corporation is Northco, the manufacturer of the Hunter and Jaguar Gears. Northco practically dominates the city-state of Rapid City and is the biggest voting entity in the national elections. Northco CEO Natalya Korolov is generally considered to be among the most important power-brokers in the hemisphere. Indeed, she chairs the Corporate Council, an assembly of the UMF's top corporations that acts as some kind of shadow government in the league. It was her support of current Treasurer Yves Banderas that won him his position, and most people feel he must be some form of mouthpiece for her. Korolov is a ruthless business leader and is greatly concerned by the rise of Norlight competitors such as Shaian Mechanics. She wishes to see Northco remain on top of the technological heap and is ready to do almost anything to ensure this.

The UMF's industrial strength made it an attractive target for the invading Earth forces and the league suffered orbital bombing and repeated attacks from the CEF. The Ashington Plains suffered most especially during this time. The UMF used strategic arms to hold back the invaders when necessary and parts of the Plains still bear the terrible scars of this time.



Vital Statistics

Founding Date:	**TN 1528 (as Lyonnesse League), TN 1551 (as UMF)**
Method of Government:	**Capitalistic Democracy**
Head of State:	**Treasurer Yves Banderas**
Member Cities:	**Lyonnesse (capital), Ashington, Baton Rouge, Canterbury, Djakarta Point, Mainz, Marathon, Pioneer, Rapid City, Swanscombe, Zagreb**
Population:	**27.7 million**

Corporate Diversity

The Mercantile strategy of guaranteeing the social systems of city-states that were incorporated into the league has made the UMF the most polyglot league in the North and arguably on the planet. While cities geared toward big business are the rule, including the motor-city of Rapid City and the computerized town of Marathon, the UMF also includes a strict matriarchy in Swanscombe, a hereditary monarchy in Ashington and a communist state in Zagreb. The most powerful social current remains corporate business, however. Huge corporations such as Northco and Abaline Research purchase enough votes to control much of the election results and most governmental functions are thought of in corporate terms. The nation itself is a corporation, with its bureaucracy held to a strict sense of accountability. The UMF Army, while supremely well equipped, has a roguish reputation. Indeed, according to some, it is mostly a glorified PR machine for the state, a showcase for Northco's best products. UMFA veterans of the War of the Alliance greatly resent these comments.

An Eye Toward the South

The postwar period has seen an increasing gulf growing between the UMF and the NLC. The Norlight state has tried to assert its economic independence and many Mercantile corporations resent the rise in Revisionist feeling across the North — which they see as an instrument of Norlight power. Treasurer Yves Banderas, in inimitable Mercantile style, is busy transforming this problem into an opportunity. Looking South, he has tried to build bridges to the Mekong Dominion, the Allied Southern Territories' own corporate state. Banderas and some of his allies have visions of an alliance between the two wealthy states that could exert financial control over the rest of Terra Nova. The CNCS would consider this plan treasonous, of course, so Banderas has established a network of spies and secret negotiators of his own. Northco CEO Korolov has become aware of Banderas' plans and is less than happy about it. Indeed, she fears that any ties with the Mekong Dominion will cost her company lucrative contracts with the NLC and WFP, and expose it to increased competition. So far the Mekong response has been careful interest.

Western Frontier Protectorate - 2.1.4

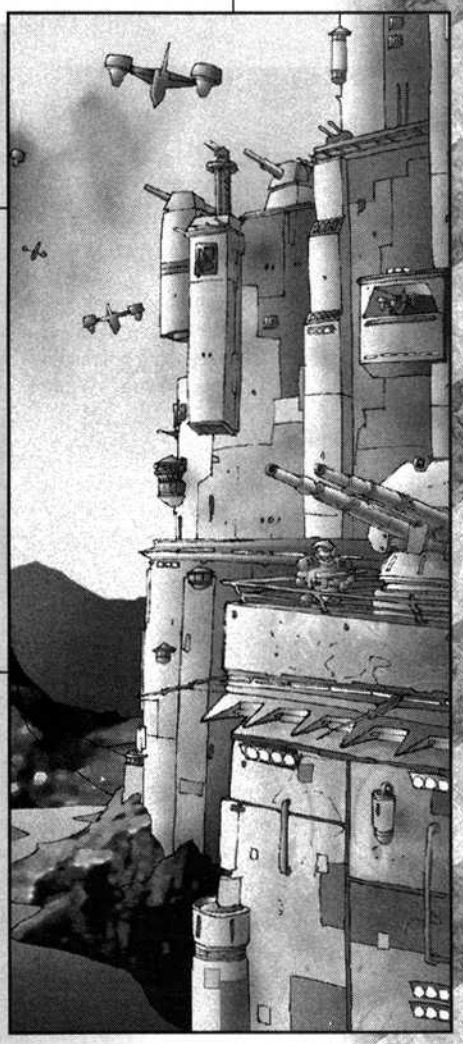
The smallest of the three Northern leagues, the Western Frontier Protectorate is built upon the fertile expanse of the Great Western Plain and framed by the Westridge Range and the Barrington Basin. Although the plains produce a great deal of wheat and johar (edible native grasses), the lack of natural obstacles has historically made the region very vulnerable to attacks. The West developed a militaristic lifestyle in response, building walled and armed city-states known as forts to defend themselves. The communities of the region were subject to attack from rover bands and neighboring states throughout Reconstruction and this led to the formation of the Protectorate. Soon thereafter, as the danger of attack became increasingly grave, the Protectorate's military took control of the political arena and oversaw the fortification of the city-states. Ever since, citizenship has been extended only to those who have served in the military and the army has been constantly pacifying the rough Badlands frontier.

The Great Western Plain is also subject to violent storms because of its exposure to the Barrington Basin. The Basin is the birthing ground for the most violent Badlands tempests and they can easily cut up into the WFP. Sand can suddenly whip out of the horizon and into the crop and ranch lands. The WFP has initiated a tree planting program along the savannah regions to stave off desertification. Nevertheless, this choice of lifestyle may also stem from the violent weather.

The West's geography proved a hindrance again during the War of the Alliance. The major landing point of the CEF forces was in the Barrington Basin and little stood between them and the West. Although the CEF had its sights set on the industrial heartland of the UMF, the West fought a constant and not always successful battle to preserve its lands from the invader. The West also provided some of the war's greatest heroes. Lang Regina, an officer from Fort Henry, would lead the Northern contingent during the climactic Battle of Baja. She now serves as the Fort Henry Proconsul. In the postwar period, she has become a political moderate. Well aware of the cost of war, she hesitates to send her nation into a bloodbath again unless she feels it strictly necessary.

Vital Statistics

Founding Date:	**TN 1527**
Method of Government:	**Militaristic Democracy**
Heads of State:	**Proconsuls Zucco Adamo (WFPA Field Marshal), Lang Regina, and Hasegawa Ichiro.**
Member Cities:	**Fort William (capital), Fort Henry, Fort James**
Population:	**13.9 million**



Citizens and Clans

Western society is divided along two lines: citizenship and clan. Because only those having served 5 cycles in the army (or more in other allied forces) qualify for citizenship, a full two-thirds of the population does not have any voting rights. Although non-citizen residents are still ensured certain rights and many live happy lives, they do form a second class and can never achieve positions of true political leadership. Residents are still members of their clan, however, and this can be as important as voting rights.

Westerners take family prestige and heritage very importantly and most are willing to stand with their kin come hell or high water. The number of clans is huge, but most are loosely aligned with one of two factions. The Zuccite faction (headed by clan Zucco and Field Marshal Zucco Adamo) is the most powerful and is considered aggressive and conservative. Their more moderate rivals form the Maderan faction, headed by clan Maderas and Lang Regina herself. Non-citizens usually have their rights defended by relatives who have achieved citizenship. Westerners take clan so seriously that they traditionally place their family name ahead of their given name.

Counterculture

The West has a twin cultural legacy. On the one hand it is a land of self-reliant, conservative people who place great emphasis on military traditions and on their families. On the other hand, the league breeds a wild attitude that expresses itself both in the stereotypical Western tendency to go off half-cocked and a vibrant and extreme counterculture. Fort William is the Northern center of shock, a musical and cultural style seemingly designed to upset conservative attitudes and appeal to young minds in search of rebellion. Shock has played on tensions in the West, with many hits of the genre pointing accusing fingers at the army and appealing to non-citizen residents. Shock also tends to be critical of clan and emphasize individuality. Many traditional Westerners see the movement as an aberration, but others accept it as a natural outlet for teenage rebellion and the frustration of mounting tensions with the South. Indeed, if the South were to attack, few Westerners doubt they would see their streets become combat zones once again.

2.2 - THE SOUTH

The southern hemisphere of Terra Nova is geographically more diverse and harsher than the North. While grassy plains, stark alpine heights and forests can be found, the South is also home to huge expanses of tropical jungle and endless swamps. Generally tropical in climate and teeming with indigenous and adapted species, the South seemed attractive to early colonists and became home to Port Oasis, Terra Nova's oldest spaceport.

The South as a whole was settled by a diverse group of corporate and private colonists that initiated a program of selling lands to citizens. This has left the hemisphere with a laudable legacy of diversity and a bloody history of conflict. The hemisphere is now officially united under the flag of the Allied Southern Territories (AST). The AST is dominated by the South's largest league, the Southern Republic (SR) that uses it to effectively control the other Southern leagues, namely the Mekong Dominion (MD), Humanist Alliance (HA) and Eastern Sun Emirates (ESE). Like the North, the AST also has several Badlands protectorates: Westphalia and Azov in the Western Desert and New Baja in the Karaq Wastes. AST troops are also currently occupying Lance Point, an important petroleum source for the Republic that is officially allied to the New Coalition in the Badlands (see 2.3.2 Port Arthur and NuCoal, p. 30).

The AST is officially ruled by the Curia, an assembly made up of Lord Councilors appointed by the government of the Southern Republic. These posts are usually given as rewards to loyal Republican officials and a few prominent members of the so-called "vassal leagues" who have not rocked the boat. The Curia is chaired by Lord Protector Jacques Molay. While the Lord Protector is usually seen as nothing but a mouthpiece for the Prime Minister of the Southern Republic, Molay has been very independent. A former director of the dreaded Southern Republic Intelligence Directorate, Molay seems free to act as he sees fit. Few people in the South realize that this freedom of action goes back to a secret deal between Molay and Republican Prime Minister deRouen. Molay could ruin deRouen by releasing details of his rise to power, so the Prime Minister has little choice but to let him act as he wishes — at least until he can be dealt with.

More information on the Allied Southern Territories and its member-states can be found in the sourcebook **Life on Terra Nova**.

2.2.1 - Southern Life



Life in the South is far more varied than in the North. Radical cultural differences separate the various leagues and even regions within them. The AST counts scientist-philosophers, wealthy emirs, slaves, merchant princes, soldiers, industrial workers and many more as citizens. With the notable exception of the Humanist Alliance, the southern states generally leave their citizens free to choose their beliefs and act as they will. Personal freedom is appreciated, and short of harming anyone, most Southerners may do as they please. The one taboo area is political expression, especially in the Southern Republic. The media and the individuals may discuss any topic they choose, but criticizing or opposing the government is extremely dangerous. The Republican government has eyes everywhere and dissidents have been known to vanish overnight without a trace. Southerners in general (and again, especially in the Republic) have a very supremacist attitude and openly express great pride in their society and in their achievements. They tend to despise the Northerners' repressed attitude, in particular their religious zeal.

The official language of the Southern Republic is Universal French, a derivative of French, Italian and Spanish, although Anglic is also taught in schools and used for international affairs. By force of absorption, the smaller leagues have also adopted some Universal French, but the Eastern Sun Emirates still cling to their original Mandanese. In the Humanist Alliance, the majority of people speak Intralingua, a "constructed" language which is extremely easy to learn and is spoken here and there over the world.

The currency in the South is the dinar, which is worth about the same thing as a mark in the North. Despite occasional fluctuations, the two currencies have remained fairly comparable ever since they were established. Dinar notes have different size but are invariably deep red. Northerners often refer to it as "blood money." As a habit, most southerners keep their larger bills on the outside of the smaller ones to give the impression of wealth.

While perhaps more repressive than the North in many respects, the South is host to several cultural wonders which do not find their equivalent in the northern hemisphere. For instance, the Yang Dancers from Atsi in the Mekong Dominion never cease to amaze their audiences, regardless of their origins. Body sculpting, also an art form originating from Atsi, combines plastic surgery and esoteric aesthetic concepts, using the body as a canvas and sometimes resulting in alien-looking humans. The alternative shock music bars of Newton feature erotic and exotic performances which would seriously disturb any Northerner. In the Eastern Sun Emirates, the excesses of the Patriarchs may have trampled the human rights of their citizens, but they have also led to wondrous constructions and architectural feats. Without a doubt, being a Southerner often means having been in touch with the most colorful cultures of Terra Nova.

A Lord and Its Vassals

The Allied Southern Territories are in fact nothing more than a convenient way for the Southern Republic to dominate its neighbors. Any pretense of equality between the member-states is at best naive and usually the product of Republican propaganda. Not only are the members of the Curia named by the Republic, but it includes three Lord Chancellors — AST officials whose job is to oversee the vassal states and ensure they conform to a Republican agenda. The AST was formed in conquest and remains an instrument of bondage, although one that seems to be cracking at the seams.

Indeed, the structure of the AST is currently under a great deal of stress. Lord Protector Jacques Molay has been acting extremely independently from Republican Prime Minister deRouen, using leverage dating back to a secret deal between the two men. This has caused great strain within the AST. Resistance is also growing from the vassal states. The Mekong Dominion has used corporate means to remain powerful in its own right, while the Humanist Alliance has used its opaque social system to resist Republican social control. In the Eastern Sun Emirates — where the aristocracy is largely corrupted by the Republic — armed revolt is spreading.

The Southern MILICIA

The Southern counterpart to the Northern Guard is the Southern MILICIA (MILitary Intervention/Counter-Insurgency Army). Unlike the Guard, however, the MILICIA is not a prestigious volunteer army that leads the charge during a war. The MILICIA is a conscript force made up of citizens of the three vassal states (and some Republicans) pressed into service. It is generally considered the poor cousin of the far more prestigious (and larger) Southern Republican Army and so is assigned to menial duties and given poorer equipment. In peacetime, the MILICIA acts as a border guard, ensures peace in AST member states and deploys in the Badlands to defend Southern interests and harass the Northern Guard. During a war, the MILICIA becomes a pool of expendable forces to be used by the Republican Army and is absorbed into its command structure.

Currently, the worst assignment for MILICIAmen is the city of Basal in the ESE. In the midst of an armed revolt, Basal is a hellhole where rebels and ESE troops fight a life and death battle in the streets. The MILICIA has been instructed to only defend military targets for the time being, but the conscripts inevitably find themselves under fire from both sides.

Perhaps the best assignment in the MILICIA is to the elite Special Intervention Unit (SIU). Created by Commandant Aristide Lazarus, the SIU groups together a wide variety of troops with special skills for dangerous missions. Most SIU operations are commando-style missions (often using Gears), but Aristide is thought to have deep cover agents under his command as well. Lazarus is reputed to have the most loyal troops in the army; indeed, most of his agents were personally recruited, often from troubled backgrounds, and given the chance to shine.

Web of Intrigue

The South is sometimes called the Land of the Snakes because of the legendary amount of backstabbing, espionage and assassination that takes place in the halls of power. Although many Southerners lead perfectly respectable and peaceful lives and the North has its fair share of shadowy organizations, the South's intelligence agencies are truly legion. Every politician, business leader or power broker worth his salt will have at least one source of covert information and "special operations" resources. Those who do not make easy targets for their more resourceful enemies.

The king of all Southern shadow empires, the Southern Republic Intelligence Directorate (SRID) is a gargantuan body with its tentacles across the hemisphere. SRID is responsible for federal policing within the Republic, but also for intelligence gathering and political security. SRID directs many operations in the vassal states and the North and uses its puppet Allied Southern Intelligence (ASI) in the Badlands. The Republic also counts Les Témoins (the secret police), Military Intelligence and the Légion Noire (military special forces) among its shadow-players. The Humanist Insight and Regulatory Authority (HIRA) is the Humanist Alliance's own intelligence organization and it carries out a surprising number of illegal operations inside the Republic and other states. Most major Mekong corporations have their own intelligence wings as well, as do several prominent emirs in the ESE.

The Wildlands

The South has a proportionately much higher ratio of wild and largely unexplored lands than the North. In 1900 cycles of inhabitation, almost all regions have been at least charted, but many of the deepest jungle areas have been largely left alone and are still considered dangerous territory. The chaos of the colonial times and Reconstruction also saw the development of isolated and even "primitive" tribal cultures in remote areas as people lost contact with "civilized" centers. Because of the contrast between highly modern city-states and areas of nearly untouched wilderness, Southerners often divide themselves between urban "drylanders" and rural "wildlanders."

The roughest wildlands include the deep jungles of the Yung An Basin and the depths of the Okavango Swamp. The jungles of the Mekong Dominion are home to a bewildering variety of tribal communities, bandit legions and dangerous creatures. The jungle has been known to swallow up whole cities and the number of ghosts towns still sought after by treasurer hunters in legendary. The Okavango Swamp in the Eastern Sun Emirates is a huge marshy area that hides a thousand dangers. Eastern traders and rebels ply the murky waters in shallow craft, while vicious beasts lurk just under the surface.

2.2.2 - Southern Republic

The dominant political and military power in the South is unquestionably the Southern Republic. Terra Nova's most populous league, the Republic was built on a wave of conquest that lasted over 200 cycles, from the dark days of Reconstruction all the way to the Southern War of 1670. During this period the Republic reached its current borders by conquering 12 city-states and then moved on to dominating the neighboring leagues. The Allied Southern Territories are in fact nothing more than a convenient structure for Republican control. Military power is the key to Republican dominance, but the league is not a military dictatorship. Instead, the upper echelons of both the military and civilian bureaucracies share power. The population participates in elections, but the real decisions are made long before ballots are cast. Average Republicans accept this lack of political say in exchange for prosperity and freedom in their private lives. As long as the state provides a high standard of living, continues to show itself as grandiose, and does not legislate private choices, most Republicans gladly allow themselves to be ruled. Propaganda and education reinforce this social contract and a huge internal security apparatus enforces it.

Northerners see the Republic as a land of total oppression, but citizens call it a nation of true freedom. Republicans live in incredibly diverse conditions and are free to explore all kinds of lifestyles without attracting either legal problems or the scorn of their neighbors. Rural farmers, sophisticated Oasians and bold Ashantites all accept each other. Of course, the line between private matters and matters of state security is thin and nebulous. An artist whose bold work is a critique of the state can be paid a visit by the authorities. The organization charged with protecting Republican security and supremacy is the Southern Republic Intelligence Directorate. SRID is responsible for most extra-territorial espionage, internal counter-espionage and also serves as the national police. SRID Director Justinian Salazar is generally considered one of the most powerful men in the hemisphere. Even more shadowy than SRID, however, are Les Témoins (literally, the Witnesses). Acting as state secret police, Les Témoins have agents and associates operating secretly throughout the Republic. They report to the local police and SRID, providing evidence and background information. Few people are privy to the identities of Témoins, not even SRID.

More information can be found in the sourcebooks **Southern Republic Leaguebook** and **Southern Republic Army List.**

Vital Statistics



Founding Date:	**TN 1545**
Method of Government:	**Nominal Representative Democracy**
Head of State:	**Prime Minister Louis Philippe deRouen**
Member Cities:	**Port Oasis (capital), Ankara, Aquitaine, Ashanti, Bethany, Innsmouth, Marabou, Newton, Réunion, Saragossa, Siwa Oasis, Timbuktu**
Population:	**53 million**

Culture of Honor

The strongest cultural bond between Republicans is their sense of honor. Public image and respect are very important for citizens at all levels and this mutual understanding does more to keep the league unified than traditional propaganda or state terror. Soldiers follow orders and citizens respect each other's privacy because of the stigma of not doing so. Republican honor is as much about image as morality, however. Careers and lives can be destroyed by rumor and innuendo, but the victims of such character assassination often seek retribution in duels or counter-offensives — if they can find the guilty parties. The ultimate paragon of this brand of honor is the Republican Army. Dressed in bold burgundy uniforms, the soldiers of the Republic are held to a high standard of behavior and (for citizens) serve as icons of all that is good in the league. For foreigners, on the other hand, the army is the military fist that risks to come and crush them.

The Edge of Chaos

The precarious political balance in the Republic has come under a great deal of strain in the last cycles. In the 1920s, Louis Philippe deRouen rose to the post of Prime Minister with blinding speed and was able to displace much of the old bureaucracy. He became the closest thing to an absolute dictator the Republic has ever had. DeRouen does not seem able to control AST Lord Protector Molay and many other powerful politicians are biding their time for an opportunity to displace him. For now, he is powerful and popular, but he must maintain stability to remain so. Stability is unfortunately fleeting. Beyond the intrigues of Port Oasis, the city-state of Saragossa has become a grave problem. Local anti-Republican revolutionaries have transformed themselves from a dying movement to a real threat to the state in the postwar years. Externally, revolt in the Eastern Sun Emirates and evidence of resistance in the other vassal states threaten the dominance of the Republic. Some whisper that deRouen wants a war to unify the country behind him.

Mekong Dominion - 2.2.3

The Mekong Dominion is a powerful merchant league that holds many of the economic resources of the South. The Dominion is the successor of the a huge corporate alliance that purchased colonization rights for much of the Yung An Basin and the surrounding plains. This Terra Nova Corporate Foundation (known to Dominionites as the "Founders") became a powerful lobby for colonial rights and eventually had to flee Earth when the home world abandoned Terra Nova. After a long period of ensuing chaos and civil war, the various corporate enclaves and other cities formed into the Mekong Dominion. To this day, the Dominion maintains the corporate social model established by the Founders. The league is ruled by the CEOs (called taipans) of the largest corporate houses and the nation is the South's economic powerhouse. The Dominion is probably the Southern Republic's most important partner in the AST and it was the Dominion's decision to sign a formal alliance that allowed the Republic to conquer the other vassal states.

Since then, the Mekong Dominion has been a deceptively loyal partner to the Southern Republic. All the while the Dominion has been helping to finance Republican power in the hemisphere, it has also been working to further its own hold. Mekong corporations hold shares in a great many key industries across the South and a surprising number of decisions are made within the Mekong Assembly before arriving in the Curia or even the Estates General. The Dominion supports the AST because it ensures profits and serves as a cover for exerting economic control over the hemisphere.

The Dominion suffered greatly during the War of the Alliance, and saw a great deal of territory come under occupation or become constant battlefields. Jungle fighting in the Domion (and ESE) was among the most brutal fighting during the conflict. With Earth forces having cut deep into the league and Terranovan forces strained past their limits, many feared the invaders could never be dislodged. This desperate battle did, however, reemphasize the prestige of the Mekong Peacekeepers, the league's national police and home defense guard. The Peacekeepers were often the only line of defense and became heroes of the state by the end of the war. Today, in a league often rife with corruption and double-dealing, the Peacekeepers are universally respected for their honor and skill.

Vital Statistics

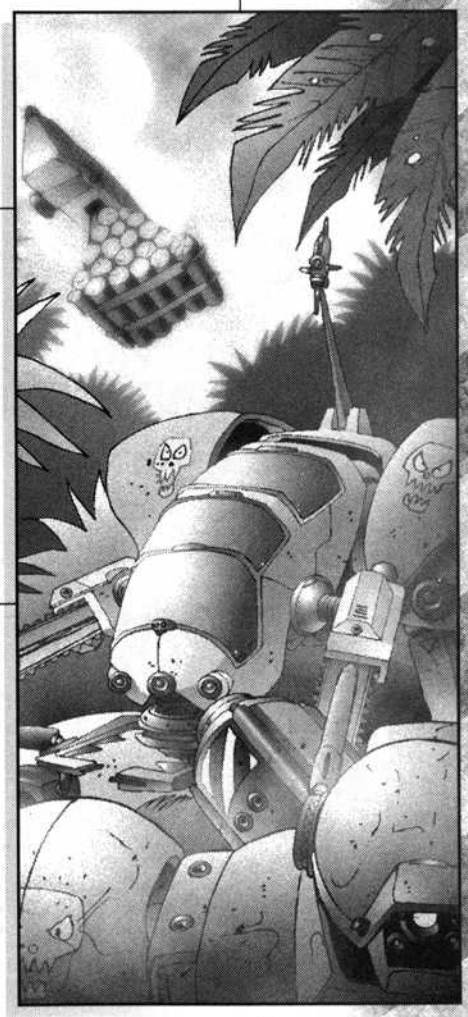
Founding Date:	**TN 1532 (as Mekong Alliance), TN 1562 (as Mekong Dominion)**
Method of Government:	**Mercantile Oligarchy**
Head of State:	**Speaker Miyako Sogabe of the Mekong Assembly**
Member Cities:	**Mekong (capital), Atsi, Hsi Tsang (under AST authority), Loyang, Ngorongoro, Olduvai, Yung An**
Population:	**46.8 million**

Taipans and Oyabuns

The Mekong Dominion is sometimes called two faced by outsiders. While it has a rich and sophisticated culture, including an excellent education system and a vibrant arts scene, the Dominion is also home to wild bandit armies and slave rings. Indeed, the privileges of Mekong citizenship are reserved for those who own corporate stock and everyone else forms an official underclass that has few rights and little recourse to justice. The underworld has done an excellent job of organizing itself to deal with life in the Dominion. The roughest of criminals live in the deep jungles in bandit gangs and the largest of these form virtual armies that control whole provinces. The most feared bandits are the Mongols, led by an enigmatic Khan. More formal is the Mekong Yakuza, born of an alliance of criminal cartels that arrived from Earth in colonial times. The Yakuza control Hsi Tsang and are even recognized as a Mekong corporation. A recent deal with Mekong Lord Chancellor Durocher has made Hsi Tsang virtually free of Mekong control.

A Global Agenda

The taipans of the Mekong Dominion have rarely deviated from an agenda of global power acquisition that dates back to the league's creation. Financial and economic influence are their major instruments, but the taipans have long been willing to use darker methods to get their way. So-called ghost squads — highly trained saboteurs — help cripple competitors or targets of acquisition across the globe, while blackmail ensures influence even in foreign-owned companies. Taipan Aaron Logan or the Mekong Development Corporation has proven to be master of these strategies and many of the key CEOs in the Southern Republic are rumored to be in his debt. Some call him the most dangerous man in the South. Current Speaker Miyako Sogabe has taken a different tack, pushing through a program of mild social reforms to appeal directly to the people and create a more just state. She is still a ruthless businesswoman when she needs to be, however, and has her share of assassins and spies in the field. Among her most trusted agents is Kitani Yang, a famed Kabuki dancer who also serves as Sogabe's personal spy.



2.2.4 - Eastern Sun Emirates

The Eastern Sun Emirates (ESE) is the current "hot spot" of the southern hemisphere. Widely recognized as the most backward of the Southern vassal states, the Emirates has been home to a hereditary caste system established during Reconstruction by the crew of the HCS Eastern Sun, a merchant Gateship that refused to leave Terra Nova and crashed after a mutiny. The descendants of the command staff became the emirs of the East, while other citizens are either solicitors (middle-class) or commoners. The direct descendants of Captain Enri Masao himself became the Patriarchs of the league. This system was originally maintained by a bond of feudal responsibility between lords and lackeys, although it was always prone to certain excesses. The Republican invasion of the ESE made matters much worse. The Republic found it easiest to make the Patriarch their puppet and placed a pliable member of the ruling Masao family on the throne. From that time forward the Patriarch (or Matriarch) has owed his power as much to Republican support as to the respect of Easterners and the support of the nobility. This has largely snapped the bonds of respect between the classes and many emirs have become utter degenerates, using blood sports and unspeakable acts to stave off boredom. Oliver Masao, the current Patriarch, is the most extreme example of this unfortunate trend.

Despite its reputation, the East is not only a land of decadence and brutality. Eastern commoners and, to a lesser extent, solicitors, maintain a strong and vibrant culture that has not forgotten the days before the AST. There are progressive emirs as well and many claim that a wave of change in the East is long overdue. TN 1931, two cycles ago, saw the beginnings of this change when the Emirate of Basal declared its independence from the ESE. Revolt has been a constant undercurrent of Eastern life, but this was the first revolution to be led by a legitimate emir, a man named Nigel Shirow. Shirow had spent much of his life in hiding because of his brother Salman's machinations and gained an understanding and appreciation for commoners. When he finally rose to power, he broke ties with the Patriarch and called for freedom for his nation. A bloody civil war ensued, with fanatical Patriarchal troops committing atrocities on the civilian population while unlucky MILICIAmen are stationed to keep the revolt from spreading.



Vital Statistics

Founding Date:	**TN 1492**
Method of Government:	**Hereditary Aristocracy**
Head of State:	**Patriarch Oliver Masao**
Member Cities:Strathclyde (capital), Bangweuleu, Basal (in revolt), Cimmaro, Javari, Okavango, Skavara, Smyrna	
Population:	**29.6 million**

Mystic Outlooks

A large part of the Eastern reputation of backwardness comes from outsiders who cannot understand the importance locals place on esoteric and quasi-mystical matters. For a traditional Easterner, material matters are only half the equation of life and matters of the spirit are just as important. This has led to a wide range of millennial and mystical movements taking root in the Emirates. Revisionism found its only fertile Southern ground in the ESE and the Massadan branch of the church remains strong in the league. Erzach Ibn-Muhammad, the only Terranovan Jerusalemite prophet, is also believed to have hailed from the East. This trend is currently evident in the activities of Adrianna Xing and Rafael Bhravo. Xing is a Revisionist mystic from Bangweuleu. She claims she has been visited by Mamoud and calls herself his Apostle. Bhravo is the exiled child emir of Okavango and is currently traveling the league at the head of a growing procession of children and holy men. Easterners also hold memories of Earth as almost mystical and the prospect of a return to the home world is still talked about in some circles.

Revolution

The Basalite revolt has been ongoing for two cycles, has cost thousands of lives and has had aftershocks across the league and beyond. The CNCS rapidly recognized the independence of Basal and it is widely believed that Shirow receives substantial Northern support in the form of supplies and intelligence. Easterners tired of the Patriarch's rule have traveled to Basal to swell the local forces or set up covert support for him in their own regions. Other emirs have begun to talk about change and several are providing covert support to the revolution. The Republic and AST are obviously very concerned by these events. The MILICIA has had troops stationed in Basal since the beginning of the revolt, but they are under orders to defend military targets only. Those in the know take this limited engagement as a sign of discord between Lord Protector Molay (who despises Shirow), Prime Minister deRouen (whose sole concern is political survival) and Lord Chancellor Kenichi Tanaka. Tanaka is the Republican charged with overseeing the East, but has no respect at all for Patriarch Masao. The Patriarch himself seems to be enjoying the chaos.

Humanist Alliance - 2.2.5

The Humanist Alliance (HA) was created as a bold effort to create a perfect society, where citizens could live in peace and reach their full potential. Much like the doctrines of Revisionism in the Badlands and the North, the Humanist way was born of the terrible suffering of the Reconstruction era. Yuri Gropius, a bold thinker of the time, saw the blood and chaos around him and set out to better his world. Using his own idea on behavioral science and borrowing from the philosophies of the ancient thinker Plato and the example of Greater Samarkand, a 30th century utopian state on Earth, Gropius built Terra Nova's first true league of city-states and established a radical social system. At 16 cycles, after undergoing extensive testing, Humanists are assigned to one of three castes. A small minority become preceptors (the scientist-leaders of the league), a slightly larger number become protectors (the guardians, soldiers and police of the league) and the remaining 90% or so become commoners who undertake all other tasks. This system is designed to ensure that everyone ends up a position best suited to their capabilities and desires.

Gropius' utopian state survived his death and thrived for over two centuries. The central direction of the state's resources proved very effective and allowed the Alliance to build an unparalleled high technology base. Gropius and his system came to virtually replace religion in the Alliance and his successors took on the title of Illuminatus (enlightened one). Unfortunately, technological advancement and planning was not enough to halt Republican troops for more than a few cycles and the Alliance was forcibly brought into the Allied Southern Territories in TN 1670. Since then, the Alliance has made the best of its position in the AST and tried as best it could to preserve Gropius' dream.

The Republic has demanded certain "reforms" be made to the system and slowly some changes have been made. For the most part, however, the Republic is most concerned with ensuring that the high technology weapons developed in the Alliance are under their control. The Ghost stealth aircraft as well as the Fire Dragon and Damocles striders are only the best known examples of Humanist military technology. Some believe the Alliance has many more advanced vehicles and prototypes they keep under wraps.

Vital Statistics

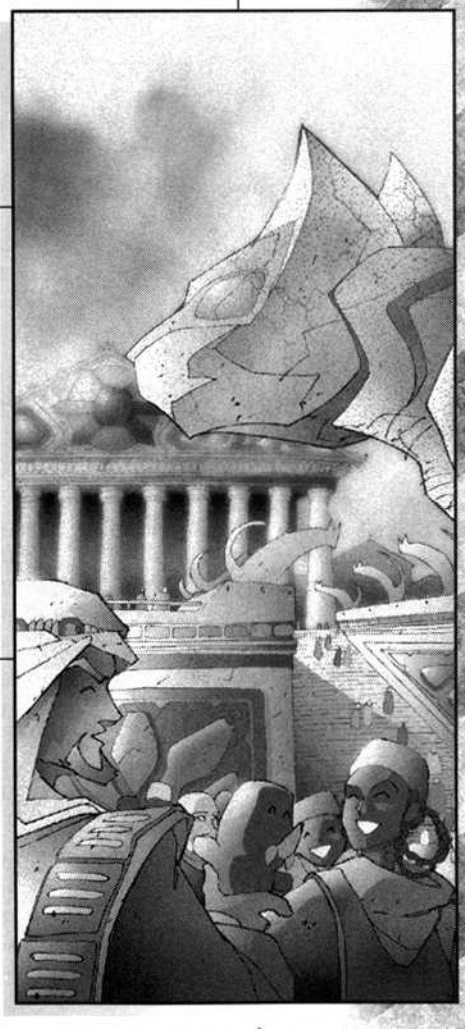
Founding Date:	**TN 1482**
Method of Government:	**Self-Perpetuating Hierarchy**
Head of State:	**Illuminatus Salvador Anastapulos**
Member Cities:	**Perth (capital), Gardena, Gropius, Oxford, Raleigh, Thebes, White Rock**
Population:	**23.4 million**

The Price of Utopia

The "perfection" of Humanist life does not come without a serious price. Concepts such as absolute privacy, political freedom and unrestrained career choice are totally foreign to the Alliance. Many fundamental choices are made for the citizenry without any say on their part unless they happen to be high-placed preceptors. Social peace and happiness is ensured by aggressive programs aimed at eliminating "deviance" (what would be considered crime or alternative thinking in other leagues). Hypnotherapy, reeducation assisted by drugs, and electronic surveillance are all very common in the Alliance. The Humanist Insight and Regulatory Authority (HIRA) is responsible for uncovering deviance and also deals with internal security. The pressure to conform can be overwhelming and while Humanists have a high life-expectancy and are guaranteed all basic needs, the league still has the highest suicide rate on Terra Nova. Some internal dissidents feel that Humanist society is too strict (even more strict than Gropius intended) and have taken to armed revolt. The most prominent of these groups operates in the city of Gropius itself. The Southern Republic also distrusts the Humanist system and has tried to force changes, with only marginal success.

Operation LongNight

When the Humanist Alliance capitulated to the Republican invaders, the Illuminatus of the time established a complex long term plan called Operation LongNight. This plan was designed to maintain Gropius' utopia through the "long night" of Republican rule. LongNight's timetable was very long because the Illuminatus realized that revolt could be very damaging to so ordered a society. In the meantime, the Alliance used its widespread control to prevent corruption from without. HIRA and the Department of Health and Morality (DHM) became the major instruments for LongNight. Unfortunately, the plan was dealt a serious blow by the invasion from Earth. Just before the CEF's arrival, LongNight seemed to finally be reaching fruition, but the cohesion created by a common enemy and the carnage of war seems to have derailed the plan. The current Illuminatus and his Inner Circle are scrambling to preserve their utopia in the face of growing instability.



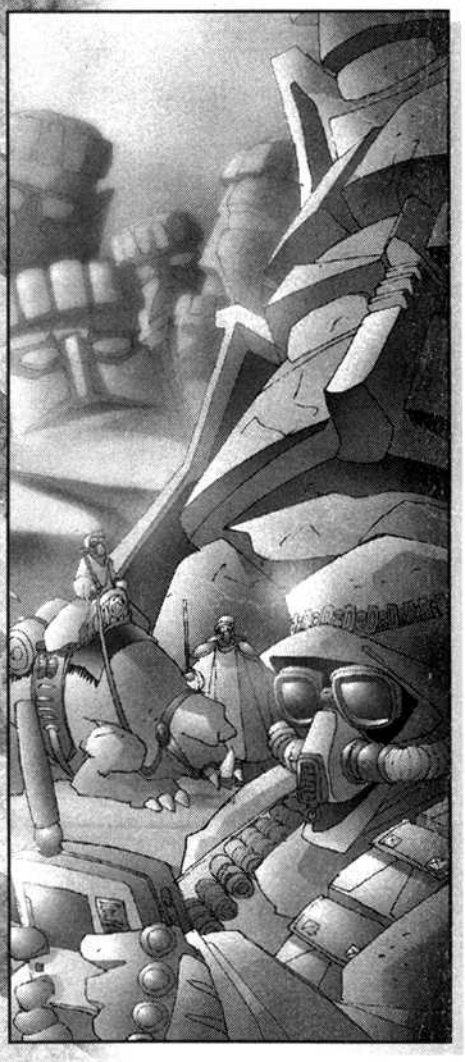
2.3 - THE BADLANDS

The Badlands is the most volatile and hostile geopolitical region on Terra Nova. From roughly 15° North to 15° South, the Terranovan climate is arid and harsh, with marginal savannahs and dune seas stretching for hundreds of kilometers between water sources. Sandstorms and tempests regularly sweep the region, making life even harder. This harsh equatorial band, however, is home to 16 million people, largely because it is the only independent region on the planet. Neither of the two polar confederations has dominance in the Badlands. Of course the deserts also form the buffer between the polar powers and is regularly home to military task forces jockeying for position. As tensions increase, so do the stakes and many communities have come under pressure to align with one side or the other.

The equatorial arid band consists of four different deserts. All share extreme temperatures (reaching 50° C during the day) and near complete aridity. Precious water is only available from rare oases linked to the underground rivers of the MacAllen Cave Network. Indigenous life has adapted to the harsh conditions and plants either have huge root networks or live under the top layer of sand; animals are often nocturnal to avoid the blazing heat. Each desert is unique, however, ranging from the dune seas of the Barrington Basin to the scrub of the Western Desert. The Karaq Wastes and Eastern Desert, in turn, feature many rocky mesas and bolder plains. Perhaps the harshest place on the planet is the Great White Desert, a section of the Western Desert filled with deadly white sand. White sand is a corrosive substance derived from volcanic ash ejected by the many active volcanoes that line the region. Because of the plentiful natural wells (remnants of the same volcanic system that created the desert in the first place), the fringe of the White Desert is home to many homesteads.

More information on the Badlands can be found in the sourcebooks **Life on Terra Nova** and **Into the Badlands**.

2.3.1 - Desert Life



Across these harsh lands millions have made their homes. Several large city-states continue to thrive in the desert, chief among them Peace River. This corporate city is generally recognized as the greatest Badlands power, mostly because it is home to Paxton Arms, the planet's largest weapons manufacturer. Port Arthur, a community founded by abandoned Earth soldiers, is currently challenging Peace River's dominance and has recently helped found an alliance of independent city-states. Other communities have had to align with one power or another and both confederations have protectorates in the region.

Badlanders have developed a wide variety of ways to survive their harsh homeland. The most common communities are homestead counties, groups of family farms (raising native springers, hoppers, and waterroot) that cooperate and support a small trading town. Homesteaders are highly conservative and self-reliant. Others live in massive oasis towers, enclosed, half-buried complexes built over water sources. These massive buildings are designed to withstand tempests, can house thousands and serve as stops on major trade routes. The trading caravans that stop at oasis towers are nomadic communities in their own right, often including dozens of vehicles and riding animals, constantly crisscrossing the deserts. The most rugged Badlanders live in semi-nomadic tribes that minimize their reliance on technology, which is liable to break down or run out of fuel. One enigmatic tribe known as the Sand Riders is known to live within the Great White Desert itself. The most "modern" of Badlanders live in full-fledged city-states that feature all the conveniences of polar life.

Polar citizens often believe that Badlanders are small-minded hicks, but a surprising number of desert-dwellers are well-traveled. Caravans carry people thousands of kilometers and homesteaders often send some of their children off to get an education in the big city or with a relative in another community. The War of the Alliance displaced a huge number of people as well, while others went to ground to fight a resistance battle.

Regardless of their living conditions, all Badlanders share a healthy respect for just how precarious their existence is. They all seek shelter (and usually sleep) at midday and they all know how precious water is. Water purification and conservation are natural instincts to Badlanders, who shower with fine sand abrasive and use large super-cooled nets to strip the wind of its moisture. Badlander clothing is also specially adapted, often featuring a heat reflective poncho and a lining of heat exchanging gel. Because of their harsh lifestyle, Badlanders have a strong sense of community and a low tolerance for visitors from the poles trying to impose their will upon them.

Unfortunately, they seem not to have a great deal of choice in the matter. The Northern Guard and Southern MILICIA tend to fight their battles across the Badlands and are often heralded (or accompanied) by a legion of "political advisors" and "trade representatives." While Badlanders can continue to refuse polar dominance, there is often little they can do to stop entire divisions from rolling across their lands.

The Paxton Protectorate ◆

The Peace River Defense Force (PRDF) is the most active native military force in the Badlands. Consisting of the equivalent of a division of well-armed and well-trained soldiers, and organized roughly like the Northern Guard, the PRDF is responsible for defending Peace River and enforcing the Paxton Protectorate. The Protectorate is a corporate policy to ensure the peace and security of the Badlands. While the PRDF cannot patrol the whole Badlands, it does have a significant rapid-deployment air wing which gives it good range. Some of the Western Desert and all of the Karaq Wastes are under PRDF protection and dangerous rovers and polar forces can expect to be challenged by Paxton units.

The PRDF also regularly sends deep patrols further into the Western Desert where they sometimes confront the Arthurian Korps. Paxton sees the Korps as a threat and shooting matches have been known to break out when units meet. The distances involved make these battles relatively minor, usually ending in a rapid withdrawal of one side or the other. Paxton Arms is currently reevaluating the necessity of the Protectorate as the polar armies get more and more aggressive. With their interest in selling arms to North and South, Paxton executives are challenging the logic of defending small communities from their clients. Others argue that withdrawing from the Protectorate is tantamount to promoting a global war. The PRDF itself has remained neutral in the debate thus far, but General Lesli Moreshead, the PRDF's commander, may be forced to take matters into his own hands soon enough.

Despite its important role, the Defense Force is in fact only a recent entity. Before the War of the Alliance, Peace River maintained only a smaller militia geared exclusively for local defense. At the height of the war, however, Paxton mobilized the volunteer Peace River Army and helped turn the tide in Terra Nova's favor. Based on this success, Paxton established both the enlarged PRDF and the Protectorate itself. The Defense Force is not comparable in number to either the MILICIA or Northern Guard., but it does benefit from Paxton's best weapon systems as well as some polar designs purchased for credit.

For more information on Paxton Arms and Peace River, see *Chapter 3: Peace River*, p. 32.

Rovers ◆

Rovers are outlaw raiders, usually making their living by stealing from small communities and trade caravans. Despite tales of huge rover armies, most gangs can only threaten isolated homesteads and small trading convoys. Lightly armed bands are easily chased off by even a nominal defense force, and those communities with enough money to invest in light military vehicles, such as Gears, have little to fear from almost all rovers. Most gangs gather around a charismatic leader who provides arms, money, alcohol or some other desired item. Gangs usually last only as long as their leader is able to bring them success.

The aftermath of the War of the Alliance has made rovers more dangerous than ever. The Peace River Army (a Badlander army backed by Paxton) mobilized and armed a large section of Badlander society and battlefields remain littered with discarded or damaged weapons. Many gangs have acquired Gears and heavy weapons, making them much more powerful. Several communities have armed themselves in response, or have called on the PRDF, the Arthurian Korps or even polar forces for aid. Unfortunately, both North and South have realized that rovers can serve as excellent tools with which to harass their enemies and several gangs have acquired new weapons from their patrons. A small minority of rovers have established themselves as bandit heroes, protecting communities from outsiders in exchange for shelter. The largest of these bands is the Desert Wolves, operating in the Western Desert near Prince Gable.

Living Free ◆

Badlanders pride themselves on many things: their rugged life, their tenacity and their raucous sense of humor. But independence is the most valued Badlander quality. The endless equatorial deserts stand between the two giants of the CNCS and AST and the locals like living away from these geopolitical mammoths. The unfortunate price of living free on Terra Nova is living in harm's way: when the two confederations fight it out, they inevitably do so in the Badlands, for neither wants to fight on enemy soil. Although no formal state of war exists between the AST and CNCS, entire divisions of the Northern Guard and Southern MILICIA trudge through the dunes and come into conflict. The frequency of these conflicts is rising and more and more people feel war is imminent. In recent cycles the North has arranged for a protectorate over the holy city of Massada, while the South has occupied the industrial town of Lance Point.

While most Badlanders were born and raised in the sands, an increasing number of polar citizens are fleeing their homes to find a new life in the desert. Dissidents, rebels and free thinkers come to escape persecution, while others simply wish to live life without answering to anyone else. Officials from both poles are greatly concerned by the growing number of soldiers who are leaving for the Badlands. Many of these are retired veterans of the War of the Alliance who feel disgusted by the prospect of fighting their former allies, but a small but influential number of young and idealistic pilots are also leaving their nations behind. The defections of Northern Duelists Danghen and Maena Jarak is only the most recent example of this trend.

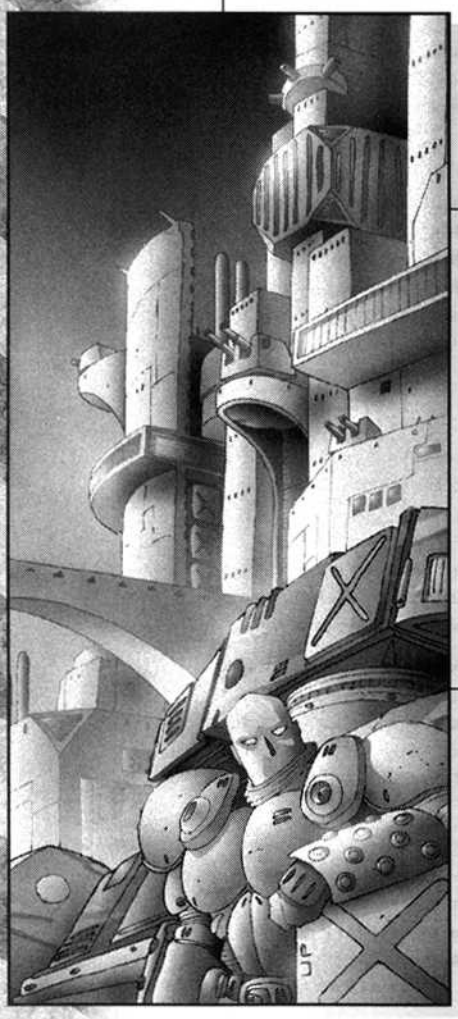
Some Badlanders have refused to accept the increasing polar influence in their homes and taken up arms to preserve their freedom. When the Southern MILICIA suppressed a worker's revolt in the Badlands community of Lance Point, the fleeing workers formed the Badlands Revolutionary Front under the charismatic leadership of Ernesto Jaxon. The BRF started out as a rag-tag group of rovers with political aspirations, but their struggle has inspired many other revolutionaries and the BRF banner is now claimed by a diverse group of cells across the desert. Perhaps the most dangerous of these cells operates in Peace River and fights to overthrow the corporate giant Paxton Arms (see *Chapter 3: Peace River*, p. 32, for more details).

2.3.2 - Port Arthur and NuCoal

The most populous Badlands city-state, Port Arthur was originally known as the Western Basin Base. The Barrington Basin settlement was built by Earth's Colonial Expeditionary Force as a beachhead and later as a supply port. Soon after the end of the war, survivors from every side started to arrive at the camp seeking refuge. In TN 1921, Colonel Charles Arthur III, a former senior officer of the Colonial Expeditionary Force, built up a loyal following and unified the various factions in the city. Today, Port Arthur is one of the strongest Badlander powers, boasting a large population, a strong military (known as the Korps) and a lucrative spaceport. Port Arthur has recently joined the New Coalition, forging a strong alliance with other Badlands communities and becoming a serious rival to Paxton Arms' dominance in the region.

Arthurian society is weird collage of Earth and Terranovan cultures. On occasion, the differences between the various groups boil over, but normally they co-exist peacefully. Over one quarter of the population are Genetically Recombined Experimental Legionnaires (GRELs), the genetically engineered "supersoldier" shock troops designed to fight Earth's battles. About 2% of the city's population are normal Earthers. These exiles form the core of Port Arthur's military high command and intelligentsia. The majority of Port Arthur's population is composed of native-born Badlanders. These immigrants overcame their fear of the Earth military forces and established most of the businesses, wealthy diamond mines and farms around Port Arthur.

The GRELs are divided into eight classes, each designed for a specific battlefield function: Isaac (technician), Isabella (medic), Jan (leader), Kassandra (electronic warfare), Maxwell (gunner), Minerva (pilot), Mordred (shocktrooper), and Morgana (commando). In Port Arthur, GRELs live in segregated neighborhoods, and some fear they are becoming restless. Most Terranovan strategists believe that Port Arthur maintains enough equipment to arm and supply almost all their GRELs. This is of great concern because it means that, if necessary, the Korps could swell from 8,000 troops to close to 100,000 within a few Terranovan days. This level of armament could not be sustained for long, however, so Colonel Arthur is thought to reserve its use for defensive or rapid-strike purposes.



Vital Statistics

Founding Date:	**TN 1921**
Method of Government:	**Military Oligarchy**
Head of Government:	**Colonel Charles Arthur III**
Allied Cities:	**The New Coalition (Fort Neil, Lance Point, Prince Gable, Temple Heights)**
Population:	**370,000**

The New Coalition (NuCoal)

Despite the increasing pressure on Badlands communities to align with one of the polar confederations, most settlements wish to retain their independence. The small communities of the Westridge Range — an important rail axis — have banded together with the power of Port Arthur to maintain their neutrality in the coming conflict. This New Coalition (NuCoal) is the brainchild of Royz Malkom, the mayor of Fort Neil. Royz created NuCoal as a cooperative trade coalition and was able to gain the support of Port Arthur, which could provide the deterrent necessary to allow NuCoal to survive polar aggression. With Colonel Arthur on board, the NuCoal Agreement was signed on 16 Summer 1931. Beyond Port Arthur, NuCoal includes Prince Gable, a trade and commerce center, Lance Point, a petroleum-rich city-state, Fort Neil, a vehicle-manufacturing center, and Temple Heights, an agricultural and academic center. The NuCoal Agreement established a free-trade zone between all the signatories and a joint policy of low tariffs on outside trade. Despite its laudable goals and provisions, the coalition is being sorely tested. Barely a season after the singing of the Agreement, Lance Point was rocked by an all-out worker's revolt. Southern troops brutally crushed the uprising to protect their fuel supply and still occupy the city.

The Arthurian Korps

Port Arthur's military, called the Korps, counts 8,000 active troops and is divided into two basic units, a cavalry brigade and an infantry brigade. The infantry brigade serves as a home guard and is equipped with high-powered anti-armor rifles of Earth manufacture. The cavalry brigade, affectionately referred to as the "pack," is equipped with highly sophisticated Earth hovertanks armed with particle acceleration cannons and lethal missile systems. The most unusual thing about the Korps, however, is that most of its troops are GREL supersoldiers. These lethal, genetically engineered giants are extremely deadly in combat and give the Korps a battlefield efficiency envied by most Terranovan commanders. All commanders beyond the company level (and many below) are humans; most were born on Earth but some are native Terranovans.

Khayr Ad-Din - 2.3.3

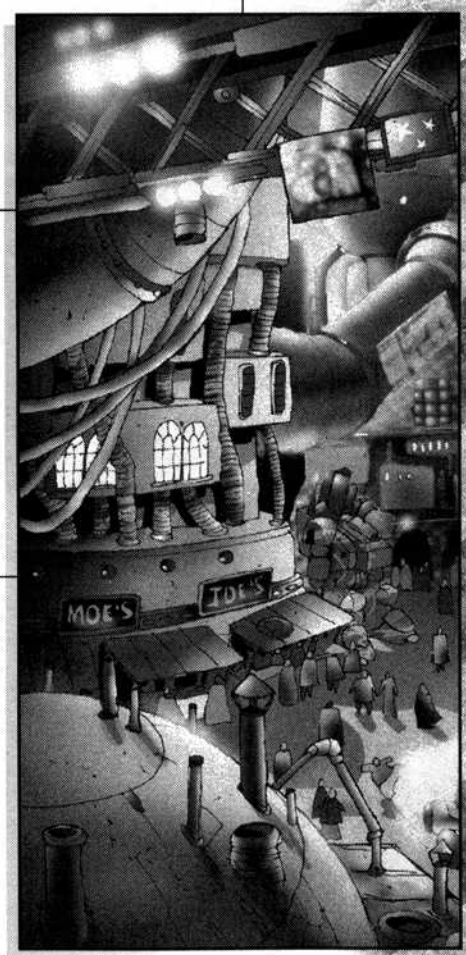
Khayr ad-Din sits on the ruins of Monroe, a colonial-era community along the gamma maglev line. Monroe was a thriving settlement until a great tempest charged with corrosive white sand swept across the Western Desert and literally eroded it away to almost nothing. It took nearly a decade for the maglev to be rebuilt and even longer for the community to be reborn. Now, only the most generous call Khayr ad-Din a full-fledged city. At best, it is a poor community centered around a valuable resource: the Khayr ad-Din Waste Disposal Site. This giant junkyard covers nearly 26 square kilometers, built-up by over three centuries of waste dumped by cities along the gamma maglev line. The metals, machinery and consumer goods thrown away by polar citizens find a new life thanks to Khayr ad-Din's legion of scavengers, known locally as Trashers. While most are abysmally poor, others have made a decent life in the trash heaps and can even field refurbished Gears.

Huddled around the maglev terminal is a small community that thrives not only on the trash, but on trade and tourism. Caravan traders from across the Western Desert flock to Khayr ad-Din to sell their wares to polar purchasing agents who then load them on maglev trains. Since the end of the War of the Alliance, Khayr ad-Din has also become the global center for gladiatorial Gear dueling. Mechanized blood matches feature some of the best pilots on the planet, most of whom have fled the military for one unsavory reason or another. The most powerful crime lord of the city, Saddik "the Spider" Jahmoon, has built his fortune on gambling receipts and broadcast rights for the duels. He has refurbished the center of Khayr ad-Din into a vaguely livable section called the Core, featuring an endless variety of bars, brothels and gambling dens. Beggars, hustlers, killers and mercenaries now rub shoulders with polar gamblers looking for a thrill.

While the city is definitely a den of cutthroats, it also has elements of a true community. Khayr ad-Din is a city that epitomizes much of the Badlander spirit of survival, of independence and of final solutions to problems. Death is never that far away in the Trash City, but there are people who will help those in need. The rich hire mercenaries or bodyguards, while the poor band together into gangs or turn to lawgivers, an informal brand of police among the poor traders of the city. See **The Duelist's Handbook** for more information on the city of Khayr Ad-Din.

Vital Statistics

Founding Date:	**TN 1550 (approx.)**
Method of Government:	**Anarchy**
Head of Government:	**None (various crime lords)**
Allied Cities:	**none**
Population:	**approximately 70,000**



The Maglev

One of Khayr ad-Din's greatest resources is the gamma maglev line that runs through it. Its very existence is dependent on the line, which brings in travelers and trash to feed the city's barter economy. Terranovan Trans-Rail (TNTR), the international consortium which runs the three maglev lines that cross the Badlands, runs a whole section of Khayr ad-Din like a corporate fiefdom. Station chief Basyl Paleologus has absolute say in the large compound and takes advantage of this fact to line his pockets. The gamma maglev links Khayr ad-Din to Franklin Harbor (NLC) and Fort James (WFP) in the North and Réunion, Marabou, Siwa Oasis and Port Oasis in the Southern Republic. This allows relatively easy access for rich polar gamblers who wish to visit the dueling arenas of the trash city and also makes the city a center for caravan trading. Large import houses have set up in the city in order to get goods into the polar leagues.

Duelist's Haven

The dueling circuit established by Saddik the Spider has made Khayr ad-Din the home of many of the planet's best underground pilots. It has also gained the reputation as a heaven for Gear pilots looking to start over. Fugitives from polar justice and those who have turned their back on politics and warmongering sometimes come to the city to hide in the crowd of Duelists. Others come seeking a thrill that is not available to them. Rumor has it that Lash, the enigmatic current Khayr ad-Din champion is a fugitive from the North — just what she is fleeing is unknown.

Of course, the life of a Duelist is dangerous and often short. In the underground pits, there are relatively few rules and fatalities are not uncommon. This brutality is often criticized by "civilized" polar citizens, but it also attracts millions of viewers on global trideo. The pilots themselves understand the risks and put their lives on the line for a variety of reasons, ranging from noble quests for lost honor to pure and simple greed, or even just the search for a new thrill.

LIFE GOES ON



The MegaPlaza was buzzing with the murmurs of the crowd gathered in Arland Longchamps Park. The Blue Spider concert was a gift from Paxton to the populace, obviously meant as some form of peace offering to appease the disgruntled masses. In a "generous" gesture, President Gerald Simosa had arranged for free transportation for anyone in the Prospects who wanted to come up to the First Terrace for the concert. As a result, Prospectors from the Fourth Terrace had shown up by the thousands. Many among them were filthy, their clothes in tatters. Up here, they looked out of place. Most had come with one or many friends, bringing bad booze and a temper to match. Marshal Terri Chen sighed.

This concert is a power keg, she thought. And of course, it was the Peace Officer Corps that had to contend with the mess. *Whoever came up with this sick little scheme should be shot without trial.*

She walked over to the park gate where a dozen Peace Officers were checking IDs and scanning concert-goers. Two Paxton Security officers, a brutish bald man and an athletic redhead, had been assigned to this gate by none other than Milani DuBeau-Slovenski herself. If rumors about the Black Queen held any truth, they probably only *looked* stupid. No one was paying any attention to them. Chen almost missed it when the bald man whispered to his partner and slipped outside the gate. On a sudden hunch, she followed him discreetly into the crowd.

He was moving rapidly, occasionally glancing over his shoulder, but he failed to notice her. She saw him pause, look around and lock eyes with a teenage Prospector. He pulled out his sidearm, grabbed the boy by the shoulder and exchanged a few words with him. Chen rushed forward through the crowd, all shoulders and elbows against the current. Something felt horribly wrong. Pulling a gun in the middle of a potential mob was suicidal. She was almost upon him when he shot the kid in the chest. There was screaming and chaotic movement, and Chen grabbed the bald man's arm. Surprised, he tried to resist, so she bent his wrist backwards and broke it, locked him into a choke hold and took the gun away. Suddenly, the crowd was silent, watching morbidly, angrily. There was some shuffling and some muttering.

The kid was frantically clutching at his chest, trying to close the wound, gurgling in pain. There was an awful lot of blood, there. Chen knew he was going to die. Even if medical help could get here in time, this wasn't covered by his worker caste insurance. With this crowd, it could get ugly. She released the PaxSec officer and spun him around to face her accusing stare.

"What the HELL do you think you're doing?!?"

"He was reaching for something inside his vest, ma'am," the bald man offered with a cool, level gaze. "I'm sure it was a gun."

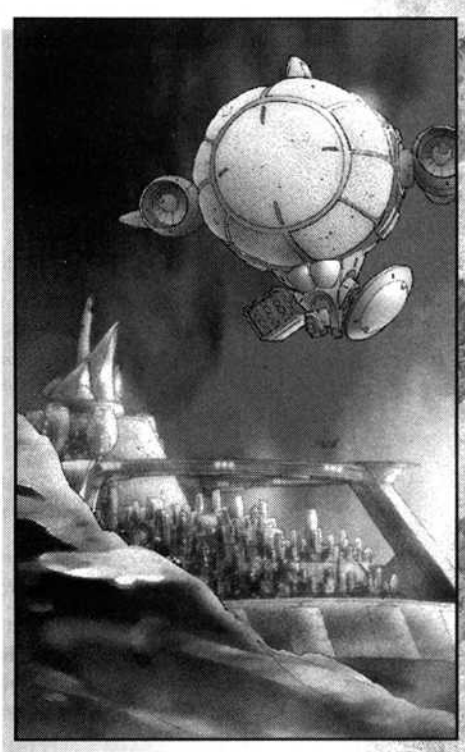
Immediately, Chen sensed something was wrong with his tone, with his eyes. He was in pain from his broken wrist, but he wasn't agitated enough. His body language was all wrong. Then it hit her and she laughed, a dry, humorless laugh. He wasn't a PaxSec officer, but some kind of fanatic who wasn't afraid of dying at the hands of a riotous mob just to ruin Simosa's party. He must have hoped that the sight of someone in PaxSec uniform killing off a few Prospectors would send the crowd in a killing frenzy. The Black Queen would have a fit when she realized her own security force had been compromised.

Peace Officers caught up with Chen. Her orders were curt. Take the man away. Find the redhead. Let DuBeau-Slovenski know about the impostor. Standard procedure.

Moments later, as the Peace Officers dragged the impostor away, Chen heard the kid on the ground exhale for the last time. As if on cue, Blue Spider stepped onto the stage and the crowd cheered. The bystanders pressed on. There was nothing else to see here.

Life went on.

OVERVIEW - 3.1



Paxton Arms is the most powerful corporate entity on the planet and a nation in it its own right as owner of the Peace River city-state. Paxton Arms seems to be doing well in TN 1933. As Terra Nova's largest armaments manufacturer, its factories, most located deep beneath the surface, are running at full capacity, feeding the arms race between the two polar leagues. Profits are high and the quality of life of Riverans is improving.

Paxton Arms, however, is facing a political crisis. During the last decades, especially in the wake of the War of the Alliance, it has moved from a simple corporation to becoming the most powerful political force in the Badlands. Certain individuals within its executive caste feel the pull of wider responsibilities to their fellow Badlanders. After the departure of the colonial forces, they forced the creation of the Paxton Protectorate to defend the people of the Badlands from polar exploitation and violence. Rather than minimizing Paxton's political imperatives, however, the Protectorate has multiplied them. Paxton is now on the verge of leading a league of its own. The time is quickly coming when it must chose between the profits of neutrality and what some claim is its manifest destiny to lead the Badlands to true independence.

Inside the walls of Peace River, factions within the executive caste fight a war of propaganda and intrigue to choose the direction of the corporation. Meanwhile, as members of the worker caste demand change, dissatisfaction in their ranks causes growing civil unrest. Furthermore, the polar leagues and Paxton's other enemies constantly watch for signs of weakness while the whole planet slowly slides towards the next global war.

Violence has become a problem within Peace River as well. The Badlands Revolutionary Front has set up shop in the desert city-state and become a banner under which worker radicals gather. Tired of endless empty promises of class-system reform while Paxton executives make fortunes from war machines, the members of the BRF have turned to violence to get their point across. Inspired by the revolt in Lance Point, they demand freedom from the caste system and the wars between North and South. Executives have responded with anger and an iron fist.

History - 3.1.1

In TN 1595, Erbert Paxton moved into the Badlands from the newly created Mekong Dominion, determined to build a corporate empire free from political restrictions. Discovering rich mineral deposits, Erbert purchased the nearby oasis tower of Peace River and created Paxton Mining.

Following Erbert's death in TN 1641, Paxton Mining continued to grow, diversifying into the manufacture of mining machinery. Still, Paxton was slowly shut out of important markets by unfair practices that served the interests of the polar leagues. Only St. Vincent's War (TN 1723-29) saved the company from bankruptcy. Following the war, the poles were devastated, but Paxton President Kyle Oglin foresaw that military confrontation would continue and turned idle factories to manufacturing armaments. It was a stroke of brilliance and in TN 1750 — as profits soared — Paxton Mining became Paxton Arms.

Paxton underwent uninterrupted growth until TN 1913 when worries about a coming polar war were replaced by the terror of the Earth invasion. Paxton, fearing an assault it could not defeat, declared itself neutral. In the tradition of its founder, however, Paxton did not wait for others to come to its rescue. Having won the time it needed, Paxton kept its factories at full production, slowly building a network of contacts and supply lines with Badlands resistance groups, and stockpiling arms. In TN 1916, it unleashed the Peace River Army into the lightly defended rear areas of the invaders.

Victory in TN 1917 brought no return of peace to Paxton Arms. Rather, the upheaval of the war brought to the surface long-suppressed social and political dilemmas. In the post-war period, careful social reforms, the formation of the Paxton Protectorate and Peace River Defense Force (PRDF), and continuing heavy demand for its products from the polar leagues have all failed to stem the growing internal difficulties of the corporation.

Society - 3.1.2

Erbert Paxton was a social reformer as well as businessman, and drew on the ideas of Yuri Gropius when creating his corporation. He wanted all employees to be brothers, a corporate family where none were superior to others and all worked together for the betterment of the whole. While Erbert lived, his composite family remained vibrant and active, and soon prospered into a full-fledged community that could have laid the pattern for a new model of society. Those who followed him, however, lacked his vision and commitment. Preserving their own power and that of their peers became more important than anything else — save perhaps for corporate profits. Thus by TN 1700, the family had ossified into an industrial caste system, rigid, exploitative and oppressive. While some caste mobility is possible for exceptional people, Paxton executives are generally descended from several generations of other Paxton executives.

The Caste System

The corporation's executives entrenched themselves as an absolute elite. They divided ownership among themselves using a system of shares and elected the entire Board of Directors but for a single nonvoting worker representative. Restricted access to higher education made it harder for other groups in Paxton to compete, and the executive caste grew enormously wealthy and privileged.

Still, the executives were a small group. To fill the gap, they developed a lower management caste made up of the white collar personnel (about 30% of employees) needed to direct the corporation. Their loyalty was assured through substantial material benefits, indoctrination and the right to elect the Peace River Council to advise the Board of their concerns.

The vast majority of employees became the worker caste. Though comfortably supported from cradle to grave, they were not given any opportunity to advance in the corporation. This lack of outlets for bright workers and the well-meaning but stifling paternalism of the executive caste led to alcoholism and violence as releases for worker frustrations.

Some attempts were made to include the workers in the corporation. Through their network of workers committees, they elected 10 Councilors and a Director. The executive caste's desire for control, however, meant these advisory processes were usually ignored. Unwilling to offer true partnership, the executive caste resorted to buying off the lower castes. When this failed they used harsher methods, but in general workers realized the value of what they had and their grievances were not so great that they were willing to risk it all to achieve change.

The number of Riverans not directly employed by Paxton also grew, reaching 35% of the population by TN 1900. The executive caste, fearing a shift in power, placed all private employees in the worker caste. The result was a stifling of city-life and removal of a potential safety valve for disaffected workers.

The Winds of Change

The social and economic costs of the caste system were slowly forcing consideration of reform when outside events forced the issue in TN 1913. During the War of Alliance, the executive caste had to rally the lower castes by appealing to their patriotism. In doing so, they irrevocably overturned the stability of the caste system. Lower caste members came back from the war demanding a greater say in their corporation, for which they had died and bled.

In TN 1918 Gerald Simosa was elected President by the executive caste with a mandate for reform. Over the last fifteen cycles, he has slowly moved to return the corporation to the vision of Erbert Paxton. He has introduced a measure of social mobility through competitive entry to the management and executive academies, and by allowing independent businessmen to petition for management caste status. Despite these and other smaller changes, frustrations remain high and more and more frequently lower caste radicals and greedy executives argue that reform has failed, that the corporate family structure must be abandoned. The former want to see the corporation collapse altogether, while the latter call for an end to corporate patronage and a transition to a more profit-oriented approach. As tensions rise, the forces of moderation in all castes are struggling to find a new purpose and place for their people and their corporation while the ranks of extremists swell.

PRESIDENT GERALD SIMOSA



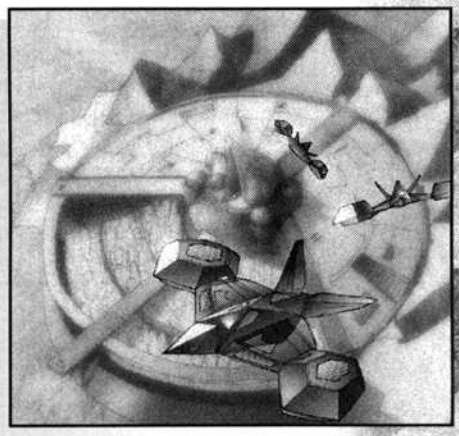
President Gerald Simosa is the Chief Executive Officer of Paxton Arms and the official leader of Peace River. Simosa was born into the executive caste in TN 1869 and his life differed little from his peers. Following graduation from the Peace River Business Academy, he started climbing the corporate ladder until he finally became President in TN 1918.

President Simosa is extremely loyal to Paxton Arms and the ideals of Erbert Paxton. He places Peace River's success as a community ahead of profits. The company's prestige in the Badlands is also very important to him, not because it is profitable but because of concern for the region, and because of what he sees as Peace River's destiny of leadership. To these ends he sees Port Arthur as Paxton's chief external threat, disliking their constant interference in Paxton's sphere of influence and openly despising Port Arthur's Colonel Charles Arthur III.

The origins of Simosa's beliefs lie in his time in the Badlands Affairs Bureau as a young executive. From his travels Simosa felt that Badlanders deserved more than the crumbs and violence the polar leagues were providing. Upon taking up other positions in Peace River, he realized Paxton was guilty of the same exploitation of its people. Simosa has worked for reform ever since and feels that his beliefs were justified by the response of both Riverans and Badlanders to the Earth invasion.

An open, friendly man, Simosa started having problems when real opposition to his reforms manifested itself. His unwillingness to make brutal decisions would have cost him his presidency but for his recruitment of Milani DuBeau-Slovenski as Head Executive Officer. Despite recurrent and growing concern over her often brutal methods, Simosa realizes that they form an almost perfect team. He wonders, however, how long Milani will be content with being the power behind the throne.

CITY TOUR - 3.2



Nothing remains of the simple Oasis Tower Erbert Paxton purchased in TN 1595 on the western edge of the Karaq Wastes. Instead, a massive city rises from the bosom of a great red rock mesa, part oasis tower, part arcology and pride of the Badlands. The city grows out of the mesa and continues far into its depths.

The majority of the surface city, called the Habitat Core, is a terraced arcology rising from beneath the shadows of the Storm Wall. It is a complex maze descending from the luxurious beauty of the upper management condominiums to the gloomy brutality of the Prospects.

Rising 400 meters over the Habitat Core, the Executive Tower stands at the center of both the city and Paxton Arms. Despite a heavy armor plating to resist the storms prior to the construction of the Storm Wall, the Exec Tower remains a tall and elegant structure. Inside, the tower displays a splendor which few Polar structures can match.

Amidst these man-made edifices, dotted with parks and other public areas, it would be easy to forget that Peace River lies in the center of the Badlands. Only the vista of a red-yellow dune sea reminds the populace that Peace River is an island of civilization in a sea of sand.

Executive Tower - 3.2.1

The Paxton Executive Tower is the ultimate development of the oasis tower concept. It rises 900 meters above the desert floor, emerging from the top of the Industrial Sector to overshadow the Habitat Core and Storm Wall. The exterior is heavily armored and has significant defense emplacements.

The tower's lower levels contain archives, vaults, computer centers, PRDF High Command, the Paxton Security Service and all the machinery and supplies necessary for the Tower to be self-supporting. The upper section combines offices with luxury apartments. Only the ground floor Plaza is open to the public, and except by appointment, polite but firm Security Service personnel guard the executive caste's privacy.

The tower, however, is more than just a simple residential and office complex. It personifies corporate wealth and executive excess and features beautiful hanging gardens. Further gardens are located on the roof or hang out from the tower on large balconies, all protected by sliding storm shutters. Indeed, some of these balcony gardens are the personal preserve of a single senior executive.

Exclusive restaurants, clubs, theaters and shops selling every imaginable luxury good are scattered around the ground floor Plaza. The embassies of the polar leagues and various Badlands states are located just above as much international as corporate politicking goes on in the Tower's decadent comfort.

The Executive Tower is the ultimate statement of the power of the executive caste and its architectural presence was designed to awe and cow the masses.

Paxton Central Offices ◆

The offices of the Paxton Board of Directors and the personal offices of its President are located near the center of the Tower. While luxurious, they do not possess the calm, smoothly functioning atmosphere one would expect. There is instead a palpable air of tension, and many staffers have an unusually furtive demeanor.

TN 1933 is an election cycle and President Simosa's reform faction is under serious attack from the rationalist faction of Chief Financial Director Fidel Jacobi. Since Paxton stands upon the verge of decisive change, the normal infighting has gotten vicious. Only in Simosa's carefully guarded offices do calm and fortitude hold sway.

Paxton Treasury Directorate ◆

The offices of Fidel Jacobi, the Chief Financial Director of Paxton Arms and the second most powerful man in the corporate hierarchy, are located on the top floors of the Tower. They are more lavishly decorated than those of President Simosa and reflect Jacobi's ambition. His arrogant contempt for the lower castes is reflected by his employment of only born and bred executive caste members.

Jacobi was the first to raise the idea of abandoning the corporate family model, appealing to the greed of his fellow executives. All who work in the Directorate are beholden to him and few know exactly what occurs on these floors. Not even the Paxton Security Service are cleared to enter without invitation; Treasury has been allowed since the days of Erbert Paxton to have their own security force.

All too aware of what is at stake, Jacobi has been at the forefront of support for the PRDF, secretly increasing General Moreshead's budget through discretionary funding. He does not trust President Simosa to abide by the results of the election and intends to be ready to take control of Paxton Arms through more underhanded means if necessary.

◆ PRDF High Command

The PRDF High Command, known colloquially as the Bunker, is located deep under the tower. Guarded at all times by the Security Service and by stringent security procedures, the Bunker is totally secure. It is an austere facility, with senior officers having quarters far above. Despite the lack of comforts, however, an increasing number of executives have come to consult with General Lesli Moreshead in his glass-fronted office overlooking the Operations Room. His vote on the Board has given him unsolicited power in the struggle between Simosa and Jacobi.

General Moreshead has surprised his fellow Directors with his political savvy and inflexibility as he resists the manipulation of his force for political ends. Still, Moreshead is aware that the PRDF is too powerful to stay neutral forever in the growing political ferment. Whatever the turn of events, Moreshead is determined that he will not be driven from Peace River or his command. Once commander of the Humanist Alliance Protector Force, he was driven out by the machinations of the AST.

3.2.2 - Habitat Core

The Habitat Core descends in three massive semicircular terraces from one side of the Executive Tower to the top of the Storm Wall's base, with a further level underneath the permanent shadow of that massive structure. Status in caste society determines where one lives: the higher the caste, the higher the terrace. The municipal levels lie beneath the living areas that cover most of the terraces. They contain the city's service industries. Most structures in the Habitat Core are all connected via the municipal levels. Many are linked via flying bridges while others are simply one continuous city-wide structure.

Hidden amongst this architectural jungle are little pockets of sunlit gardens and small plazas thronging with people and ringed by coffee shops, bars and restaurants. No surface or space is not decorated or painted; even the Storm Wall's massive struts rising above the Habitat Core are beautifully lit at night like some modernist sculpture. The caste system, however, has lent an atmosphere of frustrated disaffection to the society of the Habitat Core and — like the Prospects themselves — the real ugliness lurks out of sight.

◆ Peace Officer Corps HQ

The Peace Officer Corps Headquarters is a squat, ominous slate-gray building built into the wall of the Second Terrace. While precinct buildings are scattered throughout Peace River, the HQ is home to the POC Academy, city prison, municipal courts, the office of the Peace River Marshal, specialist police units and the administrative offices of precinct-based units.

The most important special units are the Crowd Pacification Group (CPG), responsible for riot control; Tactical Response Group (TRG), which handles violent situations; Special Weapons Operations Squad (SWOS), in charge of heavy ordnance, including Gear deployment and bomb disposal; and Criminal Intelligence Bureau (CIB).

The HQ features its own subway station, the Corps' main heliport and special connections to the road tunnels that run under the Core. The only place in Peace River the Corps cannot get to quickly is the Executive Tower, which is out of their jurisdiction.

Peace River Marshal Terri Chen oversees the Headquarters. Chen's effectiveness and willingness to hit the street make her a popular commander and a well-respected figure in the city. After 45 cycles in the Corps, Chen has seen it all, but the rising spiral of violence has forced her to adopt measures she abhors. Chen has dealt with the Security Service for cycles in their role as the Internal Affairs instrument for the Corps and understands the necessity of a joint effort against terrorism. She is afraid, however, that the Corps is getting caught in PaxSec's politicized agenda.

◆ Peace River Council Chamber

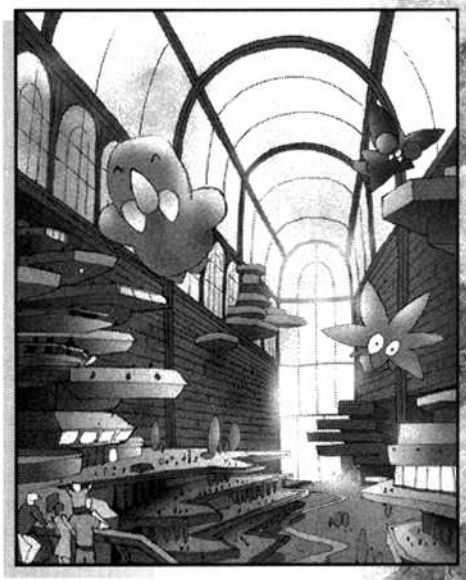


The simple domed chambers of the Peace River Council are located amongst the senior management condominiums on the First Terrace. The council's ninety members, along with ten non-voting worker caste members, work here in crowded, badly designed and poorly equipped offices.

Most management caste members have traditionally been elected as a retirement benefit. The worker caste radicals filling the remaining seats are no better, their interventions more disruptive than constructive. As a result, the council has earned a reputation for uselessness. Since it is only a consulting body that has largely been ignored over the cycles, this has presented no great problem. Hoping to change the Council, Administrator Hitashi has ordered a major refurbishment of the Chambers while President Simosa is trying to motivate more competent members of the management caste to run for office next cycle.

For over two cycles, the main debate within the Council has been reform of the corporate family. Often heated and usually uninformed, the debate has nonetheless been useful to President Simosa. It has raised the concerns of the general population via the live broadcast of the Council debates. The nature of the debates has enraged Fidel Jacobi. He has repeatedly called for the dissolution of the Council as a cost-saving measure and because of its counter-productive contributions to the city.

Erbert Paxton MegaPlaza



Built on the First Terrace, Erbert Paxton MegaPlaza is a massive shopping and entertainment complex and the public center of Peace River. While people may usually frequent their local bars or shops, when they go out on the town, they come to the MegaPlaza and its diverse businesses. Important sites like Arland Longchamps Park and War Memorial, and the offices of the Peace River Administrator add to the prominence of the MegaPlaza. President Simosa proudly regards it as his brightest legacy to his city.

The complex is a great leveler, a place where all castes rub shoulders, and has done much to stimulate desegregated social activity. Some suspect that this was President Simosa's intention when he commissioned the MegaPlaza in TN 1920. Its high profitability limits grumbling about the huge expense of construction and possible political motivation.

To the average Riveran, political concerns are irrelevant. Whether they come to shop, visit an old comrade's name amongst the flowers of Longchamps Park, swim in the Badlands' only public pool, attend a Peace River Theater Company play or watch a game of hoop-ball or merely wander around, the MegaPlaza is a guaranteed source of pleasure.

The MegaPlaza is also the center of independent business in Peace River. Even if their production facilities or warehouses are down in the municipal levels of the Habitat Core, the cheap office space in the MegaPlaza has encouraged more than half of the city's independent businesses to locate their offices there. Thus the MegaPlaza Management Committee has become the unofficial Peace River chamber of commerce.

Storm Wall

In TN 1770 Paxton engineer Thor Heidal offered a solution to the problem of expanding Peace River without resorting to series of oasis towers. Heidal proposed an enormous set of storm shutters which he called a Storm Wall. The initial expense and technological difficulties held back approval, but it soon became clear that Peace River was growing so fast that no other solution was going to be cheaper or as versatile.

In TN 1796 the Wall was finished. Rising from a 300 meter solid base, a great 100 meter wide strut thunders upwards for another 350 meters to become level with the top of the Industrial Sector. Machinery built into the industrial section drives huge shutters along the base, protecting Peace River against sandstorms and war. The Wall is a source of pride in Peace River, especially since — when viewed from above — Heidal's web of roof struts form the corporate peace-symbol logo. To make Peace River's power even clearer, Heidal built some of the Peace River airfield's smaller runways onto the roof struts.

The Wall contains a multitude of other facilities, including a large proportion of Peace River's defenses. However, because it has been off-limits to non-restricted personnel since it was built, the Wall's full capabilities are a matter for wild speculation by Riverans and careful consideration by Paxton's enemies. One thing is certain: none of the half dozen orbital and missile attacks launched by the Earth forces during the War of Alliance did significant damage.

Peace River Airfield

While air transport is not popular over the Badlands because of its strange weather patterns, Paxton has enough wealthy and secretive customers to warrant an airfield. Originally a simple strip with a few buildings atop the Mesa, the airfield was replaced by a more ambitious facility in the TN 1790s, during the early cycles of corporate success. Peace River Airfield was designed as three separate but integrated facilities. Since the War of Alliance a fourth has been added.

Paxton integrated the majority of the Airfield's facilities — an array of hangers, workshops and control facilities — into the base of the Exec Tower. This had the dual benefit of protecting expensive aircraft and facilities and not spoiling views from the Tower's residential area. The runways were just extended along the Storm Wall's roof struts.

In order to provide wealthy arrivals with the best possible welcome to Peace River, a terminus was constructed into the side of the Executive Tower. Designed to impress visitors, this luxurious installation provides a breathtaking view of the city.

Following the War of Alliance, Paxton needed a base for the new PRDF's air-arm. Rather than construct a new airfield from scratch, Paxton dug an entire new base beneath the existing one, with lifts to carry aircraft up to runway level. All the PRDF's air power, from the deadly Black Wind stealth hoppers to helicopter troopships, are based here along with military facilities like barracks and armories. Military aircraft now outnumber civilian ones using the Airfield.

The Airfield is now one of the most recognized icons of Paxton's corporate image. Indeed, the four runway struts leading out from the Executive Tower over the Habitat Core and the top of the Industrial Sector turn the entire city-state into a giant peace symbol — Paxton's corporate logo. Paxton executives are proud of this achievement; some other Riverans liken the experience to living inside a giant billboard.

◆ The Prospects

Lying beneath the permanent shadow of the 300-meter high base of the Storm Wall, the Prospects are the gloomy home to the least skilled of the worker caste. Not surprisingly, half of all Peace Officers work in the Prospects because most of the city's violent crime, criminal gangs and other unsavory activities occur among the Sector's massive concrete apartment blocks.

In the 100-story linked housing projects, there are few social centers other than bars. Only a few recreation facilities were put on the Fourth Terrace. It was thought people would prefer to go up to the light and airy Third Terrace instead. Unfortunately, workers housed here did not have the money for regular inter-terrace trips. The result has been a boredom that has ripped at the social fabric of the inhabitants, and alcoholism, domestic violence, suicide and political radicalism have been as much the result as crime.

Often other Riverans forget that the majority of Prospectors are hard-working people trying to live in a bad situation, and that discrimination against them just exacerbates matters. Social commentators, however, have noted how it has been people from the Prospects who have been the most eager to take up chances to try for the management and executive academies.

3.2.3 - Industrial Sector

Merging seamlessly with the municipal levels of the Habitat Core, the Industrial Sector sinks down 2 kilometers and fills the massive armored semi-circle behind the Executive Tower. Only the upper levels are of human proportions. Here, the light, high tech components of Paxton products are created; the corridors are well lit and painted with soft pastel colors. The further down one goes, the more the facility swells into inhuman immensity. Deep within lies the vast, vaulted main blast furnace chamber. A dark, infernal place of continual noise, it seems to beat like the heart of the mighty corporation and city above.

Hundreds of assembly lines, forging plants, refineries, paint shops and thousands of other facilities fill the Sector. There are also immense warehouses containing both products to be sold and Paxton's strategic reserve of important raw materials like uranium and oil. Isolated in a distant part of the Sector, behind a hundred meters of solid rock and armor, lay the ammunition plants and magazines. Each is also sealed from the others, so that no accident can destroy more than one operation.

There are a few areas of human habitation or proportion, such as the PRDF Main Garrison, the maglev station and the Paxton Research and Development Compound, but they are few and far between. The depths of the Sector are almost all huge and dark, or cramped, twisted and darker still. Some minds are incapable of dealing with the Sector and old-timers maliciously unnerve new workers with stories of executives driven mad and throwing themselves into industrial shredders or furnaces.

HELENA HITASHI



Helena Hitashi is the Administrator of the Peace River Habitat Core. Although President Simosa is technically leader of the community, Helena is responsible for the day-to-day affairs of the city-state and all its inhabitants, whether they be employed by Paxton Arms or not.

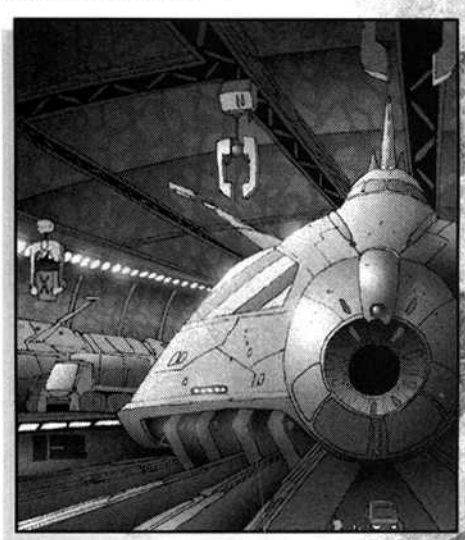
Born into the worker caste, Helena became a leading radical before her expulsion from Peace River for leading a violent protest march in TN 1913. Helena was only readmitted because of her brilliance as a commander in the War of Alliance. Unrepentant, she immediately resumed her political activities. Through these activities she repeatedly met President Simosa and both learned to respect each other. In TN 1923, Simosa took a significant political risk and made Hitashi Administrator. She has proved equal to the position, struggling to change Riveran society despite constant setbacks.

President Simosa's unbending support has created a strong bond of friendship between the two. Aware of his political problems, Hitashi does everything she can to help her ally. She knows well that if Jacobi wins the presidency, all her struggles will have been in vain. However, she and her close ally worker Director Rodrigo Ferdinand are increasingly under attack from their own caste. Extreme radicals led by Eduardo Kosta-Diga and the terrorist Badlands Revolutionary Front (BRF) have been targeting both as traitors. Despite all that they have achieved, they cannot defend themselves without doing political damage to Simosa.

Administrator Hitashi continues to have some strong support in the worker caste, but she has felt less and less welcome in recent cycles. She has made efforts to make herself available to the poorest of Riverans, opening "administrative access" offices (community centers and service bureaus) in the Prospects and other neighborhoods. These have unfortunately become favorite targets for the Badlands Revolutionary Front.

Exacerbating matters, Helena's personal life is in tatters. She has had strong feelings for Paxton HEO Milani DuBeau-Slovenski since they first met 5 cycles ago, and fell fully in love in the TN 1930s. They had a brief liaison in TN 1932 but it soon fell apart. She feels that Milani is still interested, but cannot make her face her feelings. Still hurt by this rejection, Helena feels increasingly lonely and isolated, throwing herself into her work.

Alpha Maglev Link Station



The sheer volume of Paxton Arms sales means that the alpha maglev is the only economical way of moving product to the poles. Raw materials, on the other hand, come mostly from the Badlands and arrive via a constant flow of convoys. Nevertheless it was still profitable to construct a maglev siding into the Industrial Sector. The maglev line is so important that Paxton Arms is a major shareholder in Terranovan TransRail, the neutral conglomerate controlling the three lines.

The station is huge, resembling a loading dock more than a passenger terminal. It has four docks, each capable of loading or unloading an entire train at once. A small sealed and humanly proportioned terminal and bank of elevators seem grudging concessions to passenger traffic, but it is comfortable, pleasing to the eye and sound proof. Outside the passenger terminal, few figures can be seen and the harshly lit station often seems inhabited only by work Gears and other vehicles. The lighting is a new feature installed in response to attempted infiltration via the maglev. In TN 1926 a man was found wandering around the Sector. It was discovered he had entered via the maglev, but his motivation remained a mystery; a week lost in the Sector had driven him mad.

Despite widespread belief that any further infiltrators would suffer the same fate, the Security Service ordered the Peace Officer Corps to search all arriving maglev trains more thoroughly. The lighting of the Station should also make any covert exits from the trains that much more difficult. Peace Officers generally consider maglev duty to be a pain. Indeed, searching through the massive cars can take long hours. Most officers feel if PaxSec wants it searched, they should do it themselves.

PRDF Main Garrison

Built into the far side of the mesa from Peace River, the Peace River Defense Force Main Garrison is almost a small city in its own right. Except for airmen and senior officers, all single PRDF personnel live here. Only married troops are given housing in the city, and they must still report for inspection every morning.

The Garrison is built right up against the wall of the Mesa. The innumerable mess halls and barracks thus have natural lighting through windows, minimizing feelings of isolation or oppression. The officers' mess even has a large garden balcony resembling those in the Executive Tower. Heavily armored shutters prevent storms or attacks from breaching the integrity of the Garrison.

The many vehicle depots are grouped around the cavernous main hangar, in which small unit exercises can be held. The PRDF uses the desert for most exercises, however, and its real purpose is to allow troops to issue forth in reinforced battalion strength in the event of a siege. The main hangar doors are hardened to withstand a close nuclear strike, as are the smaller doors used in normal operations.

Other facilities include the PRDF Officer Academy and Boot Camp, control rooms for Peace River's air defenses and automated artillery systems, a restricted level connected to the MacAllen cave network, extensive supply dumps, and the administrative offices of the PRDF. The Garrison is a lively place, home to many young people, and the pride with which they serve is obvious.

Paxton Research and Development Compound

Even the precise location of the R&D Compound is restricted information. It lies within the Industrial Sector, but only one elevator bank from the Executive Tower goes there. While there must be other links, anyone who knows about them is under strict orders not to talk about them.

The work force in the Compound is also unusual; at least a quarter come from the executive caste and the rest belong to the management caste. The best minds come here and genius has always been rewarded with higher caste. Paxton relies too heavily on R&D to maintain its position to allow anything to inhibit success. For that same reason the Security Service has carte blanche when dealing with threats to Compound security.

A hothouse environment where money is no object, the Compound pushes the boundaries of Terranovan science every day. While only one project in ten reaches production, Paxton knows the value of any and all information. The Compound is said to bristle with captured Earth weaponry, including antimatter devices. Rumors about captured GRELs, the near-sentient "Bowser" Gear and other more outrageous projects sweep Peace River every season.

Such wonders as the new Paxton light recon Gear, a stealth cruise missile designed to take out landships, repeating laser infantry rifles, orbital range laser cannons, NNet-equipped infantry armor, special "devices" designed for the Security Service and a hundred other deadly high tech toys are but a few of the many speculations that regularly sweep over the city-state. No one knows for sure, but whatever the Compound contains, it consumes fifteen percent of Paxton's total budget.

According to the Paxton Security Service, there has never been a successful infiltration of or theft from the Research and Development Compound. Unfortunately for them, that is not true. Operatives of the Mekong Dominion infiltrated the compound in TN 1927 and implanted destructive computer virus that took a full season to isolate and destroy. When put in charge three cycles later, HEO DuBeau-Slovenski stepped up security to prevent any repeat infiltration.

3.3 - PAXTON SECURITY SERVICE [PAXSEC]



The Paxton Security Service, originally created with the founding of Paxton Mining as a traditional facility security service, was transformed with the creation of the Peace Officer Corps in TN 1829. No longer simple security guards, PaxSec became an efficient and deadly secret police, protecting Paxton from internal and external threats. Now answerable only to Head Executive Officer Milani DuBeau-Slovenski, PaxSec is feared throughout Peace River and by Paxton's international enemies.

The head of PaxSec is Colonel Reichter Lenaris, a fifty-cycle veteran of the service at the peak of his career. Though respected within his corporation and feared by his opponents in the shadowy world of intrigue, the Colonel has no regard for such lofty sentiments. His pleasure comes from playing the game. Some subordinates whisper it would not matter to the Colonel who he worked for.

The Colonel only feels comfortable working for those he respects, and he respects those who ruthlessly wield power. Milani DuBeau-Slovenski fit his criteria perfectly. Indeed, the Colonel has enjoyed working for her over the last three cycles more than anything since the war.

The PaxSec uniform is a variation on the gray uniform or armor of the POC. PaxSec officers wear a black version, unadorned but for two small inverted peace-symbols on the collar or their helmets. The combination of the uniform and arrogant demeanor of service agents makes them a formidable sight. Their equipment and abilities are a match, for they are Paxton's best, PaxSec accepting only combat veterans. Usually, uniformed agents can only be seen at the Executive Tower and R&D Compound, or situations like major terrorist incidents.

The Colonel prefers more subtle operations and PaxSec agents are much more likely to never even be noticed by those around them. Many problems have been nipped in the bud by judicious assassinations or blackmail. To support these sinister efforts, the service's many deep cover agents scattered through the city and in strategic foreign centers feed information back to the Colonel. Within Peace River, plain-clothes agents usually carry a hidden PaxSec symbol on their person. Merely displaying it is often enough to ensure terrified cooperation from any Riveran.

The Service is uncannily successful. The Colonel is increasingly worried, however, that someone has penetrated his networks. He has little more to go on than intuition and a few small, seemingly unrelated incidents, but with the next world war perhaps mere cycles away, he regards paranoia as a healthy attribute.

The Service is also concerned about enemies internal to Paxton Arms and the Peace River mainstream. Fidel Jacobi's Treasury Directorate (out of PaxSec's jurisdiction) is a constant thorn in the Colonel's side and he also fears that Peace Officer Marshal Terri Chen has too many plans of her own. Only HEO DuBeau-Slovenski's orders have stayed Lenaris's thus far.

◆ Organization

Colonel Lenaris and HEO DuBeau-Slovenski operate the service with a very flat command structure. The Colonel controls only three bureaus: Operations, Intelligence and Training. Together, DuBeau-Slovenski and Lenaris are able to keep close eye on all operations, and indeed direct many of them personally.

One result is that all PaxSec agents have wide discretionary powers. Combined with its agents' high intelligence and training, this makes the service much more responsive than most opponents, offsetting its small size to some extent.

Recruitment and training is a long, slow process which usually takes about seven cycles. The Colonel takes members from all three castes, and even recruits talent from small communities in the Badlands. Training is realistic and harsh, and deaths are not altogether unheard of.

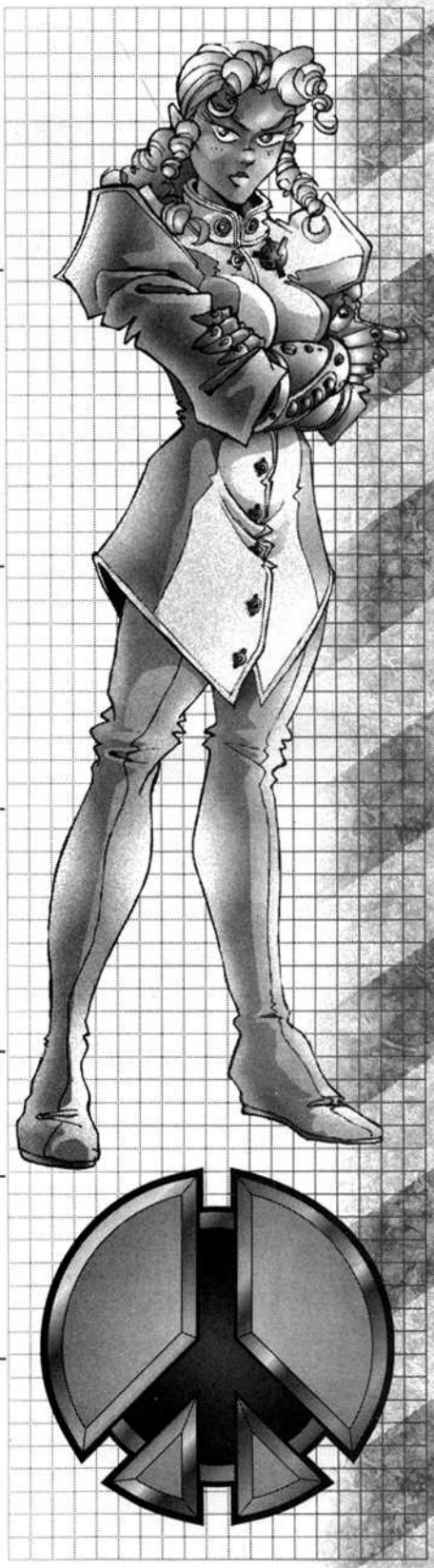
◆ Current Concerns

PaxSec currently has three main tasks; Milani DuBeau-Slovenski has charged the Colonel with exterminating the terrorist Badlands Revolutionary Front, disgracing or eliminating Fidel Jacobi, and keeping track of the machinations of the polar leagues in the Badlands. Lenaris also wishes to discover the fate of Nicosa Renault, the famed mercenary master spy missing since the War and the only opponent he knows to be skilled enough to penetrate his networks.

Operations against the BRF are not going well. In fact the almost total lack of information has led the Colonel to dismiss them as a threat, but he is trapped by the continuing terrorist actions claimed by them and subsequent political pressure. Thus he has resorted to assassinating suspected BRF contacts to flush the terrorists out.

MILANI DUBEAU-SLOVENSHI

Milani was born in TN 1889. Her mother was in labor for over 36 hours — a full day — before Milani came out, crying angrily. Days later, exhausted, her mother expired. Resented by her father and two older brothers for her mother's death, Milani grew up an angry child. Educated in a series of boarding schools, she achieved academically but her distant and aloof manner earned her wicked nicknames. She easily won entry into the Peace River Business Academy, where she learned to use feminine wiles in addition to her formidable mind and driving ambition. More academic successes and a series of convenient paramours saw her graduate with the highest honors. Milani's move into the corporate world was easy; the cutthroat nature of Paxton Arms suited her perfectly. She quickly climbed the corporate ladder and turned into a ruthless businesswoman.



◆ Profession

At the beginning of TN 1930 Milani became Head Executive Officer for Paxton Arms, apparently working closely with CEO Gerald Simosa to solve the company's problems. In reality they have formed a different partnership. Simosa presents the public face while Milani deals with the blacks operations and assassinations. In doing so, Milani has earned the nicknames of "Head Executioner" and "Black Queen." Most employees at Paxton steer clear of her and dread her appearance in their departments. Only the incompetent need really fear her, however, since her major concern is to make Paxton ready for the coming world war. To this end she is methodically eliminating deadwood and other threats to the corporation.

◆ Attitudes

Milani is a cold, lonely and vengeful woman, but her demeanor betrays none of that. She is determined to let no one control her. Yet now that she is at the very top of Paxton Arms, she finds her freedom empty. Rather than face these feelings, Milani drove away Helena Hitashi, the only person to ever truly affect her emotionally, and instead loses herself in a fast, furious and amoral lifestyle. Power is her only joy, and with it she inflicts the same suffering on her enemies that she has experienced.

◆ Combat Reactions

Although she enjoys long hours at the shooting range, Milani is not used to combat. She will use her 6mm Maus pistol if she has no other choice, but would rather lie and lure her attacker into a trap. Milani takes great care, however, to never put herself in such positions — laying plans within plans in order to control every situation. Her pistol is always in top condition — she maintains it every night — and she carries it with her at all times, along with a clip of extra ammo, just in case things go wrong.

Vital Statistics

Age:	44 cycles	Height:	1.67 meters	Weight:	79 kg	Hair :	red-brown	Eye :	dark gray

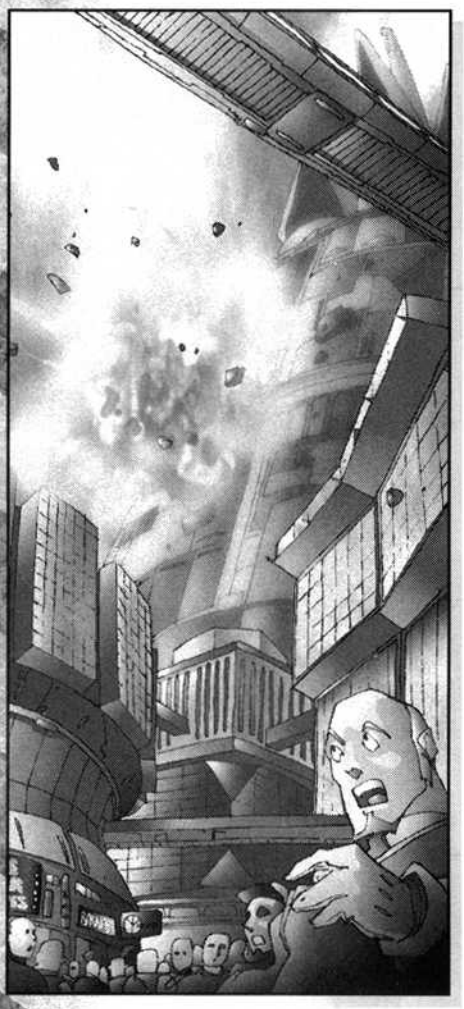
Attributes

AGI	0	APP	1	BLD	1	CRE	1	FIT	0
INF	0	KNO	1	PER	2	PSY	-1	WIL	1
STR	0	HEA	0	STA	30	UD	4	AD	4

Skills

Skill	Level	Attr	Skill	Level	Attr	Skill	Level	Attr.	Skill	Level	Attr.
Bureaucracy	2	1	Investigation	1	2	Psychology	1	1	Business	2	1
Law	1	1	Small Arms	2	0	Etiquette	2	0	Leadership	2	0
Theatrics	2	0	Forgery	3	1	Notice	2	2			

3.4 - BADLANDS REVOLUTIONARY FRONT (PEACE RIVER CELLS)



When rebel workers seized control of the industrial Badlands city of Lance Point in TN 1931, a wave of solidarity swept through the worker caste and groups organized to provide aid. One of these was led by a fiery young agitator named Sundra Gabriel. The subsequent massacre at Lance Point by the Southern MILICIA showed her that the bosses respected only force.

When word of Ernesto Jaxon's Badlands Revolutionary Front being formed from surviving rebels and fighting in the hills around Lance Point reached Sundra, she realized her true destiny. She immediately set about recruiting members for a Riveran BRF, concentrating on the Prospects. By TN 1932, she had four cells operating.

At first attacks were limited since weapons were hard to come by. Small successes lead to more recruits however, including some disgruntled management caste members. One of these, Harris Bilton, was able to start a steady flow of small arms, protected from discovery by subtle assassinations and manipulation of clerical documentation. Using some of her shadier recruits, Sundra also started smuggling some weapons out of Peace River to trade for explosives and money to fuel her efforts.

Narrowly escaping capture by PaxSec in late TN 1932, Sundra fled to a Revisionist mission on the pilgrimage route to Massada. From there she maintains control of the BRF's fifteen cells via the smuggling network and personal visits while disguised as a Massadan Revisionist missionary. The failure of PaxSec to follow up its early successes has convinced Sundra that the BRF was ready; for the last two seasons she has ordered bombings and assassinations by the dozen.

By carefully minimizing casualties amongst the lowliest members of the worker caste and judiciously spreading about some of the smuggling profits, Sundra has been very successful in building support in the Prospects. Each BRF cell now has a number of safe houses and lists of trustworthy supporters for support tasks. More importantly, even uncommitted Prospectors now refuse to inform on the BRF, frustrating attempts to locate them.

The BRF is slowly expanding throughout the Prospects, creating caches of small arms in preparation for the major rebellion Sundra foresees. The Riveran BRF has no ties to any foreign power. Despite their reputation among executives, they are patriots and wish to save Peace River rather than destroy it outright.

Through her smuggling operation, however, Sundra has established ties to some important allies. She sells her weapons to the Forzi smuggling cartel out of Wounded Knee and they in turn have provided a way to receive many other resources or even weapons that can be used without fear of being traced. This has greatly slowed investigations into BRF attacks, because they often use weapons produced at the poles. PaxSec and the POC have been unable to uncover this critical connection thus far, but the CNCS and AST are both looking into the theft of their armaments.

◆ Organization

The main problem for PaxSec is that the BRF has no hierarchical organization. Each cell is completely independent, knowing virtually nothing of the others. The smuggling operation is also separate and run by professionals recruited from the Prospects' criminal gangs. Even the secret weapons caches are hidden by supporters unaware of just what they are concealing. This system has successfully concealed the extent of BRF mobilization from PaxSec, who believe Sundra leads a single cell.

Only Sundra Gabriel knows it all. It is her impressive genius for guerrilla warfare and leadership that allows the BRF to operate as a unit. She provides each cell with lists of targets and lets them decide how and when to hit them. The result is a frustrating randomness into which Colonel Lenaris and HEO DuBeau-Slovenski are desperately trying to read a pattern.

◆ Current Concerns

Sundra has recently decided that attempts at reform threaten the major worker uprising she is preparing for. She has consequently added worker caste moderates to her list of targets and started distributing pamphlets attacking the motivations of moderates, especially Helena Hitashi and Rodrigo Ferdinand.

Reading the political situation in Peace River astutely, Sundra has realized that a victory by the Jacobi faction would bring her worker revolt much closer to reality. Thus she has decided upon a series of atrocities against the executive caste to try and discredit President Simosa. Sundra realizes she is playing a dangerous game, however, since she does not wish to weaken Peace River to the point that it falls to polar or other outside forces.

SUNDRA GABRIEL

Sundra was born in the Prospects in TN 1900. Her childhood was hard but loving, her parents doting on her and her brother although they both worked long hours. Sundra was the family's pride and joy, her intelligence winning her scholarships to executive caste schools. Her success seemed assured until her life fell apart around her in TN 1923. Her father was diagnosed with black lung, a fatal disease caused by contaminated air in the ore refineries, and rapidly succumbed. His wife died soon after him, probably from grief.

Sundra's bitterness knew no bounds and in TN 1925 she turned down a place at the Peace River Academy for politics. While political agitation came easily to her, willingness to kill and injure is a recent development. Her brother, Thom, was killed in TN 1930 in an industrial accident. To her, Paxton Arms became a monster consuming everyone she loved, and her hatred for the corporation now knows no bounds.



◆ Profession

For 8 cycles Sundra has been a professional agitator and revolutionary. Fanatical belief in her cause and personal loss have steeled her against feelings of remorse for those she kills or maims. Understanding the importance of knowledge, Sundra has worked and studied until she is one of the best informed people on the social and political situation in Peace River. If her enemies realized how much Sundra knew and how cunningly she directed her plans, she would soon find herself the most wanted person in the Badlands. Her military skills are also self-taught, but she is looking for formal training after noticing gaps in her knowledge. She has made initial contacts with Ernesto Jaxon, unaware that he is no more a soldier than she is.

◆ Attitudes

With the death of her family, Sundra has become a cold, calculating and unfeeling woman. All the killings she has planned and performed since then merely freeze her emotions further. Only the hatred and anger behind the cause fire any response in her. Yet this is very much against her natural personality, for behind the hard killer is a keen intellect that once delighted in friends, jokes and had great plans for the future.

◆ Combat Reactions

Sundra is inured to violence and will resort to it without hesitation if it means success. She will take any action, no matter how barbaric, justifying it in name of the cause. Her lack of restraint makes her a frightening opponent. Realizing that the BRF will not succeed without her, Sundra will not throw her life away; at the time however, she will not allow herself to be taken alive if at all possible. She carries at least two weapons at all times, hidden beneath the Massadan sister's robes that are now her usual mode of dress.

Vital Statistics

Age:	33 cycles	Height:	1.52 meters	Weight:	59 kg	Hair Color:	brown	Eye Color:	brown

Attributes

AGI	0	APP	1	BLD	0	CRE	0	FIT	0
INF	2	KNO	1	PER	1	PSY	-1	WIL	1
STR	0	HEA	0	STA	25	UD	3	AD	3

Skills

Skill	Level	Attr	Skill	Level	Attr	Skill	Level	Attr.	Skill	Level	Attr.
Ambush	1	0	Investigation	1	1	Stealth	2	0	Bureaucracy	1	1
Leadership	2	2	Streetwise	3	2	Demolitions	1	1	Notice	2	1
Tactics*	2	0	Dodge	1	0	Psychology	3	1	Theatrics	2	1
Etiquette	1	2	Small Arms	1	0	*(Guerilla specialization)					

4.0 - SILHOUETTE BASICS

The **Silhouette** rules system is an extremely flexible game engine. Depending upon a gaming group's preferences, it can serve as a roleplaying game, a tactical board game, or a smooth integration of both. Roleplayers may wish to ignore the tactical sections of these rules. Similarly, wargamers should feel free to use only the tactical rules system. Gamemasters should feel free to adjust the "realism" of the campaign, from an accurate simulation of reality right up to a movie-like flash of action and adventure. No matter the type of game played, however, the following characteristics will always remain at the base of each and every Silhouette game session.

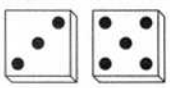
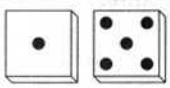
4.1 - DICE AND DIE ROLLING

The Silhouette system uses everyday six-sided dice to add a random element to the game. These are sometimes referred to as "1d6" in the rules, "2d6" for two dice, 3d6 for three, and so on. The same die rolling convention is used for both the roleplaying and wargaming aspects of the rules, so this is not repeated in the respective rule sections.

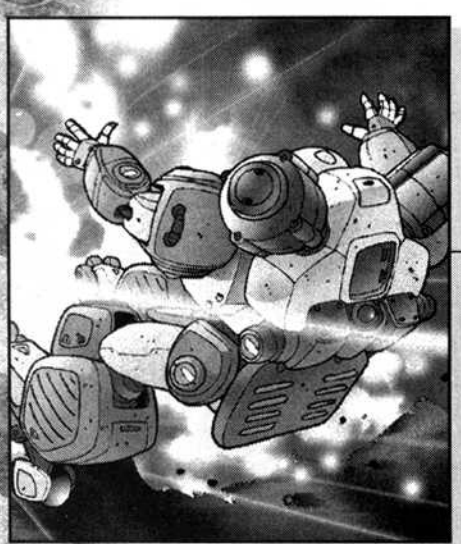
When two or more dice are rolled simultaneously, their results are **not** added together. **Instead, the highest result is considered to be the outcome of the die roll. If more than one "6" is rolled, each extra "6" adds one (1) to the total.** If every die rolled turns up "1," the die roll is a Fumble and counts as an overall result of zero and no modifiers may change this value. Unless specifically mentioned otherwise, **all** die rolls work in this way.

The totals of die rolls are often influenced by modifiers. Modifiers are added to the total of a die roll. If negative modifiers lower the total below zero, the final result is always zero and cannot go any lower. Modifiers are **not** applied to Fumbles.

Die Rolling Examples

 = 5	*Example 1:*	*Player A rolls two dice. The dice read 3 and 5. The total of the die roll is 5 (the highest individual die result).*
 = 8	*Example 2:*	*Player B rolls five dice. The dice read 1, 6, 4, 6, and 6. The total of this die roll is 8 (the highest roll + 2 for the two extra sixes).*
 = fumble!	*Example 3:*	*Player C rolls three dice. All three dice read 1. He has fumbled the die roll. The total is considered to be 0.*
 + 2 = 7	*Example 4:*	*Player D rolls two dice and has a +2 modifier. The dice read 1 and 5. The total of the die roll is 7 (highest roll + 2).*

4.1.1 - Fumbles



A Fumble is a mistake or mishap that cause the failure of the action attempted. It is not necessarily caused by an error or the incompetence of the character, and may well be the result of environmental factors. No matter what caused the Fumble, however, the total die roll is always zero.

In the tactical game, Fumbles produce clear results. This is hardly the case in the roleplaying rules due to the mind-boggling number of possible actions and outcomes. The effects of each separate roleplaying Fumble must thus be decided and described by the Gamemaster. In general, the harder the task attempted, the greater the effect of the Fumble.

Tactical System Fumble Effects

Situation	Fumble Effect
Initiative	lose automatically; if both Fumble, reroll
Attack	miss automatically
Defense	hit automatically unless attack also Fumbles; for damage purposes treat roll as 0
Active Sensors	fail to achieve Line of Sight automatically
High Speed 180° turn	crash; roll 1d6 — take Light (1-4) or Heavy (5-6) damage

ACTION TESTS - 4.2

Many actions involve an element of chance. Did the shot hit? Do the sensors detect the enemy ambush? Is the spy's disguise convincing? Is that dose of poison sufficient to kill? In such situations, an **Action Test** is called for. Action tests consist of a die roll whose result is compared to a fixed value called a **Threshold**. Threshold values reflect the difficulty of the task. Higher Thresholds indicate more difficult situations.

Because of the peculiar probability curve of the six-faced die system used by Silhouette, the difficulty level of the Thresholds increases dramatically after 7, i.e. the progression between Threshold levels is not linear. The chart below should help to determine the difficulty level of any given test.

If the die roll total — with any situation modifier added — surpasses the chosen Threshold, the test succeeds. The degree of success is defined by the **Margin of Success** (MoS): a value equal to the die roll (plus modifiers) minus the Threshold. The magnitude of the Margin of Success reflects the success of the Action Test. For example, a MoS of 1 is a marginal success, while a MoS of 6 would be a spectacular success.

If the die roll, again with modifiers added, is less than the Threshold, the test fails. The degree of failure is defined by the **Margin of Failure** (MoF): a value equal to the Threshold minus the die roll (plus modifiers). A high Margin of Failure indicates a miserably failed Action Test. For example, a MoF of 1 would be a close call, while a MoS of 6 would be a definite (and potentially deadly) failure.

If the total die roll and the Threshold are equal, a draw occurs. In roleplaying situations, draws are often interpreted as marginal successes or ambiguous results. In combat, draws tend to favor the defender. In the tactical rules, draws also favor the defender

Typical Thresholds

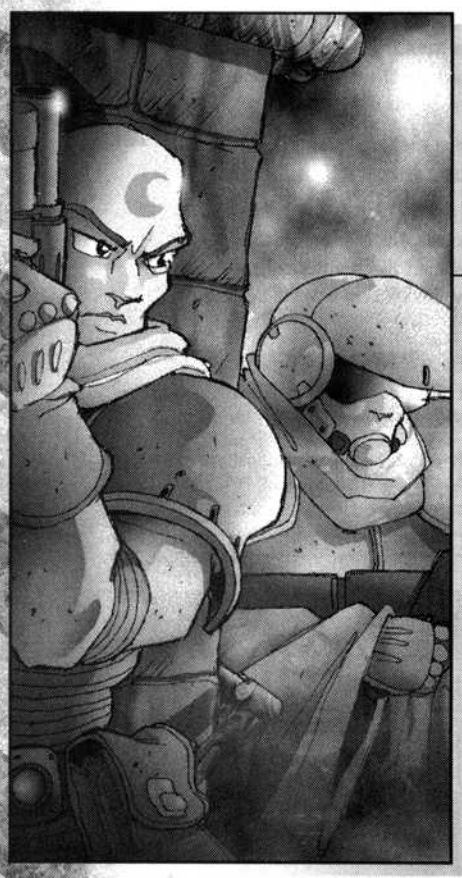
1	Moronic
2	Routine
3	Easy
4	Moderate
5	Challenging
6	Difficult
7	Very Difficult
8	Extremely Difficult
10	Near Impossible
12+	Pray for Divine Intervention!

Threshold Example

Example 1:	*Lhon knows an enemy infantryman is located nearby. He will try to spot him by using his Notice Skill. The Threshold required will vary according to what the infantryman is doing. For simplicity, we will disregard any sensor device Lhon might be carrying and assume he is motionless. Likewise, we will assume the infantryman is not aware of Lhon's presence.*
Example 2:	*If the infantryman stands atop a stonehead and waves his poncho, the Threshold required to spot him is 1 (Moronic). Lhon would have to be a fool not to see him. If the infantryman stands still atop the head, he's still fairly obvious. A Threshold of 2 (Routine) would be appropriate.*
Example 3:	*If the infantryman stands behind nearby bushes but moves (for example, reloading his gun), he's still easy to spot. The bushes mask him, so a Threshold of either 3 (Easy) or 4 (Moderate) would be fine. If he's motionless, his camouflaged poncho will blend in with the vegetation, raising the Threshold to 5 (Challenging) or even 6 (Difficult).*
Example 4:	*Hiding under a derelict Hunter head and behind the bushes would make him extremely difficult to spot. Lhon cannot see him and must rely on sound, so a Threshold of 7 (Very Difficult) is appropriate. Should the infantryman be dug in and completely motionless, Lhon will never spot him without some kind of sensor device — a Threshold of 10 or more will apply.*



4.2.1 - Opposed Action Tests



Sometimes two individuals will oppose each other's actions. Attacks can be dodged. Guards may notice people sneaking past them. Negotiations obviously require more than one participant. When two or more individuals oppose each other's actions, an **Opposed Action Test** is called for.

Each opponent makes a die roll using the appropriate Attribute or Skill. The highest result wins the test. The Margin of Success of an Opposed Action Test is equal to the winner's roll minus the loser's roll. If more than two participants are involved, separate Margins of Success are worked out between each of the participants as needed. Tied rolls result in draws. In general, draws are marginal wins for the resisting person.

Action Test Examples

Example 1:	***Ethos shoots at a moving target in a marksmanship contest. The Threshold of the action is 6. His die roll with modifiers is 7. He hits with a Margin of Success of 1 (7 minus 6).***
Example 2:	***Shanna drops a microdot containing top secret information while escaping across a grassy field. Later in the day, she sneaks back to the field and begins to search for the tiny device. The Threshold for this impossible task is 18 (!). With modifiers, Shanna rolls a 12, resulting in a Margin of Failure of 6. Despite her best efforts, she fails miserably in her attempt to recover the lost microdot.***
Example 3:	***Buxby the Great, stage magician to the stars, attempts to impress his audience by pulling a rabbit out of a hat. The Threshold to impress the bored crowd is 5. Buxby rolls a 5, producing a draw. The audience is unimpressed but at least they do not throw tomatoes at him like they did last time.***
Example 4:	***Evan tries to stab Chen. Since Chen is aware of the attack and obviously does not wish to become an oversized pin-cushion, the attack is an Opposed Action Test. Evan rolls a 7. Chen rolls a 5. Therefore, Evan has a Margin of Success of 2 (7 minus 2). Chen staggers back, clutching his wound in agony.***

Skill Rolls: When, How and Why?

Roleplaying is not just about dice. There are a few situations when asking for Skill checks detracts from the purpose of the game. Roleplaying should be fast and entertaining, something that dice rolling is not. You normally make Skill tests in one of two situations: in combat, and when the result matters.

Even when asking for Skill checks, you should be careful to keep it short and simple. The standard way of rolling is not always the best one, and you should feel free to simplify the system. For instance, imagine that a PC wants to sneak past a sentry. The standard way of doing it would require that you figure the PER Attribute of the sentry, plus his Notice Skill, plus whatever relevant equipment and environmental factors would give him modifiers on his Notice check. Then, you have to make an opposed Action Test and see who between the Player Character and the sentry has the highest result. The simple way of doing it is just to replace all of the sentry's Skills and Attributes with a difficulty Threshold (for instance, a Threshold of 5).

Lastly, a quick piece of advice on interpreting die results. A success is not just a success, nor is a failure just a failure. The greater the Margin of Success, or the Margin of Failure, the more dramatic the results. A MoS of 3 or better is a resounding success, and should be described accordingly. A MoF of 3 or better is a catastrophic failure, and should have unfortunate consequences. As an example, if a Player Character is trying to use Acrobatics to jump down a three-meter wall and land safely, and gets a Margin of Success of 4, the description should be something like this (assuming you are running a cinematically styled game): "You throw your gun into the air, dive athletically forward with your arms extended, grab a thick branch, wheel around it, let go and land in a perfect crouch, not a hair out of place. You extend your hand and, as if by magic, your weapon lands smack into your palm. You look at the two guards coming your way and grin as they stop dead in their tracks, stunned."

Having no Margin at all (a MoS/MoF of 0) is a mitigated success. The action has succeeded, but not entirely, just enough so that the character may proceed with his plan, with perhaps one or two "threats" still hanging. For instance, when deactivating an electronic lock, an infiltrator could have succeeded in bypassing the lock mechanism without triggering the alarm system, but one false move and next thing you know, the sirens start blaring and the guards are on their way.

Gamemastering is not just a matter of keeping Players on their toes, but of making them feel good about their characters.

RATINGS, SKILLS, AND SKILL TESTS - 4.3

In both forms of the game, people are rated in terms of their Skills. A Skill is a learned talent or ability which is often improved with practical experience. Only a few Skills are used in the tactical game, but there is no theoretical limit to the number of Skills in the roleplaying game. Skill levels transfer directly from the roleplaying system to the tactical system and vice-versa. In addition, it is a common practice in the tactical game to rate an individual, such as a Gear pilot, in terms of their general training. For example, a pilot rated as Veteran is assumed to have Skill level 3 in all relevant tactical game skills (Piloting, Gunnery, etc.).

Skills are useful in determining the outcome of Skill Tests, a common form of Action Test. In a Skill Test, the number of dice rolled is equal to the Skill level of the person involved. If the character does not have the required Skill, two dice are rolled and the lowest result used (if a "one" turns up on either die, it is a Fumble).



Skill Level Values

Skill Level	Training Quality	Description
0	Untrained	Little or no skill. Cannot use this Skill in tactical game.
1	Rookie	Basic training. Common Skill level for hobbyists and other amateurs.
2	Qualified	Standard Skill level for anyone who earns his living using the Skill.
3	Veteran	Hotshots and old professionals. Represents years of experience.
4	Elite	True professionals. Individuals whose Skill commands fear, respect, or envy from all in their professions. Most individuals never achieve this Skill level, even at the peak of their careers.
5+	Legendary	The best of the best. Living legends and heroes from the history books (or the movie screen, for Skill level 6 and up).

Ratings - 4.3.1

Items or individuals are often assigned ratings to indicate how effective they are at a certain task. Both a vehicle's Maneuver score and its speed are ratings, as is a person's Build Attribute and his Stamina Trait. Many ratings, such as a vehicle's Maneuver or an individual's Attributes are **Zero-Average Ratings**. They are the ones presented in the plus/minus format (for example +1, 0 or -2).

This type of rating assumes that the rating will be used as a modifier for die rolls. An average score is unexceptional, and is therefore rated as a zero. Any below average scores are rated as negative numbers and any above average scores are rated as positive numbers.

Ratings mark the difference between learned abilities and true talent. Thus, an average Gear pilot with a long career could have a Skill level of 3 in Piloting, while the young up-and-coming hotshot pilot might only rate a level 1 in Piloting but a +2 in Agility. Because of his experience, the veteran will succeed more on average, but only the hotshot will be able to pull the truly heroic stunts.

Pyramid of Skills

One of the greatest problems in character creation is that of Skill levels. The Silhouette system was designed so that high level Skills are extremely expensive and almost crippling to purchase during character creation. We felt a rating of 4 or 5 should be a goal in itself, not something a PC starts with (even in a heroic campaign). Some Player Characters are invariably going to try to build a character with one or two Skills at level 3, sometimes even at level 4, and will take a few other Skills at level 1. That's just not how reality works. It should not be allowed or encouraged.

In real life, when someone acquires a Skill at the equivalent of level 4, he doesn't just have that Skill and nothing else. There are probably a few support Skills at level 3 which he acquired over the cycles spent learning about his expertise. These level 3 Skills themselves were probably learned in parallel to several other level 2 Skills which were mildly related to the character's specialty, and so on down to numerous level 1 Skills. This forms a pyramid of Skills which is more believable than the odd "spoke" of a level 4 Skill among level 1 Skills. GMs should encourage Players to build characters along this pyramidal structure and offer suggestions as to what Skills they should have on their list. There are Skills which they may not want to purchase now, but which you feel are necessary to the profession they have chosen. Emphasize the importance of those Skills and the consequences of not purchasing them. This is very important. Some new Players may not be aware of everything they have to purchase when they get into the game, and should be helped in the process, not punished for their lack of experience.

If they choose to ignore the GM's suggestions, however, they're on their own. When they complain during game time that they're missing a Skill which "fits the character's concept and should be there," or that they've "got a similar Skill on which they should roll instead of the one you've selected," you can say you've given them fair warning. You didn't buy the Skill, you don't have it. Period.

5.1 - THE CHARACTER SHEET

In **Heavy Gear**, information about characters portrayed either by the Players or by the Gamemaster is recorded on character sheets. These sheets list each character's abilities, possessions and vital statistics (name, height, weight, etc.).

Taking a look around the different elements on the character sheet is a good way to become familiar with the decisions to be made when making a character. The sample shown below contains the statistics of a typical starting Player Character, along with explanations about the various record fields of the sheet. The blank character sheet found at the end of the book may be photocopied for personal use.



Defining a Character

- ***Picture of the character (optional)***
- ***Civil identification***
- ***Physical description and measurements***
- ***The ten basic Attributes of the character (Agility, Appearance, Build, Creativity, Fitness, Influence, Knowledge, Perception, Psyche, Willpower) are noted in the left side middle box. The value normally range from -3 to +3, with 0 being average. The costs increase exponentially and characters with several high Attributes often have negative Attributes to compensate. See page 54 for details.***
- ***The five Secondary Traits of the character (Strength, Health, Stamina, Unarmed Damage, Armed Damage) are noted just under the main Attributes. They are calculated from several basic Attributes or Secondary Traits. They cannot be increased without increasing the basic Attributes. See page 55 for details.***
- ***The current status of any wounds received by the character have their own box. The Flesh Wounds Threshold is equal to half the character's STA trait. The Deep Wound Threshold is equal to the STA trait. Instant Death occurs past twice the STA trait. A column is available to note the any armor that the character might be wearing. Flesh Wounds cause a -1 penalty while Deep Wounds cause a -2. See page 105 for details.***
- ***The learned abilities of the character, called Skills, are noted on the right upper table. The CPLX column is used to indicate with an S (for Simple) or a C (for Complex) the level of complexity of the Skill. The Player should put the level of the Skill in the column marked LVL. The +/- column is used to record the value of the Attribute (and any other modifier) associated with each Skill. See pages 49 and 67 for details.***
- ***The statistics of any weapon currently carried are listed just under the Skills. ACC is the Accuracy modifier of the weapon; DAM is the Damage Multiplier; RANGE gives the basic (short) range of the weapon. AMMO lists how many shots can be fired. ROF is the Rate of Fire, a statistic used for automatic firing. See page 78 for a complete weapon list.***
- ***The statistics of any equipment currently carried are listed under the weapons. This space can also be used to jolt down some basic notes on the personality and background of the character. It is recommended, however, to write a more detailed and complete background on a separate sheet or notebook.***
- ***These boxes are used to keep track of the System Shock status of the character. This value is modified by the various injury-related penalties and calculated based on the Health Secondary Trait. See page 56 for detail.***

5.1.1 A - Quick Character Overview

Before getting into the nitty gritty details of character creation, we thought it would be useful to make a quick recap of what makes up a complete roleplaying character. This short section outlines the various elements that should keep in mind when making their choices.

The character Attributes and Skills are what will mostly concern the Player during the character creation process, and will require more thought than anything else. Almost everything else — Secondary Traits, Injury List, Movement and System Shock — are going to be determined based on those choices. Players should spend a bit of time reflecting on what kind of character they want to play before taking the final plunge into the character creation process. Once they get into it, there are going to be many questions which they will be able to answer much faster if they've familiarized themselves with the various components of a roleplaying character.

Attributes

After vital statistics, the first major element is Attributes. Attributes are zero-average ratings (a rating of zero represents a "normal" person) used to describe the character's innate mental, physical and social strengths and weaknesses. Attributes are summarized below and fully detailed in *Attributes Descriptions*, p. 54.

Attributes

Name	Abbreviation	Description	Name	Abbreviation	Description
Agility	AGI	Physical prowess and coordination	Influence	INF	Charisma and persuasiveness
Appearance	APP	Physical comeliness	Knowledge	KNO	Education and logical thinking
Build	BLD	Physical size and mass	Perception	PER	Alertness and ability to discern details
Creativity	CRE	Mental innovation and quick thinking	Psyche	PSY	Mental health, empathy and luck
Fitness	FIT	Physical conditioning and endurance	Willpower	WIL	Mental endurance and conviction

Secondary Traits

The Secondary Traits are a group of five ratings that are neither Attributes nor Skills but are dependent upon them. All Secondary Traits are computed from Attribute and Skill ratings. They are detailed in *Secondary Traits Descriptions*, p. 55, and are summarized below.

Secondary Traits

Name	Abbreviation	Description
Strength	STR	Raw physical strength
Health	HEA	Physical well-being and resistance to disease
Stamina	STA	Physical endurance
Unarmed Damage	UD	Base Damage Multiplier in hand-to-hand combat
Armed Damage	AD	Base Damage Multiplier in melee combat

Skills

Skills are a measure of learned abilities and range from 1 to 5 in terms of ability. The four columns of the Skill List are Name, Complexity, Skill Level and Modifiers. **Complexity (Cplx)** is a rating of how difficult a Skill is to learn: Skills are either Simple or Complex. **Skill Level (Lvl)** is the same term that was described earlier in the *Silhouette Basics* chapter (page 55). The **Modifiers (+/-)** entry is where the total of all relevant modifiers to the Skill roll (if any) are noted — this include the governing Attribute (e.g. Agility governs Piloting) for easy and quick reference.

Injury List and System Shock

Injury levels and System Shock are a measure of how much physical punishment a character can receive before being wounded. The numbers indicated are compared with the total damage received to determine the extent of injury in combat. See *Physical Status, System Shock Rating*, p. 56, and *Chapter 6: RPG Rules*, p. 98 for more details on combat.

Weapon List

This is a list of the weapons carried by the character (if any). The list includes columns for weapon type, damage, ranges (Short, Medium, Long and Extreme), and other notes. Note that personal weapon damage is on the Personal Scale, not the Vehicle Scale (see *Abstract Vehicle Rules*, page 117).

Equipment List

Below the Weapon List is the Equipment List. Prized belongings and items that are carried by the character should be listed here. The Armor points of personal armor should be noted in brackets after the item name, for example Flak Vest (+20).

Description and Personal History

The character sheet provides some space to note details of the characters physical appearance and background. It is often best, however, to take a separate blank sheet to provide a fully detailed history and visual portrait of the character.

5.2 - CHARACTER DESIGN PROCESS

Before sitting down to actually roleplay, Players will have to create their own characters. These can be almost any type of person, although the following process assumes characters above the average, but not to the level of the elite. Gamemasters may wish to adjust the number of Character Points and Skill Points available (see below) to reflect the style of their campaign.

In order to keep the character generation rules as clear and concise as possible, the full descriptions of the various Attributes and Skills have been grouped together further in this chapter (see page 54).

◆ Step One: Conceptualization

The character must first be imagined. Is it a he or a she (you need not play a character of your own gender)? Is he tall and muscular or lean and intellectual? The *Defining a Character* box offers a few questions that will help outline the character.

The more answers provided, the more detailed (and alive) the character will be. Once the character's look and feel are decided upon, a name should be chosen. If time and talent permit, a drawing of the character is always a nice addition.

Defining a Character

• What is the character's gender?	• What is the character's physical appearance?
• Does the character have a distinctive physical trait?	• Describe the psychological traits of the character.
• Does the character have any good habits?	• Does the character have any bad habits?
• How old is the character?	• Where is the character from?
• What was the character's family like?	• What relationship did the character have with his family?
• Does the character have any current personal relationships?	• What is the character's occupation?
• If a military type, what is the character's rank?	• Which organization(s) does the character belong to?
• What are the character's personal goals?	• Is the character hiding any secrets?
• Who are the character's friends and rivals?	• What is the character's name and/or nickname?

◆ Step Two: Select Attributes

Once a concept is decided upon, Players should purchase Attributes to flesh out the rough mental image of the character. A certain number of Character Points (CPs) are available to purchase Attributes. The cost in CPs of an Attribute rating is listed in the *Attribute Costs* table. Purchasing very low stats "gives back" some CPs. A rating must be purchased in all ten Attributes. None are truly more important than the others, and all have their uses. If any CPs are left over, each point becomes one Emergency Die (see *Emergency Dice*, page 115) or a Skill Point, at the Player's choice.

Joe Average, the man on the street, has only 10 Character Points available. This is just enough to purchase a 0 (an average value) in all Attributes. Children and cripples may have less, though no character can start with less than one CP. Player Characters are heroes, so they receive more points — how much more depends on the style of the campaign. This should be decided by the GM before character creation begins.

Character Points Available

	Joe Average	Player	Major NPC
Gritty Game	10	20	30
Adventurous Game	10	30	50
Cinematic Game	10	50	70

Attribute Costs

Attribute Rating	Character Point Cost	Attribute Rating	Character Point Cost
+5	36	0	1
+4	25	-1	0
+3	16	-2	+1*
+2	9	-3	+4*
+1	4	-4	+9*

* These values are added to available CPs instead of being subtracted. Values below -4 should not be authorized.

Step Three: Select Skills ◆

Players should now choose Skills for their characters. Depending on the intended style of the campaign, the Player receives a certain number of Skill Points (SPs) to purchase Skill Levels with. A Skill cannot be purchased at a level higher than its governing Attribute plus two. For example, if John's Agility is +1, he cannot purchase the Dodge Skill at any level greater than 3. If the governing Attribute is -2 or lower, the Skill can be purchased at level 1 for double the normal cost. This rule applies only when creating new characters, and may be disregarded for NPCs.

The *Skill Costs* table lists the Skill point costs for Simple and Complex Skills and the minimum value required in the governing Attribute. Starting Skill levels are generally low but can be improved through experience.

Skill Points Available

	Joe Average	Player	Major NPC
Gritty Game	20	30	40
Adventurous Game	20	40	60
Cinematic Game	20	60	80

Skill Costs

Skill Level	Simple Skill Cost	Complex Skill Cost	Minimum Attribute
1	1	2	-1*
2	4	8	0
3	9	18	+1
4	16	32	+2
5	25	50	+3
6	36	72	+4
7	49	98	+5
Specialization	5	5	n/a

* If Attribute is less than -1, level one can be purchased at double cost.

Skills and Ratings Examples

Jon does not know Mandanese and would be hard pressed to obtain directions to the nearest washroom if he was stranded in the Mekong Dominion. He doesn't know how to read or write, and the sounds of the language confuse him completely. Jon has Skill level 0 in Mandanese.

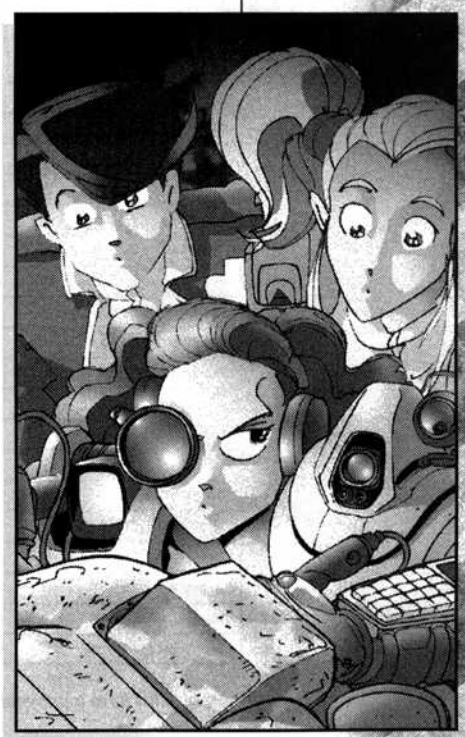
Pamilla has been taking a few shooting lessons at her local GunLovers™ chapter. She knows the basics, such as how to load a gun, point it and shoot, or how to put the safety on, but she still has a lot to learn. She cannot disassemble and reassemble her weapon very rapidly, nor could she describe its specifications very precisely to a connoisseur. At best, Pamilla has Skill level 1 in Small Arms.

Jim is a professional mechanic. He is competent, and can earn a living repairing common civilian vehicles. He can do an oil change, diagnose engine problems, and replace damaged parts, but his work is nothing exceptional, not enough to earn a loyal clientele. Jim has Skill level 2 in Mechanics.

Suzhan is an up-and-coming junior executive at Paxton. Her work is impeccable and her financial predictions extremely accurate. She constantly impresses her bosses with her insight and seems to be on the fast track to success. Suzhan has Skill level 3 in Business.

Grant is a senior NCO in a special forces unit. He has seen more action than all his teammates combined and has repeatedly proven his worth on the battlefield by achieving seemingly impossible goals. He is a consumate master tactician and his advice is invaluable to his commanding officers. Grant has Skill level 4 in Tactics.

Tanya has just won her third global award for her role in "Hourglass Women," a touching movie about the life and tribulations of a Badlands woman coming to terms with her troubled youth through the life of her daughter. Her vibrant and subtle performances are known worldwide. Tanya has Skill level 5 in Theatrics.



◆ Skill Specializations

A character may obtain a Skill Specialization at a cost of 5 SPs, regardless of whether it is a Simple or Complex Skill. A Specialization allows the character a +1 modifier to his Skill test totals under certain conditions. For example, a soldier could have a Small Arms specialization in rifles and thus add one to every roll made while using a rifle. A scientist could have a Physical Sciences specialization in nuclear physics, and gain the +1 whenever a relevant roll is called for. The Skills section later in this chapter includes suggested Specializations, but the Gamemaster can add more.

A character may purchase several Specializations in the same Skill, but no more than **one** Specialization (i.e. +1 bonus, maximum) can be applied to any single die roll. Players may be tempted to focus their characters on excelling in a few Skills by purchasing Specializations and high levels in three or four Skills. Quite often, the advantages of this are more than offset by the inflexibility of the character, which will surface whenever the GM thrusts him into unfamiliar situations.

The **Master Skill List** below lists the available Skills along with their governing Attribute and complexity, as well as the page on which the Skill is explained. The Skills are listed in alphabetical order for easy reference.

Master Skill List

Skill	Attribute	Complexity	Page	Skill	Attribute	Complexity	Page
Acrobatics	AGI	Simple	57	Intimidate	BLD	Simple	59
Aircraft Pilot	AGI	Complex	57	Investigation	PER	Complex	66
Animal Handling	CRE	Simple	59	Law	KNO	Complex	64
Archery	AGI	Simple	57	Leadership	INF	Simple	62
Athletics	FIT	Simple	61	Life Sciences	KNO	Complex	64
Bureaucracy	KNO	Complex	63	Literature	CRE	Simple	60
Business	KNO	Complex	63	Mechanical Design*	KNO	Complex	64
Camouflage	CRE	Simple	60	Mechanics	KNO	Simple	64
Combat Sense	PER	Simple	65	Medicine*	KNO	Complex	64
Communications	KNO	Complex	63	Melee	AGI	Simple	58
Computer	KNO	Complex	63	Music	CRE	Simple	61
Cooking	CRE	Simple	60	Naval Pilot	PER	Complex	66
Craft (Specific)	CRE	Simple	60	Navigation (Specific)	KNO	Complex	65
Dance	AGI	Simple	57	Notice	PER	Simple	66
Demolition	KNO	Complex	63	Parachuting	AGI	Simple	58
Disguise	CRE	Simple	60	Physical Sciences	KNO	Complex	65
Dodge	AGI	Simple	57	Psychology	KNO	Complex	65
Drive	AGI	Simple	57	Riding	AGI	Simple	58
Earth Sciences	KNO	Complex	63	Security	KNO	Complex	65
Electronic Design*	KNO	Complex	63	Seduction	APP	Simple	59
Electronic Warfare	CRE	Complex	60	Sleight-of-Hand	AGI	Simple	58
Electronics	KNO	Complex	63	Small Arms	AGI	Simple	58
Etiquette	INF	Simple	62	Sniping*	PER	Simple	66
First Aid	KNO	Simple	64	Social Sciences	KNO	Complex	65
Foreign Language (Specific)	KNO	Simple	64	Space Pilot	CRE	Complex	61
Forgery	CRE	Complex	60	Stealth	AGI	Complex	58
Forward Observing	PER	Simple	65	Streetwise	INF	Simple	62
G-Handling	FIT	Simple	62	Strider Pilot	AGI	Complex	59
Gambling	PER	Simple	66	Survival	CRE	Simple	61
Gunnery (Specific)	PER	Complex	66	Swimming	FIT	Simple	62
Haggling	INF	Simple	62	Tactics	CRE	Simple	61
Hand-to-Hand	AGI	Simple	58	Teaching	CRE	Simple	61
Heavy Gear Architecture*	KNO	Complex	64	Theatrics	INF	Simple	62
Heavy Gear Pilot	AGI	Complex	58	Throwing	AGI	Simple	59
Heavy Weapons	AGI	Simple	58	Tinker	CRE	Complex	61
Human Perception	PSY	Simple	66	Visual Art	CRE	Simple	61
Interrogation	CRE	Simple	60	Zero-G*	AGI	Simple	59

These Skills have a prerequisite (see* **Skill Descriptions, *p. 57).*

Step Four: Calculate Secondary Traits

The character's Secondary Traits, Wounding Scores, and System Shock are calculated using the following formulas. Although the formulas may appear quite involved, most of them are simply an averaging of two or three Attributes. Some Traits have minimum values, meaning this is the lowest value they can have regardless of Attributes and Skills.

Secondary Attributes Formulas

Strength	(Build + Fitness) ÷ 2, round towards zero
Health	(Fitness + Psyche + Willpower) ÷ 3, round off
Stamina	(5 x (Build + Health)) + 25, minimum 10
Unarmed Damage	3 + HTH Skill + Strength + Build, minimum 1
Armed Damage	3 + Melee Skill + Strength + Build, minimum 1
Flesh Wounding Score	Stamina ÷ 2, round up
Deep Wounding Score	Stamina
Instant Death Score	Stamina x 2
System Shock	5 + Health, minimum 1

Step Five: Purchase Equipment

There are two ways to select equipment. If the character resembles one of the archetypes, he may simply use the archetype's equipment list. Alternately, personal gear may be purchased "à la carte." In that case, the Gamemaster chooses the budget according to the campaign and the character's background. He may also wish to approve all equipment before the game starts.

Sample Character

Let us introduce Sergeant Alex Westmore, a Gear pilot in the 3rd Oasis Rangers. Alex is a large, athletic man, gifted with keen senses and good coordination. Unfortunately, Sergeant Westmore is somewhat self-destructive and has a few disfiguring scars gained from a brash and rough youth.

From this description, we assigned Alex +1 AGI (cost 4), -1 APP (cost 0), +2 BLD (cost 9), 0 CRE (cost 1), +2 FIT (cost 9), 0 INF (cost 1), 0 KNO (cost 1), +1 PER (cost 4), -1 PSY (cost 0), and 0 WIL (cost 1) for a total of 30 CPs spent on Attributes.

Sergeant Westmore is a proficient Gear combat pilot. He is also fully trained in various armed and unarmed close combat techniques. In addition, he has undergone basic training in most military Skills. In his spare time, Alex enjoys sipping fine brandy and smoking a good cigar while playing poker.

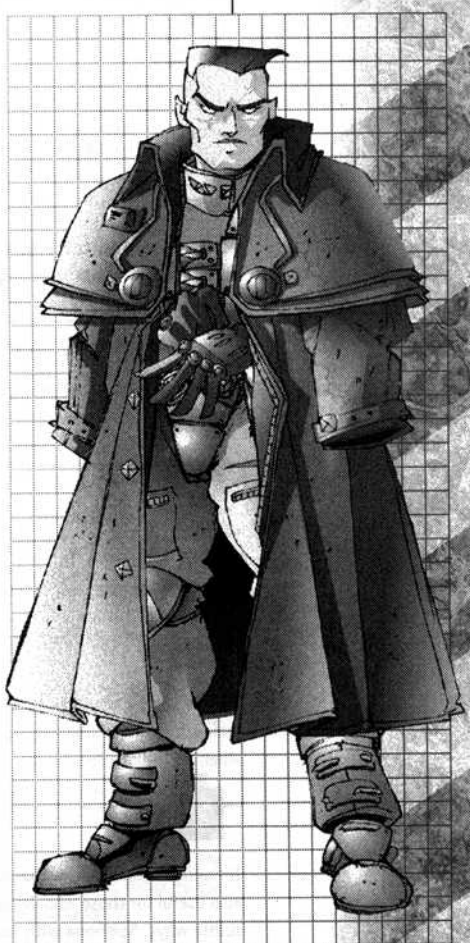
Westmore was assigned a Skill level 2 in Heavy Gear Piloting (cost 8), Heavy Gear Gunnery (cost 8), Hand-to-Hand (cost 4), and Melee (cost 4). He was also assigned level 1 in Tactics (cost 1), Leadership (cost 1), Communications (cost 2), Electronic Warfare (cost 2), Athletics (cost 1), Combat Sense (cost 1), Dodge (cost 1), Small Arms (cost 1), Notice (cost 1), Survival (cost 1), Stealth (cost 2), First Aid (cost 1), and Gambling (cost 1). A total of 40 SPs was spent on Skills.

Because of his size and excellent physical shape, Westmore is a very strong man who can withstand substantial physical punishment without flinching. Despite his excellent physical fitness, his hurried and somewhat rocky lifestyle leads him to fall sick as much as any other individual. Alex's strength, size and combat skills (with or without weapons) combine to make him a deadly brawler and swordsman.

Westmore's Secondary Traits are calculated, yielding a Strength (STR) of +2, a Health (HEA) of 0, a Stamina (STA) of 35, an Unarmed Damage rating (UD) of 9 and an Armed Damage rating (AD) of 9 also. His Wounding Scores are equal to 18, 35, and 70 for Flesh Wounds, Deep Wounds and Instant Death, respectively. His System Shock rating is equal to 5.

Sergeant Westmore is equipped with his uniform, flak suit, standard-issue sidearm, field kit, and survival knife. In addition, he sports a cutlass and sunglasses. In his pockets, he carries a dozen fine cigars, an ornate lighter, a small flask of brandy, and two loaded magazines for his 9mm pistol. His pride and joy is his customized, near-mint quality, Hunter Gear.

Westmore's personal gear is listed in the equipment section of his character sheet.



5.3 - ATTRIBUTE AND TRAIT DESCRIPTIONS

The basic abilities, knowledge and weaknesses of a **Heavy Gear** character are defined by their Attributes and Traits. These largely represent the characteristics people are born with or acquired in their formative years. These range from physical Attributes such as Agility and Strength to mental proficiencies such as Willpower and Knowledge. The table below gives a brief description of what each level represents in term of abilities. Extremely low Attribute and Secondary Trait levels, such as -3 or lower, are generally encounted only in children or cripples and are thus given mainly as a reference. The Build Attribute represents the physical size of the character and thus has its own column giving the weight equivalence for each level.

Attribute Description

Rating	Description	Weight Equivalent	Rating	Description	Weight Equivalent
+5	Superhuman	180-249.9 kg	-1	Poor	60-69.9 kg
+4	"I'm sure I've seen you on Trideo!"	140-179.9 kg	-2	Weak	50-59.9 kg
+3	Exceptional	115-139.9 kg	-3	Pathetic	40-49.9 kg
+2	Superb	95-114.9 kg	-4	Hopeless	25-39.9 kg
+1	Good	80-94.9 kg	-5	Beyond Hopeless	10-24.9 kg
0	Average	70-79.9 kg	-6	Dead	9.9 kg or less

5.3.1 - Attributes

The ten basic Attributes represent a character's natural proficiencies and potential. Some Attribute are fairly general and covers many diverse abilities, while others represent only a single facet of the character's body or mind. Il will be customized later with appropriate Skills, though Players are encouraged to further detail their character's Attributes. Attributes are costly to improve, so often vary little throughout much of a campaign (see *Character Improvement*, p. 115).



Agility [AGI] ◆

Agility is the character's hand-eye coordination, nimbleness, and reflexes. This Attribute is most well suited to action-oriented characters such as Gear pilots, bodyguards and pickpockets, all of which are likely to have high Agility ratings.



Appearance [APP] ◆

Appearance rates the physical attractiveness of the character. This can modify how other people react to him. Many heroic and cinematic characters have high Appearance scores in order to better impress those who they come in contact with.



Build [BLD] ◆

Build is a rating of the character's size and body frame. It does not represent the character's physical strength, only actual body size and mass. These are suggested weights; they can be modified by +/- 20 kg according to their character's planned appearance.



Creativity [CRE] ◆

Creativity is a measure of the character's ability to use his knowledge in innovative ways. It is also a measure of the character's ability to think on his feet. This Attribute is useful for most characters who are likely to be thrust into unfamiliar situations and for leaders who have to make many decisions while on the run.



Fitness [FIT] ◆

Fitness rates the character's cardiovascular endurance and muscle tone. While Build measures raw size, Fitness measures how well maintained the character's body is. Most olympic athletes would rate a high Fitness, while anyone with a negative Fitness gets winded when he walks a few blocks. Illness can temporarily reduce this Attribute, as can other hardships such as starvation.



Influence [INF] ◆

Influence measures the character's charm, wit, and persuasiveness. A high Influence rating is a must for any charismatic leader. It is also useful for those who desire to spend lots of time in corporate or social settings, or characters who need to get past security in more subtle ways. Someone with low Influence has almost no social life since he is either obnoxious or socially inept.

◆ Knowledge (KNO)

Knowledge is the character's ability to learn and recall information of any kind, from math formulas to simple trivia. It also takes into account the number of years of formal education the character has successfully completed. Scientists, technicians and "brainiac" characters typically have high Knowledge ratings.

◆ Perception (PER)

Perception is a measure of the character's attentiveness to detail and overall alertness. Like Agility, Perception is crucial for action heroes since the enemy who cannot be seen cannot be dealt with. Perception is especially important for scouts and investigators, who need to pay attention to obscure details and find things hidden from view.

◆ Psyche (PSY)

Psyche is an abstract measure of the character's karma, happiness, sensitivity and love of life. Psyche also reflects the empathy of the character as well as his innate luck. Psyche is best reflected by its extremes; someone with a low psyche seems to have a black cloud over his head all the time, and people will avoid him. A person with a high Psyche is highly empathic and tends to be easily trusted.

◆ Willpower (WIL)

Willpower is a rating of the character's self-discipline, determination, and pain threshold. Unlike Psyche, Willpower does not imply a love of life; it does however reflect the character's ability to deny death using sheer strength of will. Headstrong and arrogant characters are good candidates for a high WIL, as are shock troopers who want to be able to take a bullet.

Secondary Traits - 5.3.2

Secondary Attributes are calculated based upon Attributes and certain Skills (see formulas on page 53) and help round out the definition of a character. The Trait descriptions follow the same pattern as Attribute descriptions.

◆ Strength (STR)

Strength is a measure of a character's raw physical power and brute strength. It is a zero-average rating, like Attributes. Strength is the average of Build and Fitness, rounded towards zero. Cross-indexing with the Attribute Description table (page 54) shows the maximum weight that can be dead lifted and carried a few paces — the lowest weight value is used. Thus, a character with a +2 Strength can heft around 95 kg and stagger for a few steps before running into difficulty.

◆ Health (HEA)

Health rates a character's resistance to illness, toxins, and physiological shock. It is a zero-average rating, like Attributes and Strength. Health is the average of Fitness, Psyche, and Willpower, rounded to the nearest whole number. People who never seem to get sick and those who can drink large quantities of potables likely have high Health scores.

◆ Stamina (STA)

Stamina is a rating of how much sheer physical punishment a character's body can tolerate. Stamina is **not** a zero-average rating: it is equal to five times the total of Build and Health, plus 25. No character may have a Stamina lower than 10. While a high Stamina will decrease the chances of injury, it is still quite easy for a character to be wounded by gunfire or other deadly weapons.

◆ Unarmed Damage (UD)

Unarmed Damage is the Damage Multiplier of any unarmed attacks performed by the character. Unarmed Damage is equal to three plus the total of Hand-to-Hand Skill level, Strength, and Build. The minimum Unarmed Damage rating is 1. This damage is on the Personal Scale, not the Vehicle Scale (see pages 117). It is a reflection of how much force and accuracy a character can put behind a punch.

◆ Armed Damage (AD)

Armed Damage is the base Damage Multiplier of any of the character's armed melee attacks. Armed Damage is equal to three plus the total of Melee Skill level, Strength, and Build. The minimum Armed Damage rating is 1. The DM of a melee weapon is equal to the character's Armed Damage and the weapon's own base DM. This damage is on the Personal Scale, not the Vehicle Scale.

5.3.3 - Physical Status

Physical Status represents the level of resistance to physical wounds. There are three types of injuries. Flesh Wounds are nasty but not crippling wounds. Deep Wounds are immediately life-threatening injuries. Instant Death is the third type of "injury" and requires no further explanation.

Each level of injury has a wounding score. Wounding scores are the amount of damage an attack must cause to produce a certain type of wound. An attack produces the type of injury whose wounding score is equal to or under the amount of damage inflicted by the attack. Only the most severe of the possible results is applied. For example, if an attack does 40 points of damage to an average individual (whose wounding scores are Flesh Wound = 13, Deep Wound = 25, Instant Death = 50), the attack victim suffers a Deep Wound (40 is greater than the Deep Wound score "25" but is less than the Instant Death score "50").

The wounding score of Flesh Wounds is equal to half of the character's Stamina (round up). The wounding score of Deep Wounds is equal to the character's Stamina. The wounding score of Instant Death is twice the character's Stamina. Personal armor adds its Armor points to **each** wounding score when the character is under physical attack. The modified wounding score should be noted in parentheses after the original wounding score.

Action Penalties are negative modifiers to all actions that reflect the pain and confusion induced by wounds. A character is penalized -1 to **all** actions per Flesh Wound and -2 to **all** actions per Deep Wound.

The final column of the injury list is used to note how many of each type of injury a character has sustained, and possibly what they are.

5.3.4 - System Shock Rating

The System Shock rating is a measure of how many injuries a character can take before going into shock and dying. If the total of System Shock and a character's wound-induced action penalties equals zero or less, the character goes into shock (see *Injuries*, page 105). System Shock is equal to five plus the character's Health. System Shock cannot be lower than one.

System Shock is shown on the character sheet as a row of boxes — unused boxes are simply crossed out. As wounds are taken, boxes can be crossed out according to action penalties, representing the damage.

HOOKS & TIPS — THE PSYCHE ATTRIBUTE

An often misunderstood attribute, Psyche is a Gamemaster's best friend against die-hard rule lawyers. This attribute is often misconstrued as unimportant, if not downright useless. Most Players will prefer to have a negative Psyche in order to boost their other Attributes and Skills. We provide a few recommendations to GMs who would like to encourage roleplaying among their Players.

The basic rule of social interaction is that you attract more flies with honey than with vinegar. When faced with a situation where they must gather information from various individuals, low-Psyche PCs have to rely on intimidation or violence. This tends to make them more enemies than friends, however, and they can quickly find themselves shunned from most social circles. Even with a high Intimidate or Streetwise skill, they may have a hard time gathering information if everyone they want to talk to flees or hides from them. Characters with high Psyche have no such problems. While they may not be quite as successful in the short term, they often establish long-lasting relationships or become very popular with people in general. Rather than having to seek out information, they may receive free tips from people who bear them good will.

HOOKS & TIPS — STAMINA AND DESCRIBING WOUNDS

Whenever a character gets wounded, there are consequences. Because the Silhouette system works thresholds that create very specific and clear-cut game effects, it is often assumed that unless there's a Flesh Wound or a Deep Wound, nothing has happened. Nothing could be further from the truth. If the attack connects, there is at least a minimal level of pain. Even though the damage may not be enough to cause a penalty, it does not prevent the pain from being at least distracting. When there is a Flesh Wound, it hurts. A lot. When there is a Deep Wound, it hurts to tears. The black and white nature of the Silhouette wound system is often misleading. Gamemasters should carefully consider the impact of damage and see how it relates to reality.

Flesh Wounds may seem negligible, but that is incorrect. They represent deep cuts, bleeding bruises, cracked ribs, twisted articulations, etc. Several Players work under the assumption that although they have a Flesh Wound, they should not see the -1 penalty apply to anything intellectual they do. This stems from the fact that few Gamemasters take the time to properly describe what the wound looks like. If you tell the Player, "You have a Flesh Wound — you're at -1 on everything you do," he will simply shrug and ignore the effect, then start to argue that the penalty should not apply. If you tell him, "You've fallen face first on the ground — you've broken your nose and your forehead is bleeding enough to partially blind you," they will understand why their Skill checks are tougher.

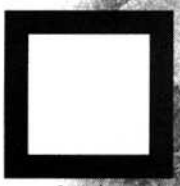
Deep Wounds are even worse. They represent fractures, internal bleeding, punctured lungs, torn ligaments, cut muscles, etc. They are rapidly incapacitating, enough to cause a -2 penalty on all rolls. The pain is sharp and extremely distracting. As with Flesh Wounds, they should be described with great detail to ensure that PCs realize the extent of the damage they have received.

SKILL DESCRIPTIONS - 5.4

While a character's Attributes define his potential, his Skills define his actual abilities. This section details all the "standard" Skills. Gamemasters should feel free to invent new Skills if they are required in their campaign. A new Skill should not be too general nor too specific — Shooting is an example of something too general, as it might allow any sort of ranged weapon to be used, while Identification of Badlands Flatworm Subspecies is definitely too specific.

Skill description have several components. The complexity icon defines whether the Skill is Simple (circle) or Complex (square). Skills that have prerequisite(s) add a triangle icon (the prerequisites themselves are noted in the description). The Specialization entry lists a few suggestions for Skill Specializations. Some Skills list Prerequisites necessary for learning the Skill. The next entry lists some professions that normally have some training in the Skill. The final entry is a short, plain-English description.


Simple


Complex


Prerequisites

Agility Skills - 5.4.1

The Skills governed by the Agility Attribute are generally those which require a high degree of hand-eye coordination and quick reaction times, as well as those that require precisely controlled movements of the body.

Acrobatics

Specializations: Leaps and Jumps, Tumbling, Tightrope, Trapeze, Diving	Often Possessed By: Athletes, Circus Performers, Martial Artists

The Acrobatics Skill is the ability to perform activities requiring tumbling, balancing, or gymnastics. The intensive training regimen involved keeps this Skill from being too widespread.

Aircraft Pilot

Specializations: Jets, VTOL, Hot Air Balloon, Prop, Helicopter	Often Possessed By: Combat Pilots, Commercial Pilots, Hobbyists

The Aircraft Pilot Skill is required in order to be able to fly various aircraft, including planes, vectored thrust vehicles, and helicopters. Few non-pilots earn this Skill to any degree due to the time involved in training.

Archery

Specializations: Longbow, Compound Bow, Crossbow, Sling	Often Possessed By: Athletes, Hunters, Primitives

The Archery Skill allows the character to effectively use such primitive missile weapons as longbows, slings, or crossbows. This Skill is seldom used in combat situations due to the inadequacies of the weapons involved.

Dance

Specializations: Ballroom, Tribal, Modern, Ballet	Often Possessed By: Sophisticates, Professional Dancers, Youth

The Dance Skill is a measure of how proficient the character is in performing the prescribed steps of a dance. The ability to mix in at various venues is always helpful.

Dodge

Specializations: Unarmed Attacks, Melee Attacks, Ranged Attacks	Often Possessed By: Soldiers, Police, Criminals, Convenience Store Clerks

The Dodge Skill is a measure of how able the character is in avoiding incoming attacks and making the best of available cover. It is used as a general "defense" Skill. Virtually every Player Character should have this Skill to some degree.

Drive

Specializations: Racing, Cargo Trucks, Combat Vehicles, Motorcycles	Often Possessed By: Joe Average, Race Drivers, Tank Drivers

The Drive Skill is the ability to control the movements of combat or high-performance wheeled or tracked vehicles, such as tanks, APCs, or motorcycles. Most characters are assumed to have their license and drive competently enough for day-to-day needs.

Hand-to-Hand

Specializations:	Striking, Grappling, Tripping, Throwing	Often Possessed By:	Boxers, Martial Artists, Police, Soldiers

The Hand-to-Hand Skill measures the proficiency of a character in close-range combat using unarmed fighting techniques. A high level in Hand-to-Hand implies that the character is using some form of martial art, such as karate or boxing.

Heavy Gear Pilot

Specializations:	Specific Model	Often Possessed By:	Military Pilots, Techs

The Heavy Gear Pilot Skill is a measure of how good the character is at maneuvering, dodging and brawling with a walker vehicle controlled via a neural net.

Heavy Weapons

Specializations:	Mortars, Grenade Launchers, Missiles	Often Possessed By:	Soldiers, Police, Criminals

The Heavy Weapons Skill is a measure of the character's proficiency with man-portable support weapons such as mortars, grenade launchers and missiles. The Skill includes basic knowledge of the maintenance procedures.

Melee

Specializations:	Knives, Clubs, Fencing, Impressive Moves	Often Possessed By:	Soldiers, Police, Criminals, Martial Artists

The Melee Skill reflects how good a character is at attacking and defending with close-combat weapons, such as knives, cudgels or swords. This type of weapon use is probably the most widespread of all since it involves little training and mostly inexpensive weapons.

Parachuting

Specializations:	High-Altitude, High-Wind, Night-Time	Often Possessed By:	Skydivers, Paratroopers, Pilots

The Parachuting Skill allows the character to use and control a parachute or similar device and to correctly absorb the landing impact. It also includes the ability to prepare and pack parachutes, make minor repairs, and estimate wind speed and evaluate weather patterns.

Riding

Specializations:	Specific Animal, Racing, Dressage	Often Possessed By:	Equestrian Athletes, Ranchers

The Riding Skill measures the character's ability to control a riding animal and is used in lieu of a Piloting or Drive Skills when astride such a creature. The Skill also includes a basic ability to care for the animal. Training is generally available only in the countryside.

Sleight-of-Hand

Specializations:	Pickpocket, "Magic" Tricks, Shoplifting	Often Possessed By:	Criminals, Stage Magicians, Spies

The Sleight-of-Hand Skill measures how good the character is at the subtle hand movements required by pickpocketing or stage magic.

Small Arms

Specializations:	Pistols, Rifles, SMGs	Often Possessed By:	Soldiers, Police, Criminals, Hunters

The Small Arms Skill is a measure of the character's proficiency with man-portable firearms such as pistols, rifles, and submachine guns. The Skill includes basic knowledge of maintenance procedures.

Stealth

Specializations:	Urban, Indoors, Jungle, Woodlands, Nighttime	Often Possessed By:	Thieves, Spies, Soldiers, Police

The Stealth Skill is the character's ability to move about undetected, be it by human observers or by electronic surveillance devices.

Strider Pilot

Specializations:	Specific Model	Often Possessed By:	Military Pilots, Techs, Artillery Specialists

Striders are the walking fire-support planforms of Terra Nova. These vehicles are sufficiently different from ground vehicles and the humanoid Gears to require their own piloting skills.

Throwing

Specializations:	Knives, Javelins, Balls, Grenades, Darts	Often Possessed By:	Soldiers, Game Players, Athletes

The Throwing Skill is the ability to accurately throw objects such as grenades or other weapons.

Zero-G

Specializations:	Specific Martial Art, Hand Weapons	Often Possessed By:	Spacecraft Crew, Asteroid Miners, Space Marines

Zero-G reflects the ability of the character to perform combat or non-combat actions in weightless or micro-gravity (under 0.1 g) environments. The lowest Skill level of either Zero-G or the physical Skill suited to the task at hand is used. Only physical actions require the Zero-G Skill when making an Action test in low gravity.

Appearance Skills - 5.4.2

People have used their looks to gain advantages since the beginning of recorded history, and these practices will probably continue for a very long time. By accentuating their attractiveness, a person can modify what other people's first impressions will be.

Seduction

Specializations:	Specific Sex, Eye Contact, Specific Seduction Style	Often Possessed By:	Con Artists, Fashion Models, Gigolos, Prostitutes

Seduction measures a character's ability to sway others by the judicious use of looks and sex-appeal. The Skill includes an understanding of what people find attractive and the ability to adapt to different preferences.

Build Skills - 5.4.3

Most of the tasks which are related to Build are innate, not learned, thus there is only one Skill for this Attribute. As they say, perception is everything.

Intimidate

Specializations:	Coerce, Terrify, Enforce	Often Possessed By:	Bullies, Police, Drill Sergeants, Muggers

Intimidate is the ability to appear large and menacing in order to scare another person into doing what you desire. More subtle or specific methods of coercion are covered by the Etiquette, Interrogation and Streetwise Skills.

Creativity Skills - 5.4.4

This group of Skills is a reflection of an individual's ability to come up with new solutions to an immediate problem. An artist tries to find new ways to entertain his audience, a lost person tries to make the best he can with what he has at his immediate disposal, a commander tries to find a new way to achieve his mission objectives. All of these show the ingenuity of an individual under at least somewhat stressful conditions.

Animal Handling

Specializations:	Specific Animal, Herding, Performing Tricks	Often Possessed By:	Farmers, Ranchers, Circus Performers

The Animal Handling Skill measures the ability of a character to care for and train various animal species. The Skill includes knowledge of the animal's preferred foods and daily habits, reproductive cycle and the basic signs of disease.



Camouflage

Specializations:	Jungle, Urban, Desert, Winter	Often Possessed By:	Soldiers, Commandos, Hunters

Camouflage represents a character's proficiency at using make-up, special clothing, and netting to conceal himself or other objects by matching the texture and color scheme of the thing which is to be hidden to that of the surrounding terrain. In general, a number of minutes equal to the Size of the object is necessary to do the job, unless the location is particularly favorable to hiding.



Cooking

Specializations:	Vegetarian, Country, Meats, Baking	Often Possessed By:	Joe Average, Professional Cooks

Possessing the Cooking Skill allows the character to concoct appetizing dishes. A fine meal that is tailored to the consumer's tastes can impress anyone. People who lacks this Skill tend to mess up the more complex recipes available.



Craft [Specific]

Specializations:	Commercial, Specific sub-category of the Craft	Often Possessed By:	Artisans, Metalsmiths

The Craft Skill covers the ability to produce useful and artistic creations with one's hands. A specific craft must be chosen: it can include such things as jewelry, metalwork, woodcraft, weaving, etc. This Skill can be taken multiple times if the abilitiy to produce many types of craft goods is desired.



Disguise

Specializations:	Specific Disguise, Theatrical Special Effects	Often Possessed By:	Actors, Undercover Agents, Special Effects Specialists

The Disguise Skill covers the physical aspects of changing one's physical appearance, including proper use of prosthetics, makeup, masks, and clothing. The result of the Skill roll is used as a Threshold to see through the disguise. Actual impersonation or mimicry of a specific person or type of person require the Theatrics Skill, however.



Electronic Warfare

Specializations:	Sensors, ECM, Underwater Sensors	Often Possessed By:	Combat Pilots, Sensor Op Specialists, Explorers

Electronic Warfare is a catch-all Skill that covers the myriad aspects of sensor operations, electronic counter-measures (ECM), and electronic counter-counter-measures (ECCM). This Skill is used for detection rolls, electronic jamming, and other similar activities. In the tactical game, this Skill also cover communication devices.



Forgery

Specializations:	Electronic, Written, Art, Counterfeiting	Often Possessed By:	Criminals, Spies, Police Experts

The Forgery Skill is the character's ability to accurately duplicate a variety of objects, such as official documents, works of art, money, and handwriting. It also encompasses the ability to recognize a forgery as such, and give an opinion as to its origin.



Interrogation

Specializations:	Casual Questioning, Torture, Specific Type of Informant	Often Possessed By:	Police Officers, Intelligence Experts

Interrogation measures a character's ability to extract information from an unwilling informant. Gamemasters can use Opposed Action Tests with informants rolling either WIL or Interrogation, whichever is higher.



Literature

Specializations:	French Poetry, Shakespeare, Science Fiction	Often Possessed By:	Professors, Students, Authors, Avid Readers

The Literature Skill grants the character familiarity with existing literary works. This includes the ability to identify, produce or critique text. The wide availability of word processors has kept humanity dedicated to this form of passing on both information and entertainment to others.

Music

Specializations:	Classical, Rock, Mixing, Critic, Singing	Often Possessed By:	Musicians, Music Engineers, Music Critics

The Music Skill encompasses the ability to understand musical notation, write a piece or song, perform music and critically evaluate performances.

Space Pilot

Specializations:	Specific Type of Vehicle	Often Possessed By:	Spacecraft Crew, Aerospace Combat Pilots

Space Pilot is the ability to figure out new vectors to maneuver spacecraft in combat and other close-range maneuvers such as docking.

Survival

Specializations:	Jungle, Desert, Winter, Urban, Foraging, Shelter, Space	Often Possessed By:	Soldiers, Campers, Survivalists

The Survival Skill allows the character to survive in hostile environments, such as jungles or deserts. Survival includes hunting, foraging, and obtaining shelter and water.

Tactics

Specializations: Infantry,	Armored, Aerial, Naval, Space	Often Possessed By:	Military Officers and NCOs, S.W.A.T. officers

The Tactics Skill represents the character's expertise in small-unit tactics. A prime example of use of the Skill is the positioning of troops while they are engaged with enemy forces.

Teaching

Specializations:	Any other Skill	Often Possessed By:	Professors, Combat Instructors

Teaching is the Skill of transmitting knowledge and expertise to others in a clear and coherent fashion. It is a Skill which few Player Characters who are not from an instructional background possess.

Tinker

Specializations:	Vehicles, Weapons, Appliances, Computers	Often Possessed By:	Inventors, Technicians, Hobbyists

The Tinker Skill is used in the modification and improvement of equipment and machinery, often without the use of specialized tools. Characters of any technically-challenged background, especially Badlanders, are prime candidates for this Skill.

Visual Art

Specializations:	Painting, Sculpting, Computer Graphics, Layout	Often Possessed By:	Artists, Computer Programmers, Editors

The Visual Arts Skill encompasses expertise in the various graphical forms of expression, such as painting, sketching and sculpting. This includes the ability to identify, produce and critique such works.

Fitness Skills - 5.4.5

The Skills which are governed by the Fitness Attribute place high physical stresses upon the body. Pushing one's body to the edge has long been a fascination of humankind, and in the rough environment of Terra Nova, physical exertion is commonplace. Sports of all kinds are also commonly played.

Athletics

Specializations:	Running, Football, Volleyball, Climbing, Break Fall	Often Possessed By:	Athletes, Sports Enthusiasts, Soldiers

Athletics represents the character's ability to engage in sporting activities of all kinds. It includes the necessary Skills and knowledge of the rules and regulations along with the physical training required by athletic activities.

G-Handling

Specializations:	None	Often Possessed By:	Pilots

G-Handling represents the characters ability to remain conscious under high acceleration. It includes breathing techniques and the knowledge of the physical and medical effects of acceleration.

Swimming

Specializations:	Endurance, Speed, Diving, SCUBA Diving	Often Possessed By:	Athletes, Lifeguards, Joe Average

Swimming is the ability to move effectively and efficiently in an aquatic environment. This Skill further encompasses the ability to perform other aquatic activities, such as diving and SCUBA diving. Swimming is fairly common in the North and South, where rivers, lakes and swamps are plentiful. In the Badlands, Swimming is an extremely rare Skill, possessed only by polar emigrés and those who explore the flooded MacAllen tunnels deep underground.

5.4.6 - Influence Skills

The arts of persuasion have always been a strong force in the history of humankind. The natural desires of people to try and get the most in return for their skills and work have manifested themselves through communications of various types for ages. The ability to convince another person of one's ideals without the use of force is far preferred to violence by many cultures. Player Characters will find Influen-based Skills useful for social situations and whenthey need to get out of trouble without firing a gun.

Etiquette

Specializations:	Military, Business, Aristocratic	Often Possessed By:	Sophisticates, Military Officers, Businessmen

Etiquette reflects the character's familiarity with proper methods of social interaction within formalized settings, such as military ceremonies, upper class gatherings or business negotiations.

Haggling

Specializations:	Specific Commodity, Specific Culture, Barter	Often Possessed By:	Traders, Smugglers, Business people

Haggling measures a character's ability to influence the final price in a transaction. Haggling is an Opposed Skill roll, with the MoS x 5% as the maximum discount possible. The specific circumstances of the deal should be kept in mind, as should the Player's roleplaying. These can affect the price by as much as the Skill roll itself.

Leadership

Specializations:	Military, Political, Business, Cult	Often Possessed By:	Military Officers and NCOs, Politicians, Businesspeople

Leadership is the capacity to lead others, either by example or through inspiration. At least one character in any group will probably posses this Skill to some degree or another.

Streetwise

Specializations:	Gangs, Organized Crime, Homeless, Prostitutes	Often Possessed By:	Urban Residents, Gang Members, Criminals

Streetwise is a catch-all Skill for interacting with the "shadier" elements of society and includes basic knowledge of the underground of a city the character is familiar with.

Theatrics

Specializations:	Drama, Con Artist, Comedy, Directing, Media Editing	Often Possessed By:	Actors, Directors, Con Artists, Undercover Agents

The Theatrics Skill covers all aspects of live or recorded acting, from drama to comedy. This includes the ability to produce, direct, act or otherwise work in these media, and also allows an actor to impersonate someone else. Guile and other forms of lying are also covered by this Skill.

Knowledge Skills - 5.4.7

These Skills are similar because they depend as much — or more — on long study and experience as they do on natural aptitude. Many of these Skills are the types taught at institutions of higher learning or acquired by diligent months or years of hands-on education.

Bureaucracy

Specializations:	Government, Military, Customs, Bribery, Corporate	Often Possessed By:	Clerks, Administrators, Businessmen

Bureaucracy involves knowledge of what makes a government or corporate structure function. It also represents the ability to manipulate that structure to achieve desired results.

Business

Specializations:	Finance, Management, Trade, Accounting, Economics	Often Possessed By:	Businesspeople, Bankers, Accountants

Business is the ability to manage the affairs of a corporation or a nation. This could include anything from compiling product feasibility reports to the creation of marketing campaigns to promote a product, whatever that product may be.

Communications

Specializations:	Coded Messages, Jamming, Listening Devices	Often Possessed By:	Combat Pilots, Communications Specialists, Spies

The Communications Skill is required both to operate and effectively jam communications devices. It is also used in the design and breaking of codes used for communications between two parties.

Computer

Specializations:	Programming, Systems Administration, Neural Nets	Often Possessed By:	Programmers, Technicians, Joe Average

The Computer Skill covers both the use and maintenance of diverse computer systems. It is one of the many technical Skills for mechanic-type characters to choose amongst, since computers are so common.

Demolition

Specializations:	Mining, Military, Construction	Often Possessed By:	Military and Industrial Specialists, Terrorists

Demolition is the Skill concerned with setting and detonating explosive charges in such a way as to maximize damage done to the target. It also includes the knowledge required to produce various types of explosives from raw materials and deactivate these same charges.

Earth Sciences

Specializations:	Geology, Geography, Mineral Survey	Often Possessed By:	Professors, Mining Specialist, Petroleum Specialists

Earth Sciences is a catch-all Skill that includes geology, geography, seismology and meteorology. A specialization *must* be chosen before a character can attain level 3.

Electronic Design

Specializations:	Computers, Sensors, Communications	Often Possessed By:	Electrical Engineers, Computer Design Specialists

Electronic Design represents a character's ability to design totally new or highly modified electronic or computerized systems and configurations. A character must have Electronics or Computer at level 2 or more before purchasing this Skill.

Electronics

Specializations:	Vehicle, Industrial, Robotics, Military, Security Systems	Often Possessed By:	Technicians, Engineers, Hobbyists

The Electronics Skill covers the use and repair of any electronic equipment not covered elsewhere in the Skill descriptions. This includes devices such as laser weaponry, targeting systems and sensor repair (Electronic Warfare Skill covers the use of sensors in the field).



First Aid

Specializations:	Combat Medic, Aquatic Injuries, Sports Injuries	Often Possessed By:	Soldiers, Lifeguards, Sports Trainers, Paramedics

First Aid is the ability to stabilize wounded peoples' conditions so that they can be transported to more effective medical treatment.



Foreign Language [specific]

Specializations:	Specific Dialect, Specific Jargon	Often Possessed By:	Travelers, Diplomats, Scholars

This is the ability to communicate and be literate in a foreign language other than the character's native tongue. All characters are assumed to have level two (standard) or three (if they are highly educated: KNO +2 or more) in their native tongue at no cost.



Heavy Gear Architecture

Specializations:	Specific Gear Model	Often Possessed By:	Engineers, Vehicle Designers, Elite Gear Pilots

This Skill is used by many designers in order to acquire a very specific and intricate knowledge of a Gear or family of Gears. Also, some elite Gear pilots use this Skill to use their opponent's weaknesses against them in melee combat. The target Gear's Armor is reduced by half if a successful roll is made against a Threshold of 8. Any Overkill result is treated as a total shutdown of all systems of the Gear. If the target has either Weak Spot or Weak Facing Flaws, +1 is applied to the roll (+2 if both Flaws are present). A character must have both Electronics and Mechanics at level 2 or more before purchasing this Skill.



Law

Specializations:	Corporate, Criminal, International, Civil, Research	Often Possessed By:	Lawyers, Legal Aides, Judges, Police, Politicians

Law is the knowledge of the legal customs of a society, and their application in a courtroom setting. This Skill might be useful to Player Characters in political or espionage campaigns.



Life Sciences

Specializations:	Zoology, Botany, Microbiology, Physiology	Often Possessed By:	Medics, Professors, Students, Researchers

Life Sciences is the study of life in its many forms. This includes all biological disciplines, with the exception of applied medicine. A specialization *must* be chosen before a character can acquire level 3.



Mechanical Design

Specializations:	Vehicles, Industrial Equipment, Agricultural Equipment	Often Possessed By:	Mechanical Engineers, Vehicle Designers

Mechanical Design represents a character's ability to design totally new or highly modified complex mechanical systems such as vehicles. The Skill includes expertise in testing such systems, but Electronic Design is required to create the computerized operating systems. A character must have Mechanics at level 2 or more before purchasing this Skill.



Mechanics

Specializations:	Automotive, Industrial, Locks, Military	Often Possessed By:	Technicians, Engineers, Hobbyists

The Mechanics Skill covers all mechanical and structural repair and design. This includes fields as diverse as automotive mechanics, robotics and locksmithing. A specialization *must* be chosen before a character can acquire level 3.



Medicine

Specializations:	Neurology, Forensics, Surgery, Toxicology	Often Possessed By:	Physicians, Surgeons, Coroners, Researchers

Medicine is the ability to diagnose and treat traumas, diseases and infections. The Medicine Skill is required for any long term medical treatment (First Aid is used in emergencies) and for any type of internal surgery. A specialization *must* be chosen before a character can acquire level 3. A character must have both First Aid and Life Sciences at level 2 or more before purchasing this Skill.

Navigation (specific)

Specializations:Night-time, Map and Compass, Star Position, Terrain Type	Often Possessed By: Campers, Explorers, Pilots, Soldiers, Survivalists

Navigation represents the character's proficiency in the various techniques used to track one's positions and movements. Air, Land, Sea and Space Navigation are purchased as separate Skills. If a character attempts to use his Skill to navigate in an environment other than one with which he is familiar, a -2 penalty is imposed on the roll.

Physical Sciences

Specializations: Nuclear Physics, Organic Chemistry, Astronomy	Often Possessed By: Professors, Researchers, Students

Physical Sciences includes the "classical" sciences such as physics and chemistry. It is a purely theoretical Skill. A specialization *must* be chosen before a character can acquire level 3.

Psychology

Specializations: Counseling, Perception, Learning, Psychological Warfare	Often Possessed By: Professors, Researchers, Clinical Psychologists

Psychology is the study of the various aspects of mental functions, such as perception, cognition, behavior and psychopathology. The Skill further includes the ability to conduct psychological therapy and counseling, including hypnotism.

Security

Specializations: Specific Type of Device, Banks, Military Bases	Often Possessed By: Thieves, Police Officers, Security Consultants

The Security Skill includes a knowledge of likely security procedures and the capabilities of many types of devices, but not the ability to dismantle or avoid them (which require the Electronics or Stealth Skills, respectively).

Social Sciences

Specializations: Sociology, Political Science, Philosophy, History	Often Possessed By: Professors, Students, Researchers

Social Sciences is a catch-all Skill for any of the humanities, with the exception of psychology and literature. It can be applied to studying ancient cultures as easily as modern societies. A specialization *must* be chosen before a character can acquire level 3.

Perception Skills - 5.4.8

Perception Skills are Skills that rely on a character's awareness of his surroundings, including both actions and objects. These take into account sight, sound and possibly other senses such as smell or the "sixth sense." To some extent, they are influenced by intuition and reaction time, but the main part of these Skills does indeed stem from the ability of the character to take in the details of what exactly is around him.

Combat Sense

Specializations: Urban, Jungle, Marsh, Night-time, Ambushes	Often Possessed By: Soldiers, Police, Criminals, Warzone Residents

A character with Combat Sense has trained himself to be aware of dangerous situations, such as firefights. Combat Sense is used primarily to detect ambushes and for initiative purposes. This Skill is useful to characters in a high-adventure campaign.

Forward Observing

Specializations: Specific Terrain, Specific Weapon	Often Possessed By: Forward Observers, Artillery Crew, Officers

Forward Observing is the ability to direct fire from remote weapons onto a target. This Skill includes some basic map and compass reading as well as terrain recognition and evaluation. Forward Observer also includes the ability to chose the best type of ordinance for a given situation.



Gambling

Specializations:	Specific Game, Cheating, Bookkeeping	Often Possessed By:	Gamblers, Bookies, Suburban Husbands

Gambling represents the character's knowledge of the rules of games of chance. It further allows the character to estimate odds, cheat (if required) and place bets on events.



Gunnery [specific]

Specializations:	Vehicle Model, Projectiles, Missiles, Energy Weapons	Often Possessed By:	Combat Pilots, Combat Gunners

Gunnery Skill is required to fire any non-portable weapons, such as those mounted on vehicles. Heavy Gear Gunnery, Ground Gunnery, Naval Gunnery, Air Gunnery and Space Gunnery are purchased separately. If a character attempts to use his Skill to fire weapons on a vehicle type other than the one with which he is familiar, a -2 penalty is imposed on the roll.



Investigation

Specializations:	Searching, Surveillance, Forensics	Often Possessed By:	Police, Private Detectives, Spies

The Investigation Skill allows the character to collect information on people, places and events. This information can be gathered by any means not covered by the Streetwise or Computer Skills.



Naval Pilot

Specializations:	Capital Ships, Submarines, Gunboats, Yachting	Often Possessed By:	Sailors, Submarine Crews, Hobbyists

Naval Pilot allows the character to pilot water-based vessels of all types. This includes submarines, hydrofoils and surface vessels. This Skill is of limited use to many characters since large bodies of water are rare on Terra Nova.



Notice

Specializations:	Specific Sense, Night-time	Often Possessed By:	Researchers, Soldiers, Police, Investigators

Notice is the ability to perceive details that may be otherwise overlooked in haste. This includes finding a clue hidden in a crime-scene, spotting a face among the crowd, reading the fine print on a legal document, and many others.



Sniping

Specializations:	Specific Weapon	Often Possessed By:	Snipers, Elite Troops

Sniping is the ability to place extremely accurate small arms fire onto a target. This Skill includes some basic meteorological knowledge to gauge wind influence and some terrain recognition and evaluation abilities. When used instead of Small Arms, Sniping allows the user to place his shot into a specific body part or system (if firing at a vehicle) with no penalty. The human head and the vehicles' Aux System are exception to this rule and are both -1 to hit. A +1 modifier is added to shots made at Long and Extreme ranges. The user must be stationary when using the Sniping skill and cannot use burst fire. A character must have Small Arms at level 2 or more before purchasing this Skill.

5.4.9 - Psyche Skills

The rather ethereal quality of the Psyche Attribute is reflected in the Skill which it governs, the ability to read the body language, eye movements, and other subtle signals which people send. What information this Skill imparts is even more at the whim of the GM than other Skills, and Players should not rely on it is a lie detector.



Human Perception

Specializations:	Body Language, Voice Tone, Eye Contact	Often Possessed By:	Barman, Psychologist

Human Perception is the Skill of understanding the state of mind of another person, mainly in regard to emotions. At higher levels, a careful observer may use the Skill to empathize with the person he is observing and can make prudent assumptions about her inner workings.

EQUIPMENT - 5.5

The various tools and pieces of equipment used in the 62nd century are roughly similar to the ones used in the previous centuries. After all, basic human needs have not changed much in all those years; a hammer is still a hammer (at least for gaming purposes). The only real difference is that many items are so much more advanced, they are ridiculously small, efficient and tough. They are made out of advanced composite or polymer material and equipped with high-speed silicone chips.

While the general technological level of humanity is very high, not everyone has access to these wonders. In many places, one must make do with slightly inferior equipment which can be built locally and easily repaired. Modern items are so small and compact it is often simpler to replace than to repair them — annoying, even dangerous, if one cannot replace a defective but critical item!

This section is devoted to listing and explaining several items that will be useful to the Players during a roleplaying session. This listing is neither inclusive, nor exclusive. The Gamemaster can create any item his or her Players may seek by simply taking an equivalent in the real world today (or other science fiction games) and converting it into Silhouette statistics. As long as the general level of technology of the **Heavy Gear** world is respected — no portable fusion generator or anti-grav unit, for example — anything goes.

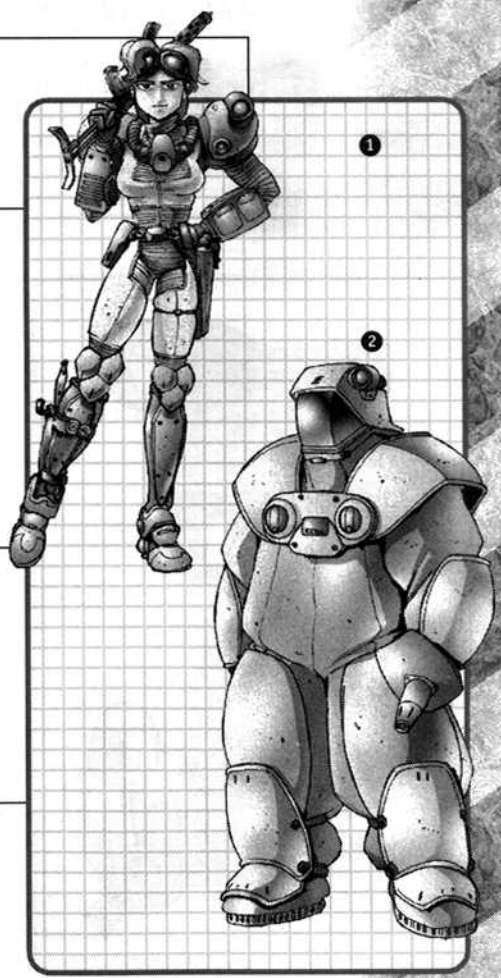
The listing below is for generic items. The Gamemaster can customize them to simulate different models and/or manufacturers; additional equipment pieces will also be published in upcoming books. The Gamemaster has the final word on the abilities, cost and availability of all equipment and weaponry in a campaign.

Clothes and Protective Suits - 5.5.1

A variety of clothing and survival suits is readily available on the market. Each of these suits protects against a specific environment and can be combined with other suits (as well as armor — see page 84) for 1.5 times the total costs of all suits and armor. Some more fashionable clothes and suits are often available, with prices ranging from 75% of regular price (for propaganda-driven uniforms or other advertising clothes) to as high as 500% of the basic price tag (for high society clothes or elite uniforms). Local market conditions can also affect cost.

◆ Clothes

Clothing comes in a wide variety of styles, purposes and costs. To offer a comprehensive list of available clothing would be ridiculous, but the few categories indicated in the Equipment Table (page 77) give an approximation to the GM who, as always, has the final word.



◆ 1 Desert Suit

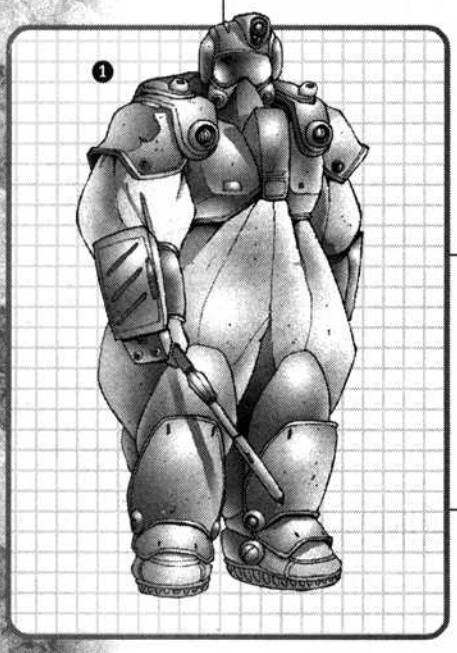
A skintight, synthetic polymer suit equipped with a heat exchanger at the belt. A special fluid flows through thousands of small tubes woven between the inner and outer layers of the suit, removing body heat through the heat exchanger. It greatly helps survival in deserts and other high temperature environments and is commonly worn by the inhabitants of the Badlands. The suit does not provide any significant protection against weapon fire, although it can be worn under any type of armor. The coolant fluid is non-toxic, even if splashed over open wounds, but is not potable. Some suits are specially designed to protect against dry environments, and can recuperate and distillate lost bodily fluids. With such a suit on, a man can comfortably function in up to 50 degrees Celsius environments with a minimum daily water ration of 250 ml.

◆ Diving Suit

A skintight suit of rubber-like synthetic material equipped with a transparent face plate. A small gill unit attached to the face plate extracts oxygen from the water and contains an emergency five-minute air supply in case the gills break down. The suit offers some thermal insulation, enabling characters to dive in temperatures as low as -5 degrees Celsius without suffering from hypothermia. Neither the suit nor the face plate provide any significant physical protection. Maximum diving depth is around 200 meters.

◆ 2 Fire Suit

Fire suits are designed to protect the wearer against very high temperatures (up to 1000 degrees Celsius) and resist most damage done from fire sources; consider the suit as having an Armor rating of 40 against fire attacks only. It includes a gas mask and air coolant unit.



NBC Suit ❶

NBC suits, also called environment suits, are sealed garments designed to protect the wearer against the effects of NBC (Nuclear, Biological and Chemical) warfare. They are self-contained environments that shield a trooper for up to 12 hours without external supplies. Each suit contains a small medical kit which contain the antidotes to the most common chemical and bacteriological weapons. Unfortunately, the suits are quite cumbersome to wear and very tiring to fight in: they have a -1 encumbrance penalty, cumulative with any armor worn. It takes one action to put on an environment suit and another to "zip up."

Vacuum Suit ◆

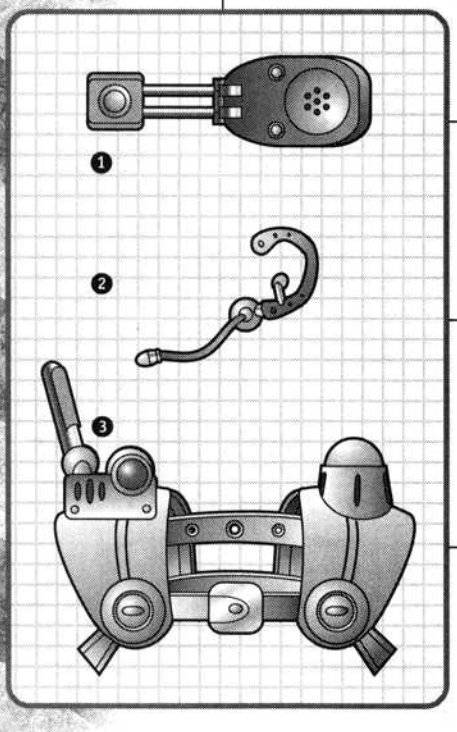
Vacuum suits, the most complex and cumbersome of survival suits, allow a person to survive in a vacuum. These suits are made of a self-sealing material that will repair a hole of up to 0.5 cm in diameter in one round. The air and power reserve usually contains up to six hours' worth. They offer total insulation against cold, and will enable the wearer to comfortably withstand temperatures of up to 250 degrees Celsius. They also count as sealed against NBC effects. Vacuum suits are cumbersome and impose a -1 encumbrance penalty, cumulative with any armor worn.

Winter Suits ◆

Winter suits are insulated and internally heated to offer complete thermal protection for a period of up to 12 hours. After this period, it will allow the wearer to comfortably withstand temperatures as low as -80 degrees Celsius.

5.5.2 - Communication Equipment

On a planet with a low population density like Terra Nova, it is important to keep in touch with others. Communication devices are plentiful, and most homesteads will have a satellite dish to link them to one of the many orbiting satellites above. Unless mentioned otherwise, all devices count as a rating -5 vehicle comm system if military vehicles operate in the vicinity. The jamming signals the latter automatically put out will also reduce the devices' range to a tenth of their listed range. Military grade communication devices are generally far more expensive than civilian equivalents, but are more capable (-2 rating).



Cellular Phone ❶

A pocket communicator connected to a relay station which uses Hermes 72 satellites to bounce its signal to the proper location. The phone is about the size of a lighter and can function for years with normal use (repeated long distance calls may wear out the battery sooner, though).

Communication Headset ❷

The headset is a small hand free radio set. It can be used to communicate with a unit on the same frequency up to 10 km away. It can also be used to transmit commands and information to a computer, acting as an interface device. The headset is made of polymer and is extremely light (30 g) and quite sturdy.

Communication Rig ❸

This shoulder-worn harness is a complete military communication system capable of amazing performances. Full encryption/decryption capacities are provided by a dedicated computer, and the whole system can be networked to a portable satellite dish to use the Hermes 72 satellite network. The harness weights 2.5 kg and has a range of about 8 km under battlefield conditions (40 km otherwise). It counts as a rating 0 vehicle comm system for jamming and interception purposes.

Military Communicator ◆

Similar to the personal communicator (see next page), but with full encryption/decryption capabilities provided by an additional chip running a complex scrambling matrix. Military communicators often use a built-in booster unit.

Military Throat/Ear Comm Set

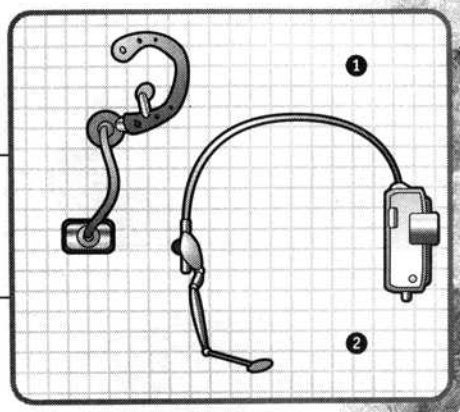
A smaller version of the communicator, worn as a 1 x 2 cm patch on the throat and an ear plug unit. Range is more limited (15 km), but it is more comfortable to use and includes full encryption/decryption capability. For triple the price, the comm set can be implanted just under the skin, although additional surgery is necessary to provide new frequency modules.

Personal Communicator

A small radio set, about 2 x 2 x 10 cm in size. Can be used to communicate with a unit on the same frequency up to 25 km away, more if used with a booster unit (50 km, double the price for booster).

Throat/Ear Comm Set

This civilian device is essentially the same as the standard military throat/ear comm set, but without the full encryption and decryption capability.



Electronic Equipment - 5.5.3

A large number of personal devices are available for the convenience of the Terranovans. Most of these have benefited from advances in the field of electronics and are exceedingly small, usually being just large enough to be used easily by human hands. Some older or jury-rigged bulky equipment is also available, however.

Audio Receiver

A small radio contained within an earplug unit. Control dials are small rounded knobs on the surface. The power drain on the energy cell is so negligible that usage is virtually unlimited (about 30 years). Range is up to 100 km, depending on the power of the emitter.

Audio Recorder

Recordings are perfectly clear and computerized audio processors ensure perfect fidelity with no degeneration. The unit has a built-in, very sensitive microphone and speakers. Almost all models also have cordless earplugs.

Bartender Glove

A novelty item gaining popularity in bars and clubs across the planet, the Bartender Glove is a nifty gadget which combines the functions of notepad, recipe book and drink dispenser and mixer in one handy package.

Data Disk

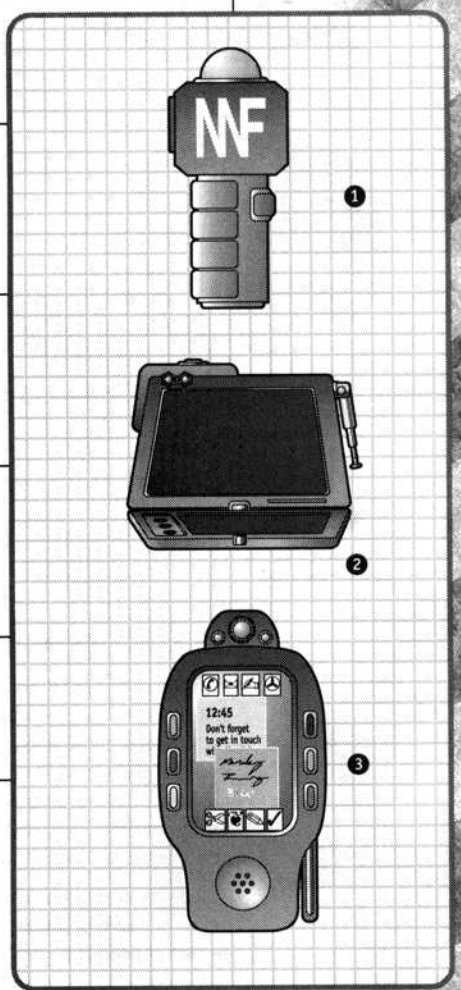
These optical data disks come in boxes of ten (10). They can be used to record any kind of digital information: text, sound, image, trideo, etc. Each disk can hold about one terabyte of data and has its own integrated miniaturized archival and compression chip. A disk is about 4 x 4 cm.

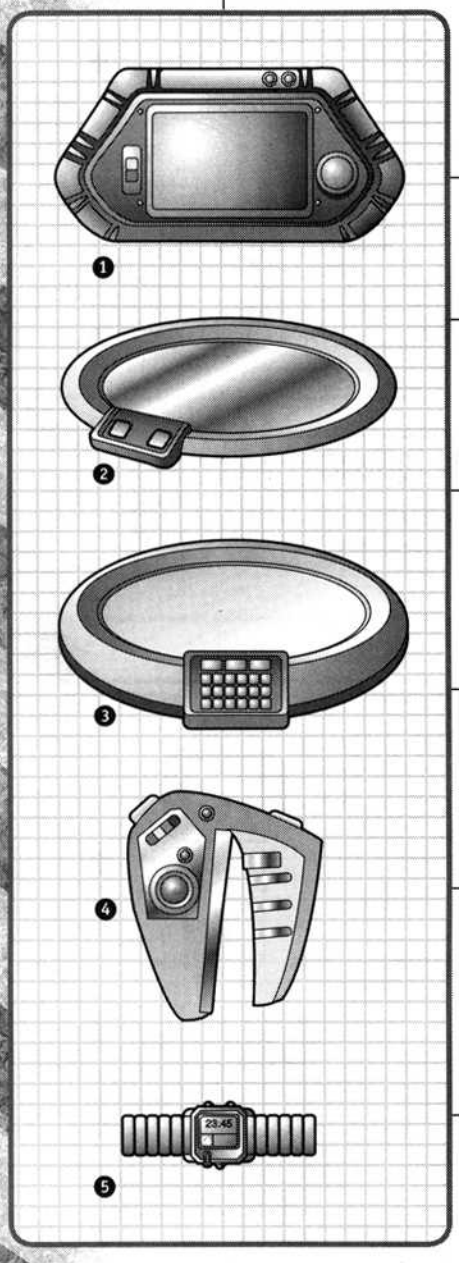
Information Pad

Touch-sensitive pads such as this one are a widely used way to enter and read data from a computer system. Voice activation is also a popular option.

Personal Assistant

A combination of electronic secretary, miniature computer and communication device, the personal assistant is a useful tool for the modern officer. This particular model is rugged and adapted to the rigors of military life. It combines a memcompass, electronic notepad and cellular phone. A stylus, located to the right of the casing, serves to enter notes on the touchscreen. The whole unit weights 0.4 kg and has a one year autonomy.





Personal Computer ❶

A small hand-held box with a deployable flat screen. It can be used for a variety of tasks according to the programs loaded in memory. Most models come with a standard flat, deployable keyboard and voice activated controls. The computer uses standard data disks and can connect to any functional computer network through a built-in fiber optic cable. For double the price, one can add a trideo output: the information seems to float in the air above the computer. Expensive, but impressive.

Tray Data System ❷

This nifty gadget serves both as a tray and as an information storage system. The bottom of the tray is a sturdy display screen where information can be entered using a special dataglove.

Trideo Receiver ❸

A trideo receiver is similar to a video receiver except that it either projects a true 3D image above the surface of the board or simulates 3D on a flat screen. The power cell lasts about one year with constant use. Range depends on the power and location of the emitter.

Trideo Recorder ◆

Trideo recorders are similar to the video ones except that the images they record can be in two or three dimensions. For best 3D image quality one must separate the remote sensor cams and place them on each side of the subject. A small holographic projector mounted on top can be used to view the recording. The trideo recorder uses standard data disks.

Video Receiver ◆

A video receiver is a flat tablet equipped with a high-definition screen, speakers and a small slot for accepting data disks. It can be used to read text and play audio and video recordings. The controls are simple keys placed on the side. The power cell lasts for about two years of constant use. Range depends on the power and location of the emitter.

Video Recorder ❹

A small, lightweight unit used to record moving images and sounds. It uses standard data disks (see previous page). Image quality is studio-perfect every time and can be enlarged up to four times. A variety of functions are available according to the model: zoom, macro, pixel editing, image sharpening, etc. This item is substantially cheaper and sturdier than trideo technology and is often favored in the harsh Badlands.

Watch ❺

A normal digital watch with a micro-computer for taking notes, keeping appointments, and so on. Available in a variety of colors, shapes, sizes and quality, with specific features depending on the exact model.

Hooks & Tips — Brands, Quality and Availability

There are thousands of manufacturing companies on the planet, some well known, others not. This section presents a sample of the tools, personal gear and equipment that is available to the Players, but is by no means complete or all inclusive. It would be impossible to list all existing variations and models that are currently available on the market. The Gamemaster may derive many of them from the statistics given above, however, by changing one or two numbers in the statistics, or adding or removing a few secondary features to the item. All of the equipment pieces named here are assumed to be reliable and sturdy, but others might not be so. If needed, the Gamemaster can assign an Unreliability rating to an object — between 2 and 6 — and roll two dice against it: if unsuccessful, the object ceases to function, with potentially deadly consequences.

Most of the items listed in the tables are easy to locate and purchase. Some, such as the medical equipment, is obviously restricted to certain professions, but the rest can be freely obtained. Weapons and armors can also be found on the free market, but they have their own set of rules. It is much harder to find a pistol in Valeria than in Khayr ad-Din, for example.

Headgear - 5.5.4

A number of protective devices for one's head are available. Many combine their defensive function with the sensitive electronics that are used to pilot a vehicle.

❶ Aircraft Pilot Helmet

The aircraft pilot helmet is very similar in design to the one used by Gear pilots. It shares the built-in holographic HUD and communication equipment but includes additional life support features. The primary connectors for the life support system are located to the front and sides of the helmet, while the data connectors plug into the side sockets.

❷ Cap

A cloth cap, usually decorated with insignias and patches. It is useful to provide insulation by minimizing the loss of body heat through the head.

❸ Combat Helmet

This type of helmet is worn by virtually all infantrymen. A sturdy shell of reinforced polymer houses a complete combat communicator and a combat microcam to relay information to the squad leader. The helmet also include a laser-crystal visor and ear baffles to protect the wearer's senses.

❹ Demolition Specialist Helmet

This piece of headgear was especially designed to meet the needs of demolition experts working in the field under hard conditions. The lightweight unit contains a voice-activated military communicator which is equipped with a throat mike with discriminating circuitry to allow clear communication at all times. Likewise, the audio protectors have similar filters designed to protect the ears while still allowing the operative to hear normally. The face plate is a tough, shatter-proof polymer designed to protect the face and eyes from shrapnel.

◆ Gear Pilot Helmet

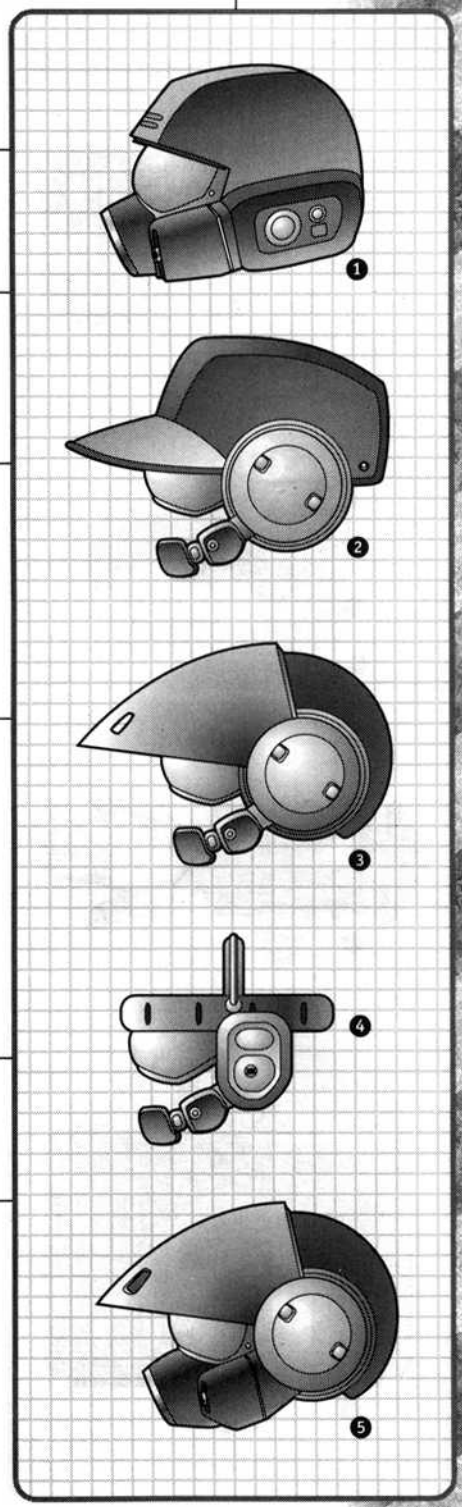
The helmet of a Gear pilot is an important part of the man/machine interface. In addition to its protective function, the armoplast shell houses a laser-crystal screen to feed the pilot information treated by the CPU's visual sub-processor, enabling him to "see" outside the cockpit. The helmet also contains some communication equipment and a gas mask. Some advanced versions replace the laser-crystal screen by a more complex full immersion projection system which provide the pilot with an unequaled view of the outside. Although the system is bulkier and tiring for the eyes, the quality of the virtual environment allows more information to be processed in a shorter time, a useful characteristic for test pilots struggling with new machines. The helmet also contains communication equipment and the standard gas mask.

◆ Hat

One of many varieties of hats, this garment protects the head against sunstroke and cold alike, both of which are common dangers in the Badlands.

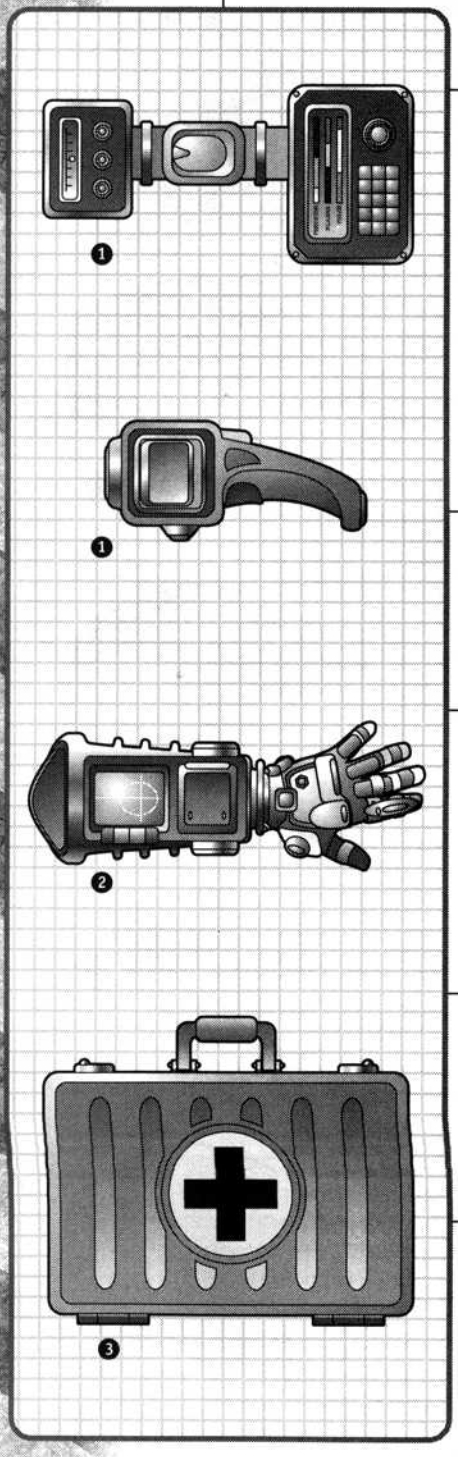
❺ Strider Crew Helmet

The strider crew helmet is a sturdy contraption made of carbon-reinforced armoplast. The unit features a standard personal communication rig and an air filtration unit, should fumes enter the strider's crew compartment. Both systems, although fully independent, are usually connected to the strider's own internal systems. Data and clean air feeds are provided by twin polymer hoses which connect to sockets located to the front and sides of the helmet. The face plate houses a standard holographic HUD, displaying battle information right in front of the crewman's eyes.



5.5.5 - Medical Equipment

It is not always possible to prevent illnesses and deterioration of health. Accidents and combat can also severely threaten the well-being of PCs. Often, the quality of medical equipment available can make the difference between life and death. Those with access to fully equipped hospitals can (eventually) recover from most injuries that are not immediatly fatal, including lost limbs. Badlanders and soldiers in the field, however, may only have access to first aid patches and field clinics.



Drugs ◆

Many types of drugs are available to help doctors in their tasks. Without going into the specifics, here are statistics for three major categories of medical drugs.

Drug Descriptions ◫

Painkiller Drug:	***A commonly available analgesic helps reduce the pain from wounds, diseases or chronic conditions. It is applied locally by hypodermic spray (Analgesic, Potency 8, Onset Time 10 minutes). A less potent version (Potency 6) is available in tablets.***
Sleeping Drug:	***A safe sedative with some side effects (Sedative/Euphoric/Analgesic, Potency 9, Onset Time 30 minutes). It was carefully designed to make it very difficult to overdose: Fumbles are treated as Margin of Failures of 9, with intense nausea aftereffects.***
Euphoric Drug:	***Not really a medical drug, though it is sometimes administered to victims of panic and anxiety attacks (Euphoric, Potency 12, Onset Time 15 minutes).***

First Aid Kit ◆

The First Aid kit is a small 10 x 10 x 3 cm package that contains a variety of medical items used in case of minor wounds: a small autodosage hypospray with loaded cartridges of painkillers, coagulants, stimulants and other useful drugs; self-sealing bandages; pseudo-skin; cauterizer; and a sterilizer. Use of this kit gives +1 to First Aid rolls.

Medical Belt and Scanner ◆❶

The medical belt is a utility harness that contains a variety of medical items: autodosage dispenser (with loaded cartridges of painkillers, coagulants, and stimulants), hypospray, self-sealing bandages, cans of foamed pseudo-skin, pincers, scalpels and sterilizer. This is complemented by the medical scanner, a miniaturized diagnostic tool which records the patient's vital signs (heartbeat, body temperature, etc.). The scanner does not provide a ready-made diagnostic of the patient, but merely reports the situation. The whole set gives an effective +1 to First Aid and Medicine Skill rolls when used by a level 2+ doctor.

Medical Kit ◆❷

This a larger, better equipped version of the standard First Aid kit. It contains the same items plus a few others destined to be used by a doctor to perform minor field operations and surgery (scalpel, thread and needle). Often, the medical kit is incorporated within a glove-like apparatus so that the instruments are more readily available. The whole set gives an effective +2 to First Aid and Medicine Skill rolls when used by a level 2+ doctor.

Surgical Field Kit ◆❸

The Field Surgical kit is a miniaturized operating theater. It contains an emergency sterile inflatable bubble environment, high-speed drug analyzer/recombiner, staplers, clamps, scalpels, and so on. An experienced doctor (Medicine level 2+) can set up the theater in less than three minutes and start operating right away. The kit gives +3 to Medicine Skill rolls when used by a level 2+ doctor.

Surveillance and Infiltration Equipment - 5.5.6

Information gathering is a vital task. Only by knowing what the other side is up to can you effectively protect yourself. It is also important to implement methods to prevent others from learning your secrets. A wide variety of people use these types of devices. While spies and covert operatives come instantly to mind, surveillance equipment is also part of the repertoire of police offciers, scouts and reporters. Most politicians and executives also use counter-intelligence equipment.

◆ Binoculars

Computer-enhanced binoculars with range-finders are standard fare for officers. They can magnify up objects up to forty times at the touch of a button and give a rough estimate of the range (around 70% accuracy) using purely passive methods. Many models include motion dampeners in the basic package. Standard binoculars are about palm-sized.

◆ Journalist VR Rig

In the fast moving world of journalism, speed and subtlety is the essence. This lightweight head-mounted data recording apparatus transforms one man into a complete media team. Combining the function of binoculars, Head Up Display and video/trideo recorder, the rig allows hand-free use through auto-adjusting features and voice activated controls. The information recorded is stored on standard data disks which are held by a small unit clipped to the waist of the operator, generally in a discrete belt pouch hidden out of sight. This unit also contains the battery, which is good for about a day of continuous operations.

◆ Nightvision Goggles

Lightweight goggles equipped with a visual-enhancement system. They offer true sight by amplification of ambient light or through the use of UV. They are useless in pitch black darkness. Some very advanced (and expensive: triple price) models look like thick sunglasses.

◆ Scrambling Device

Built into a seemingly inoffensive piece of jewelry, the scrambling (or discretion) device is a broad band signal jammer designed to prevent unauthorized eavesdropping. The device generates electronic noise on ever-changing random bands, preventing everything but tight-beam transmissions from getting through. The scrambler can also be attached to a wall or window, vibrating it to prevent laser and touch sensors from functioning. Autonomy is limited (because of the high energy output) to 6 hours.

◆ Stealth Helmet

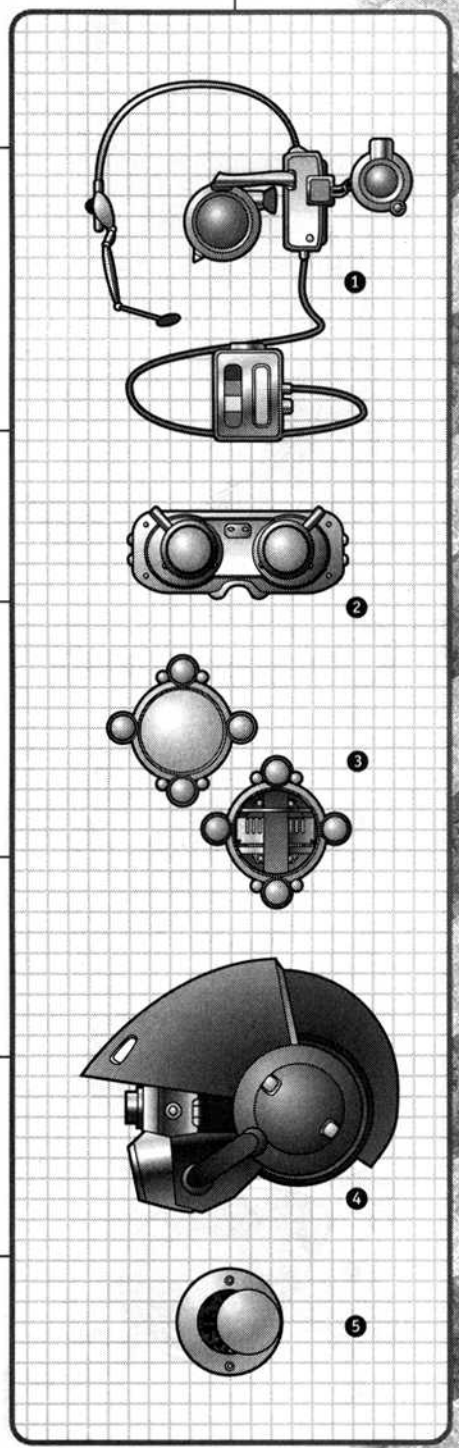
An important part of the modern intelligence operative's outfit, the helmet is made of lightweight reinforced carbon plastic. Its outer surface is coated with a rubber-like black polymer that has stealth characteristics. The helmet comes with low-light/thermal vision goggles and respirator built-in as standard equipment.

◆ Thermal Goggles

These are similar to the nightvision goggles except that they rely exclusively on infrared. These appear as moving patterns of various colors. Some practice is necessary before being able to correctly interpret the heat patterns. Also available in the same "sunglasses" model as the nightvision goggles, again at triple price.

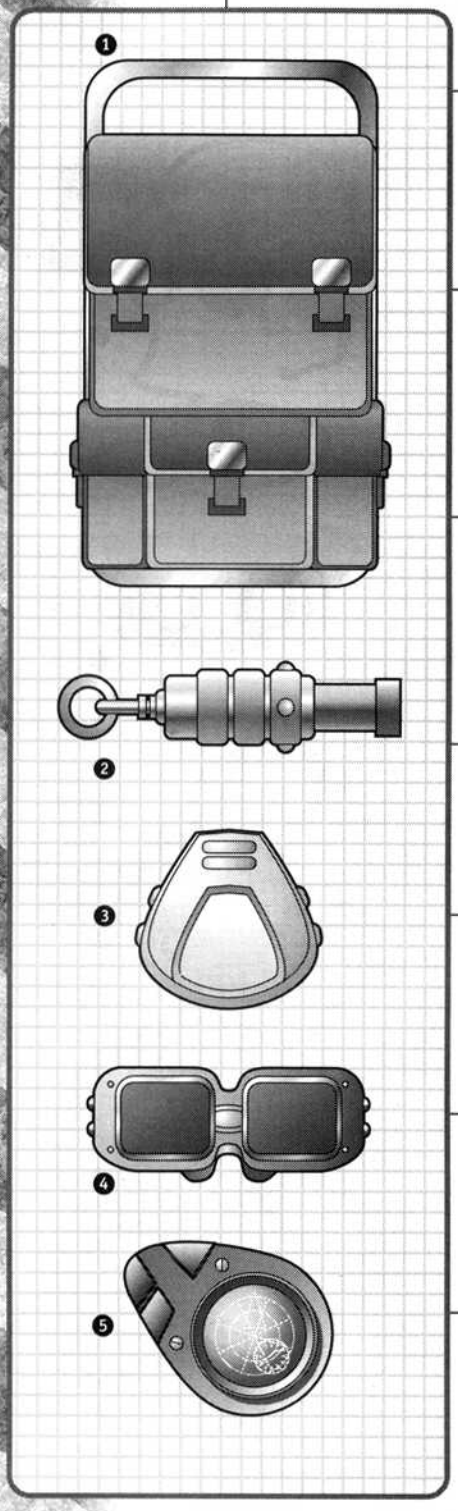
◆ Tracers and Bugs

Improvements in electronics have made these nearly microscopic. A typical tracer or listening bug is about the size of a mosquito (the Earth variant, not the Terranovan) and can broadcast up to 5 km away, though it's easy to jam. The power cell can last for two months, though the internal memory only has room for a few hours' worth of information.



5.5.7 - Survival Equipment

This section covers equipment and tools helpful for survival in difficult environments. This includes wilderness areas such as outbacks or deserts. This equipment can also be used to make a field assignment much more comfortable.



Backpack ◆1

A general use backpack that can hold up to 1 cubic meter and 100 kilograms of various equipment. The straps are large and padded to prevent chaffing.

Climbing Gear ◆

This pack, which can either be used for mountain climbing or speleology. Includes: a 50 m rope, with spikes and crampons; a compressed-air hammer for the spikes; an ice axe; climbing boots with rock screws, an oxygen mask with a two-hour supply; a radio flare; and a helmet with a HUD altimeter, a powerful headlight (50 m range) and a small radio communicator (10 km range, see *Communications*).

Flare ◆2

The size of a small pencil, the flare is a one-shot compressed gas gun that fires a high intensity blast about 200 meters into the air. Specialized loads (colors, smoke, etc.) are available. The flare is not fast or hot enough to be used as a weapon, but can be used to blind. A Radio Flare works the same way but also generates a short, but powerful, radio signal. Most rescue units' sensors are attuned to this signal and will identify it as a call for help.

Gas Mask ◆3

A lightweight plastic unit that fits over the mouth and nose. A small filtering device provides fresh air at all times, but the mask does not have an independent air supply. Characters equipped with a gas mask are not affected by all poison gas that must be inhaled (this includes smoke). The mask does not protect the user from poisons absorbed through the skin. The filter unit must be cleaned or replaced after every twenty hours of use.

Goggles ◆4

These are used when driving open vehicles or in the desert, sometimes in conjunction with specially designed gas masks (see above) for complete facial protection. Almost all Badlanders possess at least one pair. Goggles are easily available in a wide variety of styles.

MemCompass ◆5

Terra Nova's surface is irregularly seeded with magnetic monopoles. Thus, a normal compass, while not useless, is unreliable and only used for short range navigation. The MemCompass is equipped with an internal gyroscope and a memory computer chip. It can both give directions and store them, then replay them on a small screen.

Sleeping Bag ◆

A good quality sleeping bag is made of polymer and composite, and folds down to a handy packet about 20 x 20 x 3 cm. It insulates against both heat (up to 30 degrees Celsius) and cold (down to -50 degrees Celsius). Cheaper cloth models are also available for one-third the price, but ten times the weight and encumbrance, and they cannot insulate effectively against heat, only cold.

Survival Kit ◆

An emergency pack carried by all soldiers and people working in remote regions. The standard military kit includes the following items: a compass, a light but durable polymer bedroll, ten (10) ration packs (each pack is one normal-sized meal), basic fishing gear (opt.), an alloy survival knife with tools (file, cutter, tweezer, etc.), a collapsible polymer canteen (one liter) and a lighter (two-hour fuel supply).

◆ Survival Rations

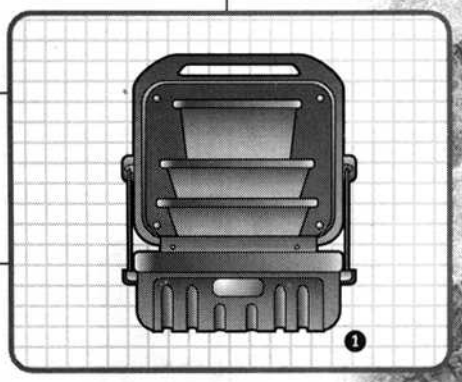
A variety of food products sealed in a polymer packet. Some can be heated, others are eaten cold. These rations can sustain a person for up to a week, and have a shelf life of two years.

◆ Tents

Tents are often used by scouts and prospectors. They are made of ultra-light reinforced composites. When collapsed, they take very little space — a one-man tent can even fit in one's pocket. Tents are quick to set up, with a sturdy anchoring system in case of bad weather. Several sizes are available.

❶ Water Condenser

This lightweight, practical device condenses about one liter of water every day from the air at the poles. In the Badlands, it produces about half a liter per day because of the dry atmosphere.



Tools - 5.5.8

Terranovans use many types of tools and equipment. They need some heavy duty stuff to survive their new home. The following tools have been designed for use on the ground. Space-adapted versions are available for 1.5 times the cost; other statistics remain the same.

❶ Cutting Torch

A high-power plasma cutter powered by a superconductor loop. It is used to cut through metal and, at a lower setting, can serve as a welding torch. It hardly makes for an accurate weapon, but can inflict severe burns if it does connect (Fire Intensity 6). The torch has enough power and gas for 30 minutes of continual use.

◆ Electronics Tool Kit

This kit contains the basic tools and diagnostic instruments for routine maintenance and repairs on electronic circuitry. No repair other than jury-rigging can be done without this kit. Common versions of the kit include cutters, pincers, a variety of small screwdrivers, a few testing boards, a multimeter/circuit analyzer, a good number of replacement chips, optical and electrical wires, a miniature plasma torch (lasts four hours), a microdrill, a saw and a small power supply (lasts a hundred hours). A complete miniaturized diagnostic computer and expert system is found in high-grade electronic kits.

❷ Flashlight

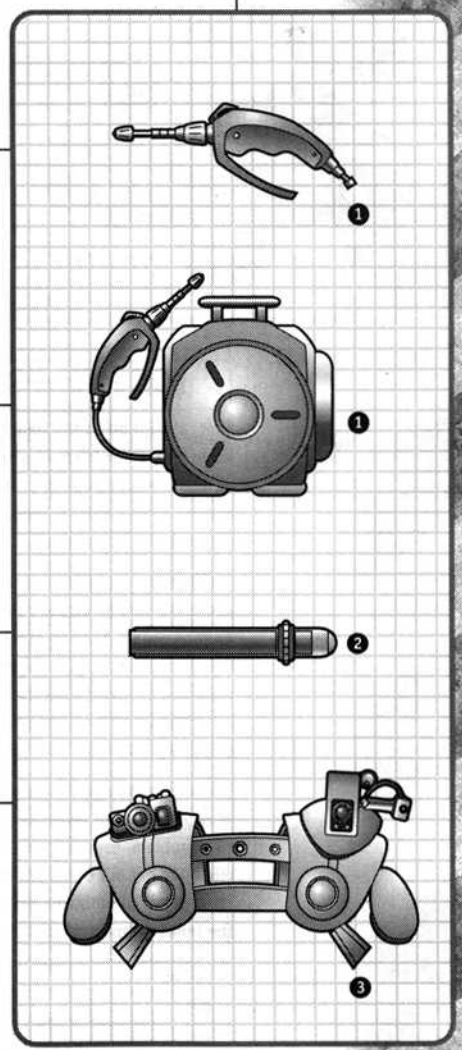
A flashlight capable of illuminating up to 50 meters ahead in its broad setting. The intensity and angle of the light beam can be adjusted by the user by rotating a small knob under the thumb. Beam width can be narrowed down almost to a laser state — although the beam is too weak to cause any damage. The flashlight is the size of a small pencil. Battery life varies depending on the model, but usually allows 36 hours of continuous use.

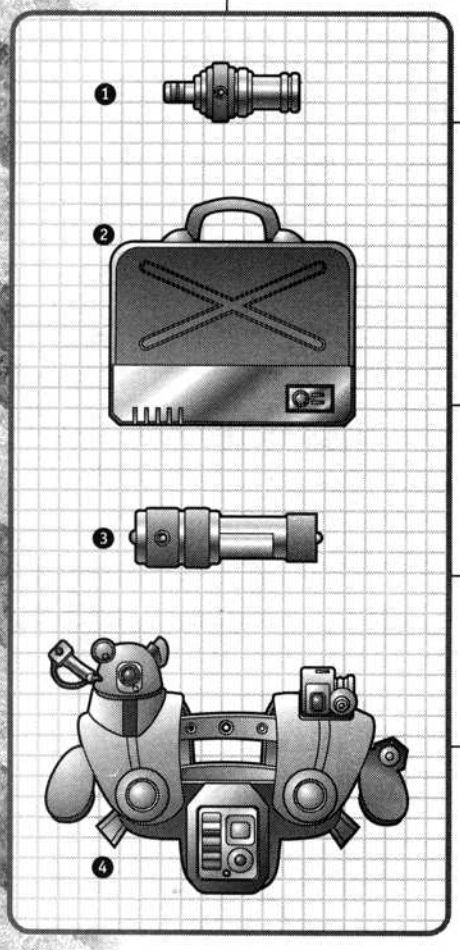
◆ Geiger Counter

A standard Geiger counter, able to detect trace radiation up to 50 meters away (further for heavy radiation). The unit is equipped with either visual or audio output and is the size of a lighter. Thanks to the counter's low power requirement, the power cell lasts practically forever.

❸ Mechanical Tool Kit

This kit contains the basic tools necessary for maintenance and repairs on mechanical objects. No repair other than jury-rigging can be done without it. The contents of the kit include two hammers, two metal handsaws, a variety of screwdrivers, wrenches and torque bars, a small plasma torch (lasts one hour), a drill with bits, a saw with blades and a small battery power supply (lasts two hours). Some high-grade kits (twice or even three times the price) feature expert systems used by field engineers to help with highly technical repairs.





Metal Detector ◆1

A small detector relying on Magnetic Anomaly Detection (MAD) technology to detect metal concentrations up to 50 meters away. The unit is equipped with either visual or audio output (sometimes both) and is the size of a big thumb. The power cell lasts practically forever.

Portable CAD Mainframe ◆2

This small polymer case houses a complete miniaturized diagnostic computer and expert system, along with some basic tools and sensors. The computer is equipped with a deployable screen and draftboard and can be networked to any other computer systems, including those on vehicles, provided the correct adapters can be found. In addition, a small cellular phone is included for linking with non-portable mainframes. A chip reprogrammer, with adapters for most of the existing chip designs, is located on an extensible side support. The portable CAD mainframe weights 3.5 kg and acts as a personal computer and electronic tool kit, giving a +1 to Electronic Skill rolls.

Prospecting Tubes ◆3

These mundane-looking alloy cylinders are in fact a useful geological micro-laboratory. Each cylinder contains the proper catalysers and analysis instruments to detect one type of ore. The soil sample needs only be dropped in and the output port connected to a computer to know the results.

Rope ◆

This is a braided composite filament cord, about half a centimeter in diameter and sold in 50 meters length, which is able to support around five tons. It is available in a variety of colors and motifs. Other diameters of ropes of various lengths exist to fulfill a large number of specific needs.

Tech Rig ◆4

This shoulder-worn harness mounts the tools required to do routine field maintenance and repair on equipment. The kit includes a small hammer, a metal handsaws, a variety of small screwdrivers, wrenches and torque bars, a plasma torch (half-hour autonomy), a drill with bits and a small battery power supply (20 hours autonomy). The harness also contains the tools and diagnostic instruments necessary to do routine maintenance and repairs on electronic circuitry. The whole weights 6 kg.

HOOKS & TIPS — HANDLING MONEY & EQUIPMENT

First, a word on Monty Haul campaigns. Back during the days of the *Let's Make a Deal* show (hosted by Monty Hall), contestants would leave with truck loads of prizes. In gaming, campaigns where Players would acquire tremendous wealth and equipment became known as Monty Haul campaigns. The sad fact is, however, that most campaigns, unless managed carefully, can easily fall into that category. Players have a natural tendency to accumulate items and money, and Gamemasters will quickly find it difficult to limit their Players' fortunes and possessions.

There are two solutions to this problem, depending on the types of Players in the group. One is to carefully monitor the Players' assets and make sure to account for everything they own or benefit from: lodging, transportation, clothes, food, various investments to save on income tax, pension plans, health care, etc. This can rapidly come up to quite a sum. It can also lead to scenarios around the Players' wealth. For instance, a Player may find that a Mekong banker has diverted his funds for some personal less-than-legal operation and he may wish to investigate the matter. As a whole, Gamemasters should remember that the richer a person is, the more likely he or she will attract unwanted attention. Several people will want to become friends with the PC while many others will try to get them involved in some financial scam that could very well leave them penniless. The road of the rich and wealth is not for everyone.

The second solution to the problem is to ignore it altogether and shift the focus of the campaign in such a way that that money and tons of equipment can never be part of the solution. In the rocky world of human relationships, money seldom provides long-term answers to a problem, especially if the other party is equally rich to the Player(s). For instance, a rich but depressed media star does not need money to get out of his drinking problem — he needs help, support and understanding. If your Players are getting rich and bored, throw them personal problems and see how they deal with them. If they throw money around, hoping for a quick resolution, carefully consider the human impact of their actions and see what turns up.

Equipment Weight and Cost

Equipment	Mass (kg)	Cost (Mark/Dinar)
Aircraft Pilot Helmet	1	3000
Audio Receiver	0.01	10
Audio Recorder	0.1	30
Bartender Glove	1	1000
Binoculars	1	50
Cap	0.2	10
Cellular Phone	0.2	40
Clothes		
Summer, Designer Suit	0.5	1,000+
Summer, Lower Class	1	10
Summer, Medium Class	1	5
Summer, Upper Class	0.5	250
Summer, Shoes, Designer	1	400+
Summer, Shoes, Normal	1	35
Winter, Boots	1.5	75
Winter, Boots, Designer	1	800+
Winter, Designer Suit	0.5	1,750+
Winter, Lower Class	1.5	25
Winter, Medium Class	1.5	90
Winter, Upper Class	1	475
Climbing Gear	10	250
Spikes and Crabs (10)	1	15
Compressed-air Hammer	1	25
Propellant for Hammer (60)	0.5	2
Ice Axe	0.8	5
Spiked Climbing Boots	1.5	80
Oxygen Mask	0.5	45
Climbing Helmet	2	120
Backpack		
Small (50 kg)	2	20
Large (100 kg)	5	35
Combat Helmet	0.7	300
Communication Headset	0.03	200
Communication Rig	2.5	1500
Cutting Torch	1	25
Reload	0.6	10
Data Disks (box of 10)	0.1	10
Demolition Specialist Helmet	0.5	200
Desert Suit		
Cooler	5	200
Water Reclamation	5	250
Diving Suit	10	500
Drugs, Medical	0.01	varies
Electronics Tool Kit	2	600
Fire Suit	6	800
First Aid Kit	0.3	10
Flashlight	0.5	10
Flare	0.05	2
Radio	0.06	8
Smoke	0.06	4
Gas Mask	0.5	50
Filter	0.05	5
Gear Pilot Helmet	1	3000

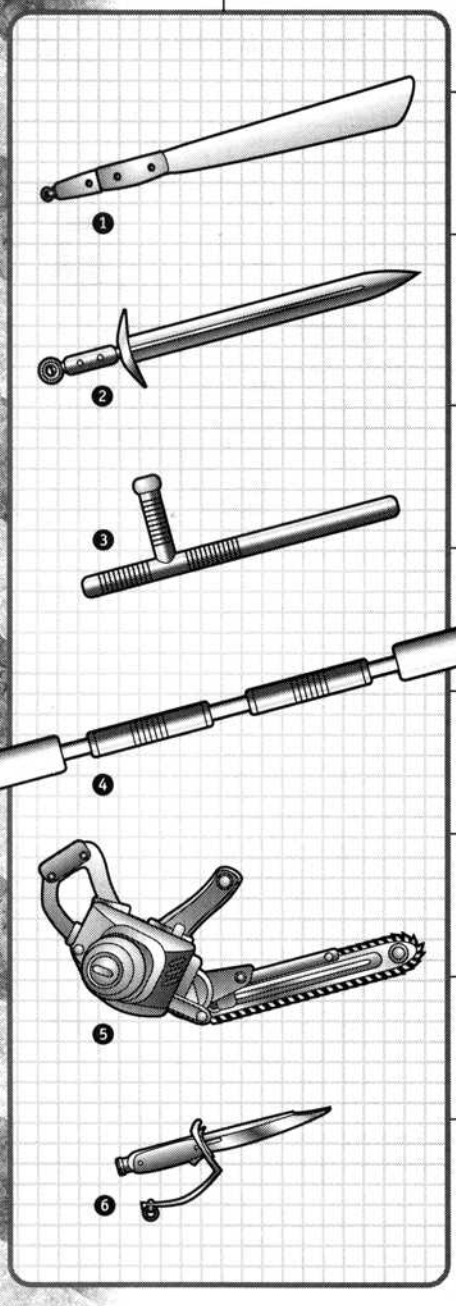
Equipment	Mass (kg)	Cost (Mark/Dinar)
Geiger Counter	0.2	100
Goggles	0.2	10
Stylish Goggles	0.2	25
Hat, Felt	0.5	75
Information Pad	0.5	75
Journalist VR Rig	0.5	300
Mechanical Tool Kit	5	400
Medical Belt/Scanner	1	1000
Medical Kit	1	100
MemCompass	0.1	10
Metal Detector	0.3	100
Military Communicator	0.3	200
Military Throat/Ear Comm Set	0.02	400
NBC Suit	12	1200
Nightvision Goggles	0.5	200
Personal Assistant	0.7	50
Personal Communicator	0.3	30
Personal Computer	1	400
Portable CAD Mainframe	2.5	5,000
Prospecting Tubes (3)	0.6	900
Rope (50m)	1	10
Scrambling Device	0.01	700
Sleeping Bag	1	40
Stealth Helmet	0.8	7,000
Strider Crew Helmet	1	1500
Surgical Field Kit	4	800
Survival Kit	5	70
Bedroll	2	25
Canteen (one liter)	0.1 (1.1 full)	5
Canteen (two liters)	0.2 (2.2 full)	8
Compass	0.1	15
Fishing Gear	0.05	2
Lighter	0.05	2
Ration Pack (10)	0.1	2
Survival Knife	0.5	20
Tech Rig	5	700
Tent		
2-man	1	50
5-man	2	100
12-man	5	200
Thermal Goggles	0.5	100
Throat/Ear Comm Set	0.01	50
Tracers and Bugs	0.001	150 each
Tray Data System	0.5	250
Trid Display	1	500
Trideo Receiver	1	250
Trideo Recorder	3	1000
Vacuum Suit	10	10,000
Video Receiver	0.5	80
Video Recorder	0.5	100
Watch	0.05	5 to 500
Water Condenser	2.5	200
Winter Suit	6	250

5.6 - PERSONAL WEAPONS AND ARMOR

Weapons used in the 62nd century are similar to those used throughout human history. Like tools and specialized equipment, they are often made of polymer and composite materials instead of the traditional metals. Personal weaponry tends to be rugged and simple, designed and built for maximum efficiency and durability. Terra Nova is not an easy place to live and a Terranovan's weapons are often all that stands between him and many dangers.

5.6.1 - Melee Weapons

Melee weapons are still the same after all these years. A knife is still a sharpened piece of metal, although it now sports an ergonomic polymer handle coupled with an alloy blade.



Knife ◆

A conventional, alloy-bladed knife. Exists in a variety of models and configurations; the stats provided are for a standard combat knife.

Machete ◆1

A large knife with an alloy blade, often used to clear vegetation. Heavier than a knife to provide a good swing.

Sword ◆2

A standard, alloy, one-handed sword, about one meter long. Rapiers and other specialized sword types such as broadswords may vary slightly in statistics for accuracy and damage (generally, the heavier the sword the less accurate it is).

Hatchet ◆

A small axe, not very useful in combat because of its small size. It can be used either for cutting or hammering since it has a blunt edge on one side.

Club/Truncheon ◆3

Any short length of wood, metal or whatnot used to bludgeon an opponent. Generally available everywhere, often from found materials.

Staff ◆4

A long piece of wood or metal, often a weapon improvised on the spot, but sometimes carefully crafted and balanced.

Spear ◆

Spears are pointed shafts whose length does not exceed two meters. Their tips can be made of wood, stone or metal. Long spears are pointed shafts whose length exceeds two meters.

Chainsaw ◆5

A powered cutting tool generally used to cut down obstacles. An alloy/ceramic chain cutter allows it to attack almost any ordinary material, including metal.

Vibroblade Weapons ◆6

Vibroblade weapons send a high-frequency vibration through a specially forged blade, causing it to vibrate at a near-molecular level. The friction heat and vibrations combine to vastly increase the cutting power of a blade equipped with such a generator. Usage consumes a vast amount of power — once the capacitor is empty, the vibroblade weapon becomes an ordinary, albeit expensive, blade.

Ranged Personal Weapons - 5.6.2

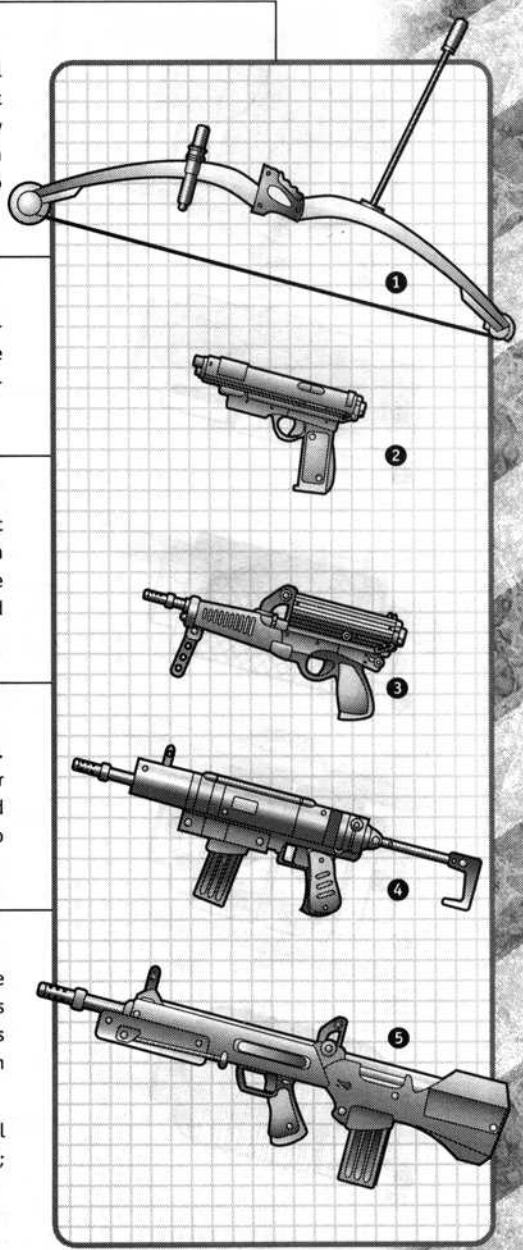
Small arms is a blanket term covering a wide variety of personal weapons. All use polymer or composite in their construction and can be loaded with a variety of ammunition types. Small arms ammunition may or may not be compatible from one gun model to another. Compatibility is generally clearly indicated in the description. Ammo is available in a huge variety of payloads, from armor-piercing to smoke rounds. Due to space considerations, the statistics listed here are for standard ammunition.

Practically all of the ammunition used is the standard age-old cased variety. Caseless ammo, while less cumbersome, corrodes rather rapidly when exposed to the Terranovan atmosphere (1d6 days at the most before performances are severely affected) and is impractical to manufacture in the field. Conversion packages are available nonetheless for most weapon types, allowing them to use caseless ammunition. The cost of such a conversion kit is ten percent of the gun's cost. Weapons equipped to use caseless ammo have double the listed ammo capacity per clip (refer to the table on page 82). Depending on the location, caseless ammo costs between one and a half to ten times more than the standard version, in addition to being hard to find.

The listed ranges are considered to be combat ranges. All ranged weaponry can fire about two to five times further depending on the weapon's type, although combat accuracy is practically nil at these maximum ranges.

❶ Bows

Though primitive, some people still like to use bows for hunting, if not combat. There are several models, from the common light bow to the cumbersome heavy bow. All are made out of lightweight composites and use a complex system of pulleys to help draw the bow. Occasionally, an artisanal bow will show up: it is likely to be slightly heavier and less powerful. The heavy bow requires a minimum Strength of +2 to use, but the smaller models have no such restrictions except the space necessary to operate them. Bows are used with the Archery Skill.



❷ Pistols

Pistols are available in several calibers from the tiny 6 mm to the big 11 mm heavy pistol. A staggering variety of designs exist and it would be futile to try to list them all. They are easy to make, use and conceal, and thus are the most common hand weapons around. Most Terranovan homes, especially in the Badlands, will have at least one handgun.

❸ Machine Pistols

Machine pistols are a cross between a submachine gun and a pistol. They can spit out a larger amount of metal in the air than an equivalent-sized pistol, but are limited by the size of their ammunition clip. They also tend to suffer from overheating if fired too long at high rates. Machine pistols are used with the Small Arms Skill and normally require both hands to operate, though they can be fired one-handed with a -1 penalty.

❹ Submachine Guns

Submachineguns are fully automatic weapons that use ordinary pistol ammunition of the same caliber. They can lay down a hail of fire and are easy to supply with ammo. For this reason, they are popular with many military units. They suffer from the same overheating problem as machine pistols if fired for too long. Submachineguns are used with the Small Arms Skill and normally require both hands to operate, though they can be fired one-handed with a -2 penalty.

❺ Rifles

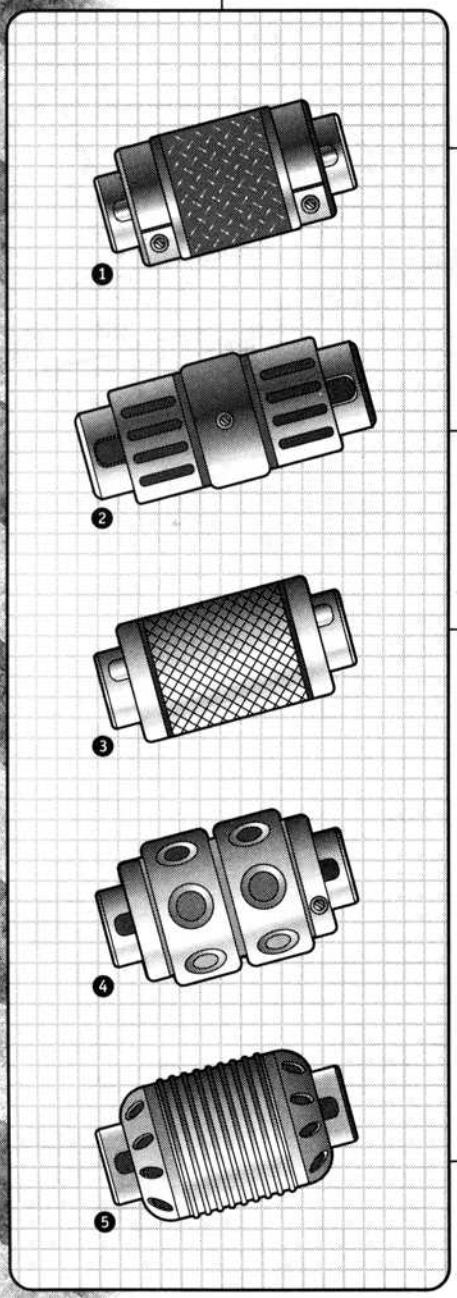
Most rifles are automatic, lightweight weapons designed for good accuracy, long range and large ammo capacity. Rifles are the most common infantry weapon and are available in a tremendous variety of designs to fit an equally varied number of operational needs. Most Badlands homesteads have at least one rifle, often more, and many are the heavy models designed to drop a large beast in one shot.

Rifle ammunition is not compatible with pistol ammunition. Rifles are used with the Small Arms Skill and normally require both hands to operate. If fired one handed, a -5 penalty is applied to the shot; if the weapon was braced, this penalty is reduced to -1.

5.6.3 - Grenades

Grenades are small, explosive weapons which are either thrown by hand or shot at their target with a launcher (see facing page for the description of the grenade launcher). Concentrating a lot of firepower in a small, easy to carry package, grenades are an important part of the infantryman's arsenal. Although a lot of variations exist as far as the type and power of particular grenades are concerned, most of them fall in a few definite categories as detailed below.

Most grenades are equipped with an explosive charge to disperse either fragments or their contents, in case of a specialized charge. The latter type of grenades (fragmentation, incendiary, gas, etc.) do more than simple concussion damage; the secondary Damage Multiplier indicates the intensity of this secondary attack, while the weapon's description explains the nature, are of effect and game mechanics related to this additional damage. In certain cases, it is possible to have non-exploding grenades, especially for the gas ones (instead of exploding, they just release their pressurized payload through small holes).



Concussion ❶

Concussion Grenades are simply explosive charges encased in plastic, which is vaporised by the explosion. They are multipurpose tools, powerful enough to be used in a variety of roles: anti-personel, anti-armor or demolition. This type is considered an "offensive" grenade, because it can be thrown further than the explosion radius.

Flash ❷

"Flashers" do little actual damage, but stun targets with a very bright chemical flash and loud bang. Anyone inside the secondary area of effect must make a Health roll against a Threshold equal to half the maximum secondary area of effect minus the distance between the target and the grenade's point of impact, rounded up. For example, a character located 12 meters away from an exploding flash grenade with a maximum secondary area of effect of 30 would have to roll against a Threshold of (30-12)/2, or 9). A failed roll incapacitates (-4 to all rolls) for a number of combat rounds equal to the Margin of Failure.

Fragmentation ❸

"Frags" do additional damage by scattering small shards of molecular pre-fractured ceramic over a wide area. Anyone caught in the secondary area of effect takes the result of one die multiplied by the secondary Damage Multiplier. Frags are superb anti-personel weapons, though they don't do as well against armored targets.

Gas ❹

Gas Grenades subject everyone within the secondary radius to the effects of a particular gas, which is treated like a drug or toxin. They come in many different varieties, the most common being Nerve Gas, Tear Gas and Smoke. Nerve gas grenades dissipate a fatal toxin gas in their area of effect, with a Potency usually situated between 7 and 15. All target in the secondary area of effect are subjected to the toxin's effect, unless they are protected by a sealed suit or inside a vehicle.

Tear gas incapacitates by attacking the victim's respiratory system and mucous membranes (such as the eyes, nose and mouth). A potential victim must make a Health test against the gas' Potency (usually between 6 and 10); a character whose Margin of Failure is between 1 and 4 will suffer an equivalent negative action modifier due to pain and blurred vision. This penalty will lessen by 1 every minute the character spends outside of the gas. A Margin of Failure between 5 and 9 will incur a -4 action penalty, which will lessen by 1 every hour after being removed from the gas. A Margin of Failure of 10 and more will, in addition to the other effects, cause damage to the character as if he'd been affected by a fatal toxin of a Potency seven points lower than the actual Potency of the tear gas; a fumble is equal to a Margin of Failure of 9.

Smoke grenades have the same stats as Tear Gas but only cause a -2 penalty on all ranged Skills.

Incendiary ❺

"Burners" carry an additional charge of high-burning chemicals, such as white phosphorus. Fire damage is applied to anyone within the secondary area of effect, with an Fire Intensity equal to the secondary Damage Multiplier.

Heavy Weapons - 5.6.4

Heavy weapons are designed to provide an infantry platoon's "punch." They are generally heavier, more cumbersome and a lot more expensive than standard weapons, and are thus assigned only in limited numbers. Common heavy weapons are those capable of covering a wide area through an explosive effect (Grenade Rifle, Light Mortar, Rocket Launcher) or rapid rate of fire (Light Machinegun, Chaingun). Others are more specialized: the laser has all but replaced the sniper rifle — it is more accurate and has a longer range.

All are used with the Heavy Weapons Skill and require both hands and a stationary position to operate. If fired on the move, a -1 penalty is applied to the die roll. All heavy weapons can be tripod or pintle-mounted for additional stability. A tripod requires another operator to carry it and takes one action to set-up or disassemble. It provides a +1 bonus to all attacks, weights 10 kilograms and cost 100 marks/dinars. Pintle mounts are only found on vehicles and fortifications, but confer similar bonuses.

❶ Anti-Gear Rifle

An anti-Gear rifle is in a class of its own. It is a rocket-boosted cannon that is light enough to be carried by a strong infantryman (BLD and STR at +1 or better), although it is often used in a static position. It has a fairly long range, but is best used in close quarters where it can punch through the light armor of most Gears and support vehicles. The anti-Gear rifle fires a special shell that cannot be used by other weapons.

❷ Chaingun

A chaingun is a large, electrically driven multi-barrel cannon which is ammo-fed by a cassette or a standard belt. It generally uses the same ammunition as a light machinegun but has a much higher rate of fire, since it can dissipate the heat through multiple barrels. Chainguns have a lower effective range than machineguns, however, because their barrels are shorter. The internal power cell for the gun lasts for two hours of continuous fire.

❸ Grenade Launchers

Grenade rifles are used to shoot grenades at a specific target; their accuracy is lower than other weapons, but serves their purpose well. A direct hit with a grenade is just a bonus; if it falls right next to the target, it is still going to cause damage! This weapon is most often found in the hands of the military or crowd control police (to fire tear gas grenades). A smaller version of the standard launcher can be carried underneath the barrel of most rifles. The underbarrel launcher has an Accuracy of -1 and its Base Range is 40 instead of 50, but it behaves like a standard grenade launcher in every other respect. Grenade launchers fire their own high explosive projectiles but they can use rifle versions of all the grenade types listed on the previous page.

❹ Light Machinegun

A Light Machinegun is a large automatic weapon that fires small caliber ammunition. Due to the low mass of each bullet and the advanced materials used in its construction, it can be carried and operated by a single infantryman.

❺ Light Mortar

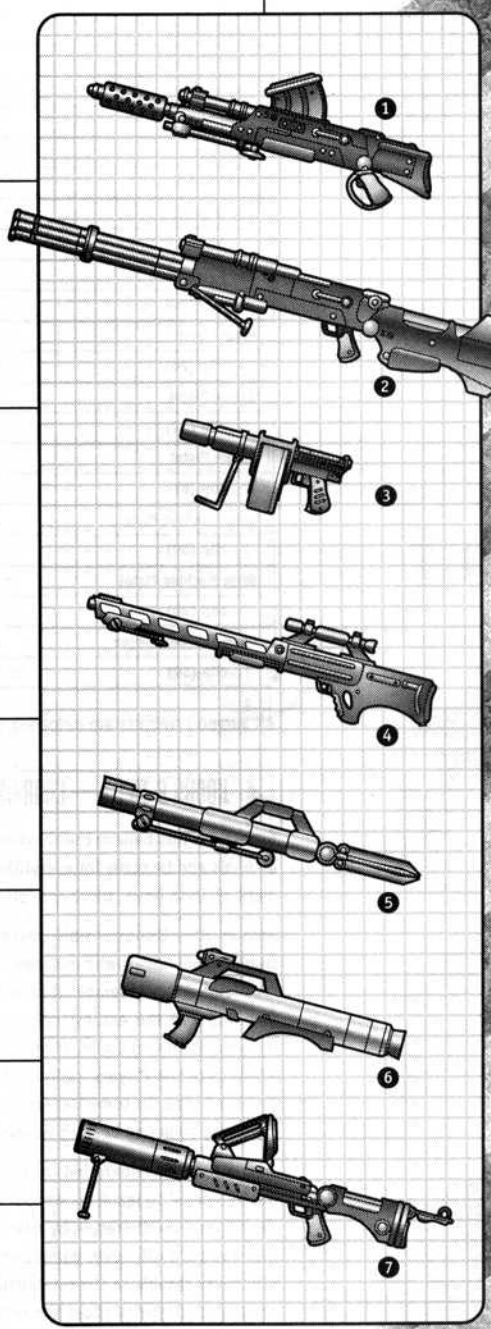
Unlike the mortars of old which required teams of highly trained men, this light and portable weapon can be carried and deployed by a single trooper in mere seconds. It fires high explosive shells in an arcing, overhead trajectory. It can also use any of the grenade types listed on the previous page.

❻ Rocket Launcher

A light missile-firing cannon without recoil, the Rocket Launcher is fired from the shoulder, but it is also available as a tripod-mounted model.

❼ Sniper Laser

A bulky weapon, the Sniper Laser is a high precision laser gun designed for long range performance. The system is composed of the gun proper with a backpack-mounted capacitor.



Weapon Weights and Costs

Weapon	Weight (kg)	Cost (Mark/Dinar)	Weapon	Weight (kg)	Cost (Mark/Dinar)
Knife	0. 5	15	11mm Submachinegun	3	800
Machete	1. 5	30	clip (30)	0.6	40
Sword	2	100	11mm Submachinegun	3	800
Hatchet	3	20	clip (30)	0.6	40
Truncheon	1. 5	10	7mm Rifle	3	400
Staff	3	10	clip (20)	0.3	20
Spear	3	25	9mm Heavy Rifle	4	600
Chainsaw	4	80	clip (10)	0. 5	30
Vibroknife	0. 5	150	15mm Sniper Rifle	10	3000
clip (30)	0. 1	10	clip (5)	1	50
Vibomachete	1. 5	325	7mm Assault Rifle	3	800
clip (20)	0. 1	10	clip (30)	0.5	30**
Vibrosword	2	1,000	Concussion Grenade	0.1	12
clip (10)	0. 1	10	Fragmentation Grenade	0.1	10
Light Bow	0.5	150	Incendiary Grenade	0.1	12
Medium Bow	1	200	Flash Grenade	0.1	8
Heavy Bow	3	450	Tear Gas Grenade	0.1	8
Arrow	0.2	1	Nerve Gas Grenade	0.1	15
6mm Pistol	0. 5	200	9mm Light Machinegun	8	2000
clip (30)	0. 2	10	belt (50)	3	150
9mm Pistol	0. 8	300	9mm Chaingun	10	4000
clip (20)	0. 3	15	belt (50)	3	150
11mm Pistol	1. 3	400	24mm Anti-Heavy Gear Rifle	15	10000
clip (12)	0. 3	20	clip (3)	2	100
13mm Pistol	2	600	37mm Grenade Rifle	6	3000
clip (8)	0. 3	25	clip (4)	2	100
6mm Machine Pistol	0. 6	350	62mm Light Mortar	2	5000
clip (30)	0. 3	10*	shell (1)	1	80
9mm Machine Pistol	1	500	50mm Rocket Launcher	0.5	10000
clip (20)	0. 3	15**	rocket (1)	1	200
9mm Submachinegun	2	600	Sniper Laser	3	10000
clip (50)	0. 6	40	backpack (12)	4	5000

All weapon weights are unloaded weights; number in parentheses is number of shots per standard clip/feed/etc.

HOOKS & TIPS — CARRYING WEAPONS

Several Players believe that having weapons at all times is the safest way to go. They like to parade their characters around like walking arsenals and be ready for everything for anything. While this is certainly a typical prudent attitude, especially given the harsh environment of Terra Nova, there are certain drawbacks to this which Gamemasters should not ignore.

Among other things, visible weapons and armor mean trouble. Most people prefer to lead peaceful lives and will do their best to avoid trouble. Individuals who are armed to the teeth appear as scary and dangerous. John and Jane Doe from the street — who are not known for their bravery (average Willpower or lower) — tend to steer clear of those people. If engaged in conversation, they will answer briefly and will take the earliest opportunity to leave the area. Some other people tend to be very antagonistic when faced with armed individuals. Young punks or other anti-social persons may react with aggressiveness with the display of available firepower and try to antagonize the Players, taunting them and daring them to show they "have the guts" it takes to use their weapons against someone their own size. In some locales, it may be considered a rite of passage among small gang members to show off how tough they are by harassing someone bearing weapons.

Most establishments forbid (or at least severely frown upon) openly displayed weapons. Again, this comes back to trouble. They will ask the individual to leave his weapons with the doorman for safekeeping. On that particular topic, several Gamemasters take advantage of the Players' collaboration by having the weapons permanently disappear. This is a grave mistake. Players whose weapons were stolen this way once will never again part with their armament. Gamemasters should do this sparingly, and not the first few times around. PCs who cause trouble in the establishment will be thrown out and their weapons will be returned to them through the police (who will no doubt ask questions about the origins and the legality of the weapons).

Personal Weapons Statistics

Melee Weapons					
Weapon	**Accuracy**	**Damage X**	**Range (m)**	**ROF**	**Radius (m)**
Knife	0	AD+7	Strength+10	n/a	n/a
Machete	0	AD+10	close combat	n/a	n/a
Sword	0	AD+12	close combat	n/a	n/a
Hatchet	0	AD+10	close combat	n/a	n/a
Club/Truncheon	0	AD+5	close combat	n/a	n/a
Staff	0	AD+7	close combat	n/a	n/a
Spear	0	AD+10	Strength+20	n/a	n/a
Chainsaw	-1	AD+20	close combat	n/a	n/a
Vibroknife	0	AD+9	close combat	n/a	n/a
Vibomachete	0	AD+15	close combat	n/a	n/a
Vibrosword	0	AD+20	close combat	n/a	n/a
AD = Armed Damage Trait					
Ranged Weapons					
Weapon	**Accuracy**	**Damage X**	**Range (m)***	**ROF**	**Radius (m)**
Light Bow	0	7	5/10/20/40	0/1	-
Medium Bow	0	10	6/12/24/48	0/2	-
Heavy bow	0	15	7/14/28/56	0/2	-
6mm Pistol	0	10	4/8/16/32	0	n/a
9mm Pistol	0	15	5/10/20/40	0	n/a
11mm Pistol	0	20	5/10/20/40	0	n/a
13mm Pistol	0	25	5/10/20/40	0	n/a
6mm Machine Pistol	0	10	4/8/16/32	1	n/a
9mm Machine Pistol	0	15	5/10/20/40	1	n/a
9mm Submachinegun	0	15	10/20/40/80	2	n/a
11mm Submachinegun	0	20	10/20/40/80	2	n/a
7mm Rifle	0	22	50/100/200/400	0	n/a
7mm Assault Rifle	0	22	50/100/200/400	1	n/a
9mm Heavy Rifle	0	30	60/120/240/480	0	n/a
15mm Sniper Rifle	+1	40	100/200/400/800	0	n/a
Grenades					
Weapon	**Accuracy**	**Damage X**	**Range (m)**	**ROF**	**Radius (m)†**
Concussion	0	30	varies	0	9
Fragmentation	0	26/14	varies	0	8/30
Incendiary	0	24/8	varies	0	8/12
Flash	0	8/flash	varies	0	3/30
Tear Gas, Smoke	0	5/gas	varies	0	2/15
Nerve Gas	0	5/gas	varies	0	2/15
Heavy Weapons					
Weapon	**Accuracy**	**Damage X**	**Range (m)**	**ROF**	**Radius (m)**
24mm Anti-HG Rifle	+1	70	150/300/600/1200	0	n/a
9mm Chaingun	0	30	50/100/200/400	4	n/a
9mm Light Machinegun	0	30	100/200/400/800	2	n/a
37mm Grenade Rifle	0	**	50/100/200/400	0	**
62mm Light Mortar	-1	120	150***/300/600/1200	0	15
50mm Rocket Launcher	0	140	50/100/200/400	0	5
Sniper Laser	+1	40	200/400/800/1600	0	n/a

*Short/Medium/Long/Extreme

**Varies according to grenade type used (all grenade types are available; double the Damage Multiplier and the cost for rifle version). Usual anti-armor rifle grenade causes x80 damage, Area Effect = 5 meters.

***Cannot fire at ranges of 100 m or less. † Primary/Secondary area of effect.

5.6.5 - Personal Armor

Personal armor has been worn by troopers since the dawn of war. Armor is divided into three categories: light flak, heavy flak and turtleshell. Because of the huge diversity of models available, no specific model has been described. The Armor rating listed is the maximum rating for the specific category — some armor may have less.

As a rule of thumb, only the lightest personal armor may be concealed under normal clothing. The chance of someone noticing is dependent on a number of elements (lighting, awareness, clothes, time of day, etc.) that are impossible to accurately summarize in a few modifiers. The Gamemaster must make a judgment call. The number listed in the Encumbrance column of the table is a penalty applied to physical actions while wearing the armor. Custom-fitted armor reduces this penalty by one, but it costs five times more and can only be worn by the person for which it is fitted.

◆ Light Flak

Light flak consists of thin bulletproof clothing that resembles normal combat fatigues. It is made of composite synthetic fibers interwoven with alloy threads. The material is supple at all times except when hit with a blow; it then distributes the impact throughout its fibers.

◆ Medium/Heavy Flak

Medium and heavy flak are bulky suits of flexible body armor worn over normal fatigues. Both are slightly heavier and work on the same principle as light flak armor, but are stronger and more durable. Hard plates are often incorporated in the torso area of heavy armor.

◆ Turtleshell Armor

The last type of personal armor is the "turtleshell." This is the nickname for full suits of antiballistic polymer or composite plates. Turtleshell armor often includes attachment points for respirator masks and radio equipment. Turtleshell plates are light but damage resistant. They are designed for optimum comfort and mobility without compromising too much on protection. However, turtleshell still restricts the wearer's movements and is tiring to wear over extended periods of time.

Personal Armor

Body Armor	Mass (kg)	Cost (Mark/Dinar)	Armor	Encumbrance	Concealable
Light Helmet	1	20	5	0	somewhat
Helmet	2	40	10	0	no
Light Flak Vest	1	100	15	0	yes
Light Flak Suit	2	150	20	0	yes
Medium Flak Vest	3	250	25	0	somewhat
Medium Flak Suit	4	400	30	0	somewhat
Heavy Flak Vest	6	600	35	-1	no
Heavy Flak Suit	8	900	40	-1	no
Turtleshell	10	5000	60	-2	no

◆ Layers and Scratchbuilt Armor

Players may want extra layers of protection between them and their opponent's weapons. The Armor rating of all armor worn is added together. The trade-off for this is a quick escalation in mass and encumbrance. Mass is added together, while the worst Encumbrance value is multiplied by (1.1 x number of layers), rounding up to the nearest whole number (minimum penalty of -1). Layered armor may prove to be more of a hindrance than a life saver.

When desperate characters build armor from scratch, the GM must ascertain how much material is actually useable as armor; a damaged suit of armor will provide an amount of Armor points equal to the proportion of the armor that is salvageable. If working with a bunch of raw metal, composite, etc. the GM must make a judgement call based on the tools available and the condition of the scrap parts.

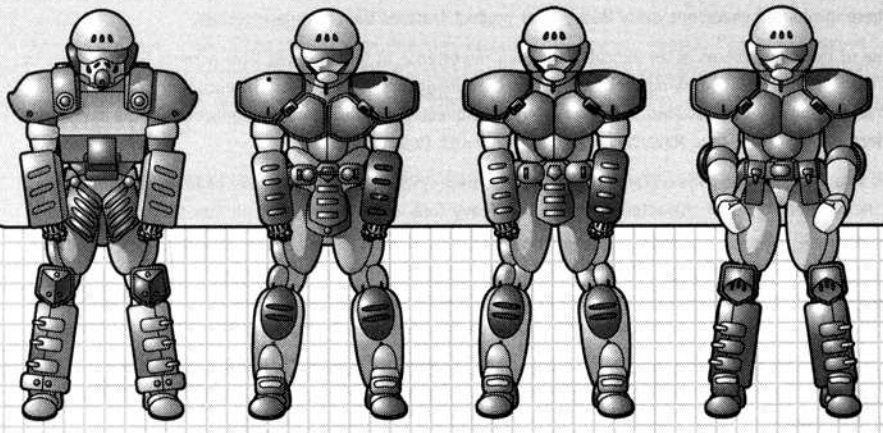
The Player must state how long he intends to work on the armor; if interrupted beforehand, the amount of armor actually available is proportionate to the amount of time actually spent. Upon completion (or interruption) the Player makes a Tinker Skill roll against a Threshold of 3. If the roll is equal to or less than the Threshold, the scratchbuild is ineffective and will slow the character down more than protect him. The formula below is applied with a maximum final Armor value equal to the sum of base Armor points available.

Final Armor Value = Tinker MoS x (square root of intended work time in hours) x 1/4 base Armor available x time available (hrs)

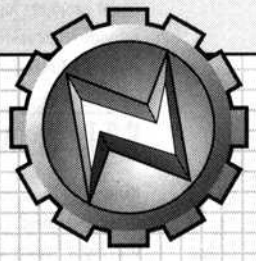
National Armor Designs - 5.6.6

Northern Guard

▼ Turtleshell ▼ Heavy Flak ▼ Medium Flak ▼ Light Flak

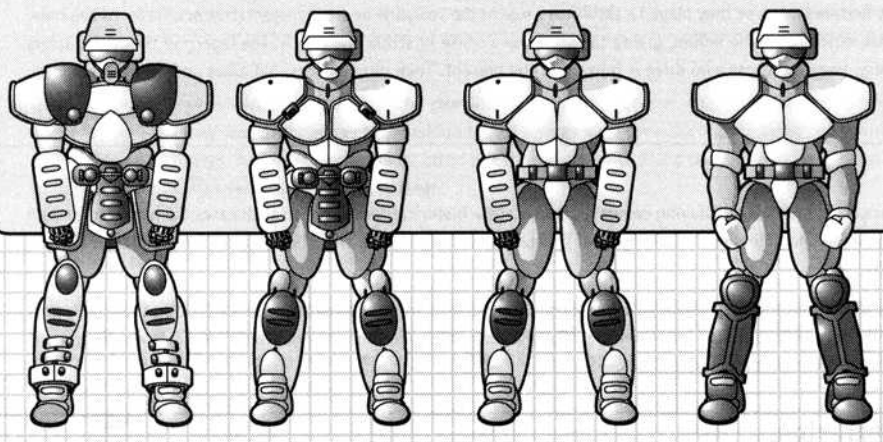


Northern troopers are equipped with the Mk 23 family of personal armor. The Mk 23 is a modular system that allows pieces of various armor toughness to be used together. Only the hard shell armor suit (nicknamed "turtleshell" by soldiers) has its own specialized components, though it shares the same undergarment as the Mk 23 series.

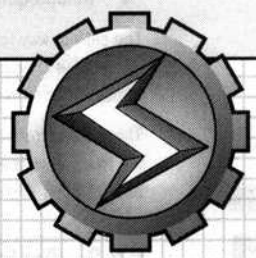


Southern MILICIA

▼ Turtleshell ▼ Heavy Flak ▼ Medium Flak ▼ Light Flak

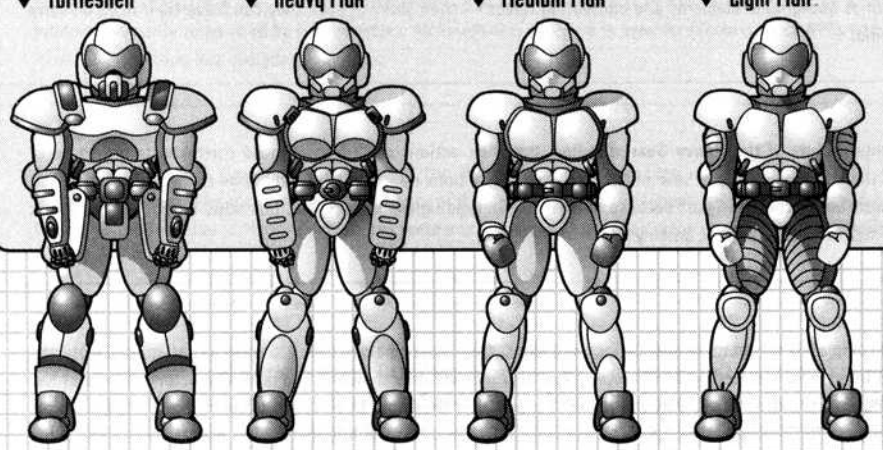


The SPMF (Systeme de Protection Modulaire de Fantassin) armor suit is comparable to the Northern Mk 23 both in conception and protection factor. It features the same level of modularity but is slightly lighter due to the greater proportion of ballistic polymer used in its construction. It lacks some of the Mk 23's flexibility, however.

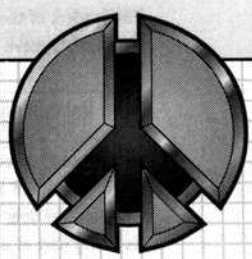


Peace River Defence Force

▼ Turtleshell ▼ Heavy Flak ▼ Medium Flak ▼ Light Flak



The futuristic armor used by the troopers of the PRDF and the security corps of the Paxton corporation is manufactured exclusively in Peace River. Each type of armor offers a very good level of protection and weigh slightly less (90% on average) than comparable armors on the market. The helmet's "bug eye" design provides a wide field of vision.



NEW EQUIPMENT



This section covers the equipment that might be useful to the players during a roleplaying session. This list is not all-inclusive, nor is it intended to be. The Gamemaster can create any item his players may seek by simply taking an equivalent in the real world today (or other science-fiction games) and transferring it to Silhouette statistics. The list below is for generic items. The Gamemaster can customize them to simulate different models and/or manufacturers. He has the final word on the abilities, cost and availability of all equipment in his campaign.

8.1 AIRCRAFT-RELATED EQUIPMENT

The following sections cover personal and heavy equipment. Personal equipment is presented in a generic, no-brand manner. Usually, the more popular an item is, the more models there should be. Heavy equipment follows a similar rule, although there are about half as many heavy equipment manufacturers as there are personal equipment manufacturers. Gamemasters should also remember that heavy equipment requires a lot of maintenance in order to keep on working properly.

8.1.1 PERSONAL EQUIPMENT



• Oxygen Mask

This is a lightweight polymer unit that fits over the mouth and nose and is linked to a small oxygen tank worn on the back, at the belt or under the hip. Characters who are equipped with an oxygen mask may ignore all inhaled poison gas (including smoke) and can survive in a thin atmosphere (down to 50% normal pressure), though the mask will not protect its user against hard vacuum. Oxygen masks have no effect on poisons absorbed through the skin.

The standard tank contains enough compressed oxygen for one hour. To extend this, the mask can be plugged into a larger tank (often built into the cockpit), or be connected to the plane's life support system (if one is present). Some large tanks offer up to six hours of oxygen, which can be stretched to nine hours with controlled breathing.

• Goggles

Goggles are usually worn when flying an open cockpit aircraft, often in conjunction with a face mask or scarf for complete protection. An absolute must for all Badlands ultralight and floater flyers. Goggles are easily available in a wide variety of styles and colors. While many wear them out of necessity, there are also a good number of "civilized" poseurs who wear them for the "cool" look.

• Altimeter

An altimeter is a small, watch sized instrument that displays the current altitude. Several models exist, some more reliable than others (depending on the method used to determine altitude). A few are helmet mounted with a Heads-Up Display to keep the hands free. Some more expensive and useful models also provide air pressure, wind direction and speed.

• G-suit

A G-Suit is a garment fitted with special pressure bags designed to force the blood to circulate normally to the brain during high gee maneuvers. A pilot without a G-Suit is at -1 for all Fitness checks due to maneuvering.

Each G-Suit must be individually fitted to the person wearing it to be of any use. The strong weave of the suit offers 10 points of Armor protection. G-Suits can be combined with other protection suits as well as armor for 1.5 times the total cost of all protection and armor.

• Flight Helmet

Flight Helmets are sturdy head gear made out of tough polymer or composite material. The Light Flight Helmet includes a standard communicator and an adjustable anti-glare visor. Many Light Helmets are designed in such a way that wearing night-vision goggles with the helmet is possible.

The Flight Helmet is somewhat sturdier than its lighter cousin and also has a built-in communication system. A laser-crystal screen is added to protect the eyes of the pilot from sudden glare and to display flight and targeting information from the craft's onboard computers. The helmet also features attachment points for a standard oxygen mask.

• Parachute

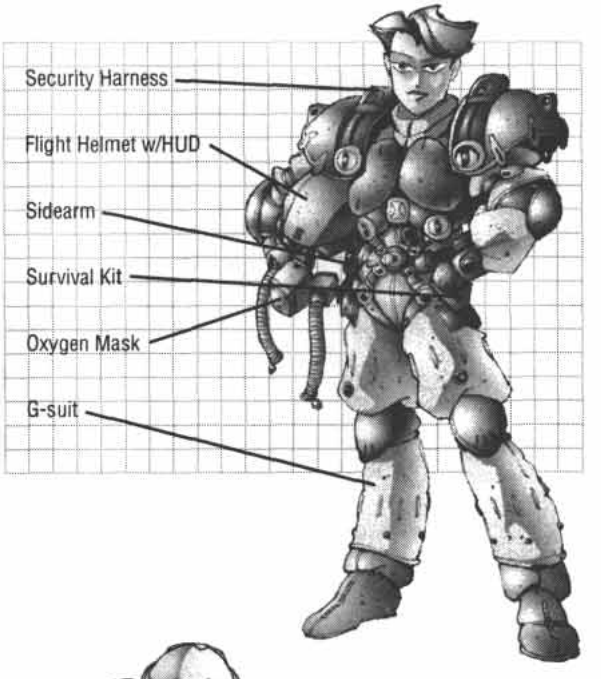
The parachute is a cloth hemisphere that increases atmospheric drag to decelerate a person's fall (see *Airdropping*, page 22). A standard parachute kit contains the main parachute, one reserve parachute and the necessary harness. The parachute can support up to 250 kg.

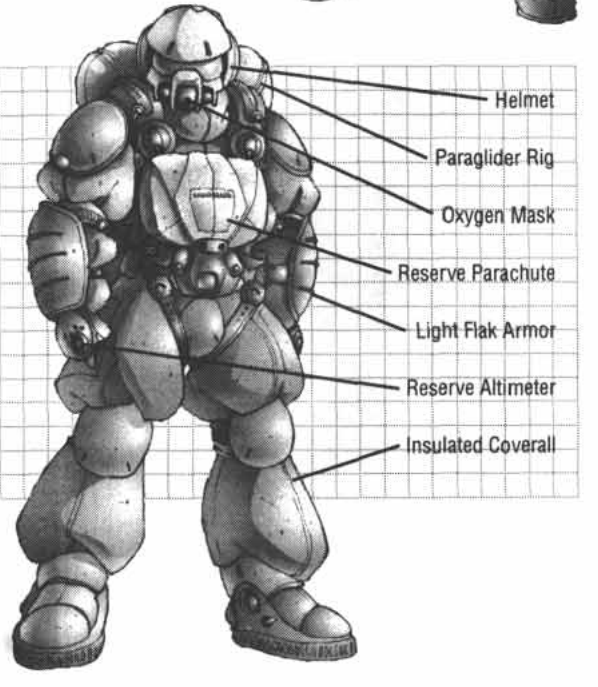
If recovered, the parachute can be reused if carefully repacked in its bag. Roll Parachuting skill versus a threshold of 2 to correctly repack the parachute and harness. If this test is failed, the parachute is damaged and the subsequent landing difficulty is increased by one. If the roll is fumbled, the parachute does not open next time.

• Paraglider

The paraglider is a specially-shaped parachute that forms an air-filled "wing" of sorts. By pulling on control wires placed on the harness, the paratrooper can modify the shape of the wing and thus gain some control over his descent (see *Airdropping*, page 22). A paraglider kit contains the paraglider, one reserve parachute and the necessary harness. The paraglider can support up to 250 kg.

If recovered, the paraglider can be reused if carefully repacked in its harness. Roll Parachuting skill versus a threshold of 3 to correctly repack it. If failed, the paraglider is damaged — increase landing difficulty by one. If the roll is fumbled, the paraglider does not open.





• HALO Rig

HALO stands for High Altitude Low Opening, a technique in which the paratrooper leaves the aircraft at a very high altitude (between 7.5 and 10 km) and free-falls below radar cover before opening the parachute. HALO rigs allow paratroopers to be deployed with very little chance of detection. As a result, they are widely employed for stealth and infiltration missions.

Because of the conditions associated with high altitude drops — lack of oxygen and freezing temperatures — this kit is required for any parachute drops above 7500 meters.

The HALO kit contains an oxygen mask and tank, an integrated helmet with a HUD display of altitude, position and the deployment of friendly and enemy forces as relayed by satellite and/or spy plane (when possible), a backup digital altimeter, an insulated coverall augmented with light flak armor (+15 armor) and a paraglider. A small, chest-mounted, parachute is provided as a back-up.

8.1.2 HEAVY EQUIPMENT



• Skyhook Rig

The Skyhook Rig is an ingenious modification of the standard Airlift Winch that allows aircraft to pick up ground personnel without landing or going to hover flight. The system consists of two parts, one aircraft-mounted, the other worn by the person to be picked up.

The ground unit is a sturdy harness attached to a length of flexible cable. The cable is held aloft by a small helium balloon that is inflated moments before pick up. A small locator flare (or radio beacon) is usually attached to the balloon to help the pilot calculate his trajectory. A special V-shaped attachment in the nose of the plane snags the cable, allowing the person to be reeled into the aircraft.

The aircraft-mounted skyhook is a V-shaped apparatus, most often placed on the nose of the plane. In addition to an Airlift Winch of at least Rating 2, the plane must have a proper cargo bay for the recovery process (at least 10 m^3). Installing a skyhook rig on an aircraft is a challenging task — roll Mechanics versus a threshold of 5. If failed, apply the MoF to any future pick-up attempt.

For pick-up, the person or object must weigh no more than 250 kg and the plane must fly no faster than its Stall speed or 150 kph (5 MPs), whichever is lower. A Piloting roll versus a threshold of 4 is required to properly snag the cable. A failure means the pilot missed the cable and must come round again for another pick-up attempt. A fumble means something went wrong — the cable snapped, got caught in the aircraft's wing, etc. The shock of pick-up is no more severe than the opening of a parachute. For safety reasons, there should not be any obstructions within 500 meters and the Wind Force should not exceed one (1).

• Vehicle Parachute Kit

The Vehicle Parachute Kit consists of several parachutes, a shock-absorbing pallet and a set of retrorockets. The exact size of the above equipment depends on the weight of the vehicle, and so Vehicle Parachute Kits come in three categories: Light (0 to 4 tons), Medium (5 to 14 tons) and Heavy (15 to 25 tons).

After the parachutes open, a small sensor is deployed underneath the vehicle. When the sensor registers that the vehicle is within three meters of the ground, the retrorockets fire, slowing it down to almost zero speed and lessening the impact. What is left of the shock is absorbed by the pallet placed under the vehicle. Walker vehicles use their legs instead of a pallet, reducing the weight of the kit by two-thirds (see *4.2.2 Cargo*, p. 22).

Characters aboard a vehicle during such a drop must make a Fitness roll versus a threshold equal to twice the Ground MP cost of the landing site. If missed, use the Margin of Failure to calculate damage, taking the Size of the vehicle as the Damage Multiplier. A Parachuting skill roll versus the same threshold can be made to reduce the impact: each point of MoS "buys off" one point of the Fitness check's MoF.

• VLAE Kit

VLAE stands for Very Low Altitude Extraction, a technique in which the aircraft flies very low and simply drops the cargo from its rear ramp (see page 22). The VLAE kit contains a shock-absorbing pallet and a set of drogue parachutes. Both can be retrieved and reused multiple times. The light VLAE kit is suitable for vehicles up to Size 7, while the standard kit is suitable for all vehicles up to Size 14.

EQUIPMENT WEIGHT AND COST

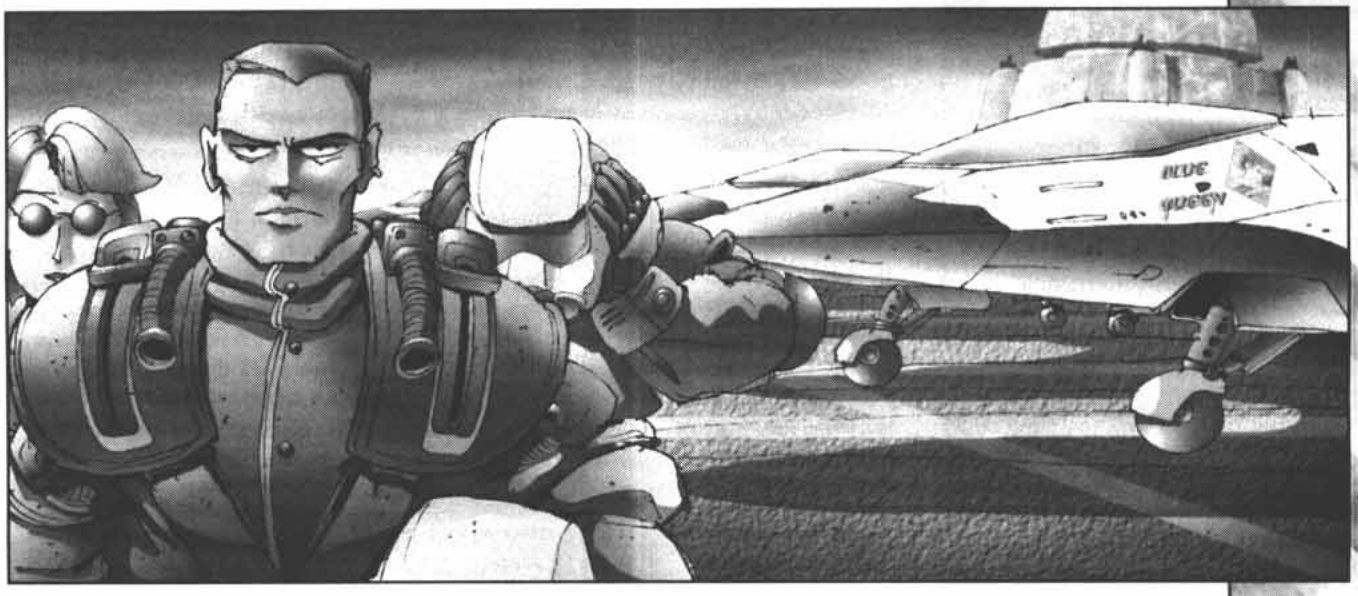
Equipment	Mass (kg)	Cost (Marks/Dinars)
Oxygen Mask	0.5	50
Oxygen Tank	0.5	10
Goggles	0.2	10
Altimeter	0.2	30
G-Suit	10	800
HALO Kit	15	900
Parachute	10	400
Paraglider	12	600
Skyhook Rig (person)	15	1000
Skyhook Rig (aircraft)	300	10,000
Light Vehicle Parachute Kit	300	4000
Medium Vehicle Parachute Kit	600	8000
Heavy Vehicle Parachute Kit	900	12,000
Light VLAE Kit	1000	6000
Standard VLAE Kit	1500	8000

None of the personal items noted here are particularly hard to find, except the G-suit, which is normally available only to military pilots (but a few used suits might make their way to the black market). The vehicular equipment, on the other hand, is somewhat harder to come by. In general, only military forces will have access to these items, though none of them have a restricted status.



PERSONAL ARMOR

Body Armor	Mass (kg)	Cost (Marks/Dinars)	Armor Rating	Encumbrance	Concealable
Light Flight Helmet	1	70	8	0	no
Flight Helmet	2	100	12	0	no
G-Suit	10	800	10	-1	no

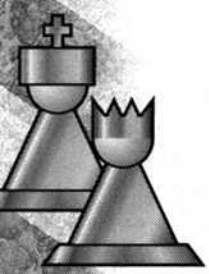


5.7 - THE CHESSPIECE SYSTEM

The most unique aspect of **Heavy Gear** is its underlying storyline. Over the course of the game's life, readers, Gamemasters and Players see the world of the game change and grow as the story threads scattered throughout our sourcebooks are woven together. While the storyline is intended to serve as an interesting background to individual Gamemasters' campaigns (which are the foreground), it does mean that not every character in the game can be used freely without worrying about the consequences. To give Gamemasters some indications of how to use these introduced characters every **Heavy Gear** product features the chesspiece system.

New characters are given one of five chess pieces as an indication of their importance in the storyline. This permits Gamemasters to understand how best to use these NPCs without worrying about disrupting the setting and having to retrofit upcoming source material. Of course, roleplaying is about creating one's own stories, so Gamemasters should feel free to disregard the limitations of the chesspiece system, as long as they understand that *their* Terra Nova may no longer mesh with Dream Pod 9's.

Other products have featured a half-page or one page explanation of the chesspiece system. The following two pages expand on this and provide indications of how the different types of characters relate to the **Heavy Gear** storyline and tips on how they can be used in individual roleplaying campaigns.



5.7.1 - Historical Figures

Kings and Queens are characters who have died before the date featured on the **Timewatch**™ display. Their inclusion indicates that they have had some importance for **Heavy Gear**, either by setting events in motion that have influenced the **Heavy Gear** storyline or by leaving a legacy still felt by Terranovans.

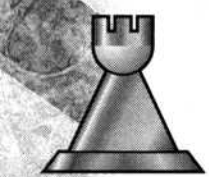
◆ Storyline Uses

Historical Figures are usually featured because they played a significant role in the storyline or are representative of a flavor of the time. They provide examples of that which has come before, giving the storyline a sense of scope and depth. The legacy of these characters may be significant in the story, inspiring those who drive it forward in the present. Their descendants, old allies and enemies may also be important.

◆ Roleplaying Uses

The easiest way to use Historical Figures in a roleplaying campaign is to stage a historical campaign. In such cases Gamemasters should treat these characters as Restricted Characters in that **Heavy Gear** products obviously assume that these figures lived out their lives as indicated in current products.

These characters can also be used in present-day campaigns as background elements or in flashbacks to historical times. Gamemasters are free to use the legacy of these figures as fodder for adventures. Some figures, such as Mamoud Khodaverdi, have left whole religions behind them and these can be used in countless adventures.



5.7.2 - Restricted Characters

Rooks are characters who are key to the **Heavy Gear** storyline and are to be used with care. Although they can still be useful in a roleplaying campaign — both as background elements and motivating forces — their survival until they can leave their mark on Terra Nova is critical to the storyline.

◆ Storyline Uses

These characters are the center-points of the **Heavy Gear** storyline, but their actions do not have to be earth-shattering to be of importance. Remember that the storyline will span several decades, so small actions now may have very large consequences later on. The leaders of the major powers are restricted in part because of their role in guiding the world's fate, but other Restricted Characters may simply leave a group of followers with a great destiny.

◆ Roleplaying Uses

Restricted Characters are not completely off-limits in roleplaying campaigns. Their most common use is to serve as background material, or to have them act through intermediaries. Restricted Characters can also interact directly with the Player Characters as long as the Gamemaster does not place PCs in a situation where they will kill or radically alter the Rook. In all cases, think of the Player Characters as being part of a subplot from the NPC's perspective. These people may be important to the NPC, but he has many other facets to his life — including the storyline.

Very Important People - 5.7.3

Not everyone of note on Terra Nova is central to the **Heavy Gear** storyline. Very Important People are those characters who have a significant impact on Terra Nova, but are not critical to the storyline itself. This does not mean they have no influence on it, however.

Storyline Uses ◆

Knights may not be central to the storyline, but they certainly can have an impact. They are important to the story setting, and can easily influence people who will be critical to the storyline. These characters may also have stories of their own tied to the storyline, but which can be removed from it with relative ease. Often they will be used to shed a new light on events and examine trends other than the central plot line.

Roleplaying Uses ◆

Knights should be used in essentially the same way as Restricted Characters, although Gamemasters need not worry about the storyline. These are important people to the setting and so should not be killed indiscriminately, but if a campaign calls for their death, the Gamemaster will still be able to use the **Heavy Gear** storyline as backdrop with relative ease. Future products will assume that these characters exist and continue in the general path established for them, however.

Social Encounters - 5.7.4

Social Encounters are those characters who are included in source material primarily to add flavor. As individuals they are rarely critical and do not have a significant impact on the storyline, but they stand as symbols of larger trends on Terra Nova. They serve most commonly as contacts and background elements, rather than opponents.

Storyline Uses ◆

Bishops have little or no personal impact on the storyline. Rather, they serve as reminders of some of the other forces on Terra Nova. These forces — be they student movements or fashion trends — may have some secondary impact on the storyline, perhaps influencing one of the major players. Social Encounters most often will show the results of the story, illustrating new societal forces and movements born as a result of the events shaping **Heavy Gear**.

Roleplaying Uses ◆

Bishops are wide open for use by Gamemasters and serve most easily as contacts and friends for the Player Characters. They can act as antagonists or allies as well, but rarely possess combat skills and will usually bring more subtle skills to play. Future products may refer to the Bishops, but Gamemasters need not worry that they will have to do extensive retrofitting if a Bishop is killed or seriously altered by Player Characters.

Expendables - 5.7.5

In general, Expendables are "average" Terranovans. The have no personal impact on the storyline and are included in **Heavy Gear** products primarily to be used by Gamemasters. Although this category is used for faceless stock NPCs and typical citizens, many of the Pawns are anything but everyday.

Storyline Uses ◆

Pawns have no direct impact on the course of the **Heavy Gear** storyline. They may, however, interact with people who have some influence on one of the major players. Some Expendables will continue to reappear in **Heavy Gear** products without having any major impact (often in pieces of fiction), simply to create a sense of continuity. Gamemasters will have no retrofitting to do if their campaigns involve the Pawn.

Roleplaying Uses ◆

Pawns are the bread and butter of **Heavy Gear** campaigns. They are "expendable" in terms of the storyline, but are designed to play major roles in individual campaigns. Other then Stock NPCs provided to fill gaps in a campaign, most Pawns include some form of story hook which can be used to make them prominent members of a campaign cast. They often provide the skills to serve as valuable allies or contacts or as dangerous opponents.

ARCHAEOLOGIST



Despite a relatively accurate recorded history, archaeologists know little about the living conditions of early settlers. Busy as they were with day-to-day survival, few bothered to keep a log of their lives for the sake of their descendants. In order to better understand their pasts, archaeologists study the remains of early colonization settlements, a task made difficult by violent storms and quick erosion, not to bandits rovers and predators.

Attributes

AGI	0	APP	0	BUI	-1	CRE	1	FIT	0
INF	-1	KNO	1	PER	1	PSY	0	WIL	1
STR	0	HEA	0	STA	20	UD	2	AD	2

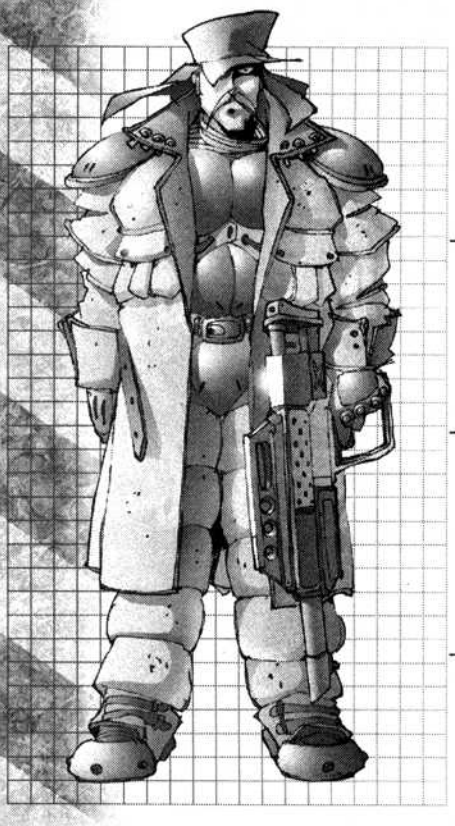
Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Bureaucracy	1	+1	Drive	1	0	Foreign Language	2	+1	Notice	1	+1
Computer	1	+1	Earth Sciences	1	+1	Literature	1	+1	Soc. Sciences*	2	+1
*Archaeology Spec.											

Equipment and Cost

Typical Equipment:	Desert goggles, survival rations, tent(s), sleeping bag, personal computer, trideo recorder, personal communicator, binoculars.
Salary:	Varies depending on notoriety and backing; ranges from 20,000 to 45,000 marks/dinars per cycle.
Basic Character Costs:	19 Character Points and 26 Skill Points.

BADLANDS MARSHAL



In the Badlands, the laws of a homestead county are enforced by marshals hired by the county council. Most of the time, Badlands marshals oversee communities of a few hundred souls and require little help. In some cases, especially when many rover gangs roam the region, marshals may organize a reserve militia on which they can call in case of emergency. As a whole, Badlands marshals are handed the job because of their reputations or because they have a true knack for it. Considering the high risks and the low pay, few individuals find it an attractive career option.

Attributes

AGI	0	APP	0	BUI	0	CRE	0	FIT	1
INF	1	KNO	0	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	4	AD	3

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	1	+1	Hand-to-Hand	1	0	Law	2	0	Small Arms	2	0
Combat Sense	1	+1	Intimidate	1	0	Notice	1	+1	Streetwise	1	+1
Drive	1	0	Investigation	2	+1						

Equipment and Cost

Typical Equipment:	Goggles, light flak suit, throat/ear comm set, 9mm pistol, knife, notebook.
Salary:	Ranges from 18,000 to 25,000 marks/dinars per cycle.
Basic Character Costs:	19 Character Points and 27 Skill Points.

CARAVAN TRADER

While there are some railways that go from one large county to another in the Badlands, a great deal of cheap or illegal commerce is still done through caravans that peddle their wares between settlements. The traders who compose these caravans are a brave and hardy lot. Trained in surviving both the environment and the bandits who set up regular ambushes along trade routes. Large caravans also provide mutual protection for traders and some companionship for the long hours on the trail.



Attributes

AGI	0	APP	0	BUI	1	CRE	0	FIT	0
INF	1	KNO	1	PER	0	PSY	0	WIL	0
STR	0	HEA	0	STA	30	UD	4	AD	4

Skills

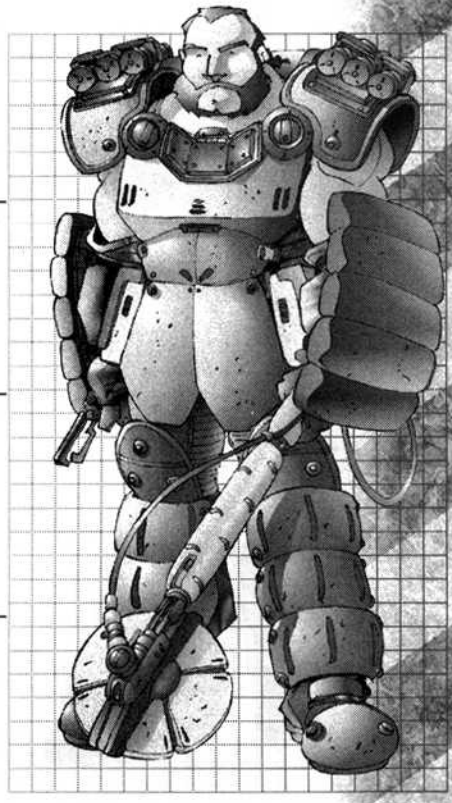
Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Business	2	+1	Drive	2	0	Gambling	1	0	Notice	1	0
Cooking	1	0	Haggling	2	+1	Mechanics	1	+1	Small Arms	1	0
Dodge	1	0	Foreign Language	1	+1	Navigation	1	+1	Survival	1	0

Equipment and Cost

Typical Equipment:	Audio Recorder/receiver, first aid kit, goggles, light flak vest, machete, personal communicator, sleeping bag, survival kit, 11mm pistol.
Salary:	Highly dependent upon wares; ranges from 15,000 to 50,000 marks/dinars per cycle.
Basic Character Costs:	19 Character Points and 26 Skill Points.

DEMOLITION SPECIALIST

Individuals who specialize in the handling and use of explosives are rare and often highly paid . Most demo experts find stable employment in the military, where their talents are put to use in to dig of trenches or mine a battlefield, or in police bomb squads some more ambitious professionals sell their services privately. Demolition specialists tend to come in two general categories: the careful planners who work with maximum safety, and the half-crazed thrillseekers who juggle with dynamite sticks.



Attributes

AGI	0	APP	0	BUI	1	CRE	0	FIT	0
INF	0	KNO	1	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	30	UD	4	AD	5

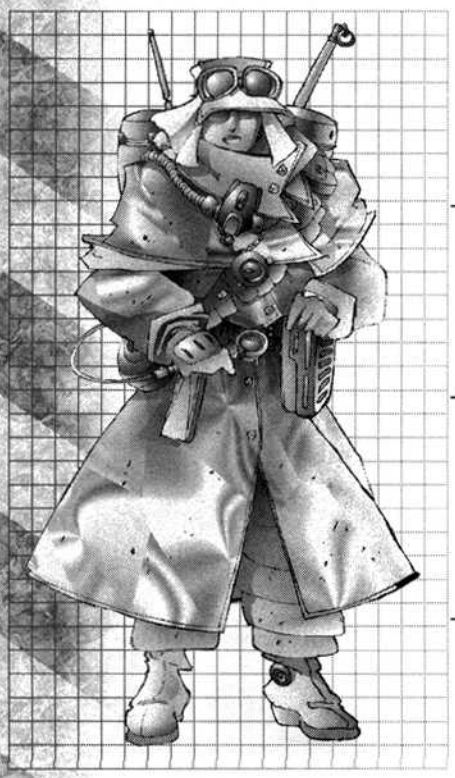
Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Camouflage	1	0	Drive	1	0	First Aid	1	+1	Physical Sciences	1	+1
Computer	1	+1	Electronics	2	+1	Notice	2	+1	Tinker	1	0
Demolitions	2	+1									

Equipment and Cost

Typical Equipment:	Electronics took kit, helmet (optional), medium flak vest, personal communicator, throat/ear comm set, watch.
Salary:	Ranges from 25,000 to 35,000 in the military; from 20,000 to 50,000 in the private business.
Basic Character Costs:	19 Character Points and 29 Skill Points.

DESERT GUIDE



Moving across the Badlands is risky business at best and guides are extremely important to caravans or scientific groups going through unfamiliar land. Unfortunately, several among them prey on unsuspecting travelers, leading them into traps set up by some of their contacts to rob them of their belongings. As a result, the profession has earned a bad reputation, forcing honest guides to work twice as hard to get any kind of clientele. Whatever their backgrounds, desert guides are almost invariably paranoid and overly prudent — at least by the standards of polar citizens.

Attributes

AGI	0	APP	-1	BUI	1	CRE	0	FIT	1
INF	0	KNO	0	PER	1	PSY	-1	WIL	0
STR	1	HEA	0	STA	30	UD	6	AD	5

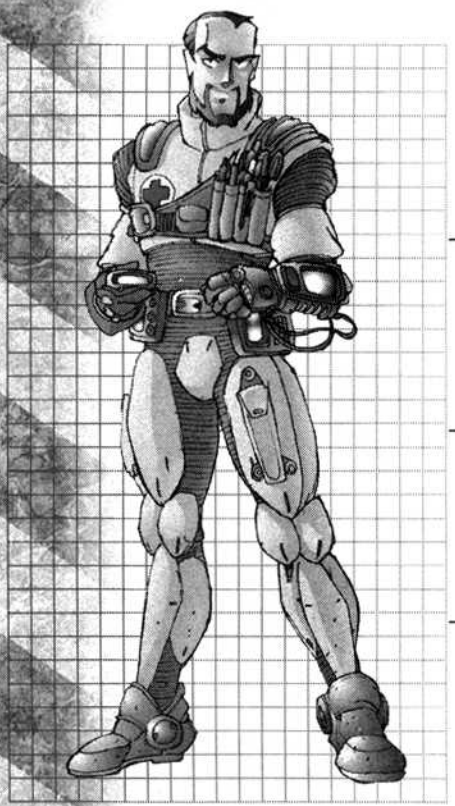
Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	1	+1	Earth Sciences	1	0	Land Navigation	2	0	Stealth	1	0
Camouflage	1	0	Foreign Language	2	0	Notice	2	+1	Survival	2	0
Combat Sense	1	+1	Hand-to-Hand	1	0	Small Arms	1	0			

Equipment and Cost

Typical Equipment:	Desert suit, gas mask, goggles, memcompass, survival kit, survival rations.
Salary:	Highly dependent upon reputation and skill; ranges from 12,000 to 27,000 marks/dinars per cycle.
Basic Character Costs:	*17 Character Points and 29 Skill Points.*

FIELD MEDIC



Few individuals relish the thought of venturing onto a battlefield, even after the battle, to tend to half-dead soldiers. The courageous or foolish men and women who choose this profession tend to value a quick and effective "patch" over a skillfully done suture. Most of the time, there is too much to do, too little time to do it in, and too few medics to do it. As a result, they go in, stabilize the patients as best they can, and take them back to the mobile hospitals where better equipment allows professional doctors to give them better treatment.

Attributes

AGI	0	APP	0	BUI	0	CRE	0	FIT	1
INF	0	KNO	1	PER	0	PSY	0	WIL	1
STR	0	HEA	0	STA	25	UD	3	AD	3

Skills

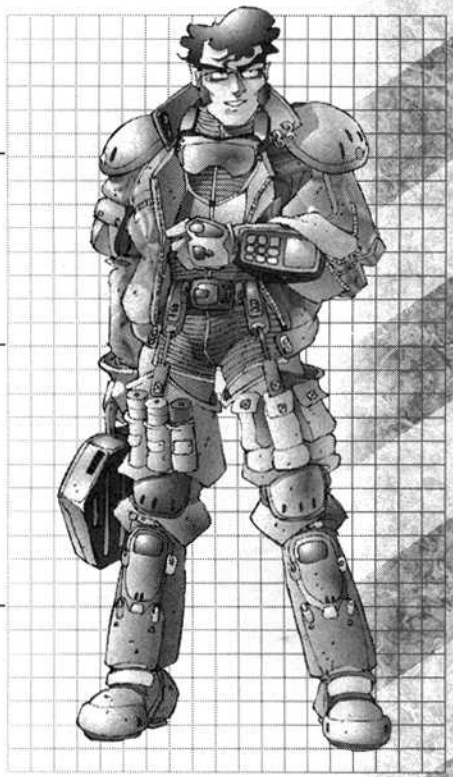
Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	1	+1	Dodge	1	0	First Aid	2	+1	Medicine	2	+1
Combat Sense	1	0	Drive	1	0	Life Sciences	2	+1	Notice	1	0

Equipment and Cost

Typical Equipment:	field medic gauntlet, field surgical kit, first aid kit, light flak suit, medbelt and scanner, throat/ear comm set (sometimes military).
Salary:	Ranges from 25,000 to 40,000 marks/dinars per cycle.
Basic Character Costs:	19 Character Points and 25 Skill Points.

FIELD SCIENTIST

Field scientists are usually called upon to participate in scientific expeditions or exploration missions into unknown (or simply exotic) territory. Whether seeking a cure for Terranovan influenza in the jungles of the South, studying the formation of tunnel structures in the MacAllen network, or prospecting for precious underground minerals, field scientists are vital members of their teams.



Attributes

AGI	0	APP	0	BUI	0	CRE	1	FIT	0
INF	0	KNO	1	PER	0	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Drive	1	0	First Aid	1	+1	Notice	1	0	Social Sciences*	1	+1
Earth Sciences*	1	+1	Life Sciences*	1	+1	Phy. Sciences*	1	+1	Survival	1	+1
Electronics	1	+1	Mechanics	1	+1	Psychology	1	+1			

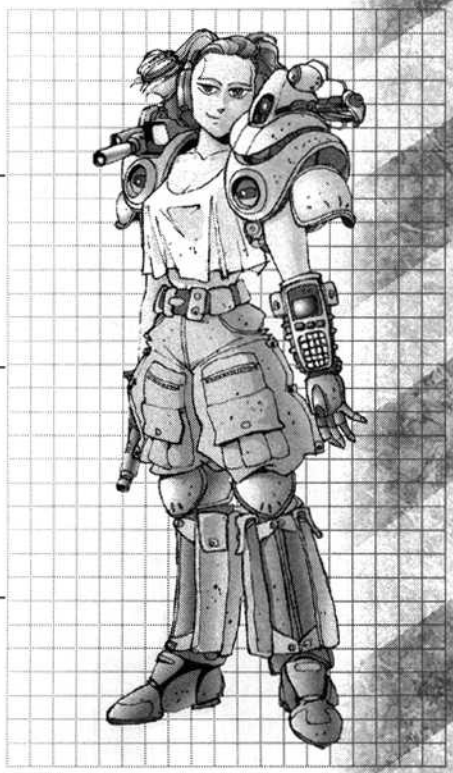
* Select two of these Skills at level 2

Equipment and Cost

Typical Equipment:	Binoculars, data disks, dataglove, goggles, personal computer, survival kit, test tubes.
Salary:	Ranges from 30,000 to 50,000 marks/dinars per cycle.
Basic Character Costs:	16 Character Points and 29 Skill Points.

FIELD TECHNICIAN

Field technicians actively participate (so to speak) in a battle by performing jury rigging on defective Gears or by repairing damaged installations during unfriendly weather. A common saying among them is "A cycle on the field is [worth] a dozen cycles in the [repair] bay." This brand of technician is almost invariably called upon to handle difficult repair work and are nowhere more appreciated than in the Badlands, where they often act as wandering repairmen between needy homesteads.



Attributes

AGI	0	APP	0	BUI	0	CRE	1	FIT	1
INF	0	KNO	1	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

Skills

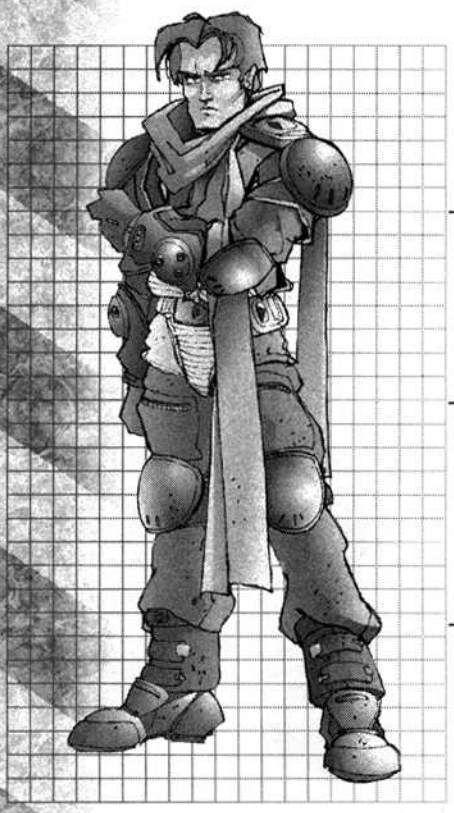
Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Computer	1	+1	Drive	1	0	Mechanics*	2	+1	Tinker*	2	+1
Dodge	1	0	Electronics*	2	+1	Notice	1	+1			

* Select specialization for one of these skills

Equipment and Cost

Typical Equipment:	Dataglove, electronics and mechanical tool kit, military throat/ear comm set, tech gear.
Salary:	Ranges from 25,000 to 40,000 marks/dinars per cycle.
Basic Character Costs:	22 Character Points and 30 Skill Points.

GEAR DUELIST



Champions and diplomats for their regiments, Duelists bear on their shoulders the history and reputation of their regiments. Outside the military, civilian Duelists represent their cities or simply themselves in regulated sporting duels or savage gladiatorial matches. Regardless of their origin, however, Duelists almost systematically follow a strict code of conduct based on horror and personal glory. In the eyes of average Terranovans, Duelists are the heroes of legend.

Attributes

AGI	2	APP	0	BUI	0	CRE	0	FIT	0
INF	0	KNO	0	PER	1	PSY	0	WIL	1
STR	0	HEA	0	STA	25	UD	3	AD	4

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Combat Sense	1	+1	Gunnery (HG)	2	+1	Melee	1	+2	Small Arms	1	+2
Dodge	1	+2	HG Pilot	3	+2	Notice	1	+1	Tactics	1	0
Electr. Warfare	1	0	Leadership	1	0						

Equipment and Cost

Typical Equipment:	Helmet, pilot suit, 9mm pistol, vibroblade.
Salary:	Dependent on the employer and reputation of the Duelist; ranges from 35,000 to 75,000 marks/dinars per cycle.
Basic Character Costs:	24 Character Points and 35 Skill Points.

GEAR PILOT



Better trained and equipped than standard infantry, and more numerous than tankers or aircraft pilots, Gear pilots have acquired a very romantic and rugged image. While Gear pilots are expected to excel at piloting their machines, they must also undergo rigorous training so that they are not helpless without their vehicles. It is not uncommon for pilots to give a "pet name" to a machine they have piloted for several cycles.

Attributes

AGI	1	APP	0	BUI	0	CRE	0	FIT	0
INF	0	KNO	0	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	4

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Combat Sense	1	+1	Gunnery (HG)	2	+1	Melee	1	+1	Small Arms	1	+1
Dodge	1	+1	HG Pilot*	2	+1	Notice	1	+1			

* Specialization w/Gear of choice

Equipment and Cost

Typical Equipment:	Helmet, pilot suit, 9mm pistol, vibroblade.
Salary:	Ranges from 25,000 to 40,000 marks/dinars per cycle.
Basic Character Costs:	16 Character Points and 26 Skill Points.

GEAR TRAINER

There is much more to the task of a Gear trainer than simply teaching rookies how to pilot their new vehicle. Gear pilots are the easy part of the job: humans are always willing to learn and are usually good learners. Gears, however, are another story. Like children, they come off the assembly line like a blank slate and must learn everything in record time. A good trainer can make all the difference between a Gear which performs well in combat and another which has several dangerous "bad habits." As a result, only highly experienced Gear pilots are assigned the job training Gears.



Attributes

AGI	1	APP	0	BUI	0	CRE	1	FIT	0
INF	1	KNO	0	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	4	AD	4

Skills

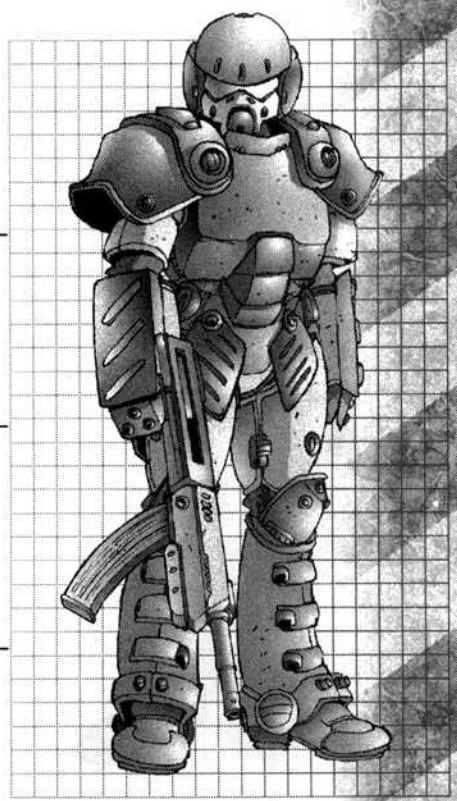
Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Dodge	1	+1	Hand-to-Hand	1	+1	Notice	2	+1	Tactics	1	+1
Electro. Warfare	1	+1	HG Pilot	2	+1	Small Arms	1	+1	Teaching	2	+1
Gunnery (HG)	2	+1	Melee	1	+1						

Equipment and Cost

Typical Equipment:	Helmet, notebook, pilot suit, 9mm pistol, vibroblade.
Salary:	Ranges from 35,000 to 50,000 marks/dinars per cycle.
Basic Character Costs:	22 Character Points and 31 Skill Points.

INFANTRY TROOPER

Although Gears have taken away some of the importance of infantry on the battlefield, no army could occupy any ground or keep a hold on military objectives and strategic locations without the grunts. Even on Terra Nova, infantry still makes up the majority of the armies, and are a force to be reckoned with. The most common infantry types are recon (scouting and forward observing), light assault (standard infantry), heavy weapons (to punch through regular lines and perform lightning strikes) and sniper (to handle high precision missions).



Attributes

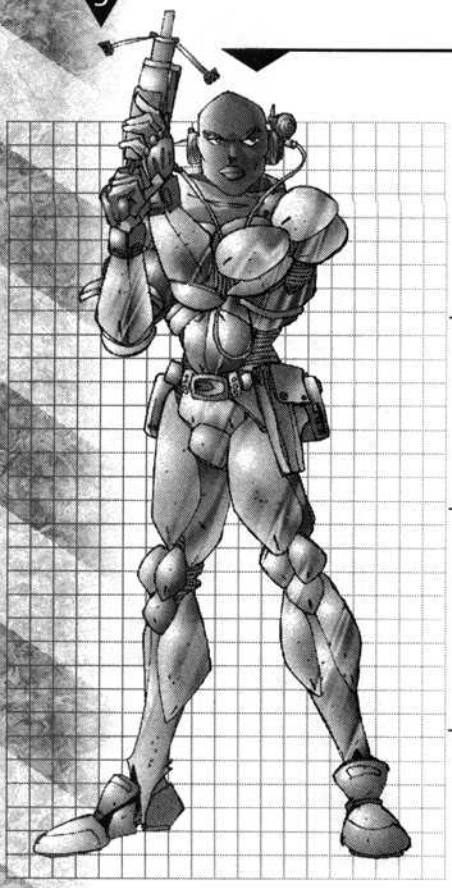
AGI	1	APP	0	BUI	1	CRE	0	FIT	1
INF	0	KNO	0	PER	0	PSY	0	WIL	0
STR	1	HEA	0	STA	30	UD	6	AD	6

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	1	+1	First Aid	1	0	Notice	2	0	Survival	1	0
Camouflage	1	0	Hand-to-Hand	1	+1	Small Arms	2	+1	Tactics	1	0
Dodge	2	+1	Melee	1	+1	Stealth	1	+1	Throwing	2	+1

Equipment and Cost

Typical Equipment:	Light or medium flak suit, survival rations, 9mm pistol, heavy rifle or 9mm chaingun.
Salary:	Ranges from 20,000 to 30,000 marks/dinars per cycle.
Basic Character Costs:	19 Character Points and 25 Skill Points.



KILLER/ASSASSIN

The intelligence agencies, militaries and corporations of Terra Nova employ a growing number of agents trained to eliminate problematic targets. Criminal cartels and underworld families also have their own specialists in this field. These professionals are trained to enter an area undetected and use sophisticated weaponry to kill a target with a single shot. They usually employ high-powered sniper rifles and stealth gear, although some use poisons, knives or explosives equally well. Assassins who can survive long enough to build a reputation can make a great deal of money.

Attributes

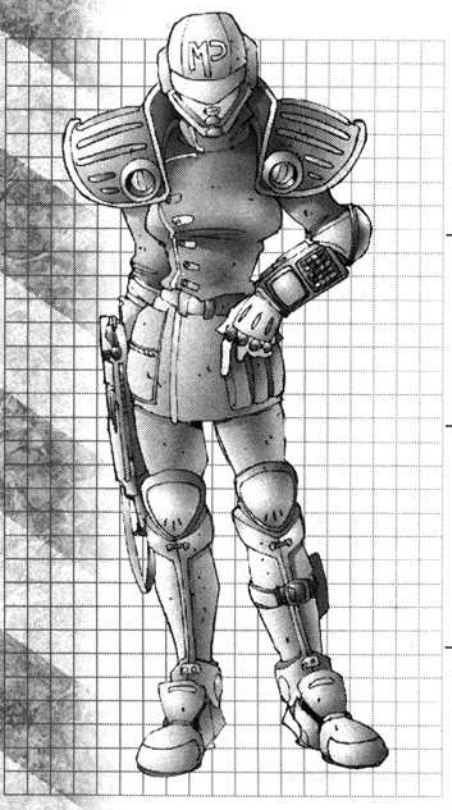
AGI	1	APP	0	BUI	0	CRE	0	FIT	1
INF	0	KNO	0	PER	1	PSY	-1	WIL	0
STR	0	HEA	0	STA	25	UD	4	AD	4

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	1	+1	Dodge	2	+1	Notice	1	+1	Sniping	1	+1
Camouflage	1	0	Hand-to-Hand	1	+1	Security	2	0	Stealth	2	+1
Combat Sense	2	+1	Melee	1	+1	Small Arms	2	+1			

Equipment and Cost

Typical Equipment:	Collapsible sniper rifle w/aiming system, 9mm pistol, stealth armor, vibroblade.
Salary:	Varies by employer and reputation; begins at 75,000 marks/dinars per cycle.
Basic Character Costs:	18 Character Points and 34 Skill Points.



MILITARY POLICE

While several soldiers may dispute the usefulness of the military police, the truth is that their work is never done. There are several issues which need addressing, including solving petty crimes which occur on an almost daily basis in the force to tracking down drug dealers or corrupt officers. Even in the most prestigious military forces, there are some rotten elements, and it is the military police's job to purge them. To that effect, they have great discretionary powers, but are often shunned and even despised by those who might have something to hide.

Attributes

AGI	0	APP	0	BUI	0	CRE	1	FIT	1
INF	0	KNO	1	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	4	AD	4

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	1	+1	Dodge	1	0	Investigation	2	+1	Notice	2	+1
Combat Sense	1	+1	Hand-to-Hand	1	0	Law	2	+1	Small Arms	1	0
Computer	1	+1	Intimidate	1	0	Melee	1	0	Streetwise	1	0

Equipment and Cost

Typical Equipment:	Communicator, data disks, helmet, knife, light flak suit, uniform, 9mm pistol.
Salary:	Ranges from 25,000 to 35,000 marks/dinars per cycle.
Basic Character Costs:	22 Character Points and 30 Skill Points.

NEWS REPORTER

In a world which seems constantly at war, the role of journalists is more important than ever. They are needed to cover a broad variety of events, be they on the international or local scenes. Unfortunately, yellow journalism still plagues newspaper stands and gives the profession a bad name, but some news organizations are still highly demanding and document their stories properly. Another form of journalism which is highly lucrative (and despised) is that of tabloid photographer.



Attributes

AGI	0	APP	0	BUI	0	CRE	1	FIT	0
INF	1	KNO	1	PER	0	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

Skills

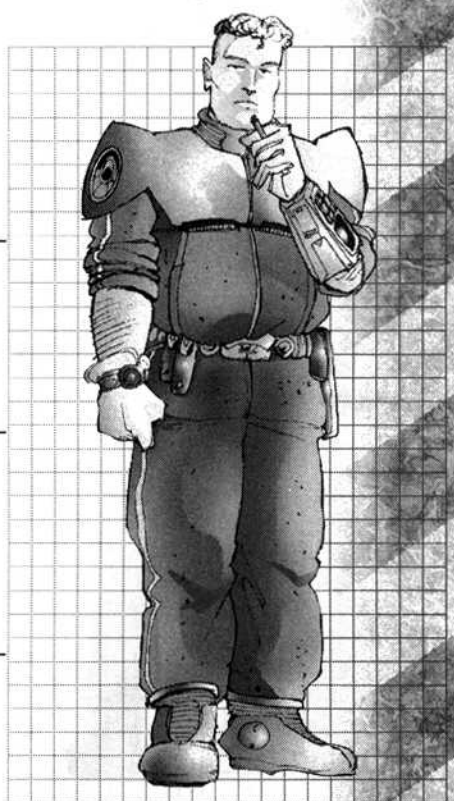
Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Bureaucracy	1	+1	Drive	1	0	Literature	2	+1	Theatrics	1	+1
Business	1	+1	History	1	+1	Notice	1	0	Visual Art	1	+1
Computer	1	+1	Investigation	2	0	Streetwise	1	+1			

Equipment and Cost

Typical Equipment:	Cellular phone, data disks, personal computer, VR gear.
Salary:	Ranges from 20,000 to 40,000 marks/dinars per cycle; photo sharks may earn two to three times that amount.
Basic Character Costs:	19 Character Points and 25 Skill Points.

POLICE OFFICER

In a world on the brink of war, where each city-state is rivaling with its neighbors for territory or resources, and where each league has its own political agenda, a high crime rate and terrorism are difficult problems which have no easy solution. Compounded by the corruption which plagues almost every police force on the planet, a honest cop has his work cut out for him. Most police officers tend to look the other way, however, aware of the risks to their friends and families should they become entangled in the affairs of drug cartels or weapons smugglers. The pay is just not worth the high risk.



Attributes

AGI	0	APP	0	BUI	1	CRE	0	FIT	1
INF	0	KNO	0	PER	1	PSY	0	WIL	0
STR	1	HEA	0	STA	30	UD	5	AD	6

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Bureaucracy	1	0	Dodge	1	0	Investigation	2	+1	Notice	1	+1
Combat Sense	1	+1	Drive	1	0	Law	1	0	Small Arms	2	0
Computer	1	0	Intimidate	1	+1	Melee	1	0	Streetwise	2	0

Equipment and Cost

Typical Equipment:	Note pad, personal communicator, 6mm pistol.
Salary:	Ranges from 20,000 to 35,000 marks/dinars per cycle.
Basic Character Costs:	19 Character Points and 28 Skill Points.



PRIVATE INVESTIGATOR

Most PIs are valid investigators — retired cops, simple freelancers or even bounty hunters — who have a license to offer their services. They can track down long lost family members, track and photograph a cheating husband/wife, or capture criminals to collect the bounty on their heads before the police gets to them. There are also the frauds who purchase expensive advertisement space in local media, promise quick success, ask for cash advances and move on to the next case.

Attributes

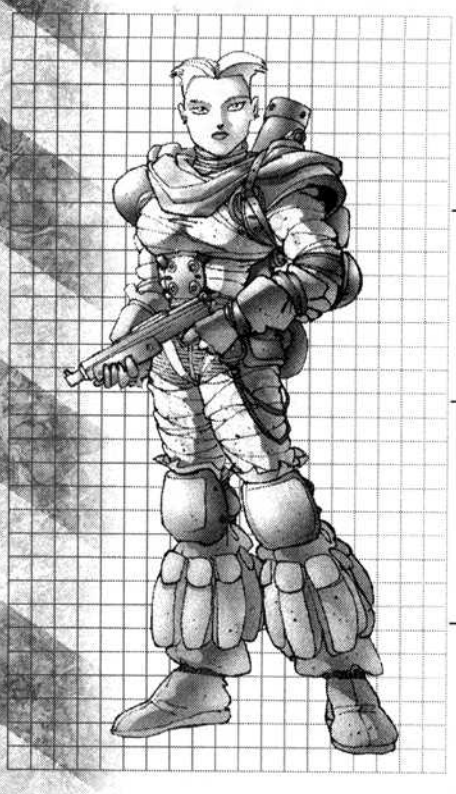
AGI	0	APP	1	BUI	0	CRE	1	FIT	0
INF	0	KNO	1	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	4	AD	3

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Business	1	+1	Drive	1	0	Investigation	2	+1	Small Arms	1	0
Combat Sense	1	+1	Etiquette	1	0	Law	1	+1	Stealth	1	0
Computer	1	+1	Forgery	1	+1	Notice	2	+1	Streetwise	2	0
Dodge	1	0	Hand-to-Hand	1	0						

Equipment and Cost

Typical Equipment:	Cellular phone, data disks, nightvision goggles, personal computer, trideo recorder.
Salary:	Varies depending on reliability and reputation; ranges from 20,000 to 40,000 marks/dinars per cycle.
Basic Character Costs:	22 Character Points and 32 Skill Points.



SMUGGLER

Most smugglers are desperate individuals down on their luck looking for a bit of quick money on the side to "start anew." Unfortunately, once a smuggler, always a smuggler, and cartels who employ these people are seldom willing to let go of a reliable courier without compensation. More often than not, smugglers become entangled in illegal activities and live in fear of the law. Cartels use that to their advantage, pressuring smugglers into doing more work for them, leading them into a downward spiral which ends up costing them their lives in the long run.

Attributes

AGI	1	APP	-1	BUI	1	CRE	-1	FIT	1
INF	-1	KNO	-1	PER	0	PSY	0	WIL	0
STR	1	HEA	0	STA	30	UD	5	AD	6

Skills

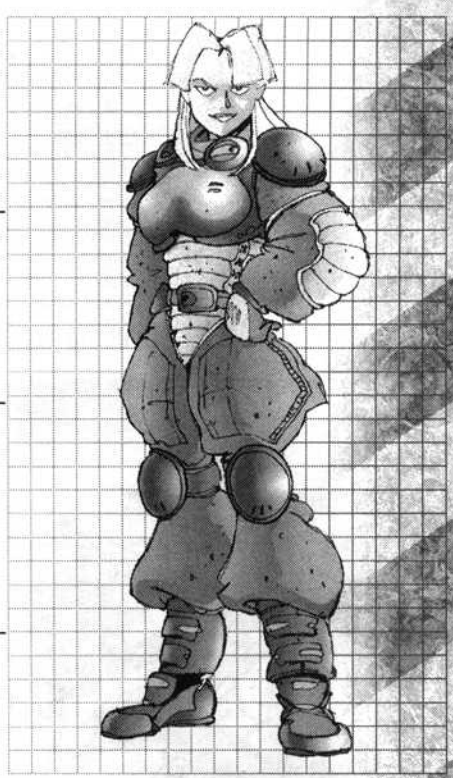
Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	1	+1	Gambling	1	0	Melee	1	+1	Small Arms	2	+1
Combat Sense	2	0	Intimidate	1	+1	Notice	2	0	Streetwise	3	-1
Dodge	2	+1									

Equipment and Cost

Typical Equipment:	Cellular phone, knife, 9mm pistol.
Salary:	Ranges from 15,000 to 40,000 marks/dinars per cycle.
Basic Character Costs:	15 Character Points and 29 Skill Points.

STRIDER PILOT

The soldiers who pilot the massive walking tanks known as striders are a special breed. They carry massive firepower across rough ground in a strategic role similar to traditional tanks, but strider crews take great pride in being even more bold than tankers. The pilot is usually the ranking officer in a two-man crew and serves as vehicle commander as well as pilot. The pilot must also be able to handle the strider's guns if necessary, although this is usally the job of the second crewman who does not need to worry about piloting.



Attributes

AGI	1	APP	0	BLD	0	CRE	0	FIT	0
INF	0	KNO	0	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	4

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Combat Sense	1	+1	Gunnery (strider)	2	+1	Melee	1	+1	Small Arms	1	+1
Dodge	1	+1	Leadership	1	0	Notice	1	+1	Strider Pilot*	2	+1

* Specialization with strider of choice.

Equipment and Cost

Typical Equipment:	Helmet, uniform and strider harness, 9mm pistol, vibroblade.
Salary:	Ranges from 25,000 to 40,000 marks/dinars per cycle.
Basic Character Costs:	16 Character Points and 27 Skill Points.

STRIDER SOLDAT

Strider soldats are the second part of the pilot/soldat team that operates the great walking tanks known as striders. Generally under the orders of the pilot, the soldat operates the auxiliary systems of the strider and the main guns. Strider soldats are legendary "tech-heads," often more concerned with the latest design in targeting computer than the course of the war. Pilots rarely criticize this because technical expertise tends to keep their striders safe from enemy fire. It also helps ensure that the enemy will not eascape unscathed.



Attributes

AGI	0	APP	0	BLD	0	CRE	1	FIT	0
INF	0	KNO	1	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Combat Sense	1	+1	Dodge	1	0	Gunnery (strider)	2	+1	Small Arms	1	0
Communication	2	+1	Elect. Warfare	2	+1	Notice	1	+1	Strider Pilot	1	0

Equipment and Cost

Typical Equipment:	Helmet, uniform and strider harness, 9mm pistol, vibroblade.
Salary:	Ranges from 25,000 to 40,000 marks/dinars per cycle.
Basic Character Costs:	19 Character Points and 30 Skill Points.

7.1 STOCK NON-PLAYER CHARACTERS

Because of the underlying storyline inherent to Heavy Gear, Non-Player Characters have been divided into five categories: Historical Figures, Restricted Characters, Very Important People, Social Encounters and Expendables. These categories will help the Gamemaster determine which characters he can or cannot use in his campaign and who among them is expendable. The attentive reader will notice that most Historical Figures, Restricted Characters and Very Important People have no stats, while Social Encounters and Expendables often do. This reflects the fact that stats are most useful for combat involving PCs, and the first three categories do not run that risk.

• Historical Figures

These are dead people. Unless a Gamemaster's campaign occurs at a date prior to the current Heavy Gear storyline, these characters may not be encountered. Their stats are not provided for this very reason.

• Restricted Characters

These are the characters who are vital to the storyline of Heavy Gear. While their actions may result in events which will affect the Player Characters' lives, they should remain in the background and are not expected to interact with the players. There will always be numerous underlings to intervene between the PCs and them.

• Very Important People

Characters who fall into the VIP category are not necessarily linked to the storyline. However, they are still important to the game world as a whole and should not be eliminated unless the circumstances and the campaign justify it. They have multiple resources and/or helpers who will come to their aid, which they can occasionally make available to the Player Characters. If the players kill such a character, they should be immediately hunted down and appropriately punished.

• Social Encounters

Most of the non-combat, Non-Player Characters should fall into this category. While stats may be provided for these characters, they are not expected to get into combat. Still, because they can encounter Player Characters, there is always the chance they could die.

• Expendables

These are the typical, faceless characters who populate Terra Nova by the millions. They also include those characters who are meant to challenge the players during scenarios. While mindless slaughter should never be encouraged, these are the most expendable characters.

AEROBATIC PILOT

• Typical Attributes

AGI	2	APP	0	BUI	0	CRE	1	FIT	1
INF	0	KNO	0	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

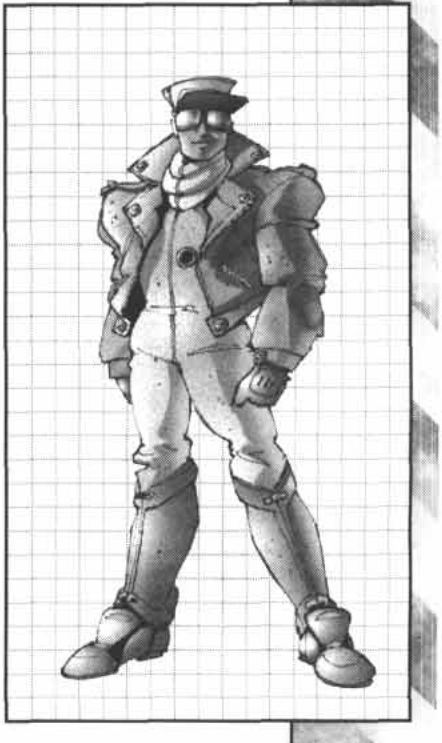
• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Aircraft Pilot (stunts)*	2	2	Drive	1	2	Navigation	2	0
Business	1	0	Electronics	1	0	Notice	1	1
Combat Sense	2	1	Electronic Warfare	1	1	Theatrics	2	0
Communications	1	0	Mechanics	1	0	* (specialization)		

• Description

As Terra Nova inches towards war, its population seeks more and more exciting diversions and the military gains greater and greater prestige. Both functions come together in the elite team of aerobatic pilots featured in most air forces. Touring air shows and media events, these daring pilots tempt death in high-speed fly-bys and tight formation aerobatics. The best aerobatic pilots of the Northern and Southern armed forces are treated like precious resources and enjoy privileges unknown to most who wear a uniform. Combat pilots often look down on them as self-important showoffs who have forgotten the true purpose of military aircraft. Civilian stunt pilots also make a good living at shows and on trideo, but few can boast the skill and equipment of their military counterparts.

Typical equipment: G-suit, flight helmet w/ oxygen mask.



AIR WING COMMANDER



Typical Attributes

AGI	0	APP	0	BUI	0	CRE	1	FIT	0
INF	1	KNO	1	PER	0	PSY	0	WIL	1
STR	0	HEA	0	STA	25	UD	3	AD	3

Typical Skills

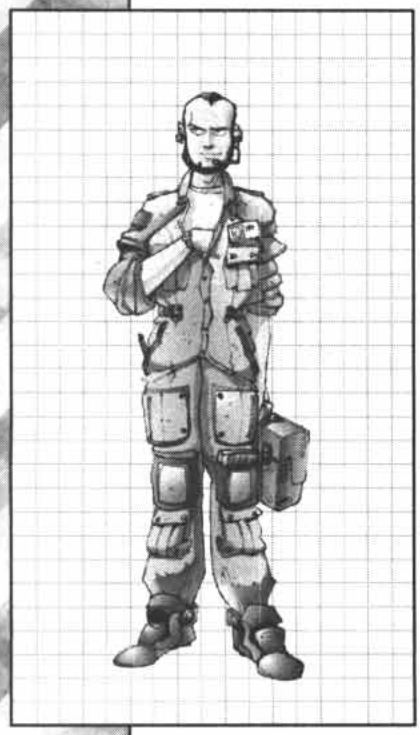
Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Aircraft Pilot	1	0	Electronic Warfare	1	1	Navigation	1	1
Business	1	1	Foreign Language	1	1	Notice	1	0
Combat Sense	1	0	Intimidate	1	0	Small Arms	1	0
Communications	1	1	Leadership	2	1	Tactics	2	1
Dodge	1	0						

Description

The officers who determine the battlefield application of air power must engage in a constant balancing act between military discipline and the attitudes of the pilots. While fighter pilots are extremely professional, the "hot-shot" attitude they are famous for remains a real concern. Similarly, bomber pilots often take the firepower of their craft for granted and must be reigned in to prevent their taking unnecessary risks. Add to this the constant demand from ground commanders for precious air resources, and the profile of the stern over-worked air wing commander becomes clear.

Typical equipment: personal computer, watch, data disks (10), personal communicator (25 km)

AIRCRAFT ENGINEER



Typical Attributes

AGI	-1	APP	-1	BLD	-1	CRE	2	FIT	0
INF	0	KNO	2	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	20	UD	2	AD	2

Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Bureaucracy	1	2	Demolitions	1	2	Mechanics	3	2
Communications	1	2	Electronics	3	2	Tinker	2	2
Computer	2	2	Etiquette	1	0			

Description

Aircraft engineers are a peculiar breed. While some of them are little more than highly experienced technicians, most have a formal education in their trade and take pride in the fact that, unlike mechanical engineers, they are not afraid to ride in the vehicles they helped design. Often during the testing of a machine, an aircraft engineer will be present in the control tower, or in the craft itself, to monitor the tests and to offer helpful suggestions in case of trouble. Because they often put their lives at risk, their salaries are appropriately high.

Typical equipment: protective cloth (Armor Rating 5, 10 against fire), personal computer, watch, data disks (10), personal communicator (25 km), engineering electronics/mechanical tool kit (quality; +1 to electronics or mechanical skill rolls).

AIRCRAFT TECHNICIAN

Typical Attributes

AGI	0	APP	0	BLD	0	CRE	1	FIT	1
INF	0	KNO	1	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Bureaucracy	1	1	Demolitions	1	1	Mechanics	2	1
Communications	1	1	Drive	1	0	Notice	1	1
Computer	1	1	Electronics	2	1	Tinker	1	1

Description

Aircraft technicians, unlike their Heavy Gear counterparts, often feel responsible for the machines they are assigned to maintain. Techs often think of them as their "birds" or their "babies," and tend to dislike reckless pilots who damage them by taking unnecessary risks. Many hotheaded pilots have discovered — much to their dismay — that antagonizing an aircraft tech often leads to their flight being canceled due to "unforeseen technical difficulties." Smart pilots bring their technicians "bribes" to stay in their good graces. This job may not be the most glamorous or the highest paying, but it certainly does have some nice perks.

Typical equipment: protective cloth (Armor Rating 5, 10 against fire), tech gear, electronics tool kit, mechanical tool kit.



AIRPORT SECURITY

Typical Attributes

AGI	1	APP	0	BLD	1	CRE	0	FIT	1
INF	1	KNO	-1	PER	1	PSY	0	WIL	0
STR	1	HEA	0	STA	30	UD	6	AD	6

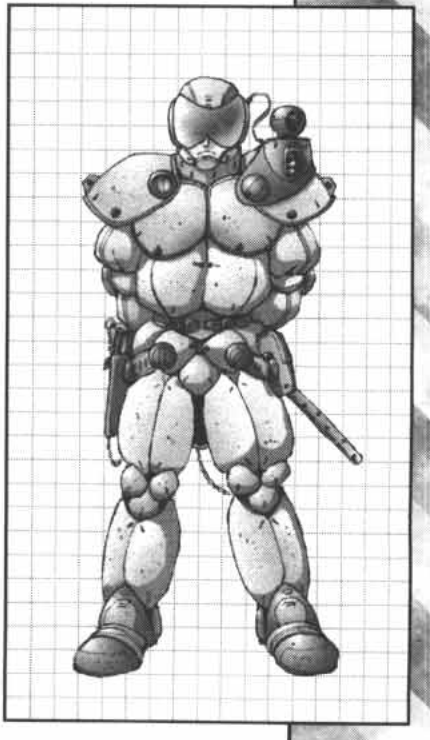
Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Ambush	1	1	Dodge	2	1	Investigation	1	1
Athletics	1	1	Drive	1	1	Law	1	-1
Bureaucracy	1	-1	First Aid	1	-1	Melee	1	1
Combat Sense	2	1	Foreign Language	1	-1	Notice	1	1
Computer	1	-1	Hand-to-Hand	1	1	Small Arms	2	1
Demolitions	1	-1	Intimidate	1	1	Throwing	1	1

Description

Considering the prevalence of terrorism and hijacking, all major airports have invested large sums of money in training and equipping their own security forces. By law, airport security can make use of limited violence in order to ensure the safety of the airport and its clientele.

Typical equipment: heavy flak suit (Armor Rating 40), helmet, 9 mm pistol, personal communicator (25 km), truncheon (AD + 5), shoulder-mounted trideo recorder, data disks (2).



BOMBER CREWMEMBER



• Typical Attributes

AGI	1	APP	0	BLD	0	CRE	1	FIT	0
INF	0	KNO	1	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	4	AD	3

• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Aircraft Pilot	1	1	Electronics	1	1	Navigation	1	1
Communications	1	1	Gunnery (aircraft)	2	1	Notice	1	1
Computer	1	1	Hand-to-Hand	1	1	Small Arms	1	1
Drive	1	1	Mechanics	1	1			

• Description

Crewmembers aboard bombers are usually gunners or bombardiers as well as backup technical assistants to any engineer or technician on board. They have a minimal knowledge of all the equipment on board and, although they have no professional training, they know enough to handle basic emergencies. While they are not cleared to land an aircraft, they could make a reasonable attempt, provided that a professional pilot gave them instructions by radio. Many bomber pilots start as crewmembers and work their way up. Officers keep a careful eye on their bomber crewmembers to see who is fit to move up and who is not.

Typical equipment: flight suit, helmet, bomber overcoat (Armor Rating 10, insulated against heat/cold), 6 mm pistol, goggles, binoculars.

BOMBER PILOT



• Typical Attributes

AGI	1	APP	0	BLD	0	CRE	1	FIT	0
INF	1	KNO	1	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Aircraft Pilot	2	1	Electronics	1	1	Navigation	2	1
Bureaucracy	1	1	Electronic Warfare	2	1	Notice	1	1
Communications	1	1	Gunnery (aircraft)	1	1	Small Arms	1	1
Computer	1	1	Leadership	1	1			

• Description

Bomber pilots realize that their aircraft are heavier and less maneuverable than fighters, but that they are better armed and perform tasks that are just as, or even more, crucial. Bomber pilots tend to think of other aircraft units as less important or simply as support for their missions, an attitude that has earned them a "snobby" reputation. They also have more traditions than regular aircraft pilots — some say that is because they have too much spare time on their hands — and tend to be more level-headed. Bomber pilots often have a crew to think of, which requires initiative and leadership.

Typical equipment: flight suit, bomber overcoat (Armor Rating 10, insulated against heat/cold), 9 mm pistol, goggles, binoculars, aircraft pilot helmet.

BUSH PILOT

• Typical Attributes

AGI	1	APP	0	BLD	1	CRE	1	FIT	1
INF	1	KNO	0	PER	1	PSY	0	WIL	1
STR	1	HEA	0	STA	30	UD	6	AD	6

• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Aircraft Pilot	2	1	Dodge	1	1	Melee	1	1
Athletics	1	1	Foreign Language	1	0	Navigation	2	0
Business	1	0	Gambling	1	1	Notice	1	1
Combat Sense	1	1	Hand-to-Hand	1	1	Small Arms	2	1
Communications	1	0	Intimidate	1	1	Survival	2	1
Cooking	1	1	Mechanics	1	0	Swimming	1	1

• Description

Former military pilots who feel that their lives lack excitement, find employment and adventure as bush pilots. They often own their own craft and take anyone, anywhere, provided he or she can pay the cash up front. Bush pilots with their own craft charge (Aircraft Piloting + Business + INF) marks/dinars per kilometer per person, but that is negotiable. The price can drop to 25% of that amount if they are provided with an aircraft.

Typical equipment: light flak vest (Armor Rating 15), knife (AD + 7), survival kit, personal communicator.



CHIEF TECHNICIAN

• Typical Attributes

AGI	0	APP	0	BLD	0	CRE	1	FIT	0
INF	1	KNO	1	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

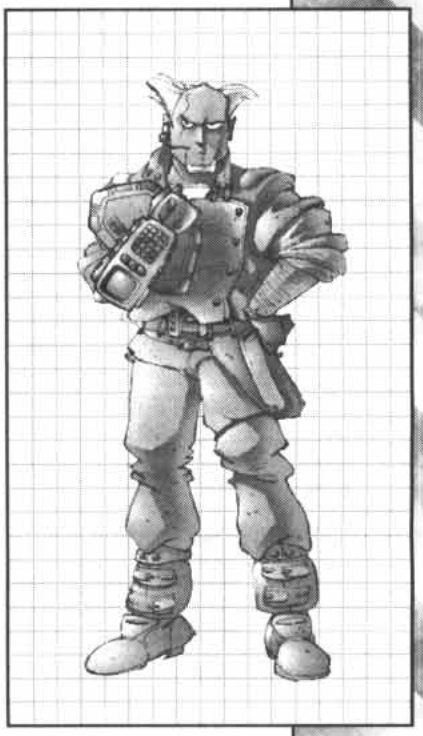
• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Bureaucracy	2	1	Drive	1	0	Notice	1	1
Communications	1	1	Electronics	2	1	Teaching	2	1
Computer	2	1	Leadership	1	1	Tinker	2	1
Demolitions	1	1	Mechanics	2	1			

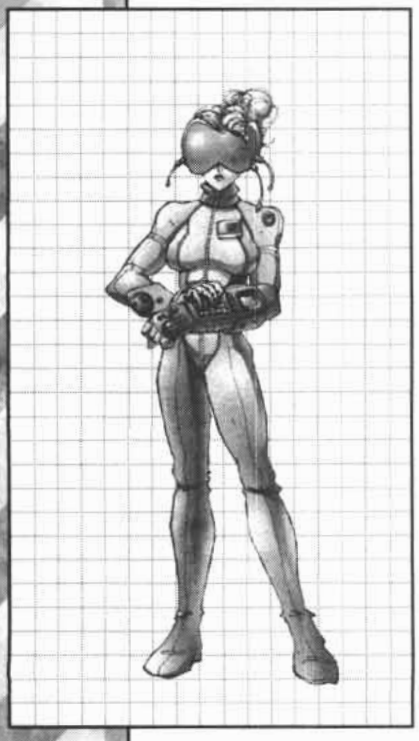
• Description

Taking care of an aircraft is a complex and demanding task that requires the skills of several people. The chief technician is the person who makes sure that everyone's abilities and time are used properly to ensure that the vehicle will be cared for as fast and as carefully as possible. He is well versed in aircraft maintenance and can often lend a hand whenever one of his crew faces unexpected trouble. On many airfields, the chief technician has the final say on whether or not an aircraft will leave the hangar, regardless of the pilot's wishes or headquarters' orders. The base's aircraft are the chief's babies, and he'll be damned if he'll let some hotshot pilot damage one.

Typical equipment: datapad, communicator, light tool kit.



CONTROL TOWER OPERATOR



Typical Attributes

AGI	0	APP	0	BLD	-1	CRE	1	FIT	0
INF	1	KNO	1	PER	1	PSY	-1	WIL	1
STR	0	HEA	0	STA	20	UD	2	AD	2

Typical Skills

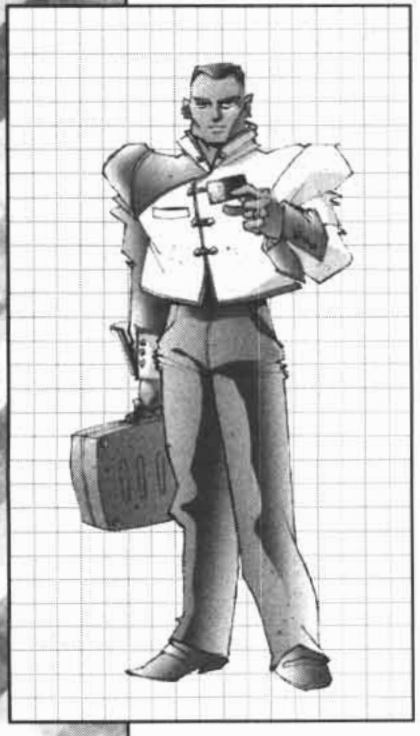
Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Aircraft Pilot	2	0	Drive	1	0	Leadership	1	1
Bureaucracy	1	1	Etiquette	2	1	Navigation	1	1
Communications	2	1	Foreign Language	2	1	Notice	1	1
Computer	1	1						

Description

Even though navigation computers greatly reduce the workload of both flight and ground crew, human supervision is still required to take care of unexpected situations. This is where control tower operators come in. Their job is to oversee the routine computer-directed traffic in their assigned flight zones, ready to take over at a moment's notice should something go awry. A special 3D imaging device lets them see the actual flight path of the aircraft from all sides and even allows them to run hypothetical scenarios. Many operators are former or retired pilots and often boast that they could even coach a grassrunner to land an airplane. Control tower operators are prone to mental fatigue and breakdowns because of the high stress associated with the job.

Typical equipment: dataglove, communicator headset, data imaging system.

CORPORATE REPRESENTATIVE



Typical Attributes

AGI	0	APP	1	BLD	0	CRE	1	FIT	0
INF	2	KNO	1	PER	0	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Bureaucracy	1	1	Drive	2	0	Notice	1	0
Business	2	1	Etiquette	2	2	Psychology	1	1
Computer	1	1	Foreign Language	3	1	Theatrics	2	2

Description

Aircraft are expensive, and the few companies that manufacture them can reap enormous amounts profits if one of their designs is chosen by an airline or air force. Competition is fierce, and the corporations are ready to spend a lot on customer service to ensure loyalty. A corporate representative must know whose palms to grease, and when, to ensure the sale and will often accompany the delivery of a new aircraft to act as a liaison between the factory and the end user. They stay on hand to root out any problems that might develop with the new aircraft and report on the customer's present and future needs. They also keep an eye on the competition to find out what's hot and what's not.

Typical equipment: personal computer, privacy devices, expensive clothes.

CRASH CREW (DEMOLITION)

• Typical Attributes

AGI	1	APP	0	BLD	0	CRE	1	FIT	0
INF	0	KNO	2	PER	1	PSY	0	WIL	1
STR	0	HEA	0	STA	25	UD	3	AD	3

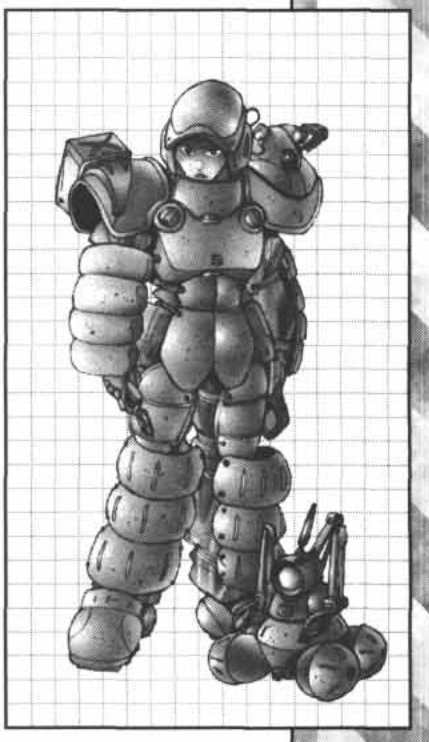
• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Combat Sense	1	1	Demolitions	2	2	Mechanics	2	2
Communications	1	2	Electronics	2	2	Notice	2	1
Computer	2	2	First Aid	1	2	Throwing	1	1

• Description

If a military plane is forced to come down with live ordinance on board, no rescue may be attempted before the weapons are dealt with and neutralized. A few crash teams have been trained especially for this purpose. They have an intimate knowledge of explosive devices and aircraft weaponry, and can usually defuse them without delay. The demolition team is also in charge of removing any unused ordinance on returning warplanes before the aircraft is returned to its hangar. Similar demolition teams are found in the civilian sector where they operate at dangerous crash sites, clearing the way for other rescue workers to follow. Whether military or civilian, they are renowned for their unflappable nature and quiet efficiency.

Typical equipment: light flak suit with turtleshell armor, tool kit, wire-guided robot.



CRASH CREW (FIREMAN)

• Typical Attributes

AGI	1	APP	0	BLD	1	CRE	0	FIT	1
INF	0	KNO	0	PER	1	PSY	0	WIL	0
STR	1	HEA	0	STA	30	UD	6	AD	6

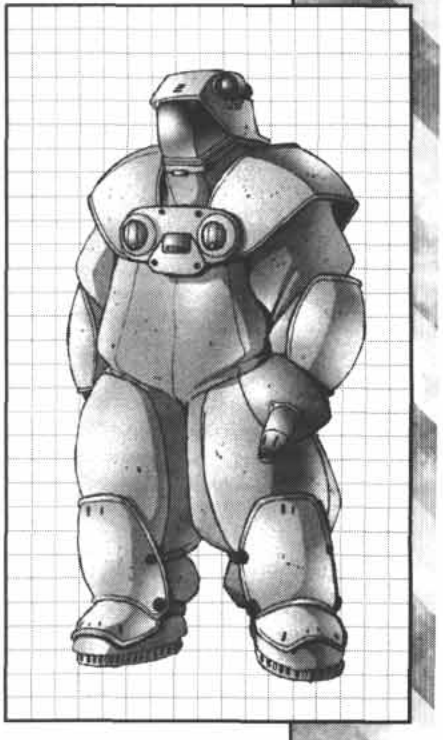
• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	2	1	Earth Sciences	1	0	Melee	1	1
Combat Sense	1	1	First Aid	1	0	Notice	1	1
Demolitions	1	0	Hand-to-Hand	1	1	Physical Sciences	1	0
Dodge	2	1	Investigation	1	1	Throwing	1	1
Drive	2	1	Law	1	0			

• Description

Given the amount of fuel it carries, a burning aircraft can become an unbearable inferno in a very short time. The crash crew firemen are trained to put out the flames as quickly as possible to allow other rescue teams to move in. Their heavy fire suits contain complete life support equipment and are heavily padded to allow them to withstand the scorching heat as they approach a fire. The scorched look of their suits and their apparent fearlessness in the face of fire have earned crash team firemen the nickname "lava men," which they bear with considerable pride.

Typical equipment: fire suit with turtleshell armor, fire ax.



CRASH CREW (MEDIC)



Typical Attributes

AGI	1	APP	0	BLD	0	CRE	0	FIT	0
INF	0	KNO	2	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	1	0	Dodge	1	1	Medicine	2	2
Combat Sense	1	1	Drive	2	1	Notice	1	1
Communications	1	2	First Aid	3	2	Psychology	1	2
Computer	1	2						

Description

Once the demolition and fire teams have cleared the way and made sure the crash site is secure, the medical team moves in. They are trained to work in extremely difficult conditions, and most crash team medics are extremely limber, ready to crawl between twisted panels to reach a wounded crewman. They have even been known to operate on patients while they are still trapped within the wreckage. A compact medical kit, very similar to that used by battlemeds, allows them to stabilize injuries while the rest of the crash team frees the victims from the twisted wreckage. Many crashmeds (as they call themselves) double as field psychologists since they are the ones who must calm down shocked crash victims.

Typical equipment: medical kit, glove-mounted medical scanner, communicator.

FIGHTER SQUADRON LEADER



Typical Attributes

AGI	1	APP	0	BLD	0	CRE	1	FIT	0
INF	2	KNO	0	PER	1	PSY	0	WIL	1
STR	0	HEA	0	STA	25	UD	4	AD	3

Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Aircraft Pilot	3	1	Drive	1	1	Navigation	1	0
Bureaucracy	1	0	Electronic Warfare	1	1	Notice	1	1
Combat Sense	1	1	Gunnery (aircraft)	2	1	Small Arms	1	1
Communications	2	0	Hand-to-Hand	1	1	Tactics	2	1
Computer	1	0	Leadership	2	2	Teaching	1	1
Dodge	1	1	Mechanics	1	0			

Description

Although they may not always be the hottest pilots in the unit, squadron leaders are skilled in a huge number of fields. It falls to them to make sure that the various parts that compose the squadron — flight crew, technicians, supply, support — work smoothly together. Squadron leaders may sometimes appear rough, but they have the well-being of their unit at heart.

Typical equipment: personal computer, G-suit, flight helmet w/oxygen mask, 9 mm pistol.

FIGHTER PILOT

• Typical Attributes

AGI	1	APP	0	BLD	0	CRE	0	FIT	1
INF	0	KNO	0	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	4	AD	3

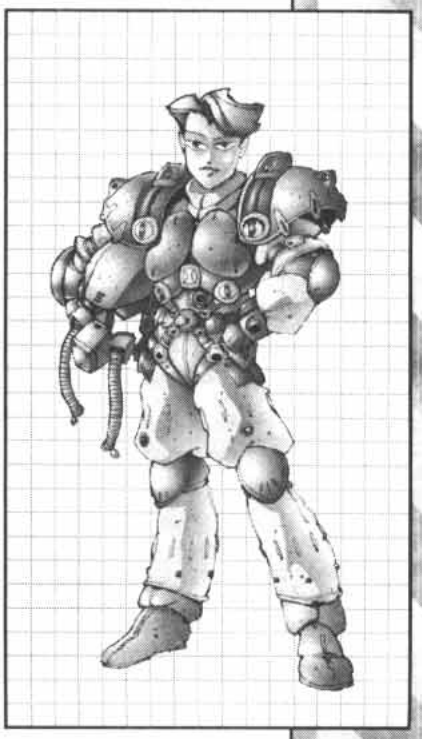
• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Aircraft Pilot	2	1	Electronics	1	0	Navigation	1	0
Communications	2	0	Electronic Warfare	2	0	Notice	1	1
Dodge	1	1	Gunnery (aircraft)	2	1	Small Arms	1	1
Drive	1	1	Hand-to-Hand	1	1			

• Description

Military aircraft pilots have always been surrounded by an aura of heroism and bravado, and the pilots of the various air forces of Terra Nova are no different. In fact, they are admired even more than usual because there are so few of them and they must often fly and fight in weather conditions that most pilots would find suicidal. The adrenaline rush associated with this kind of hotshot piloting is precisely what attracts them to the job. Still, most fighter pilots are remarkably calm, and many would deny the above statement. Those that don't, usually do not survive very long.

Typical equipment: G-suit, flight helmet w/oxygen mask, 9 mm pistol.



FLIGHT ATTENDANT

• Typical Attributes

AGI	0	APP	1	BLD	0	CRE	0	FIT	0
INF	1	KNO	1	PER	1	PSY	1	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Bureaucracy	1	1	Drive	1	0	Foreign Language	2	1
Communications	1	1	Etiquette	3	1	Notice	1	1
Computer	1	1	First Aid	1	1	Psychology	1	1
Cooking	1	0						

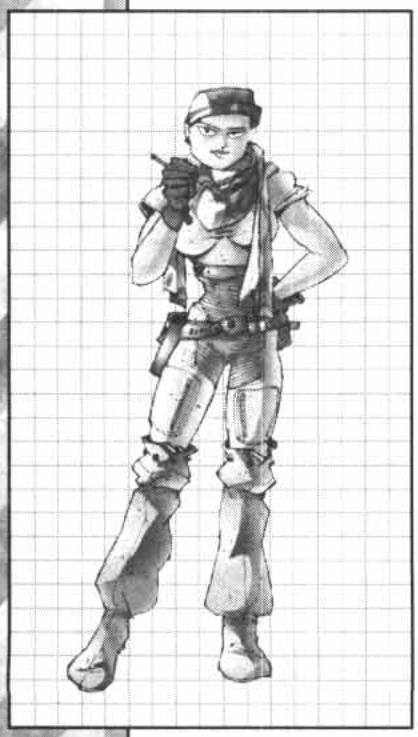
• Description

The low population density on Terra Nova means that any trip between city-states is likely to be quite long. This is even more true of the commercial airlines and passenger floaters plying the trading routes of the Badlands since they have to carefully navigate around potential tempests. To ensure the passengers' comfort, airlines assign several flight attendants to each crew. Their main purpose is to make sure that the passengers get everything they need and do not disturb the flight crew, but they generally have enough training to act as a makeshift cook, paramedic or psychologist. Because they travel a lot, flight attendants are an excellent source of foreign news.

Typical equipment: datapad, bartender glove.



FLOATER PILOT



• Typical Attributes

AGI	1	APP	0	BLD	1	CRE	0	FIT	1
INF	1	KNO	1	PER	0	PSY	0	WIL	0
STR	1	HEA	0	STA	30	UD	5	AD	5

• Typical Skills

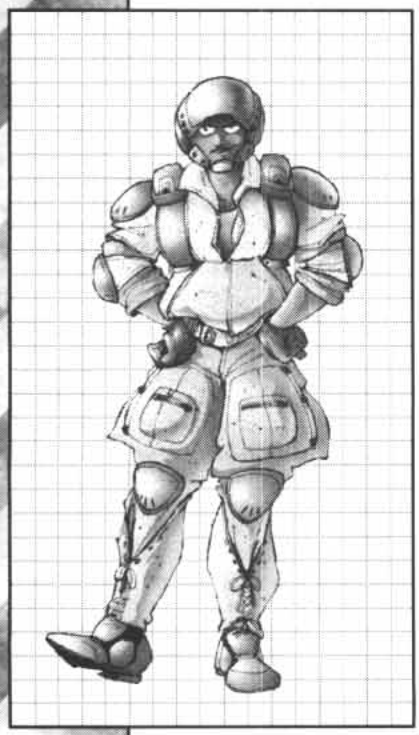
Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Aircraft Pilot	2	1	Communications	2	1	Notice	1	0
Athletics	1	1	Electronics	1	1	Small Arms	1	1
Bureaucracy	1	1	Mechanics	1	1	Tactics	1	0
Business	1	1	Navigation	2	1			

• Description

Blimps, or floaters as they are more commonly called, are a frequent sight in the Badlands. Because they are inexpensive and can drift on the wind to save fuel (thus greatly extending their range), floaters are used as cargo carriers and light patrol vehicles by Badlands communities. Floater crewmen (or just floaters, like their vehicles) are generally easy-going, used to watching the desert sands drift lazily under the vehicle as they travel from place to place. Still, under their placid appearance they are hardy souls, always wary of potential tempests and other disturbances that could rip their fragile aircraft apart.

Typical equipment: goggles, communicator, 6 mm pistol.

HOPPER PILOT



• Typical Attributes

AGI	1	APP	0	BLD	0	CRE	0	FIT	0
INF	0	KNO	1	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Aircraft Pilot	2	1	Computer	1	1	Gunnery (aircraft)	1	1
Bureaucracy	1	1	Dodge	1	1	Navigation	2	1
Combat Sense	1	1	Drive	1	1	Small Arms	1	1
Communications	2	1	Electronic Warfare	1	0	Tactics	1	0

• Description

Hopper pilots are either seen as saviors or total nutcases by ground pounders, depending on their point of view. Vectored-thrust vehicles have a helicopter's hovering capability and maneuverability, but without the large exposed main rotor assembly. It gets to the heads of many hopper pilots, who then make a habit of mixing it up with the ground vehicles they are chasing. Combined with their tendency for nap-of-the-earth flying and love of hard, high-gee maneuvers, it makes for a potentially explosive cocktail. Hopper pilots are often loud, boastful and always ready for a new challenge. They are also very dependable when you are in a fix and will not hesitate to plunge into danger to assist a unit under fire or pull them out of a hot LZ.

Typical equipment: light flight helmet, 9 mm pistol.



MARSHAL (AIR)

• Typical Attributes

AGI	1	APP	0	BLD	1	CRE	0	FIT	1
INF	1	KNO	1	PER	1	PSY	0	WIL	1
STR	1	HEA	0	STA	30	UD	7	AD	5

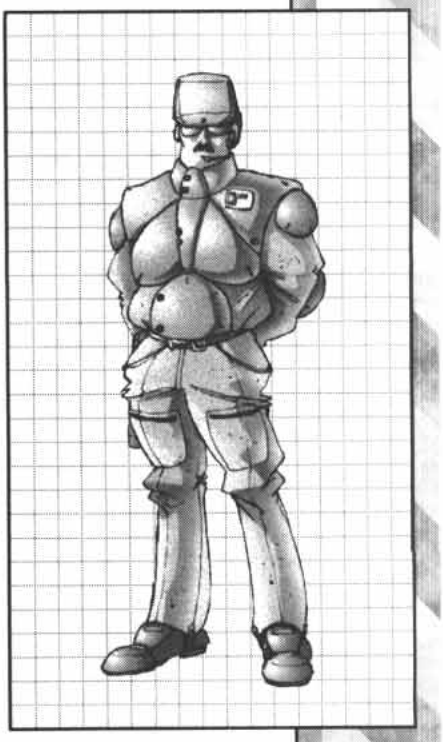
• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Aircraft Pilot	1	1	Computer	1	1	Hand-to-Hand	2	1
Ambush	1	1	Dodge	2	1	Intimidate	1	1
Athletics	1	1	Drive	1	1	Investigation	1	1
Bureaucracy	1	1	Electronics	1	1	Law	1	1
Combat Sense	2	1	First Aid	1	1	Notice	1	1
Communications	1	1	Foreign Language	2	1	Small Arms	2	1

• Description

Planes are excellent targets for terrorists and other bandits, and security officers are now assigned to practically every flight. These guards are often former military police looking for a more "relaxed" job when they retire from the army. The usual practice is to post one guard for every fifty passengers, though this number is not an absolute. Sometimes, they board the plane as civilians, with their equipment concealed under long coats.

Typical equipment: light flak vest, communicator, 6 mm pistol.



PARATROOPER

• Typical Attributes

AGI	1	APP	0	BLD	1	CRE	0	FIT	1
INF	0	KNO	0	PER	1	PSY	0	WIL	0
STR	1	HEA	0	STA	30	UD	7	AD	5

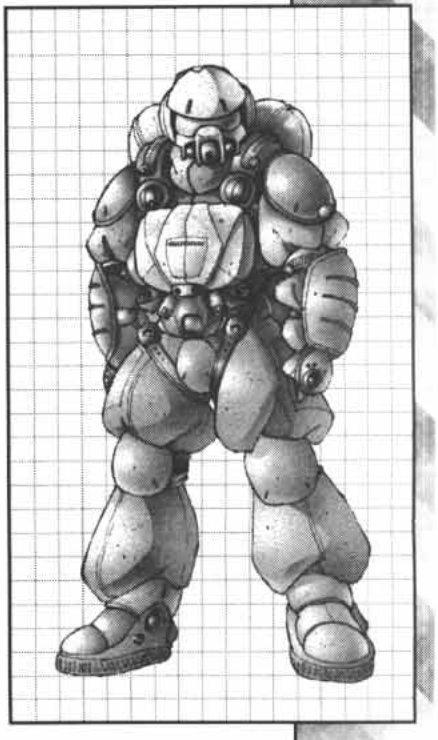
• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	2	1	Drive	1	1	Parachuting	2	1
Camouflage	1	0	First Aid	1	0	Small Arms	2	1
Combat Sense	2	1	Hand-to-Hand	2	1	Stealth	1	1
Communications	1	0	Intimidate	1	1	Survival	2	0
Dodge	2	1	Notice	2	1	Tactics	1	0

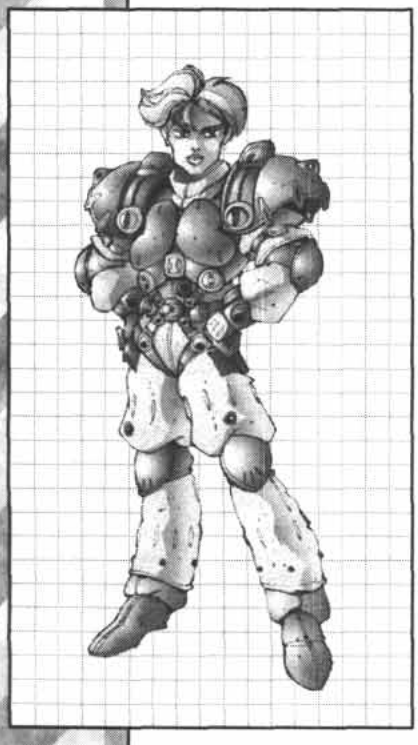
• Description

Paratroopers are experienced soldiers who are parachuted into combat situations. Because they must be able to rely on themselves and their own skills to perform their missions, they are often well trained in survival and personal combat techniques. They are usually expected to secure an area or perform surgical strikes with little or no support. Because of this, they rely heavily on one another and work closely to ensure the success of their missions. Paratroopers are usually given dangerous assignments, and consequently receive higher salaries.

Typical equipment: survival kit, memcompass, military communicator, three grenades, 9mm heavy rifle (plus 2 reload clips of 20 ammo), light flak suit, HALO rig.



PILOTING INSTRUCTOR



• Typical Attributes

AGI	0	APP	0	BLD	0	CRE	1	FIT	0
INF	1	KNO	2	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	4	AD	3

• Typical Skills

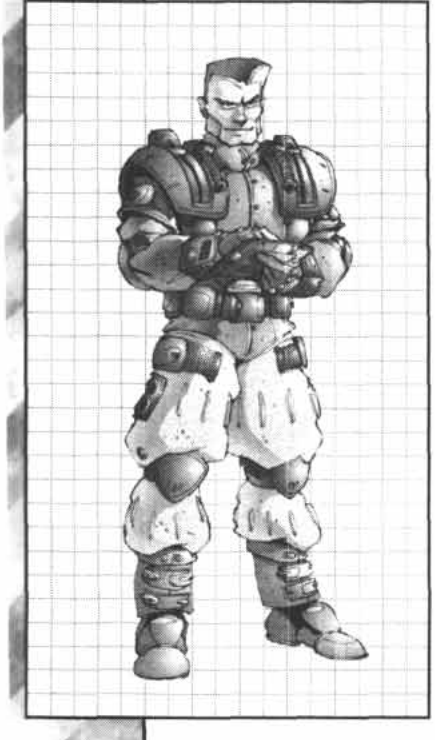
Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Aircraft Pilot	3	0	Electronic Warfare	1	1	Navigation	2	2
Bureaucracy	1	2	Etiquette	1	1	Notice	2	1
Communications	1	2	Gunnery (aircraft)	2	1	Small Arms	1	0
Dodge	1	0	Hand-to-Hand	1	0	Tactics	2	1
Drive	1	0	Leadership	1	1	Teaching	2	1

• Description

Teaching aircraft piloting requires more than passing skills. While being a test pilot requires raw talent and nerves of steel, teaching someone how to pilot an aircraft requires technical knowledge, patience and a good dose of authority. Many rookies join the air force with the hope of becoming hot shot mavericks — a stereotype created and encouraged by holofilms such as *Top Fox* and *Steel Eagles*. It is the instructor's job to break that stereotype and to mold them into efficient, disciplined pilots. Naturally, to become a piloting instructor, an aircraft pilot is expected to have had quite a bit practical experience and usually has a correspondingly high rank.

Typical equipment: G-suit, flight helmet w/oxygen mask.

SYSTEM OPERATOR



• Typical Attributes

AGI	0	APP	0	BLD	0	CRE	1	FIT	0
INF	1	KNO	1	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Bureaucracy	1	1	Electronics	1	1	Gunnery (aircraft)	1	1
Communications	2	1	Electronic Warfare	2	1	Navigation	2	1
Computer	2	1	Etiquette	1	1	Notice	1	1
Drive	1	0	Foreign Language	2	1			

• Description

System operators are reputed to be discreet individuals, although this is yet another stereotype fostered by the media. System operators are quiet professionals whose skills are indispensable in combat aircraft, but whose operations have a less glamorous and visible effect. Their duties include navigation, computer operation, radio communication and electronic warfare (ECM and ECCM systems). While it is not a prerequisite, many of them are proficient in basic electronics and understand a foreign language — a particularly useful skill when assigned to spying missions. System operators may only be support personnel for the public at large, but any smart pilot will appreciate the true value of a competent operator.

Typical equipment: G-suit, flight helmet w/oxygen mask, personal computer.

TEST PILOT

• Typical Attributes

AGI	1	APP	0	BLD	0	CRE	1	FIT	1
INF	0	KNO	0	PER	1	PSY	0	WIL	2
STR	0	HEA	1	STA	30	UD	3	AD	3

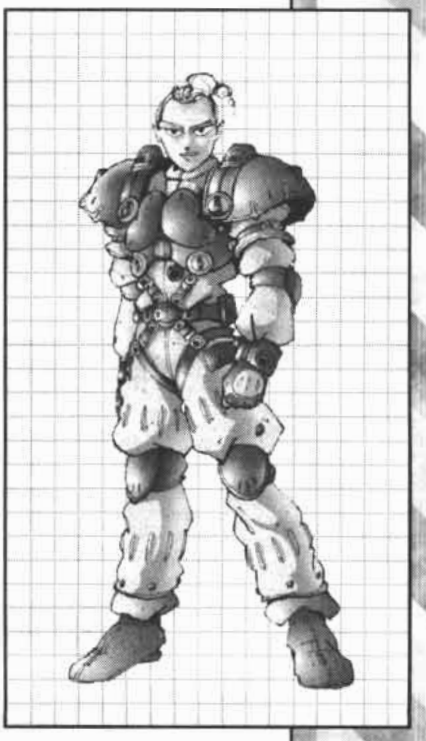
• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Aircraft Pilot	3	1	Electronic Warfare	2	1	Navigation	2	0
Athletics	1	1	First Aid	1	0	Tactics	1	1
Communications	2	0	Gunnery (aircraft)	2	1	Tinker	1	1
Drive	1	1						

• Description

Many test pilots are unpredictable, follow no rules and are annoyingly arrogant about their status. Because their skills are usually prized and because they regularly risk their lives testing new aircraft, they are often allowed a bit more leeway, much to the dismay of their less erratic wingmates in the regular military. Not all test pilots are this chaotic, however. Some of them are extremely methodical and compensate for their lesser skills and creativity with careful study and thorough preparation. While the end result is much the same, they are often more prized for their social skills and professionalism, and usually find more employment outside the military.

Typical equipment: G-suit, flight helmet w/oxygen mask, 9 mm pistol.



WEAPONS TECHNICIAN

• Typical Attributes

AGI	0	APP	0	BLD	0	CRE	1	FIT	0
INF	0	KNO	2	PER	1	PSY	0	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

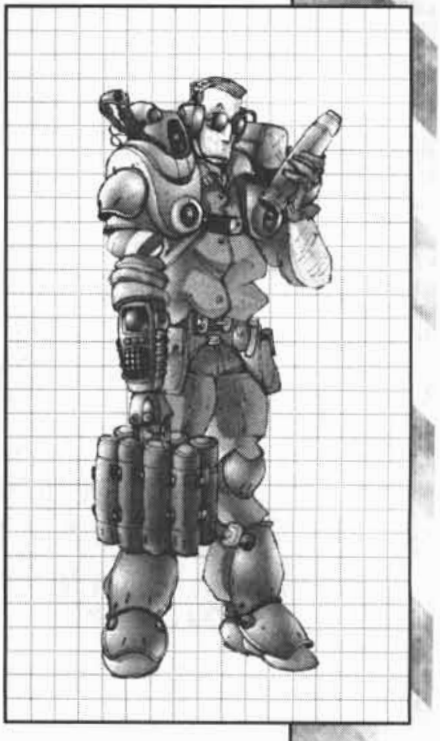
• Typical Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Computer	2	2	Electronic Warfare	1	1	Notice	1	1
Demolitions	1	2	Gunnery (aircraft)	1	1	Small Arms	1	0
Electronics	2	2	Mechanics (weapons)*	3	2	Tinker	2	1
*(specialization)								

• Description

Weapons technicians often serve aboard larger craft (crew of three and up) or beside regular hangar technicians. Their job is to either ensure that weapon systems are running smoothly aboard bombers or armed transports, or to maintain and replace weapons and ammo on the ground. They occasionally embark on test flights (with the appropriate danger pay) when new and complex weapons are being tested. While they are seldom tested under heavy fire, they are expected to perform well under pressure and to be able to repair weapon systems rapidly should they fail in combat.

Typical equipment: protective cloth (Armor Rating 5, 10 against fire), tech gear, electronics tool kit, mechanical tool kit and dataglove.



6.1 - ACTIONS

There are three standard types of actions a character can attempt in a roleplaying game: automatic actions, possible actions, and impossible actions. Automatic actions (e.g. opening a door, walking on a sidewalk) will succeed unless something (like a firefight) complicates them, in which case they become possible actions. Possible actions are actions that could potentially fail e.g. forcing open a locked door, walking on a tightrope). Impossible actions are doomed to failure, because they are logically impossible or just incredibly challenging (e.g. flying by flapping one's arms, breathing in a vacuum, finding a needle in a haystack). It is the Gamemaster who must exercise his judgment to decide whether an action is automatic, possible, or impossible.

Automatic actions do not require Skill rolls. Possible actions require an Action Test: Action Tests consist of a modified die roll which is compared to either a Threshold value or an opponent's die roll. See *Silhouette Basics* (page 44) for a detailed description of Action Tests. Obviously, impossible actions fail without question.

6.1.1 - Running Action Tests



There are four different ways a Gamemaster can run Action Tests. The first way is to tell the Players what the action's Threshold is and have them report their Margins of Success or Failure. This method is the easiest, but it lends itself to "roll-playing" instead of roleplaying, since it focuses much of the Players' attention on dice and bookkeeping tasks. It also takes control away from the Gamemaster since the Players will expect him to abide by the die results, even if they mess up the storyline. After all, the GM selected the Thresholds.

The second way is to reveal to Players only what Skill, Attribute, or Secondary Trait is being tested and have them report their die totals. It is then up to the Gamemaster to compare the number to his Threshold and describe the results to the Players. This method is a good compromise and allows the Gamemaster to have reasonable control over the game while giving Players the satisfaction of having been the one's who controlled (i.e. rolled the results of) their characters' actions.

As a third alternative, the Gamemaster can choose to tell the Players nothing in terms of game mechanics, while he performs the roll behind a screen. This method is generally inconvenient for most Gamemasters, but it is very useful for performing Perception tests, such as Notice or Combat Sense. Besides that, rolling dice every now and then while wearing a fiendish grin keeps Players on their toes.

The fourth alternative is for Players who prefer to dispense with dice altogether in favor of drama and plot development. The Gamemaster must make a judgment call, based on the complexity of the task and the character's competence. No dice are ever rolled. This method is excellent for either very simple or incredibly difficult situations. Advanced roleplayers, especially those who enjoy live action, are encouraged to use this method.

6.1.2 - Skill Tests

The roleplaying game, like the tactical game, relies on Skill tests to determine the outcome of most characters' actions. However, in a roleplaying session, the number of possible actions (and the Skills required to perform them) is infinite. The Skills section (previous chapter, page 57) lists the most common Skills. These are by no means the only ones— they are just a list of suggested Skills. If a Player comes up with a reasonable new Skill, and the Gamemaster agrees, the new Skill can be used in the game without any problems.

In a Skill test, the number of dice rolled is equal to the Skill level of the person involved plus any applicable modifier. For example, a Skill level 2 pilot will roll two dice whenever he must make a Piloting Skill roll.

◆ What If I Don't Have That Skill?

Often, characters will need to accomplish a task for which they have no Skill. In these cases, roll two dice. The result is equal to the lowest of the two individual die rolls. If either of the two dice rolled is a "1," a Fumble occurs. If no Fumble occurred, add the appropriate modifiers to obtain the final total. For instance, Debrah has a sharp wit but no hand-to-hand skill. If she tries to throw a punch, she rolls two dice (let's say the results are "6" and "1"). If she had Skill level 2, she would take the highest result and add her Agility Attribute to it (that would be the "6"). Unfortunately, because she has no skill in personal combat, she takes the lowest value (that's the "1," a Fumble). Odds of her making any damage are, obviously, pretty slim.

If Emergency Dice are purchased using experience points (see *Character Improvement*, page 115), use the following rules: spending one XP will reduce the number of dice rolled to one; spending two XPs will keep the number of dice rolled at two, but the roll is normal (i.e. the highest die result counts, two 6's = 7, both dice must roll "1" to Fumble); spending additional XPs will have no further effect.

Attribute, Strength and Health Tests - 6.1.3

Some situations require innate instead of learned abilities. In such cases, a Gamemaster should request that a Player roll an Attribute, Strength or Health test. Attribute tests are fairly rare since many actions that involve an Attribute are really learned abilities. Attribute tests are used when a truly broad reflection of a character's abilities is required. For example, a Knowledge Attribute test is appropriate for recalling an obscure bit of trivia. An Appearance Attribute test could determine just how stunning a character looks on a particular day. Resisting torture might require a Willpower test. To perform an Attribute test, roll two dice and add the Attribute in question to the total.

Strength and Health tests are rolled in exactly the same manner as Attribute tests (roll two dice and add the secondary trait). These two types of Action Tests are much more common than Attribute tests. Strength tests are required for acts requiring sheer brute strength (e.g. lifting heavy objects, bending metal bars), while Health tests are required to resist drugs, illness, and shock (e.g. surviving a drug overdose or venomous snake bite, staying conscious while in agony).



Attribute, Strength and Health Tests Examples

Example 1:	***Nikki, a renowned manhunter, is trying to recall who her seventeenth boyfriend was. The GM rules that this requires a Knowledge Attribute test with a Threshold of 6. Nikki rolls two dice, obtaining a 1 and a 4, and adds her Knowledge Attribute (-1), for a final total of 3. Nikki has absolutely no clue about his identity.***
Example 2:	***Lara is trying to batter down a sturdy door. The GM rules that this requires a Strength test with a Threshold of 6. Lara rolls two dice, obtaining a 3 and a 6, and adds her Strength (+1), for a final total of 7. Adventurous Lara successfully batters down her own door, only to find her boyfriend in bed with Nikki.***
Example 3:	***Nikki, our favorite sleaze, has just received a solid punch from Lara and must make a Health test with a Threshold of 1 to remain conscious. Unfortunately, Nikki has only recently recovered from a nasty social disease and her health isn't very good at the moment. The GM rules that Nikki has a -1 modifier due to her recent ill health in addition to the -1 she suffers due to her injuries and the -2 she suffers due to her pathetic Health Attribute (she drinks and smokes too much). Nikki rolls two dice, obtaining a 2 and a 4. Combined with her -4 penalty, this produces a final total of 0. Nikki crumples to the ground, unconscious.***

Chance Tests - 6.1.4

"Chance test" is really just a fancy name for the dice roll required to decide the outcome of a completely random action. Simply roll one die and add the character's PSY Attribute. High results are favorable, low results are unfavorable — the Gamemaster decides upon the exact effect depending on the situation (or the odds) at hand (see example). If appropriate, a "1" is still a Fumble. As with all dice rolls, Emergency Dice can be added to improve a character's odds.



Chance Tests are best used to add drama to a situation in which a character's Skills and abilities have no significant impact. The use of the Psyche Attribute to modify Chance Tests allows Players to feel that they have some impact even on random events. Gamemasters running very "realistic" games may wish to dispense with this bonus, but fate can have a role even in the grittiest campaign, so it may still be appropriate.

Chance Test Example

Example:	***Nikki, our archetypal naughty girl is indulging in yet another vice: gambling. She places a bet in a game of roulette. The GM rules that the Gambling Skill is not particularly helpful in roulette due to its strong random element and calls for a Chance test. Nikki rolls one die and it turns up a "1." With her PSY of -1, Nikki loses big at the roulette wheel that night...***

6.2 - COMBAT

Drama centers around conflict. In adventure stories, this conflict often manifests itself as open combat. The hero and the villain often have a shoot-out at the end of the story. Just try to imagine movies like Star Wars, Rambo and Terminator without combat. So, deplorable as it may be in real life, combat is one of the key elements of adventure. This is not to say that combat equals adventure. An adventure that consists of little else but combat is simply an exercise in mindless slaughter. A well-placed fight can, however, spice up an adventurer's life by adding an element of risk.

In the roleplaying game, time is divided into 6-second rounds during combat.

6.2.1 - Initiative



Initiative determines who acts first in a combat round. To see who gains initiative, all combatants roll a Combat Sense opposed Skill test. The Margin of Success is irrelevant in this case. The combatant with the highest result will act first. The next highest is second and so on. Those with tied results act simultaneously.

Any character who Fumbles the test is confused for a moment by the panic and chaos of combat, and cannot begin to perform any action — but he or she may continue any action that began in a previous round and requires more than a round (e.g. treating a wounded buddy).

The roll for initiative is repeated at the beginning of every combat round.

Initiative Example

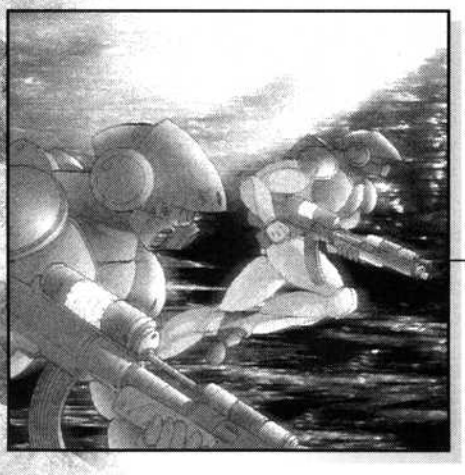
Example: ***Al and Moe challenge Biff and Ugly Bubba to a fight. To determine who throws his punch first, the GM calls for initiative to be rolled. Each adversary rolls his Combat Sense Skill. The results are Al = 5, Moe = 6, Biff = Fumble, and Bubba = 7. Bubba will act first in the round. Moe will act second. Al will act third. Biff is confused and can't make up his mind; he does not get to act this round.***

6.2.2 - Actions

During a round, a character may perform one action (e.g. shoot a gun) at no penalty. If the character chooses to perform multiple actions (e.g. drive a car and shoot a gun at pursuers), all actions are penalized by -1 per extra action.

An action is defined as anything initiated by the Player that normally requires the character's full attention. Generally, this means anything that requires a Skill or Attribute roll. The Gamemaster can decide that some actions are easy enough to not require an Action Test, but time and/or energy consuming enough to impose an action penalty on all other actions. These are generally actions made up of several simple steps that require little skill but some concentration, such as drawing or reloading a weapon, or activating a system.

6.2.3 - Movement



Many Gamemasters prefer to abstract movement for dramatic purposes, but some GMs and Players like to have precise numbers on hand. These individuals should assume that under normal circumstances, a character can sprint up to 25 meters per combat round plus 5 meters times the total of the character's Fitness Attribute and Athletics Skill level. A character's running, jogging, and walking speeds are 2/3, 1/2, and 1/3 of his sprinting speed, respectively. Gamemasters who intend to use these specific movement values with any regularity should have Players inscribe them on their character sheets for quick reference during play. Gamemasters who prefer abstract movement should simply ask for Athletics or FIT tests.

Character Movement Table

•	**Sprinting Speed (m/round) = 25 + 5 x (Fitness + Athletics Skill)**
•	**Running Speed = 2/3 Sprinting Speed**
•	**Jogging Speed = 1/2 Sprinting Speed**
•	**Walking Speed = 1/3 Sprinting Speed**

Ranged Combat - 6.2.4

To attack a wary target, the attacker must defeat the defender in an opposed Skill test. The attacker rolls his Skill in the attack form being used (Small Arms, Archery, or Throwing). The defender either rolls his Dodge Skill or Melee Skill (if performing a shield block). If the attacker succeeds, the attack hits. If the defender wins or the result is a tie, the attack misses. If the attacker Fumbles, the attack fails. If the defender Fumbles, the attack succeeds unless the attacker also Fumbled.

Attackers should add the appropriate modifier from the following list to their roll depending upon what range they are attacking from.



Attacker Range Modifiers

Point blank range (≤3m)	+1
Short range	+0
Medium range	-1
Long range	-2
Extreme range	-3

Attack Example

Example 1:	***Howard has been cornered in an alley by two hooligans. Fortunately for him, Howard has won initiative for this round. He opts to draw his concealed pistol, shoot the furthest one, then use the butt of the weapon to bludgeon the thug nearest to him. This requires three actions: one to draw the gun and two attacks. Howard suffers a -2 penalty to all his actions this round due to the two additional actions he has taken.***
Example 2:	***Howard has the Small Arms Skill at level 2. His die roll is 3 for the first attack. The following modifiers are applied to this value: the -2 multiple action penalty, a +0 due to his unexceptional Agility, a +0 short range modifier, a +0 modifier for remaining stationary, and a -1 for the poor lighting in the alley. This results in a final attack total of 1. The hooligan has a Dodge Skill of 1. He rolls a 3 and applies a +0 modifier for his average Agility, a +0 modifier for walking towards Howard, and a -2 modifier for being moderately intoxicated. The hooligan has a final defense total of 1, resulting in a draw. Since all draws on attacks are in the defender's favor, the bullet barely misses the thug.***
Example 3:	***Howard turns towards the closer of the two thugs and attempts to club him with the pistol butt. The GM rules that this is a clumsy improvised weapon and applies a -1 Accuracy penalty to the attack. Howard has a Melee Skill of 3. He rolls a 7 and applies a total modifier of -4 for the various situation modifiers (see above), yielding a final attack total of 3. Howard's foe Fumbles his Dodge roll. As a result, his defense total is automatically 0. Howard beats his assailant handily, as indicated by the Margin of Success of 3.***

Close Combat - 6.2.5

To attack a wary opponent in close combat, the attacker must defeat the defender in an opposed Skill test. The attacker rolls his Skill in the attack form being used (Melee or Hand-to-Hand). The defender either rolls his Dodge Skill (to avoid being hit), Melee Skill (to parry with a weapon) or Hand-to-Hand Skill (for unarmed blocks). If the attacker wins, the attack hits the defender. If the defender wins or the result is a tie, the defender avoids the blow. If the attacker Fumbles, the attack fails. If the defender Fumbles, the attack succeeds unless the attacker also Fumbled. If an unarmed defender blocks an armed Melee attack, he suffers a -1 to his defense roll. If a defender parries using an object, the object takes the damage penalty which the defender would have taken if he had not parried (i.e. Light Wound means a -1 to the next parry with that object, Deep Wound means a -2, Instant Kill means the object is destroyed).

Although parrying with a Melee weapon or performing an unarmed block are technically uses of "offensive" Skills (Melee and Hand-to-Hand), like a standard use of Dodge, they do not count as actions for the purposes of calculating the number of actions in a round. So a character can parry and attack in the same round at no penalty.

6.2.6 - Surprise Attacks



Attacking unwary targets requires the attacker to pass a standard (not opposed) Skill test with a Threshold number of 1 + defender's modifiers (like movement and cover). However, unlike a normal attack, the attacker must roll the lower of two Skills: either his attack Skill or his Stealth Skill. Untrained individuals tend to be noisy or otherwise mess up surprise attacks by alerting the victim at the last moment.

Surprise Attack Example

Example: ***Jan Augusta ambushes Ted, a wanted terrorist. Since Ted is unwarily strolling along an alley in the middle of the day, all his defense modifiers are +0. This means that Augusta must pass a Threshold of 1 on his Skill test. Augusta has Skill level 2 in Small Arms and Skill level 3 in Stealth. He rolls the lowest of these two (his Small Arms Skill) and obtains a final modified roll of 4. His attack succeeds with a Margin of Success of 3.***

6.2.7 - Attacker Modifiers

The following modifiers apply to an attacker's roll to hit for both ranged and close combat. The Gamemaster will often have to make a judgment call as to whether to apply any of the situational modifiers listed below. Although the most important criteria is to keep combat dramatic, GMs should be careful to apply modifiers consistently to both PCs and NPCs.

Offensive Modifiers

Attacker Movement	
+0	**if stationary**
-1	**if walking**
-2	**if jogging**
-3	**if running**
Intoxication	
-1	**if mildly intoxicated**
-2	**if moderately intoxicated**
-3	**if heavily intoxicated**
Lighting	
-1	**if area is poorly lit (e.g. dim lighting, moonlight)**
-2	**if area is very poorly lit (e.g. candlelight, starlight, fog)**
-3	**if area is barely light (e.g. light of a single candle, dim indirect light, heavy fog)**
-4	**if area is completely dark**
Aiming	
+1	**per round of aiming (maximum bonus equal to attacker's Skill level)**
-2	**if aiming at specific location, except head**
-3	***if aiming at head***
Weapon Accuracy Modifier	**Varies according to weapon used. Refer to the Weapon chart (page 83).**

Alternatively, the Gamemaster may wish to apply the full rules for drug effects (see Hazards, page 109).

◆ Aiming Modifiers

A character can spend a few combat rounds aiming at a target to improve his odds to hit. Add one to the attacker's roll per combat round spent aiming (up to a maximum equal to attacker's Skill level).

Alternatively, a character can aim at specific body part (e.g. chest, leg, abdomen) of a target. A -2 modifier applies to all such attacks except head shots, which are penalized by -3. All shots aimed at vital locations, such as the chest and head, reduce the victim's normal injury Thresholds by half (but Armor is at full value). Shots aimed at specific limbs are useful as non-fatal attacks. Burst fire attacks cannot be aimed at specific body locations. Note that characters using the Sniping Skill (see p. 66) do not suffer from the penalties for hitting specific body parts, except as outlined in the Skill description (-1 for the head or a vehicle's Auxiliary Systems). Snipers can benefit from bonuses for prolonged aiming, however.

Defender Modifiers - 6.2.8

The following modifiers apply to the defender's roll to avoid being hit. The following modifiers apply to the defender's roll to avoid being hit. As with attack modifiers, the GM must use his best judgment to apply them evenly. In the case of armed parrying, the GM may also wish to apply the Accuracy of the parry weapon or impose a -1 penalty for using particularly small weapons.

Defensive Modifiers

Defender Movement	
-1	if not moving
+0	if walking
+1	if jogging
+2	if running or sprinting
+2	if dodging (cumulative with movement)
Cover	
+1	if under light cover (e.g. shrubs, garbage cans, tall grass, thin walls)
+2	if completely hidden by light cover
+3	if under heavy cover (e.g. strong walls, rocks, large vehicles)
Automatic success	if completely hidden by heavy cover
Intoxication	
-1	if mildly intoxicated
-2	if moderately intoxicated
-3	if heavily intoxicated

Alternatively, the Gamemaster may wish to apply the full rules for drug effects (see Hazards, page 109).

All-Out Dodging - 6.2.9

The game system assumes that characters always attempt to avoid injuries in combat. Sometimes, however, an all-out attempt to dodge is required. A character must declare an all-out dodge at the beginning of the round (before the first character acts, even if this is out of his initiative sequence). The character cannot perform any actions other than move (up to a run) and dodge. A dodging character adds +2 to his defense rolls against all attacks that round, in addition to his movement modifiers. In addition, a dodging character gets a full defense against all attacks, including surprise attacks. Surprise attacks against a dodging individual are rolled like normal attacks.

Burst Fire - 6.2.10

Many weapons have a Rate of Fire (ROF) bonus of +1 or greater. These weapons are called burst fire (or fully automatic) weapons because they can fire a hail of projectiles in short order. Burst fire weapons are assumed to be able to fire at any ROF bonus equal to or lower than their listed rating. Thus, a +3 ROF weapon could fire as a +3, +2, +1, or 0 ROF weapon. This is done to conserve ammunition since a weapon expends 10 shots per +1 of ROF in each attack — slightly unrealistic, but it simplifies the bookkeeping. ROF 0 weapons expend one shot per attack.

Burst attacks usually consist of firing a tight burst towards a single opponent. If the attack succeeds, the ROF bonus of the weapon is added to the attack's Margin of Success.



Burst Fire Examples

Example 1:	***Alia attacks Gordon using a submachinegun with a ROF bonus of +2. She unloads a full burst into Gordon and obtains a Margin of Success of 3. The attacks effective Margin of Success is (3 + 2 =) 5.***
Example 2:	***The next round Alia is still fighting off Gordon, but is getting worried about her ammunition situation. She attacks with her SMG again, but uses a ROF of only +1 to conserve ammo. She obtains a Margin of Success of 2 so the attack has an effective Margin of Success of (2 + 1 =) 3. She expends 10 rounds from the magazine of her weapon. She could have spent a single round (ROF 0), but would have had a MoS of only 2.***

Walking Fire

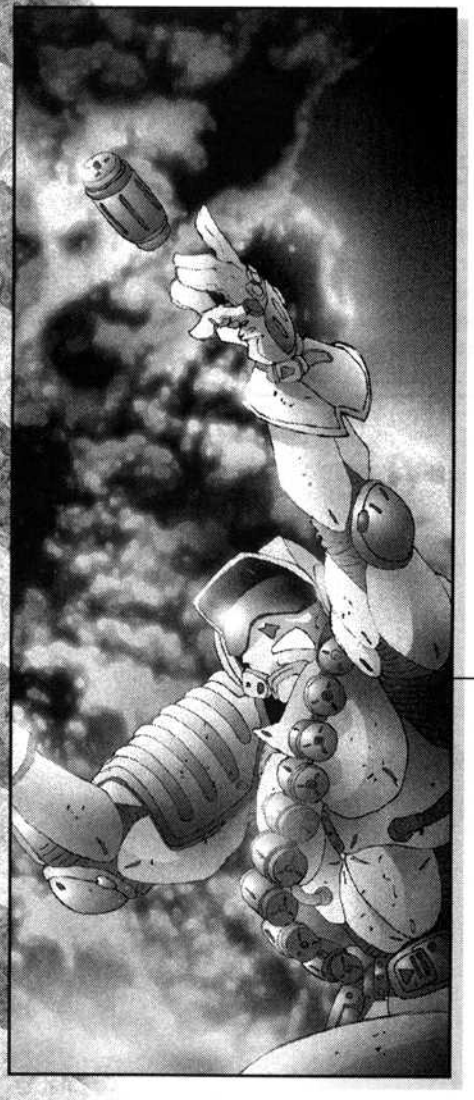


Weapons capable of burst fire can be used to attack multiple targets in a single action by walking the burst across the targets. A Player must declare that he is walking fire before any attacks are made. The Player then chooses the targets of his attack. A number of targets equal to the weapon's ROF plus one may be attacked. For each extra target, the weapon's ROF is reduced by one for damage purposes (but not for ammo expenditure). All targets must be within the weapon's firing arc. Each attack is rolled separately. Each individual target may not be attacked more than once per round by the same weapon (no extra attacks against one target).

Walking Fire Example

Example: ***Alia now turns toward Zack and Rhonda. She decides to walk her fire across the two of them. Since she is attacking more than one target, her effective ROF bonus for each attack is reduced by one per attack (down to +1). She rolls two separate attack rolls and succeeds in both. Against Zack she has a Margin of Success of 1. This becomes an effective Margin of Success of 2. Her Margin of Success of 3 versus Rhonda becomes an effective Margin of Success of 4.***

6.2.11 - Grenade Attacks



Attacking with a grenade differs slightly from attacking with other weapons: the grenade is thrown or shot near its target, and it detonates either on impact, after a short delay, or in the air (in the case of gas grenades). The Margin of Success of the original attack determines how close the throw was to its target, and how much time there is between landing and detonation for the target to take cover or flee the grenade. In order to be more realistic, a maximum Margin of Success equal to the maximum primary area of effect is imposed on grenade attacks (i.e. the highest possible Margin of Success with a concussion grenade is 9). Hand grenades are used with the Throwing Skill.

When attacking, a large Margin of Success signifies that the throw was dead on, and that detonation quickly followed impact; inversely, a low Margin of Success (or a failure) will probably mean that the throw was off mark, or that the grenade was thrown too soon after arming it, leaving enough time for the target to get out of harm's way. A dodge roll is allowed to defend against grenades if the defender is aware of the attack. Grenades usually have wide area of effect; anyone deemed by the GM to be in this area must also defend against this attack or take damage from the grenade. Secondary targets get a +1 to their defense roll.

If the GM uses a hexagonal map to figure out combat, the Margin of Success indicates how far from the target the grenade has fallen. Simply subtract the Margin of Success (or failure, for that matter) from the maximum primary radius of effect; the difference is the number of meters between the grenade impact site and the target. Roll 1d6 for direction, assigning each number to a hexagonal bearing, with the intended target being at the center; the grenade fell in that direction, at the calculated distance from the target. Determine the Margin of Success for other potential targets by counting the number of meters between them and the impact site, subtracting the result from the maximum primary area of effect.

Grenade Attack Example

Example: ***Jack Thunder gets a concussion grenade (Damage Multiplier x30) thrown at him by a soldier. After rolling both the attack and the defense rolls, the attacker succeeds with a Margin of Success of 2, for 60 points of damage. The maximum primary area of effect for a concussion grenade is 9 meters; the grenade thus fell 9 - 2 = 7 meters away from Jack. The Gamemaster then rolls 1d6 for the hexagonal direction and places the grenade's impact site; it happens to be five meters away from Fyana, Jack's girlfriend. She thus receives an attack with a Margin of Success equal to the maximum area of effect minus the distance, or 9 - 5 = 4; her Dodge rolls results in a 3. The final Margin of Success for the grenade attack on Fyana is 1, for 30 points of damage — enough for a Deep Wound.***

Injuries - 6.2.12

If an attacker hits an opponent, he does an amount of damage equal to his weapon damage multiplier times his Margin of Success. Remember to always use the final Margin of Success to calculate damage. This means adding in used ROF bonuses in burst fire and subtracting the Dodge result of secondary targets in grenade attacks.

- **Damage = Weapon damage x Margin of Success**

This damage value is compared with the wounding scores of the victim. If the damage equals or surpasses any of the three scores, the effect of the highest score passed affects the victim. If an injury does damage less than the target's Flesh Wound Threshold, the target suffers a minor injury that is somewhat painful but has no game effects.

Injury Example

Example: ***A gunshot victim has a Stamina of 25. Therefore his wounding scores are Flesh Wound = 13, Deep Wound = 25, Instant Death = 50. His opponent shoots him with a heavy pistol (Damage Multiplier x15) and gets a Margin of Success of 2 (total damage 30). The victim therefore suffers a Deep Wound. He does not suffer a Flesh Wound result as well, only a single Deep Wound.***

Armor

Many people in high risk occupations, such as police and military personnel, wear body armor. Personal body armor is rated by its armor rating. That rating is added to all three of the character's wounding scores.

Shots aimed at parts of the body that are not covered by a character's body armor are not affected by the armor rating. If a specific location is not declared, use the Armor rating of the victim's torso.

Personal Armor Example

Example: ***If the victim in the previous example had been wearing a flak jacket with an Armor rating of 20, his wounding scores would have been Flesh Wound = 33, Deep Wound = 45, Death = 70. The 30 points of damage he suffered would not even have inflicted a Flesh Wound, let alone the Deep Wound he suffered.***

Action Penalties

Severe injuries are very painful and crippling. These effects are simulated by the action penalty associated with injuries. Each injury applies a penalty to all Attribute, Secondary Trait, and Skill tests due to pain and trauma. This includes tests to resist degeneration of wounds and avoid unconsciousness. These action penalties also affect the First Aid/Medicine rolls of any medic who attempts to treat the character.

Action Penalty Example

Example: ***Rex has suffered two Flesh Wounds and a Deep Wound. This produces a (-1-1-2 =) -4 action penalty which is applied to all Action Tests that he performs, including Health tests to stay conscious.***

Flesh Wounds

Flesh Wound is a catch-all term for painful but generally non-life-threatening injuries such as minor gunshot wounds, deep cuts, minor concussions, and other severe Flesh Wounds. Multiple Flesh Wounds can induce shock and are thus potentially life-threatening. Each Flesh Wound applies a -1 action penalty. Characters with Flesh Wounds cannot sprint but they can maintain a steady, if quite painful, jogging pace.

Deep Wounds

Deep Wounds are more severe than flesh injuries. Compound fractures of major bones, punctured or crushed organs, damage to major blood vessels, and severe concussions are all Deep Wounds. They can be immediately life-threatening and are often fatal if left untreated. Deep Wounds have a -2 action penalty. Characters with one Deep Wound can go no faster than a slow walk. Characters with more than one Deep Wound are reduced to crawling and cannot stand unassisted.

◆ Knockouts



Whenever a character suffers a wound (Flesh or Deep), he may be knocked unconscious from pain or cranial trauma. The character must pass a Health test versus a Threshold of 1 (remember those action penalties) to avoid unconsciousness. If a character fails the test, he will remain unconscious for 1d6 minutes per Flesh Wound plus 1d6 hours per Deep Wound. If the character Fumbles the unconsciousness test, he slips into a coma. The GM should decide how long the coma will last based upon the character's injuries. Gamemasters are advised to remember that comas are unpredictable in duration and severity.

Knockout Example

Example 1:	***Rex has just suffered another Flesh Wound, bringing his action penalty down to -5. Since he has suffered a wound, he must pass a Health test with a Threshold of 1 to remain conscious. He rolls a 6, which is modified down to a 1. Just enough to produce a draw and stay conscious, albeit crippled.***
Example 2:	***Nate, a sickly old man with a -2 HEA, receives a Deep Wound. During his Health test he rolls 3 on two dice, for a final result of (3 - 2 - 2 =) -1. Nate falls unconscious for 1d6 minutes because of his wound.***

6.2.13 - Untreated Injuries



Any major wound that is left untreated will, after a while, begin to fester and become infected. Untreated wounds (not stabilized by a medic) also cause additional blood loss and trauma. The effects of leaving wounds untreated is simulated by wound degeneration.

Degeneration is tested daily for Flesh Wounds and hourly for Deep Wounds, independently of each other. Multiple injuries of one type cause the time between the degeneration tests to be divided by the number of injuries of the appropriate type. For example, two untreated Flesh Wounds will cause a test once every (24 hours ÷ 2 =) 12 hours.

Degeneration test are Health tests with a Threshold of 1. If the test is passed, the character's wounds do not worsen. If the test is failed, the character adds a new Flesh Wound to his or her injury list. If the test is Fumbled, the character adds a new Deep Wound to the list (nasty bleeding or infection). These additional injuries can lead to the character's death (see below).

Wound Degeneration Example

Example 1:	***Rex has three Flesh Wounds and a Deep Wound. The single Deep Wound must be checked for degeneration every hour. The Flesh Wounds must be checked for degeneration every (24 hours ÷ 3 wounds =) 8 hours.***
Example 2:	***Rex must pass a Health test with a Threshold of 1 to avoid wound degeneration. He rolls a 4. Unfortunately, his injuries modify the total down to a -1 (counted as 0). Rex fails the test and acquires a new Flesh Wound to represent the poor condition of his "true" wounds.***

6.2.14 - Stabilizing Injuries

To stabilize an injury, a medic must pass a First Aid or Medicine Skill test with a Threshold of 1. This test is modified by the victim's Health trait and the victim's action penalty due to injuries. Therefore, any medic attempting to stabilize his or her own injuries is penalized by his action penalty twice (once as a person in pain and once as the medic dealing with messy injuries). A successful roll stabilizes one injury (Deep Wounds usually are stabilized before Flesh Wounds). A failed roll accomplishes little and wastes five minutes. A Fumbled roll wastes five minutes and aggravates the victims injuries, creating an additional Flesh Wound. One attempt to stabilize a single injury (one Flesh Wound or Deep Wound) may be made per 5 minutes.

Stabilized injuries do not degenerate, but they can be destabilized. Flesh Wounds are destabilized by any heavy activity (including combat). Deep Wounds become destabilized by anything greater than minimal activity (bed rest, feeding, bathroom, and little else). Destabilized wounds once again begin to degenerate until they are stabilized again.

Death - 6.2.15

There are two ways a character can die in combat: instant kill or trauma. Note that this section focuses almost exclusively on the critical time between the moment when an injury occurs and when a wounded person receives full medical attention. The rules assume that if a victim's wounds can be stabilized and he can then receive proper care (in a hospital for serious injury), he will eventually recover.

Instant Fatality ◆

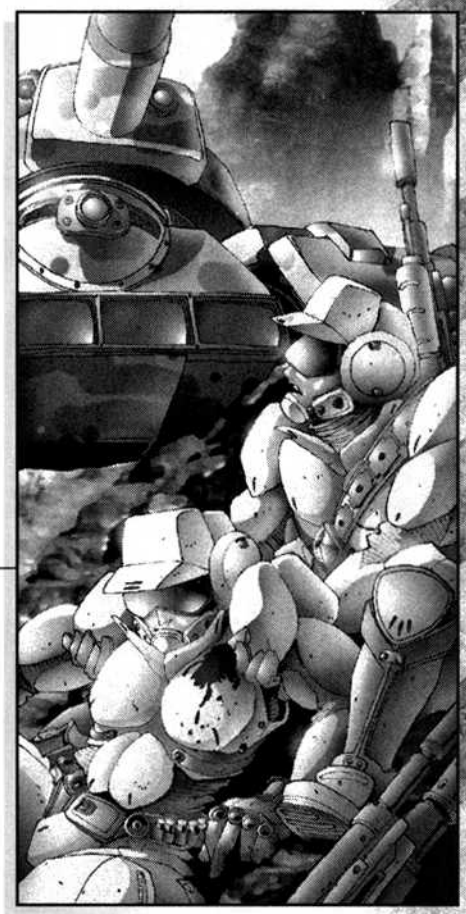
If characters receive damage that surpasses their Instant Death score, they are immediately dead. These injuries are beyond the help of medical science (e.g. head blown off, skull crushed, cut in half), and characters cannot be recovered.

Trauma and Resuscitation ◆

Characters begins to die of trauma as soon as their injury action penalty is greater than or equal to their System Shock rating. Characters can be resuscitated by modern medical techniques if they are reached soon after "death." The time between apparent death and irrevocable death is equal to twice the characters' System Shock plus the characters' action penalty (remember, it's a negative value) in minutes. If a character's action penalty plus twice his System Shock rating is less than or equal to zero, the trauma is too severe and he dies immediately.

A resuscitation roll is conducted in the same manner as a stabilizing roll for injuries. Due to the action penalty, it is very difficult to resuscitate a dying person unless one's character is a well-trained medic. If the roll succeeds, the victim is resuscitated and the medic gets one chance to stabilize one of the victim's injuries. If the roll is failed, the victim will die after the time limit is expired. If the roll is Fumbled, the victim dies immediately.

If, after resuscitation and injury stabilization, the action penalty from the victim's non-stabilized wounds in now below the victim's System Shock rating, the victim will live as long as he receives constant medical attention and his wound has not reopened (destabilized). If the action penalty of the victim's non-stabilized wounds is still greater than the victim's System Shock rating, the victim will once again begin to go into shock and "die." The time until death is reset and the medic must once again resuscitate the victim and attempt to stabilize an injury. This process continues until the victim dies or enough of his injuries are stabilized to allow him to live.



❒ Trauma Example

Example 1:	***Rex had a Health of +1. This gave him a System Shock rating of 6. A new Flesh Wound brought his action penalty down to -6. Rex begins to die due to trauma. He can be saved if a medic arrives within (6 x 2 - 6 =) 6 minutes.***
Example 2:	***Fortunately, Jed arrives a minute later. He has five minutes to attempt to resuscitate Rex. Jed, an experienced medic, has Skill level 3 and rolls a 7. Rex's injuries reduce this to 1 (still enough to save him). Jed must now stabilize at least one injury to bring the action penalty above -6. Jed attempts to stabilize Rex's Deep Wound. He rolls an 8 (reduced to a 2), and succeeds. Jed has just barely saved Rex's life.***

Recovery from Injuries - 6.2.16

Only one wound heals at a time. Flesh Wounds heal before Deep Wounds do. The resuscitation resting period (see *With Constant Medical Aid*, next page) occurs before Flesh Wounds begin to heal. Comatose individuals heal normally. The rate of healing depends upon the availability of modern medical facilities. Constant medical aid requires a properly staffed medical facility such as a hospital or a M.A.S.H. (field hospital).

Without Constant Medical Aid ◆

If only minimal care is applied to the wound, such as a splint or bandage, the body is essentially left to heal by itself. Flesh Wounds take one week to heal. Deep Wounds take four weeks and inflict a long-term penalty of -1 to physical actions until the wounded person can get proper rehabilitation treatments. Both types of wounds will cause pain for several weeks after recovery. Resuscitated people and those in long comas (over a week) will die without medical aid.

◆ With Constant Medical Aid



Flesh Wounds take three days to heal. Deep Wounds take two weeks to heal. Resuscitated individuals must spend one week recovering before their injuries begin to heal. Comatose individuals can survive on life support indefinitely (until they die of old age, that is). These time scales assume that the hospital is fully equipped with healing drugs, rehabilitation facilities and well-trained personnel.

Recovery Example

Example 1:	***Rex is now resting in a hospital. He spends the first week in intensive care recovering from his harrowing near-death ordeal. Thereafter, he begins to heal. His four Flesh Wounds heal at a rate of one per three days. Once they have healed, his Deep Wound heals after two more weeks. So after (7 + (4 x 3) + 14 =) 33 days in hospital, Rex is pronounced healthy and is released from the medical facility.***
Example 2:	***Nate, our old man, can't afford to stay in a hospital and heals up at home thanks to a makeshift splint. It takes four weeks for him to heal from his Deep Wound (a broken arm) and he suffers a -1 penalty to all physical actions until he can get into a rehabilitation program.***

6.2.17 - Permanent Injuries



Anytime a character suffers a Deep Wound, he may experience permanent effects. Once a character begins to recover from wounds, he must make a roll using a number of dice equal to the number of Deep Wounds he has. From this roll is subtracted his Health trait. If the die result is greater than six, permanent injuries occur. One roll is made on the permanent injuries table per point over six on the roll. If the recovery is done in a well-equipped hospital, this rule can be disregarded due to the excellent medical technology of the 62nd century.

Permanent Injuries

Die Roll	Attribute Lost
1	Agility reduced by 1
2	Appearance reduced by 1
3	Fitness reduced by 1
4	Fitness reduced by 1
5	Limb maimed beyond use
6	Neurological Damage/Crippling Damage (roll on second table)

Neurological Damage

Die Roll	Attribute Lost
1	Creativity reduced by 1
2	Influence reduced by 1
3	Knowledge reduced by 1
4	Perception reduced by 1
5	Willpower reduced by 1
6	Complete (1-2) or partial (3-6) paralysis

Permanent Injury Example

Example:	***After four weeks of healing, Nate rolls for permanent injury. He rolls one die and gets a 5, which becomes a 7 once his -2 HEA is subtracted. He must roll for one permanent injury and rolls 3: his FIT drops by 1. Poor Nate just can't exert himself as he used to.***

HAZARDS - 6.3

Combat is far from being the only threat that characters face. This section examines some of the more common hazards of life. The rules introduced here are intended to spice up the game. Gamemasters should feel free to disregard them, however, if they feel their use would slow down play too much, or if detailed effects are simply not needed.

Drugs and Toxins - 6.3.1

Drugs and toxins are rated with three Attributes: their Potency, Effect and Onset Time. The Potency of a toxin is the Threshold number of the victim's Health test to resist the drug's effects entirely. The Effects are the symptoms that a character who fails to resist the toxin will exhibit. The Onset Time is the longest period the toxin will require to take effect. The actual time until the effect of the toxin occurs is equal to the Onset Time divided by the Margin of Failure of the victim's Health test. For example, Joe rolled a 5 when trying to resist a Potency 8 toxin. If the poison has an Onset Time of 30 minutes, it will take (30 ÷ 3 =) 10 minutes to affect Joe. Fumbled Health tests produce an Onset Time equal to one-tenth the normal value.

Analgesics ◆

Analgesic drugs numb pain. For every point of the Margin of Failure of the victim's Health test to resist the effects of the drug, one point of action penalty can be ignored. This effect decreases by one per hour until it is gone. A Fumbled Health test indicates that the analgesic failed to help reduce the pain.

If the Margin of Failure while using an analgesic is greater than twice the character's System Shock, the character goes into a coma for a number of days equal to the roll of one die.

Euphorics ◆

Euphorics induce a feeling of well-being and contentment. Euphorics produce identical game effects to hallucinogen, but they are vastly different in roleplaying terms. A hallucinating character perceives non-existing experiences while a euphoric character is simply very, very happy. Too happy, in fact, to concentrate on anything, hence the action penalty or incapacitation.

Fatal Toxins ◆

Fatal toxins induce damage and often death if their Potency is high enough. A fatal toxin does a number of points of damage equal to its Potency times the Margin of Failure of the victim's Health test. Fatal toxins usually range between Potency 7 to 20 and often have Onset Times that are under one minute. Injuries induced by fatal toxins represent diffuse tissue damaged by these chemicals. Fumbled Health tests are automatically fatal — Emergency Dice (see page 115) would be well spent here.

Hallucinogens ◆

Hallucinogenic toxins cause a victim to suffer altered perceptions which are often accompanied by altered emotional states. In terms of game mechanics, their effects are similar to sedatives except that the action penalties incurred are due to distorted perceptions and beliefs, not tranquilization and sedation. Hallucinogens also tend to be harder to overdose on. A Health test failed by 5 to 14 points will cause the victim to be incapacitated by massive hallucinogenic experiences (trips) for a duration similar to the unconsciousness induced by sedatives. A Health test failed by 15 of more points will induce an effect like a fatal toxin. The damage inflicted is equal to the hallucinogen's Potency minus ten, multiplied by the amount the Health test is failed by ((Potency - 10) x MoF). A Fumbled Health roll has the same effect as a Health test failed by 14 points.

Sedatives ◆

Tranquilizers normally induce drowsiness and unconsciousness. Anyone whose Margin of Failure is between 1 and 4 will suffer a negative action modifier (equal to the MoF) similar to the action penalty induced by injuries. The modifier will decrease by one per hour until it is gone. This modifier does not count in determining death by trauma, wound degeneration or stabilizing injuries, but it does affect Health rolls for knock-outs.

A character whose Margin of Failure is between 5 to 9 will be knocked unconscious for a number of minutes equal to the Potency of the tranquilizer times the amount the roll was failed by. Once he awakens, he then suffers the same effects as a victim who failed the roll by 4 points (i.e. the action penalty of -4). A character who fails his Health test by 10 points or more will overdose and take damage as if he had been affected by a fatal toxin of a Potency five points below the actual Potency of the sedative. The damage inflicted is thus equal to the drug's Potency minus five and the total is multiplied by the actual amount the roll failed by ((Potency - 5) x MoF). A character who Fumbled his Health test overdoses and immediately falls unconscious. Treat as if the MoF was equal to 9.

Stimulants

Stimulants cause a feeling of excitation and anxiety. Most combat drugs are classified as stimulants. Anyone whose Margin of Failure is between 1 and 4 will gain a bonus to initiative equal to the Margin of Failure. The modifier will decrease by one per hour until it is gone. In addition, the character will have difficulty falling asleep.

A character whose Margin of Failure is between 5 to 9 will gain a bonus to initiative equal to ten minus the Margin of Failure. The modifier will increase by one per hour until it reaches 5, after which it will decrease at a rate on one per hour until it is gone. In addition, the character will find falling asleep nearly impossible until the drug's effects have worn off.

A character who fails his Health test by 10 points or more will overdose and take damage as if he had been affected by a fatal toxin of a Potency five points below the actual Potency of the stimulant. The damage inflicted is thus equal to the stimulant's Potency minus five and the total is multiplied by the actual amount the roll failed by ((Potency - 5) x MoF).

Multiple Effects

Many drugs have multiple effects. Such drugs have a single Potency rating and Onset Time and only one Health test is made when they are used on an individual. The effects of each drug type are applied to the user according the Margin of Failure of the Health test. In the case of an overdose of a drug with multiple effects, the victim can take damage several times (once from each appropriate effect).

Multiple Doses



The rules above assume that the victim was given a single dose of toxin. For each extra dose, add 10% to the Potency of the toxin (round off for each extra dose). Multiple doses also increase the speed with which a drug or toxin takes effect. Divide the Onset Time by the number of doses administered, to get the final Onset Time. The effects of all the doses should then be resolved with a single ActionTest using the adjusted Potency and Onset Time (and unchanged Effects).

Sample Drug: Alcohol

Potency:	**1 to 6, depending on brand**
Effects:	**sedative/euphoric/analgesic**
Onset Time:	**15 minutes**

Sample Drug: PCP

Potency:	**12**
Effects:	**hallucinogen/sedative**
Onset Time:	**30 minutes**

Sample Toxin: Curare

Potency:	**15**
Effects:	**Fatal**
Onset Time:	**3 combat rounds (15 seconds)**

Drug and Toxin Examples

Example 1:	***Wendy's character has just been bitten by a white-backed viper, one of the deadly venomous snakes on Terra Nova. The viper's venom is a fatal toxin with Potency 15 and an Onset Time of 10 seconds. Wendy rolls a Health test and fails by a Margin of 9. She will suffer (15 x 9 =) 135 points of damage, easily enough to cause instant death. Hope she's got the antidote handy.***
Example 2:	***On a dare, Gil knocks back a triple shot of wounder rotgut (three doses of alcohol), making the Potency (6 + 10% + 10% =) 8 and the onset time (15 + 3 =) 5 minutes. Gil rolls a 3 on his HEA roll, for a MoF of 5. For a minute nothing happens, then Gil gets a goofy smile on his face (euphoric and analgesic effects) and promptly falls unconscious (sedative effects).***

Disease - 6.3.2

Diseases and illnesses are rated by Contagiousness, Onset Time, Virulence, and Effect. The Contagiousness of an illness is the Threshold number of a Health test that must be rolled when the character comes into contact with it. This roll can be modified by the GM to represent good or poor hygienic conditions (usually between -3 and +3). A successful roll means that the character does not contract the illness. A failed roll indicates that the character contracts the illness. The Margin of Failure is added to the illness' Virulence for that character. A Fumbled Contagiousness roll results in the character contracting the illness at double the normal Virulence.

The Onset Time of an illness is similar to that of a toxin. The Onset Time represents the longest incubation period for the illness. The actual time until the disease takes effect is equal to the Onset Time divided by the Margin of Failure of the contagion Health test. Fumbled contagion tests produce an Onset Time equal to one tenth the normal value.

Once a character contracts an illness and the Onset Time has expired, he must make a second standard Health test against a Threshold equal to the illness' Virulence rating. Keep in mind that the Virulence rating is augmented by the Margin of Failure of the contagion test (double for Fumbles). A successful Health test indicates that the character rides out the illness with minimal effects. A failed Health test indicates dangerous complications. A Fumbled Health test can be fatal (Gamemaster's discretion). Each illness' description should document the effects of all three results.



Sample Illness: Terranovan Influenza

Contagion:	**9**
Method of Contagion:	**Airborne; enters via respiratory tract**
Onset Time:	**one week**
Virulence:	**9**

Influenza Effects

Successful or tied Health test: The victim suffers from minor sniffles and discomfort, but is otherwise spared. These symptoms will lasts for 4 - MoS days, but cause no game penalties.

Margin of Failure of 1 to 4: coughing, congestion, aches for one day times the Margin of Failure with action penalty equal to Margin of Failure; reduces by one per day.

Margin of Failure of 5 to 8: incapacitated due to symptoms for number of days equal to Margin of Failure minus four. Afterwards, treat as if the character had just obtained a Margin of Failure of 4.

Margin of Failure of 9+, or Fumble: life-threatening fever for number of days equal to Margin of Failure minus eight (or 7 days for a Fumble). Without proper medical attention, the character has a 1 in 6 chance of dying every day of the fever. Without any attention at all, the character has a 2 in 6 chance of dying every day of the fever. The character is incapacitated while the fever lasts. Once the fever breaks, the character suffers the effects of the flu as if he had failed by a Margin of 8.

Falls - 6.3.3

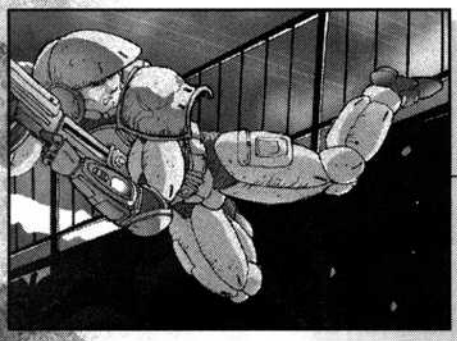
Whenever a character falls from a great height, it is likely that he will either suffer severe wounds or die. A character who suffers an uncontrollable fall must roll a number of dice equal to the number of meters fallen (maximum of 10 dice) and multiply the result by the number of meters fallen (up to a maximum of x30). This is the damage taken by the individual. If the falling person was purposefully dropped in a manner that would cause him to impact head first, add 10 to the die roll.

Softening Impact

A conscious person who is falling may attempt to soften his impact. To do so, the character must roll an Athletics Skill roll. The number rolled is subtracted from the number of meters fallen for the purpose of damage calculations. Thus, if the number rolled is equal to or greater than the actual number of meters fallen, the person falling is unharmed. If the roll Fumbles, the person falls head first and takes the extra damage associated with this type of fall.

Note that skilled characters who also use Emergency Dice during falls can create some spectacular effects, such as surviving 10 meter falls unscathed. Gamemasters running especially gritty games may want to limit Emergency Die spending to two EDs in the case of falls to minimize this, but of course this increases the chances of a PC being killed by nothing more dramatic than poor footing.

◆ Impact Surfaces



Base falling damage assumes a moderately solid surface, such as grassy soil. Unusually hard surfaces such as concrete and asphalt can double the effective number of meters fallen for damage purposes. Unusually soft surfaces such as sand and water can halve the effective number of meters fallen for damage purposes. Special crash pads and nets used by firemen for evacuating buildings can divide the number of meters fallen for damage purposes by up to ten to twenty times.

Fall Example

Example:	***Fred falls off a fourth story balcony (about 10 meters). The GM rolls ten dice and obtains an 8. Fred takes (8 x 10 =) 80 points of damage from the fall, probably enough to kill him. Splat!***

6.3.4 - Fire

Fire is one of the most powerful and destructive elements in nature. A fire is rated by an Intensity rating which combines both its size and temperature. The following is a list of sample Intensities for fires. In the case of flame weapons, use the Damage Multiplier as the Intensity (remember to multiply by 10 for vehicle-scale weapons).

Fire Intensity

Intensity	Source of Flame
1	candle, lighter, or match
2	gas light, oil lamp, kindling
3	torch, gas range
5	campfire, Bunsen burner, flare, acetylene torch
7	bonfire, napalm, incendiary grenade
10	inferno, chemical fire
20	periphery of nuclear strike*, fuel-air grenade
100	near a nuclear strike*, reactor meltdown*
1000	ground zero of a nuclear strike*

* These are only ratings of heat Intensity from nuclear attacks and do not include the concussive and radiation effects of these terrifying weapons.

◆ Wound Effects



If a character is exposed to a fire for a full combat round, he will receive damage equal to the Intensity rating multiplied by the highest of two dice. If the time of exposure is less than one combat round, halve the Intensity rating (round down) unless the fire is from a flame-based weapon. A Fumbled roll does damage equal to half the Intensity rating.

If a character receives a Deep Wound from a flame-based attack, the character is incapacitated due to searing pain for a number of rounds equal to the throw of one die. During this time, he can do little more than run about randomly or thrash in agony.

Intensity Example

Example:	***Dirk is attacked near a raging bonfire (Intensity 7) and sent sailing through flames, but he lands in safety. Dirk suffers an attack at Intensity (7 ÷ 2 = 3.5, rounded to) 4 because he wasn't in the flames for a full round.***

◆ Adhesive Incendiaries

To make matters worse, some flammable agents like napalm or petroleum fuels tend to coat whatever they strike and burn for extended periods. These agents should be rated with a Burn Duration rating. This value is the number of combat rounds they will continue to burn unless doused prematurely.

Igniting Fires ◆

Another horrible aspect to fire is its capacity to ignite objects, including the characters' clothes and hair. Every item can be assigned a Flammability rating. To see if a flame ignites an object, roll two dice and add the fire's Intensity rating (remember to halve Intensity if exposure is less than a round). If this value equals or surpasses the object's Flammability rating, it will ignite. Fumbled rolls never result in ignition. Check for ignition for every round of exposure.

The GM should assign Intensities to the newly created fires. Light clothes burn at Intensity 4, medium clothes at Intensity 5, heavy clothes at Intensity 6, human hair at Intensity 5, and animal fur at Intensity 6. These items have a Burn Duration equal to their Intensity times the roll of one die if no attempts are made to extinguish the flames.

If attempts are made to extinguish the flames (e.g. rolling on the ground) the fire will be extinguished in a number of rounds equal to the roll of one die. Strong attempts to extinguish the flames (e.g. jumping in water, dousing with fire-retarding foam) will immediately extinguish the fire. The following is a list of sample Flammability ratings.



Flammability Ratings

Flammability	Object Type
1	propane, natural gas, hydrogen gas, methane
3	gasoline
4	paper, pitch, crude oil, light clothing
5	medium clothing
6	heavy clothing, rugs, upholstered furniture, fur
7	dry firewood
9	freshly cut (moist) or treated wood, most plastics, leather
12	magnesium flares
15	fire retardant clothing
50-200	most "non-flammable" objects like steel and concrete

Fire Damage Examples

Example 1:	*Dirk is thrown into a raging bonfire. The bonfire has an Intensity of 7. Two dice are rolled to determine how much damage Dirk suffers. The highest die result is a 5. Dirk takes (5 x 7 =) 35 points of damage this round. This is enough to give Dirk a Deep Wound, causing him to be incapacitated for a few rounds. Dirk is almost certainly doomed to a horrible death.*
Example 2:	*Mek, an unfortunate soldier, is hit by a molotov cocktail (Intensity 6). The two dice rolled for the fire attack only come up with a 3 and cause 18 points of damage, enough for a Flesh Wound. The cocktail's oil is adhesive (Burn Duration 3), however, so it will stick to Mek for another three rounds, attacking each time. Mek better start rolling if he wants to survive.*

Igniting Fires Examples

Example 1:	*Elos tries to ignite some field maps before the enemy overruns his unit. The maps are made of tough polymer and have a Flammability score of 6. Elos is using a match (Intensity 1) to light the maps. He rolls two dice (a result of 4) and adds the match's Intensity, yielding a total of 5. Not enough this round: the maps just blacken and smolder. On the next round he rolls a total of 7 and the maps catch fire.*
Example 2:	*Mek, our burning soldier, rolls to put out the flames and rolls 2 on one die. He has to put up with two more attacks. Because an Intensity 6 fire is burning on him, Mek's clothes (Flammability 5) and hair (Flammability 6) begin to burn as well, unless the GM fumbles the ignition roll.*

6.3.5 - Electricity

Electricity is the most fickle, deadly force available to humans. Its effects on the human body are unpredictable. People can die from 110 volt household current, but at least one man has been struck by lightning seven times and lived to tell the tale. Like fires, electrical sources are rated by Intensities. In general Player Characters will be exposed to electricity coming either from industrial use (power supplies, batteries, power lines) or from lightning. There are electrical weapons in use on Terra Nova, however, ranging from non-lethal tasers to massive vehicle-scale haywire whips.

Electrical Intensities

Intensity	Electrical Source
1	licking a 9 volt battery
3	car battery
5	110 volt domestic current
7	220 volt domestic current
10	local power lines, industrial lines
20	power mains
25	minor lightning strike
50	large lightning discharges
100	hydroelectric dam generator

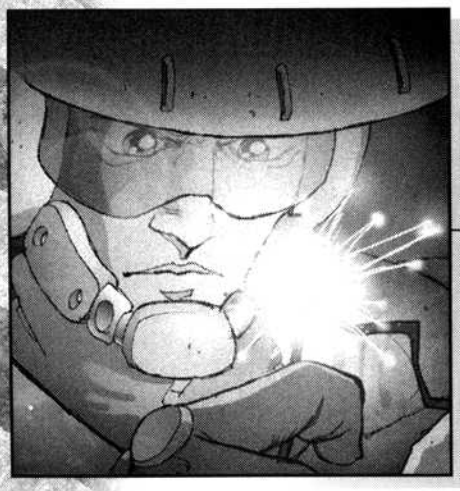
◆ Wound Effects

If a character is exposed to electricity for a full combat round, he or she will receive damage equal to the Intensity rating multiplied by the result of a die. Use two dice if the campaign style is extremely realistic. If the time of exposure is less than one combat round, halve the Intensity rating (round down) unless the shock is from an electricity-based weapon (e.g. a taser or particle beam). A Fumbled roll does no damage.

Electricity not only inflicts raw physical damage, it also mangles a victim's nervous system. Any character who receives a Flesh Wound due to electrical damage (from an electrical source or an electrical fire) suffers neuromuscular paralysis: the character's muscles clench up and the body slips into violent seizures. This effect prevents people from letting go of electrical fences and live wires. The paralysis will continue until the source of the electrical shock is removed. Any character who receives a Deep Wound due to electrical damage also suffers from neuromuscular paralysis and has a chance of suffering a heart attack and general organ failure.

The character must pass a Health test where the Threshold is the electrical source's Intensity. A successful or tied test indicates no additional effects beyond tissue damage and neuromuscular paralysis. A test failed by 1 to 4 points indicates that the character is automatically knocked unconscious from the shock (in addition to the normal knockout roll). A test failed by 5 or more points causes the character to slip into a coma. Both knockouts and comas are described in the Combat section, page 113. A Fumbled roll results in an instant and grotesque death as the character's neurons fry and he enters cardiac arrest. No resuscitation attempts will revive the character who dies in such a way.

◆ Igniting Fires



Just to make electricity that much more exciting, it can also ignite objects and people. Fortunately, electricity is not as effective as fire in igniting items. It takes prolonged exposure or a good jolt to ignite most objects. To see if an electrical discharge ignites an object, roll for ignition as if a fire of one-fifth (round down) of the discharge's Intensity was being used to ignite it. Remember to reduce the Intensity by another half if the exposure was less than a full combat round. Thus, even a large lightning strike (Intensity 50) ignites as if it were a fire of Intensity (50 ÷ 5 ÷ 2 =) 5. This is still more than enough, however, to start a forest fire in drought conditions.

Electricity Wound Effect Example

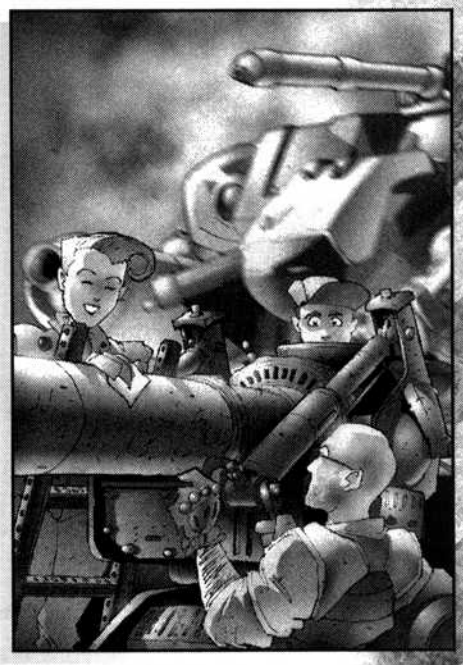
Example : ***Joel touches a highly electrified fence (Intensity 15). He rolls one die to see how much damage he takes and rolls a 2. Joel suffers (15 x 2 =) 30 points of damage. Since Joel has Stamina 25, he suffers a Deep Wound from the experience. This means that Joel will suffer neuromuscular paralysis and not be able to remove his hand from the fence. In addition, Joel must make a Health test to avoid falling unconscious or comatose.***

CHARACTER IMPROVEMENT - 6.4

One of the more blatant rewards of roleplaying is character improvement. As they learn new Skills and abilities and grow through the trials they face in their lives, the characters' Attributes and other characteristics will rise accordingly. They will also learn new tricks and become more cunning, helping them to get out of trouble more easily. Simply put, experienced adventurers are better than greenhorns. In the Silhouette game system, the character's life experience is recorded in the form of abstract Experience Points (XPs).

Earning XPs - 6.4.1

Experience Points are awarded by the Gamemaster at the end of each playing session. His decision is final. Some Players also like to judge each other's performances and give additional "audience merit points," but this requires a high degree of objectivity to avoid self-congratulatory excesses. In general, no more than five XPs should be awarded for each session. Some Gamemasters use the distribution of Experience Points as the stick and carrot to control their Players, but this is generally a bad idea that is likely to cause dissension among the group.



If a Player showed little interest in the game or did not get his character involved in the action, the Gamemaster should award no XPs. A Player who gave a good effort, but did nothing more exceptional than show up for the game is awarded one XP; if the character got really involved, the Player should be awarded two XPs. A Player who always stayed in character and showed genuine enthusiasm is awarded three XPs. Particularly dramatic or daring acts of self-sacrifice should also be rewarded with additional XPs, as should deep sub-plot involvement.

A typical roleplaying session lasts approximately three or four hours. A Gamemaster may wish to reduce or increase the amount of XPs if the session is significantly shorter or longer, respectively.

One option available to Gamemasters when handing out Experience Points is to immediately tie them to special Skills relevant to the recent events in the character's life. For example, if the last roleplaying session saw a character discover a huge set of buried ruins and deciphering an arcane code engraved in these ancient walls, the GM might give 2 XPs in the form of a Social Sciences Skill at level 1. This should be used very sparingly because it takes away some of the Player's choice, but it can be an effective way to encourage logical character evolution. Gamemasters exercising this option should make sure that these imposed Skills end up being useful later on in the campaign and that they fit with the Player's character concept. Otherwise, the Player will surely feel cheated.

Spending XPs - 6.4.2

A character can stockpile XPs if desired, but most Players will wish to spend theirs, either to improve their characters or to press their luck. There are two ways to spend XPs: buying the life-saving Emergency Dice or improving either the characters' Attributes or Skills.

Experienced roleplayers will notice that character abilities progress rather slowly. The reason for this is simple: Skills levels of 3 or more are very powerful. Most of a character's core occupational Skills should be level 2. Secondary occupational Skills and hobby Skills should be level 1. If a character has level 3 in a "hobby" Skill, it is more than a hobby: it is an obsession, or a way of life!

Emergency Dice ◆

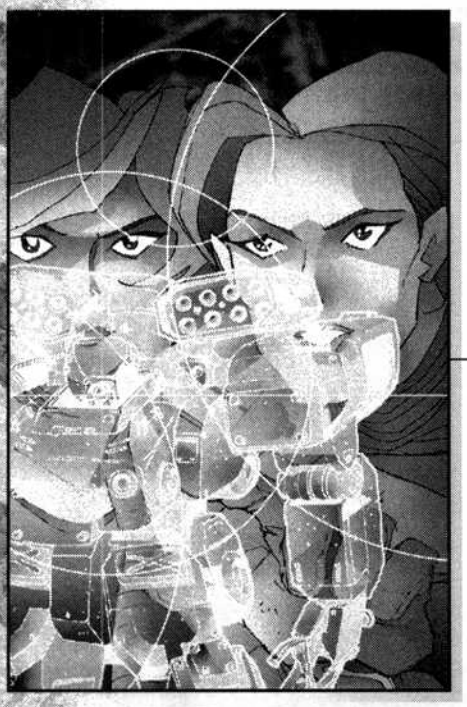
Everyone gets a certain number of lucky breaks in life. To represent these lucky breaks, any or all XPs can be converted to Emergency Dice (ED), which are then spent to boost crucial die rolls. Each XP spent buys one Emergency Die, though Gamemasters can also directly give Emergency Dice to the Players, in addition to the Experience Points. When spent, EDs are added to the dice already available for the roll. Unless the Gamemaster disagrees, up to five Emergency Dice may be spent on any single roll.

Emergency Dice can also be spent to save a character's life when his vehicle is Overkilled. Rather than use the normal ejection procedure outlined on page 148 of this manual, the Player can opt to spend five Emergency Dice and escape automatically with no damage. No roll is involved — just deleted the Emergency Dice from the character's total.

Attribute Improvement ◆

Improving the character's Attributes is possible but very costly in Experience Points to reflect the time and deep commitment required. Raising one Attribute by one point costs 20 XPs. The exception to this rule is the Build (BLD) Attribute, which costs 40 XPs per point of improvement (not to mention the increased grocery bills). An Attribute cannot be increased more than three times in this manner, although multiple Attributes can be increased up to three times each. Beyond the purely rule-oriented issues, the Player should also come up with detailed background information on the process — perhaps his character spends his free nights at the gym or the library.

◆ Skill Improvement



Skills are much easier to improve than Attributes — all that is required is patience and regular practice sessions. The base cost to improve a Simple Skill by one level is the next level squared, in XPs. New Simple Skills cost one XP to gain at level one. Complex Skills cost twice the XPs of Simple Skills (thus a new Complex Skill, purchased at level one, would cost 2 XPs). Skills are improved one level at a time; levels cannot be skipped in order to save XPs. All new Skills must be purchased at level one first; it is recommended that the Player develops a background element of how he acquired the Skill.

Developing this element can be an excellent way to develop subplots and a character background. Someone wishing to learn to pilot a Gear may turn to a Gear pilot PC — creating more interaction within the PC group — or seek out a tutor. This could lead to him joining a rover gang or the army in search of the necessary Skills. GMs should reward Players who provide such convenient plot hooks.

Skill Improvement Costs

Level	Simple	Complex
1	1	2
2	4	8
3	9	18
4	16	32
5	25	50
6	36	72
7	49	98
8	64	128

6.4.3 - Tutors

Tutors can be of great assistance to characters wishing to improve their abilities. Anyone who has a Skill level greater than the Skill level of the character wishing to improve can serve as a tutor. However, only those possessing the Teaching Skill or a high level of Skill will really make a difference. Unless the tutor is another PC, it is likely that the tutor will have to be hired, often for a high fee. The suggested cost for one course is the tutor's Skill level squared, multiplied by 1000 marks/dinars — but finding such a tutor may not always be easy, especially with high level ones. Multiple students may split the costs between them, though the maximum number of students taught in one session normally go down as the level of the Skill learned goes up.

A tutor can reduce the XP cost of learning or improving a Skill. A character can attempt to find a tutor and spend a period of time learning under his guidance. The period of time is a number of half-seasons equal to the XP cost of learning the Skill minus either the level of the tutor's Teaching Skill or half the taught Skill (whichever is highest). A minimum of one week is required for the student to gain any benefits from the tutor's teaching. There are four six-week seasons in a Terranovan cycle (see p.13).

It should be noted that the half-seasons referred to above are 150-hour learning periods (about 50 hours per week). In a boot camp-like environment, two of these 150-hour periods could be squeezed into a single half-season. This sort of environment is highly oppressive — a Willpower or Psyche check against the Skill level being taught should be rolled every three weeks to prevent nervous breakdown. Few individuals willingly choose to undergo training of such intensity. Alternatively, the learning period could be spread over a longer period. A minimum of one hour per week must be maintained to gain any benefit to the character. University courses would typically spread a tutor's teaching into three or six-hour courses every week.

Once the period of tutelage is finished, the tutor makes a Skill roll. This Skill roll uses either the Teaching Skill or the Skill being taught, whichever is highest. This is modified by the Creativity Attribute of the tutor and the Skill-related Attribute of the student. Half of the final modified die roll is the number of XP points that are subtracted from the cost of learning the Skill. If the roll is fumbled, the cost of learning the Skill is doubled due to the confusion induced by the tutor's poor guidance. The cost of learning the Skill cannot be reduced below a minimal XP cost which is equal to the new level of the Skill. One exception to this rule exists: if the original cost of learning the Skill was only one XP (a level 1 simple Skill) and the tutor rolled a six or more on his roll, the student receives the first level Skill at no XP cost.

The effects of a tutor's teaching stay with a student until a) the student gains a new level in the taught Skill or b) a new tutor attempts to teach the student. If the student gets a new tutor, this tutor will have an effect under only two conditions. If he obtains a more beneficial reduction than the previous tutor, apply the new reduction in its place. If the new tutor fumbles, the student's previously reduced cost of improvement is doubled and no further attempts at tutoring will have effect until the student gains a level in the Skill through experience.

OPTIONAL RPG RULES - 6.5

This section covers several advanced rules for the roleplaying game. Although they bring additional complexity, these rules help resolve the special situations that always seem to crop up in a game. The use of any rule in this section is completely optional and all Players must agree to use them before the game starts.

The following are some optional rules that may be used at the Gamemaster's convenience. They are mostly concerning vehicles and their use in a roleplaying context.

Abstract Vehicle Rules - 6.5.1

The game designers hope that Players will enjoy using the tactical rules for vehicle combat. However, some roleplayers dislike tactical games and prefer to avoid them if at all possible. This section offers them an alternative rules system for vehicles. For the most part, abstract vehicles follow much the same rules as characters do.

Movement and Driving Stunts ◆

Each vehicle has its Combat and Top speeds listed in its statistics. Multiply these speeds (in Movement Points) by 10 to get the speeds in meters per roleplaying combat rounds (of 6 seconds).

A vehicle that moved up to its full Combat Speed can accelerate and shift to Top Speed for the next round. The Player should declare this after moving. The vehicle uses the Top Speed modifiers for attack and defense for the rest of the combat round. In subsequent combat rounds, the vehicle may move faster than its Combat Speed, right up to its Top Speed. It may return to Combat Speed after any movement, as long as it is stated after moving. Some vehicles have multiple movement systems, such as walking and rolling. A vehicle may only switch movement types while at Combat Speed, not Top Speed, but at any point along its path. Movement types may be switched only once per combat round, though.

There are so many types of driving and piloting stunts possible we cannot list them all. The Gamemaster should select a Threshold based on the action attempted — a bootlegger turn at 120 kph is a lot harder to do than a U-turn at 10 kph. Whatever the action attempted, the vehicle's Maneuver is applied as a modifier on all Piloting/Driving tests.

Sensors ◆

Active sensors can be used to find something even when visual or passive sensors do not detect anything. To activate sensors (provided the vehicle has any), the Player should make an Electronic Warfare Skill Test, modified by the vehicle's Sensor rating. You should decide on a Threshold based on how well the target is hidden. Add any applicable modifiers (see the table). A success gives the Player the position of the target. Active sensor sweeps require a full action to complete.

Vehicle Scale Weapons ◆

Vehicle scale weapons use a different scale than RPG weapons. To convert vehicle weapons to RPG scale, their Damage Multipliers is multiplied by 10 and their range scores by 50. This conversion, while not entirely accurate — since weapon damage grows exponentially — serves its purpose well enough. For example, if a vehicle fires on a character, the damage is multiplied by ten (so an autocannon with a Damage Multiplier of x8 would have a Damage Multiplier of x80 if used against a character).

Attacking and Defending ◆

Vehicle-based attacks are rolled using the Gunnery Skill. The vehicle's Fire Control and the weapon's Accuracy are applied as modifiers to the attack roll. Vehicle-based attacks automatically suffer a -2 modifier to hit man-sized targets unless their weapons have the Anti-Infantry characteristic. Vehicles may only target opponents that are within their weapons' firing arcs. Vehicles dodge attacks using their appropriate Pilot/Drive Skill. The vehicle's Maneuver rating applies as a modifier to the defense roll.

Damaging Vehicles ◆

The use of the standard damage system from the tactical rules is highly recommended, but the Gamemaster can use the following simplified damage system. Vehicles follow the same general rules as characters. When fired upon, the total damage points are compared to the Armor Thresholds to determine what level of damage occurred. Vehicles are much tougher than people and harder to damage. If a character fires on a vehicle, count its Armor as ten times higher (for example, an Armor 5 counts as 50 versus man-size weapons). The vehicle suffers action penalties, just like a character, when it suffers "Flesh Wounds" or "Deep Wounds" and is destroyed if it suffers an "Instant Kill" result. Vehicles cannot wear Armor, unlike characters, because they are already armor plated. Movement damage applies as for characters (see page 105). Vehicles are disabled if their total action penalties are equal to -5 or worse.

6.5.2 - Integration with the Tactical System

Many roleplayers find an occasional tactical game to be a welcome change of pace. **Heavy Gear** offers roleplayers this opportunity while using the tactical game to further the roleplaying game, since many PCs are Gear pilots or other military specialists. This is done by integrating the roleplaying system and the tactical system.

The integrated system is intended to offer the best of both worlds. While the PCs are not engaged in vehicle combat, the RPG rules apply in their entirety. If and when the PCs engage opponents in vehicle-based combat, set up a tactical battle. The GM controls the opponents, but he doesn't just move them about the battlefield. This is still a roleplaying game, after all: opponents controlled by the GM will make rational decisions about when to attack, negotiate, withdraw or surrender.

◆ Conversion of RPG Scale Weapons and Damage

RPG Damage Multipliers and tactical Damage Multipliers have a 10 to 1 scale. In other words, every 10 points RPG damage are equal to one point of tactical damage. The ranges of RPG scale weapons are in meters. Tactical weapon ranges are given in 50-meter hexes. Thus, RPG weapon ranges are divided by 50 to yield their range in tactical scale hexes (round to the nearest whole number).

◆ Hidden Units

One of the advantages of having a Gamemaster control one side in a battle is that enemy units can truly remain hidden until they are spotted visually or picked up by a unit's sensors. A unit is hidden from the Players' view (i.e. not placed on the mapboard) if it is not in the line-of-sight of one of the Players and has not been detected with active sensors, or taken an action that revealed its position. Similarly, Player Characters can hide from opponents. The Players should not remove their counters from the mapboard. Instead, the GM should make opponents react logically if they cannot detect the PCs (e.g. the enemy might walk into an ambush).

◆ Ambushes

If a hidden unit (see above) is not detected and an enemy unit strays into range of its weapons, the concealed unit may attempt an ambush. The ambushed unit rolls a Leadership roll against a Threshold of 6. If it succeeds, combat begins as usual, with the ambush winning the first round of initiative. If the roll fails, the defendersare taken off guard and get penalized -2 on all defensive rolls for the first round. If the roll fumbles, the defenders are caught completely off guard and their defense rolls are equal to 0 for the first round.

◆ Characters as Drivers, Pilots and Infantry

When a character pilots or drives a vehicle, his Pilot/Drive (depending on the vehicle type), Gunnery and EW Skills are used. The character's Attributes are applied normally to his Skill rolls. Enemy NPCs may also have Attributes added to their Skill rolls.

The generic infantry Skill is the average Skill level in the following Skills: Combat Sense, Dodge, Hand-to-Hand, Melee, Small Arms and Tactics. Apply AGI as its Attribute modifier. GMs are encouraged to let individual PCs act independently from their squads or to have them lead infantry squads. Also, the Gamemaster should skip the PCs when marking down the damage on the tracks until there are no NPCs left to kill. This option may be ignored, but it ensures that the campaign is not entirely ruined by the wholesale slaughter of Player Characters unfortunate enough to be assigned to infantry duty. The generic technician Skill is the average level in the following Skills: Computer, Electronics, Mechanics and Tinker. Apply KNO as its Attribute modifier.

The above conversions are best used for NPCs. Gamemasters should encourage their Players to roleplay even tactical situations. For example, instead of using the generic Technician Skill to repair MP loss, the GM should describe the Gear's leg damage to the Player and let him describe how his character fixes it.

◆ Tactical/RPG Crew Injuries

When playing combined tactical/roleplaying scenarios, the wounds suffered by the crew may be transferred from the tactical to the roleplaying and vice-versa. Due to the additional level of detail (and thus complexity) involved, this method should be for PCs only.

Whenever a vehicle takes a Light Damage "Crew" result, each crewmember must make a Health roll versus a Threshold equal to 4. If the roll is failed, the crewmember lapses into unconsciousness and he is not counted when determining how many actions can be spent.If the vehicle receives a Heavy Damage "Crew" result, each crewmember must make a Health roll versus the Margin of Success of the attack. If failed by 1 or 2 points, the crewmember takes one Flesh wound; if failed by 3 or more, he takes a Deep Wound. All crewmembers must also test for consciousness, just as for Light Damage.

Overkilling a vehicle generally means some messy damage to the crew compartment, even if it is not the part being hit. Each crewmember must roll for ejection, even if not actually ejecting (see *Ejection*, page 148). Because this can be quite costly in Player Characters' lives, the Gamemaster is advised to let them walk away from one Overkill per game session but restrain from giving the PCs any XPs at the end of the session ("the price of their lives").

CREATURES - 6.6

The following rules are used for all kinds of non-sentient animal and animated vegetal creatures. In other words, any intelligent being is either a PC or a NPC, while semi- or non-intelligent beings are considered "creatures."

Even though a sharp distinction is made between creatures and intelligent species, the two are similar in actual game statistics: creatures have primary Attributes and Secondary Traits, as well as Skills, natural weapons and armor. In addition to these characteristics, a creature's description will often give clues as to its usual reactions in stressful situations, as well as other important facts.

Creating Creatures - 6.6.1

Creatures have game statistics similar in many aspects to those of Characters with a few exceptions: they have only six Attributes; they have no Armed damage rating; they have no equipment (such as armor and weapons), but many of them they do have natural weapons and armor.

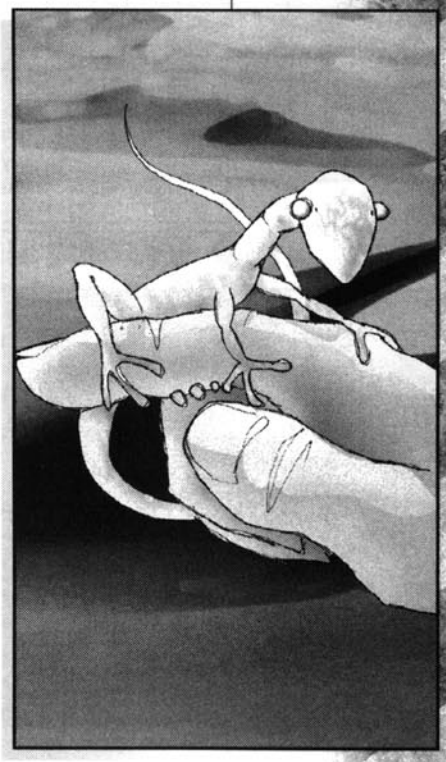
Attributes

Non-sentient creatures have six Attributes: Agility (AGI), Build (BLD), Fitness (FIT), Instinct (INS), Perception (PER) and Willpower (WIL). All Attributes save for Instinct are identical to those used for PCs and NPCs. Build may vary more widely than with humans; the table below gives mass equivalents for very low or very high BLD stats. Most other stats fall within the normal range (from -3 to +3) with a few exceptional animals going higher or lower.

Instinct (INS) is used to describe the creature's natural ability to sense and avoid danger, to find ways to get enough food, and other logistical efforts related to the survival of the individual and its species. It gives an indication of how "smart" the creature is, and how easily it can manage to survive in its environment. Creatures with high Instinct scores (the greater majority falls in the -3 to +1 range) are hard to catch, and will be able to figure out clever ways of escaping predators, as well as catching or finding food. Resourceful animals have very high Instinct scores. Whenever an animal faces a situation where it must use its wits, it makes an Instinct roll against a Threshold related to the difficulty of the task. Most simple tasks have Thresholds of 3 to 5. Tasks which involve the use of a tool — such as using a stick to make out-of-reach fruits fall from a tree — have difficulties of at least 7 (if not 8 or 9), and require the creature to have manipulator appendages or other ways of manipulating the tool.

Expanded Build/Mass Equivalencies

Build	Mass
-10	less than 0.01 kg (10g)
-9	0.01 to 0.1 kg
-8	0.1 to 1 kg
-7	1-4.9 kg
-6	5-9.9 kg
-5	10-24.9 kg
-4	25-39.9 kg
-3	40-49.9 kg
-2	50-59.9 kg
-1	60-69.9 kg
0	70-79.9 kg
+1	80-94.9 kg
+2	95-114.9 kg
+3	115-139.9 kg
+4	140-179.9 kg
+5	180-249.9 kg
+6	250-399.9 kg
+7	400-599.9 kg
+8	600-999.9 kg
+9	1 to 2.9 tons
+10	3 to 4.9 tons
+11	5 to 9.9 tons
+12	10 to 19.9 tons
+13	20 to 34.9 tons



Secondary Traits

Creatures have almost exactly the same Secondary Traits as PCs and NPCs: Strength (STR), Health (HEA), Stamina (STA) and Unarmed Damage (UD). Since non-sentient creatures almost never use tools, they have not been given an Armed Damage (AD) rating.

The Secondary Traits are calculated in the same ways as for characters, except that Health is obtained by adding together Fitness, Willpower and Instinct (instead of FIT, WIL and PSY) and dividing the total by three, rounding to the naerest integer. Unarmed Damage is the sum of STR, BLD, HTH Skill Level and the damage ratings of the creature's natural weapons (if any). The minimum rating for Unarmed Damage is 1. Stamina still has a minimum value of 10. Damage Thresholds and System Shock rating are determined in the same way as for PCs and NPCs (see page 56).

Skills

While, technically speaking, acquiring specific Skills is something closely associated with intelligent races, most creatures possess natural abilities (for combat or survival) that closely resemble Silhouette character Skills. Many creatures — predators in particular — have the Combat Sense and Hand-to-Hand Skills, as well as a few other useful ones such as Camouflage, Stealth, etc. Here are remarks on the most common ones:

Combat Sense: All animals but the dumbest of domesticated herbivores will have at least one level of Combat Sense, if only to notice and flee from potential enemies.

Hand-to-Hand: This Skill, which could alternatively be called "Tooth and Claw" when dealing with animals, is possessed by nearly all creatures, save perhaps for the shyest of farm animals — but even then, any cornered, wounded animal represents a potential (if minimal) danger to others. Note that non-sentient creature will never use the Hand-to-Hand Skill to parry an attack, even those with high Skill levels; they use the Dodge Skill instead.

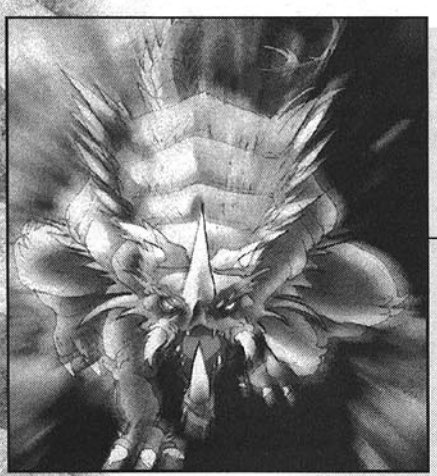
Dodge: Animals use this Skill to defend against attacks. Predators commonly have Skill levels of one; they don't need to defend against attacks very often, and therefore do not have very high Skill levels. Prey animals, on the other hand, fall into two broad categories: those who flee and those who freeze. Creatures who flee have Dodge Skill levels of 2 or (rarely) 3. Animals who freeze (usually creatures with high rates of reproduction) have Skill level 0. Creatures with very low BLD scores get a +1 bonus to their Dodge roll for every point of BLD under -5. Large creatures get a -1 to their Dodge roll for every point of BLD over +6.

Other Skills: Particular animals have other Skills relevant to their nature. Cats and squirrels, for example, might get a level or two in Acrobatics; many predators will have the Stealth Skill. Water creatures swim naturally, but a few land animals are excellent swimmers and get a level or two in Swimming. Athletics (especially jumping and climbing), Survival (for desert creatures) and Camouflage (for animals that hide their lair or their young) are also common animal Skills. Instinct replaces Knowledge or Creativity whenever Skills call for these Attributes.

Movement Ratings

This refers to the creature main means of movement. It can be calculated using the following formula: 25 + (5 times the sum of FIT, AGI, BLD and Athletics Skill, if any), with a minimum of 1. This gives the Running speed; for walking, divide by three. Special movement, such as flying, will be indicated when applicable.

Natural Weapons and Armor



The most common of all natural weapon is the bite. Other attack forms include claws, tusks and hooves. Trample attacks are calculated with a Damage Multiplier equal to twice the animal's BLD Attribute or base Unarmed Damage, whichever is higher. Many types of animals also use deadly, analgesic or paralyzing toxins to immobilize their prey of attack without being sensed. These toxins should be given statistics like all other drugs.

Most animals have no natural armor. Tougher or plated animals have "Armor" ratings that represent their hides and are used just like normal armor (added to Wound Thresholds).

Natural Weapon Example

Example : ***Kris has the misfortune of having irritated a wild barnabus iguana in the Western Desert. The angry beast does not want to eat this annoying human, just swat him. The barnaby rolls 2 dice (modified by AGI -2) for Hand-to-Hand for a total of 3. Kris's Dodge total is 2, for a MoS of 1. The barnaby's UD is 14 and its tail-lash damage is x10. Poor Kris suffers (1 x (14 + 10) =) 24 points of damage. Kris will stay away from barnabies from now on.***

Swarms - 6.6.2

Very small creatures, such as insects and miniature species of Terranovan animals, cannot be adequately described using the same system as other animals: they are simply too small. It would be useless (and a bit ridiculous) to fill out a record sheet for every mosquito or redjacket the characters encounter. But while these animals are relatively harmless as themselves, some can be very deadly when grouped in swarms or colonies. The following rules are used whenever the characters are confronted by swarms of colonial critters.

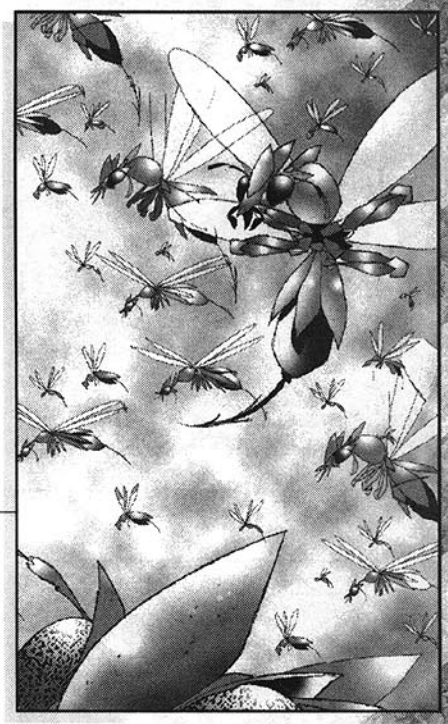
The rules use the two terms "swarm" and "horde," which are not synonymous. A swarm represents the basic unit out of which hordes are made. For example, a large horde could be made out of a dozen swarms. For the characters, the distinction is rather meaningless: all they need to know is that a very large number of critters is coming their way.

Characteristics

Swarms of small creatures have the following statistics: Aggressiveness, Damage/Turn, Damage Threshold, Random Horde Size and Basic Swarm Size. These determine how much damage the swarm will do each turn, as well as how much damage it will take to disperse the swarm.

A swarm's Aggresiveness is a measure of how aggressive each little insect is, and therefore how combative the swarm is as a whole. The Attribute gives the number of dice rolled — the usual way — for the swarm's attack, every combat round (effectively, the Aggressiveness is the combat Skill of the swarm). The result of the roll is multiplied by the Damage/Turn rating to obtain total damage. This total damage is divided evenly among all those that are inside the swarm, then check for wounds or death the usual way. The attack cannot be dodged or parried. Sealed armor will protect against all damage if it covers the entire body, otherwise it protects with its normal rating. Non-sealed armor protects with only half of its value for three rounds; it is useless after that.

Sometimes a swarm of creatures is particularly big, and is called a horde. If the Gamemaster opts for a horde instead of a simple swarm, he must roll as many dice as specified by the Random Horde Size rating, adding the results together. The total is the number of swarms in the horde. No more than three swarms can attack any given human-sized target during the same round; their damages are added, then divided up among the victim(s). The Basic Swarm Size gives the average number of individual insects in each swarm.



Swarm Attack Example

Example : ***Jimmy and Lester are attacked by a swarm of angry redjackets (Aggressiveness: 3, Damage/Turn: x4). The GM rolls three dice for the swarm's attack: he gets a 7, multiplied by the Damage/Turn rating (x4) for a total damage of 28. The damage is then split evenly between the two victims (round down), which gives a damage total of 14 for each.***

Fighting Swarms

Although swarms are by definition very hard to kill, they can be driven off by specific amounts of damage. Fire, electricity and poison gas are the best ways to disperse most swarms, and count full damage against them. Concussion, Hand-to-Hand and Melee attacks do only half their normal damage, and firearms do only one quarter. To disperse a swarm, the attack must cause more than the swarm's Damage Threshold. A horde needs to be dispersed swarm by swarm, except if a single attack does more damage (using the restrictions above) than the Damage Threshold multiplied by the number of swarms. In such cases, the whole horde will disperse.

Swarms of Common Terranovan Creatures

Species	Aggressiveness	Damage/turn	Damage Threshold	Random Horde Size	Basic Swarm Size
Army Skags (Jungle)	2	x2	15	6d6	500
Army Skags (Badlands)	3	x2	20	5d6	500
Redjackets	3	x4	25	2d6	15
Crabflies	2	x3	20	2d6	2
Flappers	0	x2	10	5d6	30
Teethpickers	1	x4	30	1d6	3

BARNABY (BARNABUS IGUANA)



A slow hunter of hoppers and skags, these omnivorous two-ton lizards have become common beasts of burden among savannah tribes and ranchers. Their inherent toughness and strength have made them ideal for plow work in those areas where technology is too scarce to be fully reliable. They are somewhat stubborn and very difficult to train, but inexpensive and sturdy. Many homesteaders keep a few barnabies around as a backup to their farming machinery in case it breaks down. Barnabies are not particularly aggressive beasts, but some city-states such as Javari (in the Eastern Sun Emirates) drug them and use them for corridas where they pit three our four of them against one toreador. Some Badlands city-states also like to have barnabies fight one another to the death, awarding prizes that can go up to 10,000 Peace River dollars to the owner of the winning specimen. Barnaby meat is relatively inexpensive, but not particularly tasty.

Attributes

AGI	-2	BLD	8	FIT	1	INS	0	PER	0
WIL	2	STR	4	HEA	1	STA	70	UD	14*

* + natural weapons

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Combat Sense	1	-2	Dodge	1	-2	Hand-to-Hand	2	-2			

Special Abilities

Bite (x10 damage), Tail-lash (x8 damage), Thick Skin (+15 armor)

DAWG



The dawg is a native species that has become a large part of rural life in the planet's savannahs, plains and valleys, along with related species like the great dawg and prairie jackal. They have powerful limbs that allow them to outrun most other plain creatures. Dawgs also have very sharp senses, and their unique eyes are reminiscent of an insectile arrangement. Roughly forward facing, they allow for excellent depth perception while incorporating a 230° field of vision. Olfactory glands are located on the animal's large tongue, and the creature often flicks it while hunting.

Dawgs can be trained to act as guard animals, although to say they can be domesticated is something of an exaggeration. Even the most well-bred dawgs are aggressive and must be handled with care. Some police forces use trained dawgs to sniff out narcotics, explosives or fugitives.

Attributes

AGI	2	BLD	-3	FIT	3	INS	2	PER	3
WIL	1	STR	0	HEA	2	STA	15	UD	3*

* + natural weapons

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Combat Sense	2	3	Dodge	2	2	Hand to Hand	3	2	Notice (tracking1		3
Camouflage	2	2									

Special Abilities

Bite (x8 damage), Sprint (60 m/round, maximum 3 rounds duration)

HUNTER VINES

A desert plant that lives just below the upper layer of sand, hunter vines can sense pressure and lash out when a large animal (or human) walks over them. They constrict around their prey and small tube-like thorns puncture their skin. The animal's own thrashing pumps blood into the vine. Once the skin of the victim has been punctured (constriction attack), it automatically suffers one Flesh Wound for each round of struggling. Only a successful Survival roll against a Threshold of 6 can prevent panic and allow escape. Characters without the Survival skill can make a Willpower roll instead, provided the affected character knows about the hunter vines' peculiar feeding mechanism. A rare version of the hunter vine has additional thorns that are linked to a small gland that secretes and actually injects a powerful neural stimulant into the victim's bloodstream. The trapped creature is sent into convulsions that help the vines pump more blood. Against this type, the Survival Threshold is 8.



Attributes

AGI	1	BLD	0	FIT	4	INS	n/a	PER	3
WIL	n/a	STR	2	HEA	1	STA	30	UD	8*

* + natural weapons

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Camouflage	3	0	Hand-to-Hand	3	1						

Special Abilities

Constriction Thorns (x8 damage), Blood Drain (automatic Flesh Wound, see text above)

RIDING SPRINGER

The result of a dedicated breeding efforts over the centuries, the riding springer is a leaner and stronger cousin of the herding springer. Ranchers, savannah and tribesmen often ride this creature. Instead of having the cumbersome side leg and less flexible hip structure of the herding springer, the riding springer has legs that go almost straight down the body, helping it to better support the weight of its body and a rider, and making it a far better runner. Riding springers are also more docile and easier to control. Not only have they been trained from birth to obey humans, but their genetic makeup has been slightly altered so that they are less aggressive.

Riding springers are harnessed with a small saddle that fits just behind the dorsal cartilage plates. The rider's legs are thus partly protected by its mount. The rest of the harness is very similar to the one used for an Earth horse, and is often decorated and worked with delicate care.



Attributes

AGI	1	BLD	7	FIT	1	INS	1	PER	0
WIL	1	STR	4	HEA	1	STA	65	US	12*

* + natural weapons

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	2	1	Combat Sense	2	1	Hand-to-Hand	1	1	Survival	1	1

Special Abilities

Kick (x9 damage)

Materials and Structures - 2.1

Research constantly develops new and useful materials. Most of the work is centered on finding new ways to improve the qualities of the existing alloys and composites while simplifying the manufacturing processes involved in their creation, in an attempt to meet the high demand. Few Terranovan items and vehicles use unmodified natural materials in their design.

Construction materials are generally divided into four broad categories: metals, ceramics, polymers and composites; and three main physical states: solid, liquid and gaseous. However, with the advancement of metallurgy and other material technologies throughout the centuries, the distinction between these categories has blurred somewhat. For convenience and ease of reference, they will be retained for this text.

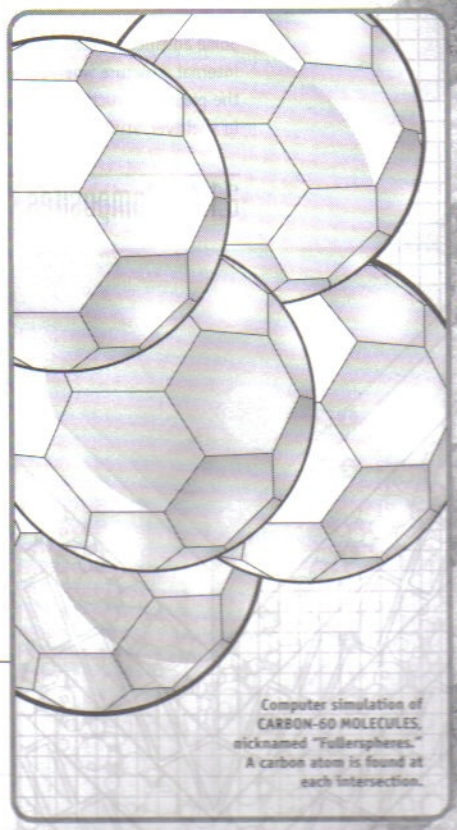
Metal Alloys - 2.1.1

For simplicity, any metallic material composed of a mix of two or more different elements is now called a metal alloy, regardless of its contents. Alloys have the remarkable property of being more than the sum of their constituent parts; for example, iron and carbon are brittle, but steel is fairly ductile. Each element brings different properties to the alloy.

Iron was one of the greatest discoveries of all time, but it was not until the iron/carbon alloy commonly known as steel appeared that this metal became vital to Man's industrial society. Since then, steel — the generic name for an alloy whose main component is iron — has been one of the most widely used construction materials. 62nd-century steels are composed of a multitude of metals, each mix tailored for maximum performance for a specific use. The internal frame of many Heavy Gears is made out of Flexite, a steel alloy that is both tough and flexible (see text below).

The twentieth and twenty-first centuries were the first to see the advent of new kinds of metal alloys made possible by the zero-g conditions of the space stations. Metals that would not normally mix well suddenly seemed more cooperative, creating materials of incredible strength. Further research in the centuries that followed showed that proper manufacturing techniques could yield similar results without the expense of sending the material into space and bringing it back. New molecular-level shaping techniques, using a combination of heat treatments, magnetic field generators and particle beams, can force completely new crystal structures into existence.

Metal alloys are commonly used in the 62nd century for all sorts of engineering functions. They are known for their high tensile strength, electrical conductivity, ductility and isotropic properties. Rare metals are used in alloys for specific purposes. Iridium, vanadium, beryllium and other such metals are often found in the resilient alloys required by military technology.



Computer simulation of CARBON-60 MOLECULES, nicknamed "Fullerspheres." A carbon atom is found at each intersection.

Flexite ◆

Flexite is a steel alloy created by advanced molecular forming techniques. Unlike standard steel, Flexite's carbon content consists partially of Fullersphere-type molecules that impart additional strength and greatly stabilize the alloy. Flexite also contains several other metals, such as iridium and vanadium, in minute quantities to improve its resistance to corrosion and surface abrasion.

Ceramics - 2.1.2

These crystalline materials were originally thought unsuitable for load-bearing functions since they were too fragile and brittle. With the discovery of new manufacturing techniques in the early centuries of the third millennium, ceramics, now stronger, saw use in a variety of items.

Most ceramics have the advantage of being extremely resistant to high temperatures. For this reason, many modern armor materials include layers of ceramic. Some armor types are specifically intermixed with ceramic compounds to be even more resistant to energy-based weapons such as shaped-charge warheads and laser beams.

Ceramics are used in internal combustion engines and other high-heat applications. They also see wide use as shielding and heatsinks for fusion reactors and spaceship hulls, particularly those equipped for atmospheric re-entry. Special ceramic coatings and glazings can also be manufactured to improve the durability of spaceships.

Natural ceramic materials, such as several varieties of rock, are also used extensively on Terra Nova. In the early centuries of colonization, most of the buildings were made out of the local variety of rock — limestone, granite or quartz — because it was cheap, available in large quantities and easy to work with. With proper care and a thin external polymer coating, rock also proved to be a fairly durable material, and many buildings are still standing after centuries.

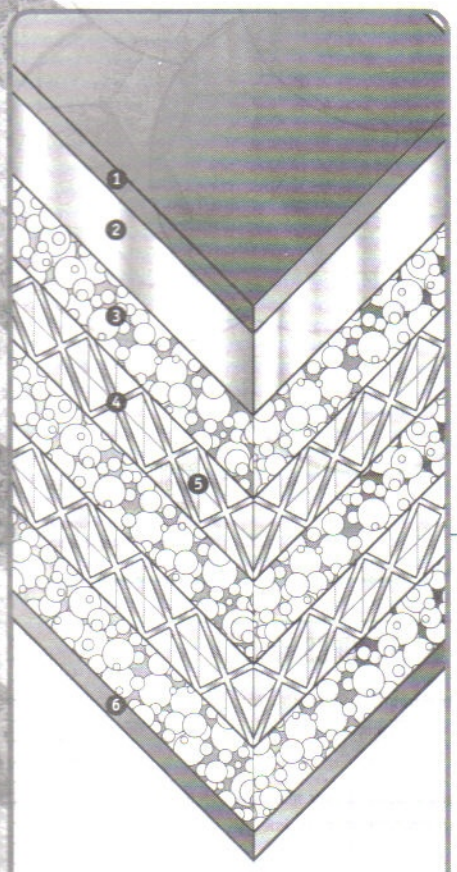
2.1.3 - Polymers

Polymers are long strings of organic molecules artificially attached to one another. This structure yields a wide variety of possible material qualities. Polymers can be molded, extruded, shaped, machined, etc. They are generally light and adaptable and are used in many everyday items. Polymers are also used in the weapons industry for light gun casings and missile outer shells. An extremely tough ballistic plastic called Armoplast is used in several kinds of laminated armor, especially the personal "turtleshell" armor worn by front-line infantry. Ceramics and polymers are often used as a matrix for composite materials because they are easy to shape and contribute properties which complement those of the metallic alloys which most often constitute the fibers (see Composites, below).

Most polymers are created from strings of carbon molecules secured together through various industrial process. Compounds are added during synthesis to give the resulting material specific properties. In addition, special chemicals are used to plug "holes" in the chemical structure of the polymer, considerably improving its strength and heat resistance. A polymer material can often be designed to fit a specific job or application, though there are limits: few polymers can resist extreme work conditions, such as very high or low temperatures or mechanical stress.

Some advanced molecular-shaping techniques can produce memory plastics, polymers whose molecules can rearrange their position and internal structure when placed under certain conditions (heat, pressure, etc.) and transform into shapes that are "programmed" within the plastic's structure. These bizarre shape-changing materials are used in very specialized functions since they are somewhat limited in their versatility and structural strength.

2.1.4 - Composites



1- Upper surface glazing
2- Ceramic layer
3- Polymer foam buffer zone
4- Flexite fiber network
5- Armoplast II matrix
6- Anti-spalling polymer

Composites, as their name indicates, are a combination of two or more different materials. Most often, this means a fibrous material encased in a matrix of some sort, the fibres providing tensile strength and the matrix providing structural integrity to the whole. Wood is a typical natural composite, a structure of cellulose fibers in a lignite matrix. Ferrocrete, a ceramic compound reinforced with metallic fibers, is another example of composite.

Composites are widely used in the 62nd century because they can be designed for almost any load and/or use. Any combination of materials — plastic, resin, ceramic or metal — may constitute a composite. Often, more than one type of fiber is used for additional strength or properties. The fibers are aligned within the composite during manufacturing, providing increased structural strength only in the desired direction(s). This allows the designers to reduce the amount of material required, greatly reducing the overall weight of the part. For that reason, composites are widely used in the vehicle industry, particularly in aerospace manufacturing procedures.

Composites are custom designed for specific applications, creating materials with the perfect balance of strength, durability and weight. Unfortunately, composites are more expensive to prepare and much harder to repair since the damage, if any, is usually deep within the composite structure. Stress-induced core delamination, where micro-layers become separated within the material, is one such problem. In these cases, complete replacement of the affected piece is recommended.

Durasheet Armor ◆

Durasheet is a flexible but tough composite that is used in a wide variety of applications. The fiber networks used in its construction are composed of Flexite and one or two other alloys, depending on the grade and intended use of the Durasheet variant. The matrix is made of Armoplast II-D, a more supple grade of the well-known ballistic plastic. The finished Durasheet is about one millimeter thick and can be worked to almost any shape. It is highly resistant to tears and punctures.

Several such sheets are necessary to create a plate of armor; often, layers of ceramic and foamed polymer are added in between for additional heat resistance and durability. The top layer, barely half a millimeter thick, is made of an anti-corrosive metal alloy or a ceramic glazing. These layers are resin-bonded together according to the required armor panel shape. Generally, a thin ballistic polymer sheet is placed behind the armor plate to absorb any spalling or fragments that may splinter off.

Whenever an attack strikes the plate, the outer layer shatters or vaporizes to absorb part of the energy. The next layer, always a rigid ceramic, shatters or tumbles the projectiles, forcing them to lose more energy. The polymer foam buffer then catches any debris or slows down kinetic penetrators by deforming instead of yielding. It is also the main line of defense against energy weaponry, vaporizing to diffuse the beam and absorbing fast particles cascading from the impact. The Durasheet then stops and absorbs the rest of the attack. Several alternating layers of foam and Durasheet can be used for increased protection, though this increases the cost, weight and bulk of the plate.

Fasteners - 2.1.5

"Fastener" is the name given to any material or object(s) that hold(s) a given structure together. Early examples of fasteners include knotted ropes, wood nails and tree resin. As the level of technology rose, fasteners kept pace: metal nails, screws, glues, etc. 62nd-century engineering makes use of these and several others, somewhat more advanced tools. For example, many vehicles have systems that are literally welded at the molecular level by advanced resin compounds.

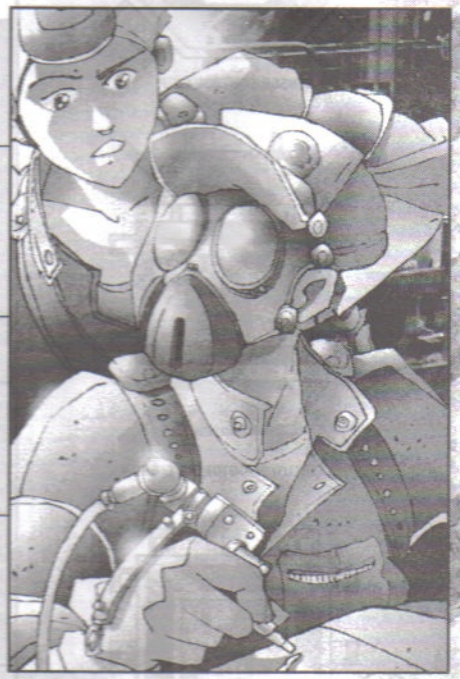
Smart Glues

The development of polymers and composites has given rise to a whole line of structural glues that not only bond two surfaces, but also serve as a proper load-bearing path. Most modern glues are rapid-forming composite types, usually epoxy-like resins with specialized filler. The proportions are mixed at the factory, or in the workshop, to vary the glue's properties according to the task at hand. These so-called "smart glues" are used extensively in armor and aerospace construction as well as electronic assemblies.

Smart glues are one of the most useful tools available to the technician faced with the prospect of jury-rigging a damaged mechanism. Their variable properties allow different make-shift repairs to be made with a single container of glue. Here are four of the most common combinations possible with the chemicals contained in a standard glue pack:

Rapid-forming mix

This mix halves the required repair time, but the technician must use extreme caution in choosing where to place the glue to make sure the repair will hold. If he makes a mistake and mis-evaluates the tensions and mechanical requirements of the break, the glue bond will let go under stress and the previously repaired damage will return.



Slow-forming mix

This is the mode used for normal repair. The mix can be colored using special dyes to make the repair disappear (or stand out, if required) and can incorporate reinforcing fibers for a stronger bond. Depending on the thickness of the glue coating, this mix sets in about one to six hours.

Foam mode

Under the action of a special catalyst, the glue becomes a foamed polymer material, with the size of the air bubbles depending on the catalyst used. This foam can be used for tasks such as plugging holes, supporting loose equipment and wiring, etc. The foam is not sturdy enough to act in a true structural capacity, nor can it be used to patch up damaged armor plating.

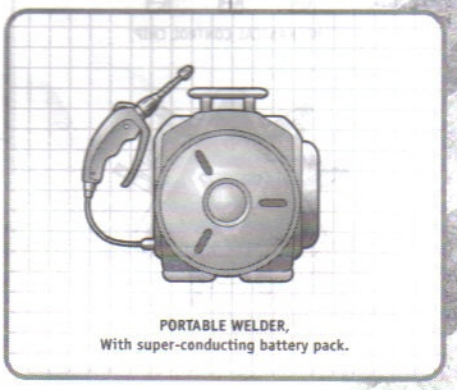
Conductor mode

With the proper catalyst/impurity mixed in, this smart glue combination hardens into a solid paste that can conduct electricity. Depending on the "doping" procedure used, the paste can serve as makeshift wiring or even low-grade capacitors or resistors. The conductor mode is far from efficient, but it does the job.

Welding

Welding is often used where parts made of similar metals or alloys have to be joined. Due to the typically high melting point of modern metallic materials, however, new methods of welding, involving tools with a higher energy output, are required. Portable and semi-portable kits for flash and plasma welding, called simply "welders," can now be found in most well-equipped workshops. These can often reach temperatures of up to 10,000° Celsius for short periods of time, sometimes more (depending on the tool and the facilities). The bulk of the equipment and the short range of the torch makes for a poor weapon, however.

Most welders can act both as high-powered cutters and as standard welding torches. Some bulky low-technology models still rely on the oxidation reaction of two gases, but more modern devices use a plasma arc instead and are electrically powered from one or more rechargeable superconducting loops. Power packs using standard hydrogen fuel cell generators are also available. The entire power pack assembly is housed in a rugged high-impact casing designed to protect it against rough treatment from hurried technicians.



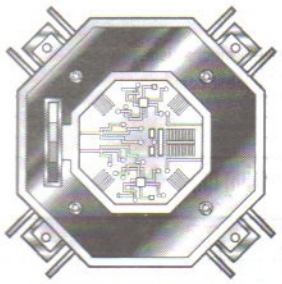
PORTABLE WELDER,
With super-conducting battery pack.

2.2 - Electronics

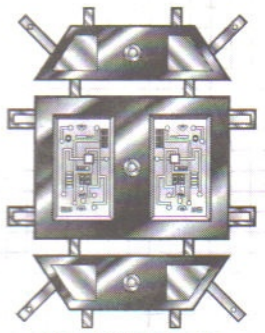
Electronics. For millennia the heart and soul of the machines of Mankind, these complex items are vital to the people of the 62nd century. Circuitry is used in all types of equipment, from the lowly kitchen appliance to the most complex military dropship, and practically all are monitored by a computer of some sort.

The electronic circuitry of the 62nd century can be roughly divided into three main categories: ceramic chips, neural networks and the more advanced optical NNets. All have their advantages and disadvantages, but some are more suited to certain tasks than others.

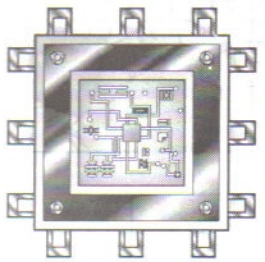
2.2.1 - Ceramic Chips



SENSOR CONTROL CHIP



CIRCUIT MONITORING CHIP



MECHANICAL CONTROL CHIP



FIRE CONTROL CHIP

Silicon chips are the oldest form of computer technology still in use. Actually, "silicon" is a misnomer: this material has not been used for centuries, having been replaced by more advanced ceramic compounds and superconductors that dissipate heat better. Less heat means that more circuits can be placed on a given surface, decreasing the overall size of the chip and improving speed and processing power. However, the old name remains common in popular language; they are also often referred to as "cerachips."

Externally, the computer chips still look like black or colored bits of plastic or ceramic with metal connector pins sticking out. Color coding is widely used in the military, although there is no set standard (which causes many, many problems for technicians working on unfamiliar circuitry). A rough set of universal standards did emerge during the War, though, and many of the newer vehicles carry such color-coded electronics. Shape is also a common indicator of the function of the chip, though not an absolute. The table below lists the most common colors and shapes as well as their associated functions.

Although they are incredibly slow when compared to modern optical NNet systems, silicon chips have the advantage of simplicity, extreme ruggedness and ease of manufacture. Automated micro-factories can turn them out by the handful if fed the correct raw material and given the time to lay out the precise circuitry within.

Cerachips are chiefly used for low-power and low-speed applications such as door controller mechanisms, low-tech appliances and the like. The military uses them in simple but important circuitry such as pump relay controllers, sensor sub-interpreters and many types of system monitoring devices.

CHIP COLOR CODING

Color	Shape	Usual Function
Green	Rectangular, Round	Communication
Blue	Octogonal	Sensors
Red	Triangular	Fire Control
Yellow	Rectangular, Square	Mechanic/Monitoring
Black	Rectangular	Movement

Self-diagnosis

Some advanced chips boast self-diagnosis readouts and can offer limited troubleshooting advice — unfortunately, most often the advice is "this chip is burnt out. Replace as soon as possible."

The presence of a SD readout makes the task of identifying or evaluating the chip much easier and faster. The readout is sometimes faulty, however, and an incorrect evaluation can be provided: a good chip reads as a bad one and vice-versa. A good tech knows when to trust a readout or not.

Customizing Chips

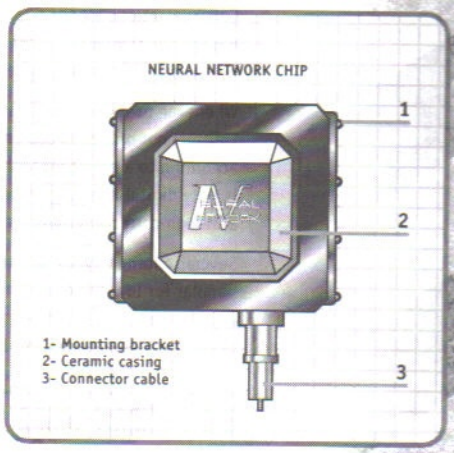
Modern ceramic chips can pack an awful lot of components onto a very small surface. Heat is not a problem since super-conducting links and ceramic compounds are used throughout. As a result, chip manufacturers tend to put more logic gates and other components than called for by the chip's intended function. This does not raise the price of the chip appreciably and enables it to fulfill several possible tasks by simply switching a couple of jumpers inside the casing. Therefore, many techs carry scores of blank, usable chips ready to replace almost anything at a moment's notice.

Neural Networks - 2.2.2

Neural networks were developed back in the beginning of the third millennium and have been the basis for many of the advancements in computer science that followed. Although research started as early as the late twentieth century, no significant improvements were made until the widespread use of cerachips enabled the construction of small, interconnected circuits.

NNets are flexible electronic circuitry, so named because they mimic natural neural pathways. These sophisticated electronic circuits are able to learn from their mistakes and establish new connections within their matrix by both changing their basic programming and by creating new electronic pathways through artificially forced crystal growths. Such changes are monitored and limited by design parameters that are generally implanted at the factory to prevent unwanted variations from the intended functions. These advanced computer chips form the basis of the 62nd-century computer.

NNets resemble regular cerachips except that they tend to be slightly bigger. They also sport a connector on only one side, generally an optic fiber cable leading to a standard jack. All NNets are black, a side effect of the protective coating applied to their exterior, and often boast the NNet symbol: a stylized mechanical brain. NNets tend to be more fragile than regular cerachips. As a result, neural net chips are often mounted on special isolated plates within the machine's electronics bay.

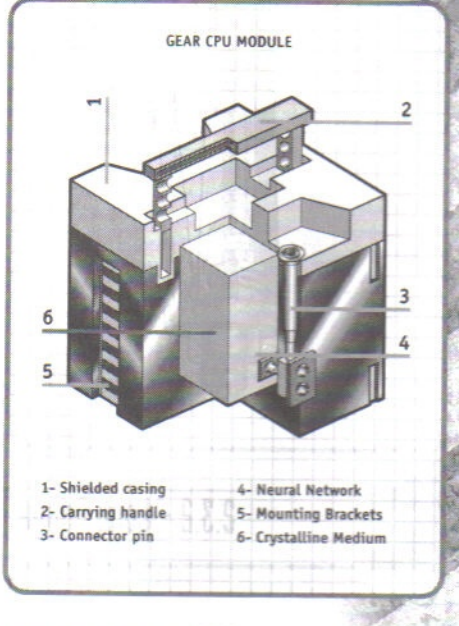


Optical NNets

Optical NNets are used for high speed calculations and other demanding data manipulations. They are similar in principle to basic neural networks, but use the interactions of photons in a transparent composite matrix for data storage and transfer. The size of a circuit can be scaled down to the molecular level, and the operation of such an NNet creates no heat or wear; it must, however, be well shielded against "parasite" photons and energy from outside. All optical NNets are roughly cubic in shape.

The main disadvantages of the optical NNets are their cost and the complexity of their manufacture. The actual act of building them is relatively simple, as the process is mostly automated — but the machines that make NNet chips are fabulously expensive. In addition, the subsequent period of training under the supervision of a human technician requires a considerable investment in time and resources. Optical NNets are becoming easier to manufacture and train as the processes and techniques used to make them are better understood by scientists and technicians. However, ONNets remains costly and rare, and it is unlikely that they will completely replace the rugged silicon chips and ceramic NNets.

Like regular NNets, optical NNets must complete their programming by creating new pathways within themselves. Those found in an ONNet are molecule-thin strands of crystal that can be easily broken by excessive jarring. External "noise" (photons and other particles) can also disrupt the system. For these reasons, all ONNets are well-shielded and encased in shock-proof material. With the development curve of the Optical NNet following that of the Heavy Gear, it is no surprise that this circuitry has grown increasingly complex since the failed Earth invasion. The influx of Caprician and Terran technology, also due to the war, helped solve many problems that had eluded the scientists working on NNets. The latest generation of NNets are capable of surprisingly independent actions, which may lead to true artificial intelligence in the near future — with unforeseeable consequences.



Neural Network Evolution

With the complexity of the self-developing neural network came a surprising phenomenon that experts call Behavioral Mimetism Syndrome, or BMS for short. Neural networks that work with humans for a long time will acquire some of their work-related habits. For example, a computer that is used for processing meteorological information every morning might do so even if its operator is not present, simply because it is used to a "routine." At the very least, it will inquire if it should launch the program.

Not all of these new self-programmed behaviors are useful and/or harmless. Safeguards and limitation routines prevent most complications, but sometimes the results can be most unexpected. A perfect example is the legendary Bowser, a very old Hunter-class Gear that almost has a personality of its own. It has been known to move by itself when threatened and can express simple "opinions," mostly with unsavory gestures learned from the troopers it served alongside. Its whereabouts are unknown at this time.

Just as human children learn how to behave by observing adults, neural nets can learn human mannerisms by observing human behavior. This behavior usually falls into two categories: useful and impolite. Useful mannerisms include limited hand signals (provided the vehicle has hands), fetching its owner, or signaling for help. Impolite mannerisms include obscene hand gestures and other bad manners (like honking the horn in the middle of the night to annoy the neighbors). These quirks are more than compensated for by the Nnet's flexibility and computing power, however. Over a long period of time, neural nets may even learn to act independently, though they remain limited by the restraining routines imprinted on their circuitry.

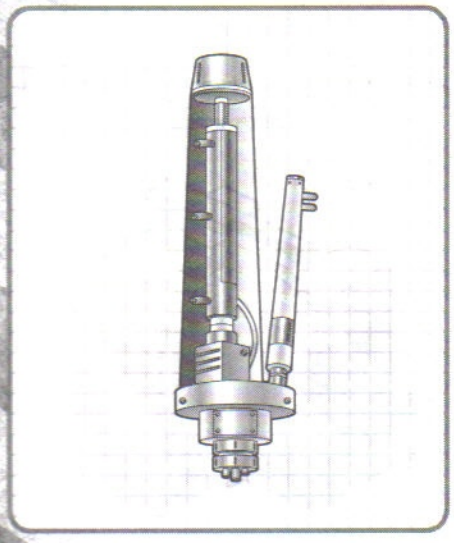
2.3 - Communications

Communications are the 62nd-century officer's nightmare. Messages can be intercepted, scrambled or just fail to reach the receiver. This has created the need for fast and powerful multi-band emitters/receivers capable of punching through the dense electronic fog created by enemy vehicles and drones.

Whenever possible, messages are sent on a microwave tight-beam, line-of-sight pulse to prevent both interception and location. Emitters not only code and compress the pulses to durations of a thousandth of a second, but also automatically vary the frequency used according to a preset algorithm. If there are no hostile units within range, a general, wide pulse message can also be used. The process is fully digital from beginning to end, ensuring crystal-clear reception under normal circumstances. Enemy scramblers can affect this, although correction routines are included in the comm software.

Several antenna types are in use, the exact type installed depending on its intended function and range band . Simple aerials are popular for low-power comm systems, while more sophisticated ones use blade or "flush plate" antennae. Blister and "combination" antennae are, in fact, low-interference pods housing several communication devices, such as directional arrays and comm lasers. Often, more than one antenna will be used by a given comm system.

2.3.1 - Short Range



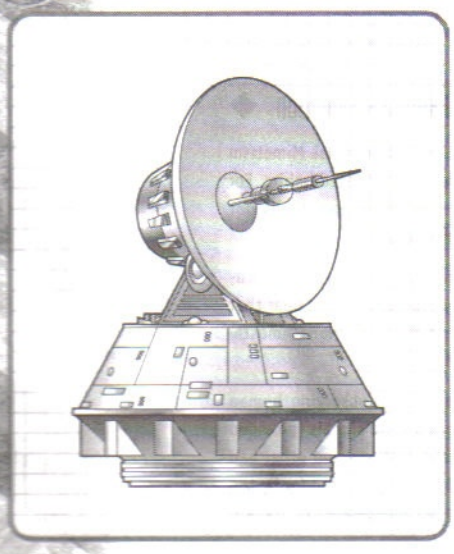
Communication systems are found in most settlements and vehicles nowadays, regardless of whether they are civilian or military in nature. The dangerous half-tamed nature of Terra Nova makes it a necessity to keep in touch with others, to ask for assistance or to help out. Most of these systems are somewhat short-ranged, allowing communications within a radius of a few tens of kilometers at best.

Radio is the most common type of short-wave communication used. The civilian systems are based around simple solid-state elements and are easy to put together and repair. Military systems are more complex, incorporating scramblers and frequency-hopping devices to stay ahead of enemy direction finding, jamming or intercept. They operate on digital pulse codes, sending their data-compressed signal through aerials and virtual phased arrays that can be tuned to a wide range of frequencies and power levels.

Units and settlements may also be connected through cables (either low tech metal wire or the more common optic fiber), allowing clear communication across any type of environment. There are downsides as well, obviously: unless the cable is permanently installed, it may be cut or snag somewhere, and its weight often becomes unmanageable over long distances.

Other systems are possible for short-range communications, such as laser pulses or visual signals. For example, both Gears and infantrymen may contact friendly forces within line of sight by making hand signals that can be "read" by others. Very short burst of laser energy from a rangefinder may also be used, though it requires that the two units be looking exactly at one another to avoid signal leakage.

2.3.2 - Long Range



Long range communications usually occurs between city-states or field headquarters; few combat vehicles in the field need to contact anything beyond the scope of the battle. Those that do bounce their signals off a friendly comsat or orbiting ship, which then relay the data to the destination or yet another relay, avoiding the need for a gigantic comm system.

By its very nature, long range communication requires more power and thus larger emitting and receiving systems: the longer the wave, the longer the range, the larger the antenna. A matrix of emitters in a mast-type structure or a broad category of phased-array systems are used to get around these limitations. Phased array are computer controlled radiation-emitters encased under broad featureless panels. These systems generally require broad flat surfaces, but can also be mounted in strips if continuous surfaces are few. Power and sensibility, and hence range, will be determined by the total number of elements in the array. For longer ranges, though, more powerful systems are needed.

An off-shoot of the Gate Drive sensors, the neutrino interference detector (NID) array is a highly sophisticated communication device that is used for transplanetary and deep space communication. Its neutrino emissions are impossible to block and almost impossible to intercept, but they require sophisticated and bulky detectors that can be mounted only in buildings or on large vehicles such as landships. Communication beams must be sent to a very precise location, or else are undetectable; a vehicle will call its base (which is equipped with a very large detection array, often hundreds of meters on each side) to announce its position, then wait for a two-way link to be established.

Remote Control - 2.3.3

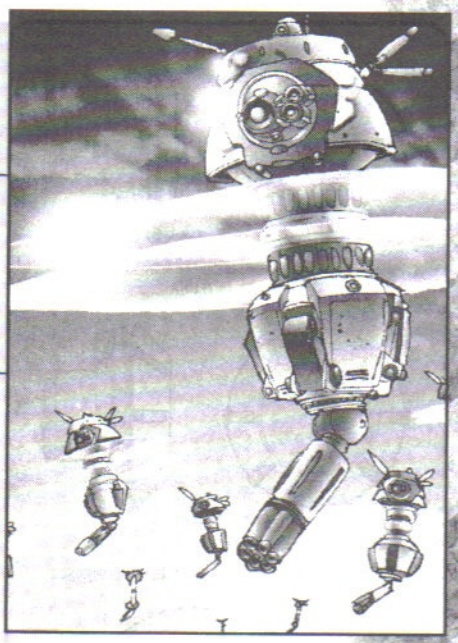
Remote controlled vehicles — also known as "drones" —are very useful in situations where a human life might be needlessly put at risk. Unfortunately, they are neither as responsive nor as flexible as a manned vehicle, which restricts them to simple operations. Almost any vehicle can be equipped for remote control, though it is rarely done except for dedicated drone designs. There are two ways to remotely control a vehicle: radio guidance and wire guidance.

Radio guidance offers the greater range of the two methods, but suffers from two disadvantages. First, there is always a time lag associated with the use of security frequency hopping and signal scrambling procedures, reducing the overall response time of the operator and thus the overall efficiency of the vehicle. These procedures are necessary to prevent hostile forces from taking over the vehicle's controls. Second, the two-way datalink flow can be easily jammed by electronic countermeasure equipment. ECCM can eliminate this, but requires expensive additional equipment.

Wire guidance removes both of these inconveniences, but presents its own particular set of problems. This method uses a fine but resilient optic fiber cable that trails behind the drone. The wire is spooled within a small container carried by the command unit (be it a vehicle, base or infantryman). This command cable can get snagged in obstacles or be cut, resulting in the loss of control of the drone unit. See the rules for remote control on page 17 of this manual.

Recon Drones

Reconnaissance is probably the most common mission entrusted to drones. Small and inexpensive drones have been used for ages as communication relays, forward observers and general bait and cannon fodder material. Modern drones often carry a laser designator as well, allowing them to "paint" targets for incoming guided ordinance. Although most recon drones are flyers, ground and submarine drones are also very common.



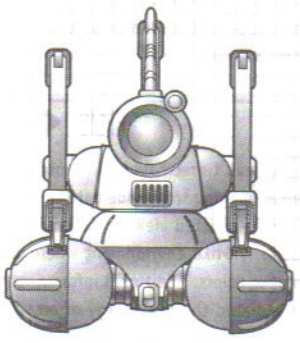
Work Drones

Work drones are part of another common drone category. These remotes are used for tasks too dangerous, hard or simply boring for human beings. For example, drones are used to defuse bombs, handle ammunition, conduct simple maintenance operations and examine hard to reach places and conduits. Work drones are often equipped with specialized equipment relevant to the task at hand.

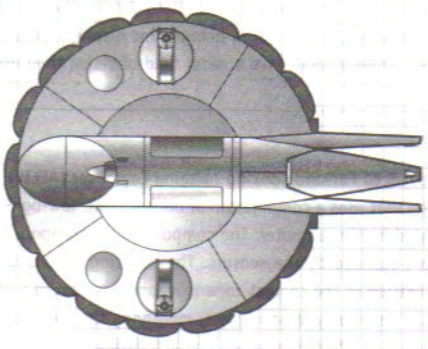
Hunter/Killer Drones

Hunter/Killer drones are dedicated combat vehicles. They are most often used to bear the brunt of the initial attack and help clear the field before the real assault starts. Hunter drones actively seek out enemy units as targets for attack. They often carry a light weapon for use against infantry (their most common target).

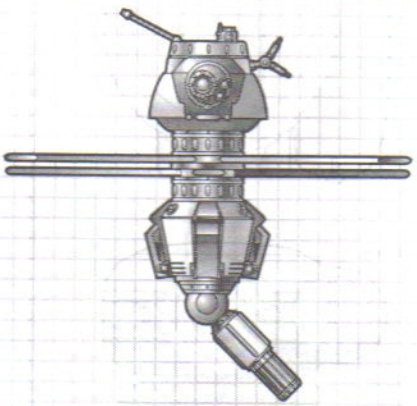
Killer drones are also attack vehicles, but use a different strategy: once they find their target, they detonate the explosives they are carrying. Cruise missiles are one type of killer drone, though they most often operate in autopilot mode.



WORK DRONE



RECON DRONE



HUNTER KILLER

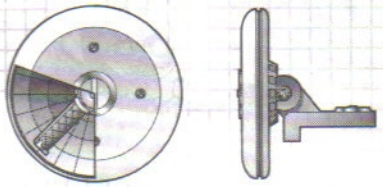
2.4 - Sensors

Sensors are essential to any front-line combat vehicle in the 62nd century. Although most vehicles are served quite well by the classic Mark I Eyeball, the fast-flowing, modern battlefield requires additional and often very sophisticated means to detect an enemy that, over the years, has become quite adept at concealing his location.

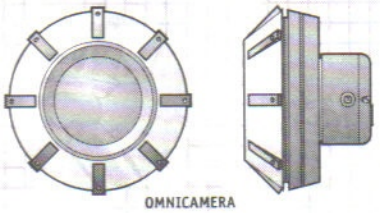
Sensors can be divided into two general categories, passive and active. Passive sensors only collect information from their surroundings. They do not reveal the presence of the unit using them, which is why they are preferred for combat vehicles. Active sensors tend to be both more powerful and accurate, but they must send out some form of energy to function. This energy can be detected by enemy units and used to calculate the approximate position of the emitter, which makes it impossible to hide while actively scanning. The emitted energy can also be used as "guiding rails" by enemy missiles, and so active sensors are used sparingly.

The most basic sensor packages are used to help boost the crew's own senses and contain at least some kind of telescope (such as binoculars) and one rangefinder (mechanical, optical or electronic). Thermo-optical cameras are next in popularity and are installed on many military vehicles to assist in night operations. Dedicated combat vehicles carry additional active sensors in order to acquire targets on the battlefield. Foremost amongst these are the radar and ladar systems, which both offer their own set of advantages and disadvantages (see next page). With improvements in technology, even a small vehicle can carry a powerful radar or ladar system.

2.4.1 - Optical Systems



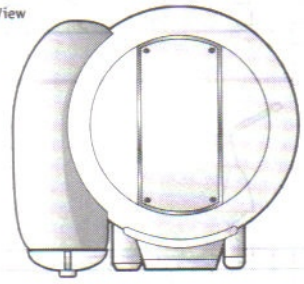
MULTI-ANTENNA



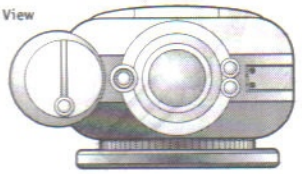
OMNICAMERA

ADVANCED FORWARD LOOKING IMAGING COMPOSER

Top View



Front View



Human beings receive about 90% of their sensory input through their eyes, and vehicle crews are no different. Coupled with high definition displays, digital imaging cameras constitute a major component of many basic sensor packages. Tied in to the vehicle's drive and battle computers, cameras are mounted on gyro-stabilized frames that can follow targets through the most spectacular maneuvers. Being passive in nature (cameras only receive signals, they do not need to emit their own), cameras supply most of the basic environmental data, both for piloting and combat purposes.

Some light amplification and anti-dazzle protection for all optical systems are usually standard, with a few rare exceptions for exceptionally simple cameras. Military issue optical sensors are all shielded against glares, and cameras with low-light capability are common. Limited zoom function is also standard, although the range depends on the quality of the camera, its built-in lenses and the image enhancement software. This can be replaced by a simple telescopic lens assembly to reduce the main processor's workload and increase battlefield survivability, or by a dedicated long range camera.

Dedicated lasers are sometimes added to the optical sensor package for range-finding and depth measurements, although the sensor array is then "active" and thus easier to spot. To avoid this, the above tasks are often fulfilled instead by a pair of small — and passive — stereoscopic cameras. Infrared cameras are generally used only as backup or as a low-cost night-time imaging system because they are easy to fool (with hot smoke or improvised fires, for example). Much preferred is the more modern AFLIC (Advanced Forward Looking Imaging Composer; see text below) system that is mostly used on tanks, striders and aircraft.

Omnicamera ◆

The designation "omnicamera" is used to identify a wide-angle, multi-purpose digital imaging sensor. The omnicamera's main receptor is composed of many smaller optical sensors, each sensitive to a specific portion of the spectrum. Additional lenses placed in front of this assembly allow telescopic and/or microscopic vision. The resulting data is then correlated by a dedicated sub-processor and displayed on flat screens or in holographic displays. Because of their shape and correction software routines, omnicameras have a wider field of vision than other digital cameras.

AFLIC ◆

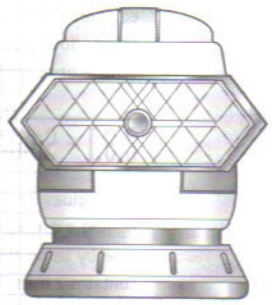
The Advanced Forward Looking Imaging Composer (AFLIC) system is a small turret-contained sensor package that uses a combination of normal light, low-light and thermal imaging to provide data to a dedicated battle computer. The computer then extrapolates a constantly-updated view of the environment scanned by the sensors. The resulting output is a composite, VR-like environment where every feature of the combat zone is mapped and tagged with the proper colors. Additional information can be displayed on request, modifying the view according to radiated thermal energy or any other heat or reflectivity-based characteristics.

Radiation-based Systems - 2.4.2

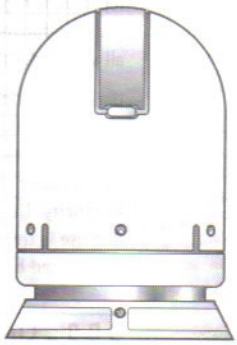
The ubiquitous radar still remains as popular as ever, although it is now often used in semi-passive, pulse-emitting mode to reduce the chance of alerting enemy forces. The bulk of a modern radar system is filled with sorting and discriminating circuitry used to cut through the electronic fog generated over the modern battlefield by all those active sensor, communication and ECM devices. All radar except the most basic models includes Track-While-Scan (TWS) capability and variable sweep width, along with "intelligent" pulse-scanning procedures for increasing area coverage.

Other long range detectors work on a similar principle, but use different wave-lengths. The ladar and madar are two such systems, one using low-intensity laser beams to scan while the other relies on microwaves. Ladars and madars are primarily used on spaceships and are standard equipment on all Gateships, though ladars are also used by many ground and air vehicles.

Radiation detectors such as Geiger counters are sometimes mounted as part of a mission-specific sensor package, especially on spaceships and prospecting vehicles. An even more specialized radiation detector is the Neutrino Interaction Detector (NID), an advanced high-energy sensor designed to detect and measure neutrino emissions. It is used by Gateships as part of their Gate-calibration gear and by battleships to detect the fusion engines of enemy vessels.



LADAR EMITTER



RADAR DOME

Radar

Modern radars (short for RAdio Detecting And Ranging) generally have emitting and receiving arrays integrated into the skin of the vehicle, giving them greater coverage and allowing them to track in synthetic aperture mode (in effect, creating a "virtual antenna" many times the size of the vehicle). Smaller directional radomes (such as the one pictured here) are also used for precision work, though they lose in power.

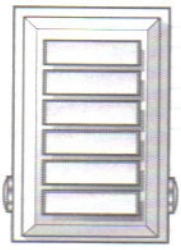
Ladar

Ladars (also known as lidars) use laser beams instead of radio waves. Specialized emitters can shape the beam into sensor arrays of varying width, power and frequency, while optic guides allow a greater area coverage. Although ladars are affected by atmospheric conditions such as dust and smoke, they are more precise than radars, if somewhat shorter-ranged.

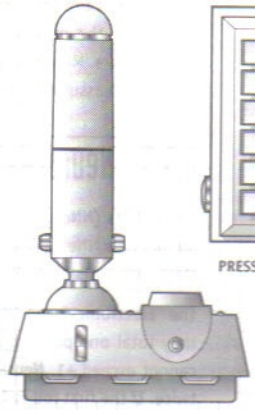
Specialized Systems - 2.4.3

Other sensor systems are used for some very specific purposes, such as the environmental feedback required by the drive computer of walker vehicles. Accelerometers are one such system. When used in conjunction with the simpler electro-mechanical position sensors in the various joints, they provide a wealth of information to the CPU. Motion and vibration sensors are also used to monitor the terrain being crossed for any excessive displacement or disruption.

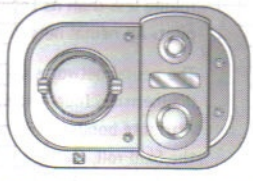
Densitometer and magnetometers (Magnetic Anomaly Detector, or MAD) are sometimes part of the on-board sensor equipment. Both systems are especially useful for detecting concentrations of metal ore in the ground, and so are frequently found on prospecting vehicles. More rarely used is the sonar, however. The lack of surface water on Terra Nova has reduced interest in this "sound radar", as its performance can be easily impaired by random noise in an atmospheric environment.



PRESSURE DETECTOR



MAGNETIC ANOMALY DETECTOR (MAD)



Pressure Sensors

Pressure sensors are used mostly on manipulator devices and in the legs of walker vehicles. They provide feedback to the drive computer to ensure that operating limits are not exceeded. Pressure sensors are also used on tanks and other heavy vehicles, helping them navigate treacherous ground.

Geological Sensors

The Magnetic Anomaly Detector, or MAD, detects the minute disturbances in the magnetic field of the planet caused by concentration of metals or monopoles. Since most war vehicles are composed partly of ceramics and polymers, MADs are not very effective combat sensors. Seismic motion detectors use vibrations transmitted through the ground to create an image of any underground resources.

2.5 - Tech-related Rules

The following section contains all the rules related to the technology described in this chapter. Additional cross-referencing is available both in the Index (page 186) and throughout the text itself. The rules are useful to technician characters working on high tech equipment, but can be applied to any situation where a character is dealing with a piece of hardware, regardless of its function or origin. Note that although the rules on NNet learning are intended primarily for Gears, they can be used for any other types of military vehicle or computer equipped with such circuitry, if the Gamemaster so desires.

2.5.1 - Smart Glues

Smart glues were discussed on page 9. They are one of the most useful tools available to the technician faced with the prospect of jury-rigging a damaged mechanism. These glues' variable properties allow different makeshift repairs to be made with a single container of glue by using the Tinker Skill. One smart glue pack (found in most mechanical repair kits) costs 80 marks/dinars, weighs 1 kg and contains 2 uses. The glue components are also available in batches of 2.5 kg (5 uses) or 25 kg (50 uses) for 150 and 1200 marks/dinars, respectively. The larger formats can be used to refill any field mechanical repair kit.

The rapid-forming glue combination halves the time required for mechanical repairs, but the tech must roll against his Tinker Skill every combat turn against a Threshold of 4 to see if the repair holds. If the test is failed or fumbled, the glue bond breaks and the previously repaired damage returns in full. If the vehicle is not submitted to a combat situation after the repair is made, roll every hour instead. The slow-forming mix is the chemical combination used for normal repair work — there is no particular game effect. It is assumed that all standard small repair procedures use this glue combination. The mix can be colored using special dyes.

Under the action of a catalyst, the glue can becomes a rapidly expanding polymer foam. It is resilient but can be cut with an ordinary saw or heavy knife. This foam can be used for numerous jury-rigging tasks. One glue pack is treated as one die's worth of Mechanical Salvage points (see page 150). No more than 5% of the total required Salvage points may be replaced by foamed glue. It is not mechanically strong enough for major structural repair. The glue can also become a malleable, plastic-looking paste that conducts electricity. The paste can serve as make-shift wiring when rolled thin enough, but it is mostly intended to bridge tiny gaps in circuitry. One use is treated as 1 Electronic Salvage point (see page 150). No more than 5% of the total required Electronic Salvage points may be replaced by the glue.

2.5.2 - Electronic Chips

About 1 in 6 chips is equipped for self-diagnosis; if needed, roll one die to determine if the chip has one. The presence of a self-diagnostic readout gives a +1 to any Skill roll for the purpose of identifying the chip or evaluating its condition. However, a Fumble means the readout was faulty and an incorrect evaluation was provided: a good chip reads as a bad one and vice-versa.

Due to their design, chips can easily be customized and reprogrammed to serve in a variety of functions. It takes approximatly five minutes minus the Skill level of the tech per attempt. Roll against the higher or either Electronics or Tinker Skills against a Threshold of 4 to see if the chip can be converted. If the test is failed, the modification is not done, but another test may be rerolled. If the test is Fumbled, the chip cannot be converted. Simple computer chips are freely available on the market for prices varying between 1 to 2d6 marks/dinars. More advanced chips are also available for specialized application, with a correspondingly higher price and rarity. If need be, one can assume that a chip or chip set corresponding to one Electronic Salvage point (see page 150) is worth 1d6x100 marks/dinars.

2.5.3 - Neural Network Evolution

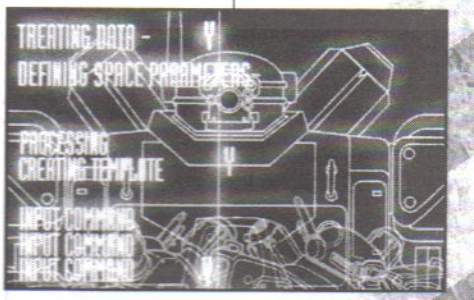
Neural Nets (NNets) can learn and improve themselves. Over time, about 1 in 6 neural nets will start to gain Learning points (roll one die per new NNet in the campaign). Such NNets gain a Learning point after every battle and after every cycle of active duty. All NNets start with 0 Learning Points; when a NNet reaches 10 points, it can exchanges them for a roll on the Neural Net Learning Table.

The "Electronics" and "Body Control" results represent the NNet learning to better use its "body." Quarter points are accumulated until they total one point, but they can be used as tie-breakers. Due to hardware limitations, the NNet bonus in any vehicular Attribute cannot exceed +1. Neural nets start with -10 Creativity and Knowledge Attributes. When "Intelligence Increase" is rolled, roll one die twice. If the first roll is 4 or greater, raise the NNet's Creativity by one point. If the second roll is 4 or greater, raise the NNet's Knowledge by one point. Rolls of less than 4 are ignored. If crew casualties cripple a combat vehicle, the NNet may take over of its own accord by rolling less than its Independence Score on one die. If successful, the NNet operates as a human Rookie (Attributes 0, all Skills level 1) pilot. All neural nets automatically begin with an Independence Score of 0.

The neural networks used in Gears are highly complex. Relocated CPUs lose all vehicular Attribute bonuses, but keep improvement in mannerisms, Independence or mental Attributes. An Electronic Skill roll with a Threshold of 6 will allow the Gear to recover the vehicular Attribute bonus in 1d6 seasons, minus 1 week times the Margin of Success (thus a MoS of 3 will cut three weeks). If the Technician fails the Skill roll, the Gear will not recover his vehicular Attributes for 1d6 cycles. If the Technician Skill roll is fumbled, the Gear permanently loses its bonus and must be wiped (e.g. lose all acquired abilities) if it is to relearn any improved body control routines.

Neural Net Learning Table

Die Roll	Benefit	Die Roll	Benefit
1	One Useful Mannerism*	4	+1 Independence
2	One Impolite Mannerism	5	Intelligence Increase
3	Electronics (reroll):	6	Body Control (reroll):
	1-4: +0.25 Communication		1-4: +0.25 Maneuverability
	5-6: +0.25 Sensor		5-6: +0.25 Fire Control



*Useful mannerisms include limited hand signals (provided the vehicle has hands), fetching its owner, or signaling for help. Impolite mannerisms include obscene hand gestures and other bad manners (like honking the horn in the middle of the night to annoy the neighbors).

Sensors and Communications - 2.5.4

The range and rating given for the sensor and communication systems are the passive combat statistics. By switching to active mode, the listed sensor and communication ranges can be doubled at any time, but the vehicle gains the "Large Sensor Profile, Rating 2" Flaw for that turn — if the Flaw is already present, its rating increases by 2.

By boosting the power even more, the range can be tripled, but at a cost of 2 more rating points. An Electronic Warfare roll, modified by the vehicle's Sensor rating, is also rolled against a Threshold of 5. If the roll is failed, the increased Large Sensor Profile takes effect, but the increased range does not. If the roll is fumbled, the vehicle is considered "locked-on" by any Guided weapon for the entire turn because of its sudden high energy signature.

Thus, a Grizzly Gear trying to detect another vehicle at a range of 6 km would need triple its normal sensor range (2 km x 3) and would be extremely easy to detect (Large Sensor Profile 1 + 2 + 2 = 5) because of its electronic emissions.

Unless using a relay station or friendly vehicle as a spotter, the maximum sensor range is equal to the distance to the horizon. From a ground-based, 4.5-meter tall Gear, this is a bit less than 7 km. This distance will increase if the unit is placed on a high vantage point, such as a mountain or other high ground, and decrease if the vehicle is on low ground (valley, canyon).

Remote Control Operations - 2.5.5

Almost any vehicle can be equipped with remote control equipment, though the inherent limitations of this type of interface means that in general, only small unmanned vehicles are likely to be equipped with it. Remote-controlled vehicles are referred to as "drones."

The remote control equipment is actually a software modification of the Autopilot Perk. Instead of responding to its internal programming, the Autopilot receives its instructions through the communication system and sends back environmental data gathered by its sensor array. Because of this, a drone must be equipped with all three of the above systems. Drones are not affected by "Crew" hits — any such damage is ignored, though Armor points are lost as usual.

If the drone must perform actions (i.e., fire a weapon, make an Active Sensor sweep), it must buy the Automation perk to represent the actual mechanical systems (note that this is an exception to the rule stating that at least one crewman must be aboard for Automation to be used). A drone cannot perform more actions than those afforded by its Automation level; for example, Automation 4 would allow up to three actions per turn. Drones are also limited by the controller's own action total. In the above example, a single controller could perform three actions at -2 each, but not four at -3. Two controllers could handle the three actions with only a -1 penalty. A single person cannot control more than one vehicle at a time, though a vehicle can have multiple controllers.

Because of the associated data-encoding procedures and control lags, remotely piloted vehicles suffer a basic -1 modifier on all of their rolls. If the vehicle is controlled through a Satellite Uplink, the extra lag increases the penalty to -2. The vehicle must be within communication range or contact will be lost. ECM affects the control link normally, and must be tested against every turn when present. The Stealth Perk can be bought for a drone, but it becomes useless when the drone is under direct guidance, since the remote control two-way transmission always points to its general location.

Drones may be wire guided instead of radio guided. This removes the need for a communication system as well as the time lag, since wire transmission cannot be intercepted and are thus not encoded. Wire guiding also makes the drone immune to ECM, but it implies that the vehicle is trailing a very fine wire for control. A Piloting roll must be made every turn against the highest Movement Point cost for the hexes traveled to avoid snagging the cable. Flying drones must test also and use the overflown ground's MP cost. Failure means the cable is stuck and the drone must halt for the next round to free it. A fumble means the cable is severed. For simplicity's sake, it is assumed that the length of the control cable is equal to the communication range of the drone.

If contact is lost, the software automatically switches to a predetermined program. The vehicle is then controlled by the Autopilot until contact is regained or the vehicle runs out of fuel, whichever comes first. The program should consists of a single line of text and should be written down when the drone is released.

Medicine in the 62nd century - 3.1

Modern medical science and its applications, as far as the characters are concerned, deal mainly with making them heal faster so they can go on the next mission without becoming cripples by the end of the campaign. Terranovan medical science is advanced enough in both hemispheres that doctors can almost totally heal third degree burns in a matter of weeks, sometimes even as few as three or four. It is also possible to recover from nearly fatal wounds in less than a month, although that requires many drugs and constant medical monitoring.

Medicine has recovered, and surpassed, what it had lost during the last Ice Age. Early during the 49th century, biology had finally become a very mathematical and precise science, something that had been only a dream during the Dark Ages of Medicine (from the 17th to the 24th century). A biological entity is now as easily programmable as a computer. Contagious diseases are a problem that can take anywhere between minutes or hours to heal, no more. Epidemics are almost unheard of. Whenever something of this sort occurs, it is eradicated within a few days at most. Problems arise only when the disease kills too quickly for a research team to react, as was the case with the St-Vincent Plague or the epidemic in the Montcalm Oasis (see Into the Badlands, p.15).

Despite all its advances, however, medicine is a highly regulated field of science due to its potential for abuse. Indeed, in both hemispheres, doctors are subject to severe rulings that prevent them from using some of the biotechnology available to them. This curious social stigma against the more advanced bio-technologies is rooted in the horrors of the War of the Alliance and before that, the Prime Knight and other supersoldier programs of the distant past.

A Brief History of Medicine - 3.1.1

What is considered to be the beginning of true medicine did not appear before the nineteenth century. Previous attempts at medical healing relied on observations and deductions that were sometimes right, but more often than not caused harm to the patient. It was not before the scientific method was applied by physicians and researchers that medicine came into its own. For example, the development of germ theory and a better understanding of how the body works improved patient survival rates greatly, as did the development of anesthesia. Even then, a lack of reliable methods for diagnosing internal problems made some medical treatments difficult. X-rays, sonic imaging techniques and other invasion-free devices eliminated the pain and risk involved.

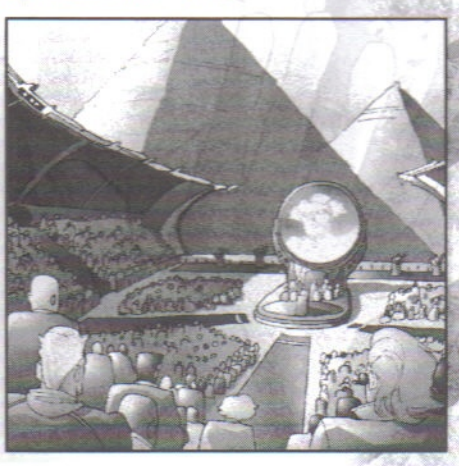


The development of high tech surgery and genetic engineering in the twentieth and twenty-first centuries, however, made the most radical differences. Medical staff did not just react to illness or trauma anymore, they could detect it in advance and actively work to prevent it. Tailored micro-organisms produced advanced drugs and other compounds, while current induction crystalizers forced broken bones to mend in days rather than weeks. Prosthetics, incorporating ultra-light composites and advanced nerve linkages hidden under extremely realistic polymer pseudo-skin, returned full autonomy to accident victims (pre-natal deformations being almost always corrected in the womb by genetic techniques).

By the late colonial era, even a small medipack could accomplish what would have amounted to miracles a mere millennia earlier. Few people worry about their health anymore; often, it is just a matter of finding the right physician in time.

The Neufeldt Axiom - 3.1.2

The basic credo of the medical profession has always been based on the principles established by the Greek Hippocrate. The oath stated, in part, "first do no harm", a motto that was interpreted as the need to preserve life above all else. This led to a series of debates in the late 20th and early 21st centuries which culminated in the ironic execution of a group of doctors who had performed a large number of assisted suicides.



The Hippocratic oath served well for many centuries, until the Ice Age drastically changed the face of the planet and the destiny of Mankind itself. Compounded by the development of regeneration technologies, problems with overpopulation, and bad experience with burned-out supermen, this crisis period clearly showed the need for more thought.

The successor to the Hippocratic Oath was first proposed at the Cairo Medical Conference of 5325 by Doctor Luiza Neufeldt. The Cairo conference was to be a landmark in history for the many techniques that were first presented there, not just because of its philosophical contributions. What doctor Neufeldt proposed was a significant shift in the way medicine was to be applied: the purpose of medical treatment should place the quality of life ahead of longevity; to make the patients happier, rather than keep them alive at all costs.

3.2 - Genetics

Genetics is the catch-all name for all treatments involving the manipulation and splicing of genetic material both in vivo and in vitro, generally for the purpose of medical treatments (see Bio-Engineering, page 25, for a discussion on design work for custom living organisms). The human gene map has long since been decoded, and its various functions and uses are well-understood by the highly trained geneticists that get to play with it. Nature being what it is, however, the occasional mishap still happens, though they are nowhere as bad as those in the early days of genetics, where causes and effects where not always connected and the cure was sometimes worse than the desease.

Genetic flaws and diseases are few and far between on Terra Nova, mainly because the original colonists were either carefully screened to start with or received extensive corrective treatments before taking the trip. Though the cases have become rarer, they have not disappeared completely. Small mutations continue to occur and accumulate over time. The cosmic radiation received during the original transit must have influenced the DNA of the first colonists, and the alien biochemistry of the planet combines with all the above to create subtle, often undetectable changes.

While they almost always provide a solution to any given medical problem, it is usually prohibited to perform a genetic operation on a patient without a special legal authorization. Such authorizations are always long in coming and, almost invariably, outrageously expensive to obtain. Human society still remembers the abuses and horrors of the past, and has placed many safeguards to make sure they will not happen again.

3.2.1 - Genetic Manipulations

In general, genetic corrections are easy to perform (relatively speaking, of course). Actual modifications to the gene map, the type that drastically change the body layout or chemistry of the patient, are much harder, involving the splicing of entirely new coded sequences within the genetic material of every cell in the body. Important genetic augmentations are detectable for up to 10 years after they have been performed. Because of the yearly genetic checkups (GenChecks) required by law, there are very few unrecorded, genetically enhanced individuals walking about.

The easiest genetic manipulations are those performed before birth, before the body has begun to grow and cells start to differenciate and specialize. Augmentations become increasingly difficult with age as the gene map stabilizes over time. It is a very messy business to genetically alter a six year-old, and it becomes nearly impossible to successfully do it without severe secondary effects (cancers, for example) once past puberty. This does not prevent some pleople from trying anyway, or just falling prey to ruthless fixers that promise incredible changes, only to disappear with the money.

◆ Tissue Regeneration



Genetic manipulation can be used to regrow missing body parts. This takes some time even in a properly equipped hospital and may not be available to all patients. In general, the younger the patient, the better the chances of success. If regeneration is not possible, the patient will be forced to rely on prosthetics (see next page).

A tissue sample is first taken and then modified to take it back to a more primitive, undifferentiated cell type. The cells are then encouraged to grow into whatever type of tissue is required for the operation. The new organ grows quite fast, having the entire resources of a growth matrix devoted to it. When it reaches the desired physical age, it is taken out of the vat and carefully transplanted to the patient's body. Since the cells were originally from the person, there are no rejection problems, and rehabilitation is usually quite fast.

Game Effects ◆

Genetic manipulations can be used to improve or "repair" the Attributes of a character, or regrow a missing limb. An increase of one point in one physical Attribute costs between 100,000 and 600,000 marks/dinars. The Threshold for success is 4 plus the character's age in cycles divided by ten (rounded down). On a failure, the regrowth does not grow properly and the patient will be forced to go through the entire procedure again, or have a prosthetic attached.

Augmentation of the mental Attributes, or augmentation to bring a physical Attribute above +3, can only be done before birth. They are also much more expensive: 800,000 to 2,000,000 marks/dinars, plus legal fees (between 150 and 200% of the cost). Increasing any Attribute above +4 is completely illegal. Because of the unpredictability of genetic mutations, pre-birth genetic manipulations have only a 75% rate of success. This drops radically to 20% during the first five years of life, and down to 4% until puberty. Past that point, it takes a miracle (1 per 10,000 is successful).

Prosthetics - 3.3

Cybernetic limbs (also called "cybs") do exist, but those who wear them are too often viewed with a mix of pity and mild disgust. A few social groups see them as a mark of martial prowess — some rover bands, for example — but overall no one would have them installed for the fun of it. Although they are easily implanted and can very discreetly replace any biological equivalent, they represent a social stigma that is very annoying for most cyborgs. Prosthetics look artificial upon inspection, but can pass unnoticed under normal scrutiny, especially if the cyborg is wearing clothes. Implants not designed to pass as human limbs (chrome-plated, exposed mechanisms, etc.) generally cost less than fully concealed ones.

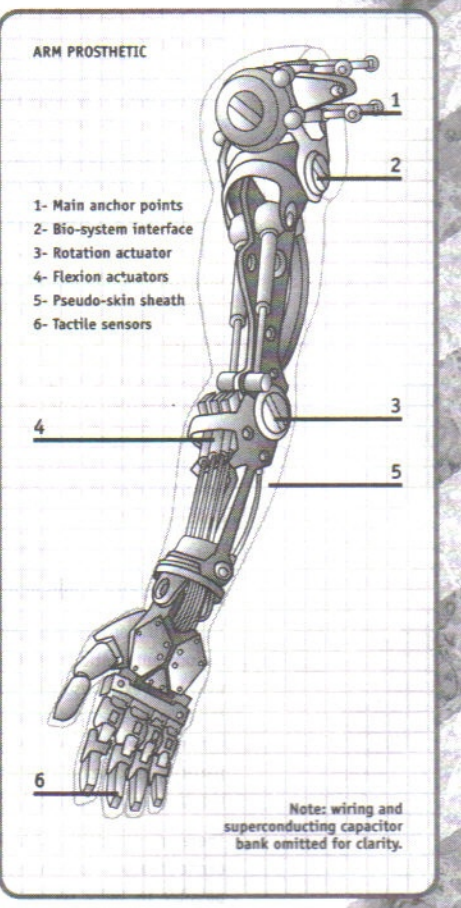
Arm and leg replacements are often roomy enough to conceal some small items such as a watch, mini-radio or even weaponry. However, power augmentations and built-in weaponry are strictly forbidden by law in most city-states and settlements. Devices of a lethal or potentially harmful nature may not be attached to a person in any permanent way, though this can be hard to enforce when dealing with concealed cybs. The law usually sets a limit of 25% past human maximal capacity for damage output as the authorized high end.

Types of Prosthetic Replacements - 3.3.1

Arms and legs are probably the most common prosthetic replacement. Advances in computer and material technology have allowed the creation of artificial limbs that replicate nearly all functions of natural ones. Some limbs can even be designed to augment the physical performance of the wearer, though the body remains limited by its natural muscles and skeletal structure.

Eyes can be cybernetically replaced and even augmented in many ways, each more expensive than the next. Fully artificial eyes (which require complete replacement) include a system that projects data directly onto the wearer's field of vision. They also commonly include automatic shutoff to protect against blinding flashes of light. Ears are more easily modifiable than eyes, and correspondingly cost less. Radio Reception ears are very popular among the general public.

Other cyber replacements are more specialized. The cyberspine was first developed for people suffering from crippling back injuries. It consists of a cybernetically-enhanced spinal cord, reinforced vertebrae and augmented synthetic back muscles. Because of their bulk, cyberspines cannot be hidden. Other implants include flesh pockets and duraskin armor. Flesh pockets are just that — supple, sealable containment units hidden within a person's flesh. Duraskin is the ultimate in personal civilian armor: a subcutaneous layer of fine duraplast ballistic fiber that absorbs both kinetic and electromagnetic energy. Duraskin does not grow or shrink with the body, nor does it repair itself.



Materials

The main concern of the designer is to provide a limb that is similar in weight to a natural one and yet still be strong enough to withstand day-to-day use. The basic structure, or "bones," is made of light alloys that imitate the natural shapes and the articulations are self-lubricating. Non-allergenic, semi-organic polymers provide the interface with the rest of the body, where the prosthesis is attached via special rivets and organic resins.

Interface

The interface between the natural nerve system and the limb is made up of paired neuron/coil groups. An extremely small metal coil, protected by a polymer shell, is protein-bonded to neurons in each motor nerve. Whenever the neurons "fire," they induce a current in the coil which is detected by the computer. The system works both ways, sending information back to the nervous system.

Power Sources and Maintenance - 3.3.2

Maintenance is of the utmost importance for implanted prosthetics, since they do not benefit from the body's natural healing capacity. They must be checked regularly for power levels and micro-fractures, and the bio-interface must be carefully monitored to make sure that no biological trauma occurs.

Cybs are powered by one or more small super-conducting batteries that are located within an easy-to-reach compartment. These batteries can be recharged by practically any energy source — it is easy to jury-rig an adapter, given time and a few pieces of assorted hardware. In addition to the purely mechanical maintenance, each cyb must be checked at least once a cycle to make sure no infection or rejection occurs.

3.3.3 Descriptions and Rules

Each individual must receive tailored prosthetics; the cost of this customization, added to the cost of any option added, may modify the listed prices considerably. Prosthetics look artificial upon inspection, but can pass unnoticed under normal scrutiny, especially under clothes. Implants not designed to pass as human limbs cost 20% less than the listed price. Implants that can pass the most thorough visual investigation (Notice check versus Threshold of 9) cost 50% more than ordinary ones.

Each arm is considered to have free internal space equal to a small Flesh Pocket, while the roomier leg has internal space equal to a large Flesh Pocket. Items (such as guns or radios) can be built directly into the prosthetic for twice their normal price (quadruple if the item is concealed). Alternatively, the space can be designed to be used as a standard flesh pocket.

◆ Limb Replacement

"Crude" arms are very basic replacements and impose a -3 penalty on all arm-related functions and Skill checks. "Basic" arms are a little better and allow limited manipulation abilities; they impose a penalty of -2 instead. Neither type can pass as a normal human limb (although Basic arms can go unnoticed underneath clothes), and must use specially adapted tools. A Crude or Basic arm is considered destroyed if it receives two Flesh wounds. A Deep wound counts as two Flesh wounds for all prosthetic arms.

"Standard" replacements, used as intelligent prosthetics, give the wearer no bonus of any kind, but replicate nearly all movements of a normal arm and hand. They are only limited in very fine motor control (-1 penalty to artistic Skills only). The limb is considered deactivated if it receives two Flesh wounds, and destroyed after three. "Advanced" arms give a +1 bonus to AD and UD when specifically using it. A pair of Advanced arms gives a +1 to FIT; any increase in Strength due to FIT increase cancels the aforementioned damage bonus. Advanced arms have 15 points of Armor; any wound done specifically to such an arm is considered a Flesh wound at worst. The arm is considered deactivated after two consecutive, targeted Flesh wounds, and destroyed after three.

"Crude" legs are simple pegs and impose a -3 penalty on all movement-related functions and Skill checks. Jumping and jogging (or any faster movement) are impossible. "Basic" legs are somewhat more useful: they impose a penalty of -2 on all movement-related tests, but do permit painful jogging. Neither type can pass as a normal human limb, but Basic legs can go unnoticed underneath clothes. A Crude or Basic leg is considered destroyed if it receives three Flesh wounds; a Deep wound counts as two Flesh wounds for all leg types.

As with arms, "Standard" legs simply replace a character's normal legs, giving no bonus or penalty. A character can have just one Standard artificial leg without any balance problem. Standard legs are only limited in their fine motor control (-1 penalty to Dance Skill). The limb is considered deactivated if it receives three Flesh wounds, and destroyed after four. "Advanced" legs are only useful when used in pairs and give a +1 bonus to FIT; this bonus is added to that received from Advanced artificial arms only if a Cyberspine is present. An additional 5 meters/round is added to the wearer's Sprinting Speed, cumulative with speed bonuses due to FIT increase. Advanced legs have 20 points of Armor and take targeted damage like Advanced arms, but are deactivated after three Flesh wounds and destroyed after four.

◆ Sensory Organ Replacements

Fully artificial Eyes (i.e. complete replacement) include a system that projects data directly into the wearer's field of vision. They also include automatic shutoff to protect against blinding flashes of light. "Deluxe" artificial eyes include Holovid reception. "Telephoto" eyes have extra resolving power at the cost of a narrower field of vision. The character can see as a x50 telescope and gets a +1 bonus for an aimed ranged attack (the modifier may then exceed the usual maximum aiming modifier). "Infrared" eyes can see into the infrared spectrum and detect sources of heat in complete darkness. The motion and shape detection eye ("Eagle Eye") recognize particular shapes and detect moving objects by passive scanning, giving a +1 bonus to PER for visual information. At least one full month of practice is required before being able to use these abilities, and it may take up to a cycle to become truly proficient with them.

There are no additional bonuses for having a pair of matched eyes, but two types of eyes may be mixed. A single human-sized eye cannot feature more than one type of cybernetic augmentation. By mounting part of the hardware on an exterior plate, however, it is possible to add a second option. APP automatically suffers a -1 modifier, while the cost is equal to the total cost of the installed options, times 1.5.

Ears are more easily modifiable than eyes. The most common implant is the Volume Control augmentation, which define the amount of noise reaching the inner ear; such implants include an automatic cutoff system that blocks sudden, very loud noises. "High Sensitivity" ears give a +1 bonus to PER, but only for hearing tests. "Radio Reception" ears are very popular, since they don't have to replace the actual ears. They allow the user to receive hi-fidelity radio broadcasts, either local or remote. They have a range of around 15 km, depending on the emitter's power. "Sonar" ears allow the cyborg to "see" in the dark with a receiver that processes the sound waves generated by a throat implant. Sonar ears reduce the total darkness penalty to only -2 penalty, but the wearer must first practice with the device for at least one month. "Subsonic" and "Ultrasonic" ears give the ability to hear well into the respective frequency range.

Except for Volume Control and Sonar ears, which must be used in pairs, there is no bonus for having a matched pair. Ear types can be mixed without a problem, but an ear cannot feature more than two options. By mounting part of the hardware on an exterior plate, a third option may be added. APP automatically suffers a -1 modifier, with the cost equal to the total cost of all the options, times 1.5.

Other Cyborg Implants

A Cyberspine gives the wearer a +1 bonus to both FIT and BLD, though the FIT bonus is not added to those provided by any limb replacements (if present). The cyberspine does, however, allow FIT bonuses from arms and legs to be cumulative. It gives the wearer 18 points of Armor against rear attacks. Cyberspines cause an automatic -1 to APP whenever visible.

Flesh Pockets are supple, sealable containment units hidden within a person's flesh. Mini pockets hold a volume of up to 8 cubic centimeters (cc) and are detected with a Notice roll against a Threshold of 6 (8 if empty). Small flesh pockets can hold up to 250 cc, enough for a small handgun, and are detected with a Notice roll against a Threshold of 4 (6 if empty). Large pockets can hold up to 750 cc, enough for a large handgun, and are detected with a Notice roll against a Threshold of 2 (4 if empty). Large flesh pockets can only be implanted in the torso. Small and Mini pockets can be implanted anywhere except the head.

Duraskin is a subcutaneous layer of fine Duraplast ballistic fiber that absorbs both kinetic and electromagnetic energy. This adds points of Armor to the body. Unless the wearer is wounded, it is virtually impossible to detect Duraskin. It is as complicated to take off as it is to insert, requiring two weeks in a specialized surgical center for either operation (these two weeks of intensive care usually cost about 250% of the armor's listed cost). Duraskin does not grow or shrink with the body, nor does it repair itself. If a character with Duraskin is wounded or gains or loses weight, he will lose one point of Armor per Flesh wound (or per point of Build changed) and two points of Armor per Deep wound in addition to the wound's effect. These lost Armor points will impair the healing process (double the healing time) and must be repaired by a qualified medic (Skill level 2+). Repairing one point of Armor costs 10% of the Duraskin's original cost and takes one complete day.

Power Source and Maintenance

Crude cybs do not require any power source and will last indefinitely, although you do have to tighten the springs and screws once in a while. All other cybs are powered by one or more small super-conducting batteries. These can be recharged by practically any energy source — it is easy to jury-rig an adapter (Tinker or Electronic Skill, Threshold 3). Each battery lasts half a cycle, two cycles for Basic implants (they have lower energy requirement). Past that time, a discrete indicator warns that the battery must be replaced. The battery will last for one more week, after which it causes a -1 penalty; each additional week will add -1. Once at -5, the item becomes useless. Arms require one battery to function, legs and cyberspines two batteries each. All other implants draw their power from a smaller battery located in the lower torso. Flesh Pockets and Duraskin do not require a power source.

Each item must be checked twice per cycle to make sure no infection or rejection has occurred. This apply to all prosthetics except Crude and Basic limbs. The character must pass a Health roll versus a Threshold of 3 (5 if not in a medical environment, +1 per check missed). If failed, a minor complication develops in a random prosthesis: it performs at -1 for all tasks until a medic looks at it. If the test is fumbled, a Flesh wound is immediately applied.

Prosthetic Reference Table

Item	Mass	Cost	CP Cost	Recovery	Item	Mass	Cost	CP Cost	Recovery
Arm, Crude	7%*	2,000	-4	1 days	Eye, Optical Readout	0.3	130,000	3	3 days
Arm, Basic	9%*	16,000	-2	3 days	Eye, Holovid Opt. Read.	0.3	200,000	5	3 days
Arm, Standard	12%*	130,200	0	7 days	Eye, Telephoto	0.3	460,000	8	4 days
Arm, Advanced	15%*	290,000	5	10 days	Eye, Infrared	0.3	350,000	7	4 days
Leg, Crude	10%*	3,000	-5	1 days	Eye, Eagle	0.3	570,000	6	4 days
Leg, Basic	12%*	18,500	-3	4 days	Ear, Volume Control	0.2	110,000	3	3 days
Leg, Standard	15%*	150,400	0	9 days	Ear, Radio Reception	0.2	80,400	4	2 days
Leg, Advanced	20%*	310,600	7	14 days	Ear, High Sensitivity	0.2	270,000	5	3 days
Cyberspine	10%*	1,000,000	16	30 days	Ears, Sonar	0.6+0.2	760,000	12	5 days
Flesh Pocket, mini	0.01	12,000	1	1 day	Ear, Subsonic	0.3	290,000	6	3 days
Flesh Pocket, small	0.02	15,000	3	1 day	Ear, Ultrasonic	0.3	350,000	7	3 days
Flesh Pocket, large	0.04	20,500	5	1 day	Cyb Battery (small)	0.3	1000	n/a	n/a
Duraskin (Armor 10)	5%*	100,500	6	4 days	Cyb Battery (large)	0.5	2500	n/a	n/a
Duraskin (Armor 20)	8%*	250,000	10						7 days

Mass is the item's mass in kilograms; items marked * use the percentage of BLD in kilograms.

Cost is the item's cost in marks/dinars.

CP gives the cost in Character Points for implants added during character generation. Negative values give back CPs.

Recovery lists the recovery time for the surgical operations required (in Terranovan days). A period of time equal to three times the recovery time is also needed for complete healing and readaptation. Recovery times for multiple implants are not cumulative.

3.4 - Webbling

Webbling is a field of medical science that was only granted "independent" science status in the late TN 1800s, after veterinarian Jolene Moth (the "cybervette," as the hourly tabloids called her) demonstrated the potential benefits of harnessing animals with such devices and having them work for man. Webbling, in short, involves interfacing an animal's brain with an internal computer neural network in order to better train it, or so it can control a device to perform certain duties.

Although the device is harmless to the animal (and perhaps even pleasurable), there has been quite a bit of controversy with this application of cybernetics and electronics. Webbling can be performed on most animals, provided they are sufficiently intelligent to properly interface with the NNet. "Webbling" consists of two processes: download and upload. The download is a set of instructions, with accompanying stimulation of the pleasure centers (operant conditioning), to perform certain actions — somewhat akin to programming, while the upload is a set of instructions sent by the animal to perform the desired actions through a remote-controlled device attached to the NNet.

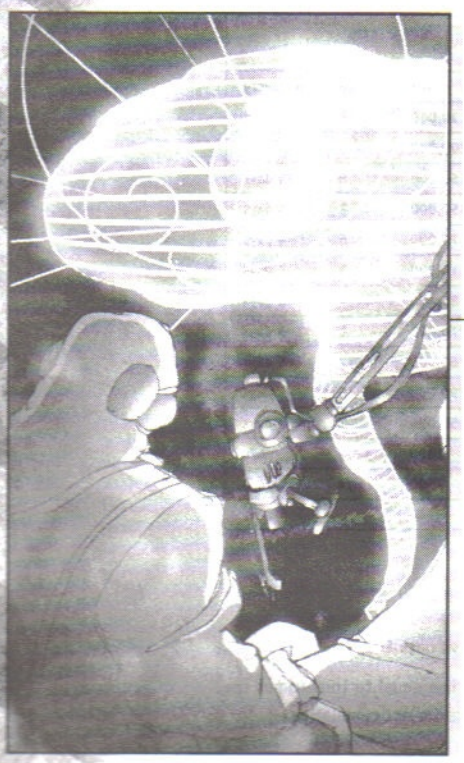
Naturally, very few animals are intelligent enough to be worth the investment. Currently, many of the larger mammals (or "mammaloids") and reptiles are capable of supporting the webbling procedure (dogs , monkeys, horses, dolphins, barnabies, for instance), but no birds, insects or fish have been successfully webbled.

Webbling is rather expensive, and often done out of fancy rather than need. Most of the time, machines are more reliable and durable than webbled animals, but are obviously far less "charming." A typical webbling will cost around 1,200,000 marks or dinars and will allow the animal to perform simple actions after a few weeks of training. While its intelligence is not increased, it can perform "more" because of the remote devices to which it is now connected. Webbling is completely internal and it is impossible to recognize a webbled animal as such.

It has not escaped anyone's attention that this could easily be used on humans. However, if anyone has done it, it is not known whether it met with any degree of success. Indeed, a human is considered too willful for the download to work effectively without extensive neural damage. Nonetheless, there are those who worry that this technology exists at all.

In both hemispheres, it is considered legal to harness and program animals with webbling brainworks in order to train them to perform domestic, commercial or industrial duties. It is thus possible to have a SenseDog™ equipped with Peripheral Sensory Webware™ to watch one's home more effectively, or a cloned ButlerMonkey™ who will take your coat and hat off when you visit a (very) wealthy friend's house. It is illegal to webble animals for combat or any other purpose that could cause harm to a human. Using webblings on humans is, of course, totally illegal.

3.4.1 - Game Effects



Webbling is only possible with large and rather intelligent animals. The Instinct (or Knowledge) score of the creature must be at least equal to -1 and its Build equal to at least -6. The operation is complex and requires extensive preparation. It takes one week to grow the basic neural network in the laboratory. Another full week and costs between 300,000 and 450,000 marks/dinars must be allowed for each level of webbling installed. The exact cost will depend on the clinic where the operation is performed. One level of webbling gives a bonus of +1 to Instinct (or Knowledge) and -1 to Willpower when resisting commands. It also gives the animal an additional Skill at level 1. It is possible to apply this bonus to an existing Skill instead, if so desired. Additional Skill or Skill level (without further Instinct upgrade) are available for half the webbling operation's price. The maximum Skill level available through webbling is 2 for any Skill.

The Cybervette

Webbling has been explored for many centuries, with the preliminary research going back to the third millenium. Progress came at a very slow rate, however, mainly due to the public's reluctance to fund a technology that could be used to program living creatures as if they were computers. The military expressed early interest in the technology, but abandoned it as unpractical when the potential for neurological damage to human neuron cells was discovered. In the late TN 1880s, veterinarian Jolene Moth came across a reference to the interfacing of the neural nets and living brain cells when browsing through an archive. She already had experience with neural interfacing, having briefly studied prosthetic sciences cycles before. She began to experiment with small animals in her lab, but met with little success at first. Moth had to face some hard opposition from groups concerned about her work (even escaping one attempt on her life in TN 1892), but pressed on. By TN 1894, she had defined the current operating parameters and established guidelines for webbling installation. She is the first to admit that using this technique on a human would not only prove difficult (or even harmful), but raise considerable ethical problems. At age 76, Dr. Moth can still be found working in her lab, refining her techniques.

Bioengineering - 3.5

Along with computers, biotechnology has been the great legacy of the first industrial age that took Mankind from the fields and villages and into space. The discovery and subsequent manipulation of the basic building blocks of life itself led to the creation of amazing products and medical techniques. It has also opened the door to the creation of chimera and other monstrosities, leading to many daunting ethical dilemmas.

There is sometimes confusion about the differences between genetic work and bioengineering, for both mean essentially the same thing and use the same basic techniques. The term genetic work is generally used to identify processes that repair damage on a living organism (see page 20) whereas bioengineering is used to describe the work done to create custom organisms, such as the modified bacterias used to grow polymers or the infamous super-soldiers used by the armies of Earth.

Genetic work has never been subject to the same kind of stigma as bioengineering, as most regard it as simply another medical tool. Bioengineering, on the other hand, is a process that has been vilified and denounced since the idea was first presented. In the 20th century, eugenics experts were employed by dictators to prove the "purity" of one race or another. In the 21st century, conflicts arose over the idea of "ready-to-order" children, often "programmed" to fulfill their parents' dreams. The super-soldier disasters of the late Ice Age did nothing to improve the image that bioengineering had among the general populace, and its practitioners and subjects are still looked upon with suspicion.

Prime Knights - 3.5.1



Only sketchy reports still exist on the subject of the Prime Knights, for the secrets of their development was lost with their home country of Kyr Arya millennia ago. They are now viewed by most people as a legend, mythical super-beings that were taller, stronger, faster, and would have enslaved humanity had they not been destroyed. Some cultures have even been known to use the Prime Knights as boogiemen to scare children into bed or control populations. Most historians, however, agree that they were most probably superb specimens of humankind, but that they did not have any super-human abilities.

As usual, the truth lies somewhere in between. The Primes were humans, but they excelled in so many domains they amazed observers. They were uniformly bright, level-headed, in excellent physical condition and with near-total immunity to diseases. They all had phenomenal eye-hand coordination and lightning-fast reaction time, making them superior pilots and marksmen.

While the Prime Knights were unable to reproduce among themselves, they could and did reproduce with normal humans. The offspring resulting from those unions were true half-breeds, possessing diluted versions of their Prime Knight parent's abilities. Over generations of breeding with humans, the Prime Knight genes and abilities have faded almost completely. There are rumors that early-generation Prime Knight descendants made a point of conceiving children with each other, hoping to reconcentrate their abilities and bear true Prime Knights, but no proof they ever succeeded.

GRELs - 3.5.2



In many ways, the Genetically Recombined Experimental Legionnaires (GRELs) are the descendants of the Prime Knight program, though any medical specialist will note that they are a pale imitation of their forebears. Despite their advantages, GRELs benefited from technological advantages and from unshakable morale more than anything else. Their combat skills may have been sharp, but their tactics tend to lack imagination.

A GREL is essentially a very specialized human being that is optimized for combat. All the major body structures are basically human, but either exaggerated (if useful for their assigned role) or underdeveloped (anything else). Thus, all GRELs are large and powerfully built, with little body fat, but they have little creativity and learning abilities. Mordred-class shocktroopers, for example, were bred for strength and loyalty. They were not terribly intelligent, but they had completely unshakable morale due to hypno-training designed to keep them going under heavy fire. They had almost no personal initiative, and had to receive orders to accomplish any remotely complex task.

GRELs of one type are all grown from the same basic template, with only minor changes between batches to prevent a single disease strain from eliminating entire regiments. It was thought that these could be used to create a disabling "key" for destroying rogues, but the chances of the key mutating were too high and the idea was abandoned. Once force-grown in-vitro, using techniques similar to the ones perfected for organ regeneration, GRELs are programmed through a symbiotic neural network that is grown onto their cerebellum during the gestation period.

4.1 Military Technology in the 62nd Century

The first centuries of the third millennium brought forth incredible advances in all of the major scientific fields. Computers were faster, materials sturdier, weapons deadlier. Medicine was capable of curing almost every known disease (see Medicine), and space travel was a fact of everyday life. The numerous armed conflicts of the third and fourth millennium, however, with their ever-shrinking supply lines, soon showed the folly of relying on technology to win battles. This caused a curious evolution, with more developments being made horizontally, in already known fields, instead of branching out into new areas. The major factors involved in this new philosophy were availability, cost and maintenance.

The availability of the high tech equipment in question was often a problem. More than once, military forces had to use whatever was available to them instead of the advanced tools and equipment designed and produced in far away locations, simply because they could not get the high tech stuff. With the advent of interplanetary conflict, logistics became a procurement officer's nightmare.

Another important consideration was the increasing ease of building cheap weapons able to defeat multi-million dollar vehicles in one shot, such as the infamous infantryman's hand-held "tank-killer" missile launchers. As a result, military vehicles were designed within much tighter guidelines and schedules and included as much field-tested equipment as possible to reduce their cost.

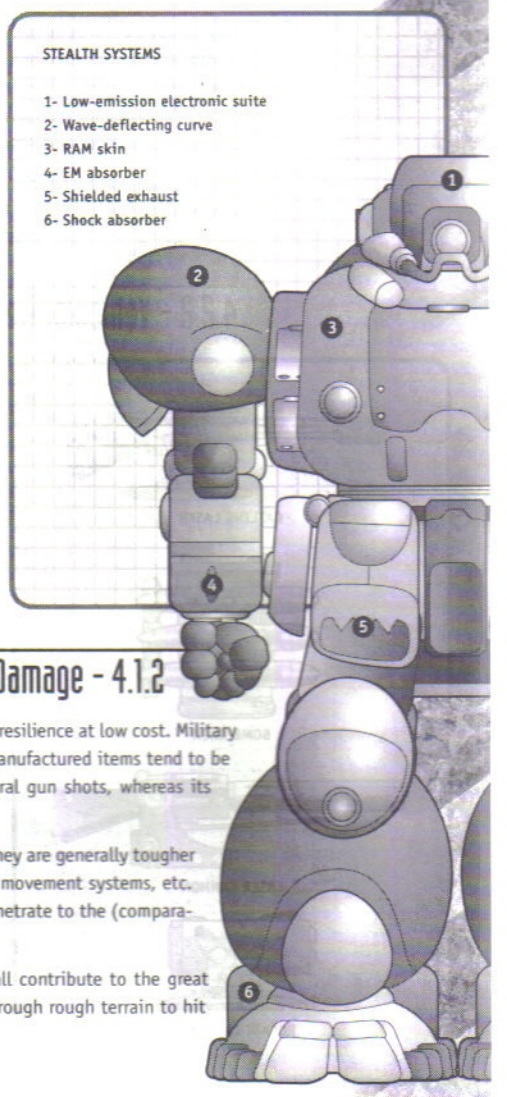
Designs gradually evolved into sophisticated and completely self-contained modular forms that could withstand a lot of punishment, required minimal maintenance and could undergo extensive hours of use without breaking down. By the fifth millennium, all tools of war could practically be built on the battlefield as long as suitable parts, either new or cannibalized, could be found.

The Influence of Stealth Technology- 4.1.1

The use of stealth technology in organized warfare dates as far back as the early twentieth century. Since the advent of electronic sensors and long range weapons, soldiers have sought ways to hide from their enemy while harming them, following the old adage "you can't hurt what you can't see." The original methods used were as primitive as the sensors, and consisted mostly of camouflage and specialized paint schemes to prevent visual detection.

With the advent of high-resolution radar and other advanced artificial detection systems in the late 20th and early 21st centuries, the old methods became virtually useless almost overnight. The first true stealth systems date from this period and, like the weapon and sensor systems they were designed to hide from, were subject to rapid evolution. The first few types (and the simplest of all) of stealth technology were mostly confined to the design of the shape of the vehicle and put numerous limits on its operating parameters. Later systems added electronic arrays to send false return signals and mask their own telltale emissions.

By the time humanity started settling the stars, electronic anti-detection systems were built as standard into the frames of most military vehicles. This trend continued up to the 62nd century: ground-based vehicles were built with a low-profile hull, shielded exhausts and a low-emission electronic suite, while deep sea, air and space vehicles carried even more complex systems such as sculpted anti-radar forms, energy absorbers and the like. Current Terranovan military vehicles are somewhat simpler and use mostly shielded systems to avoid leaving telltale traces of their presence. Walker vehicles, being by design quite tall, generally rely more on electronic masking systems than their shape to avoid electronic detection — a large silhouette is considered an acceptable trade-off for increased mobility.



Accuracy and Damage - 4.1.2

Advances in material and engineering techniques over the centuries have created structures of incredible resilience at low cost. Military vehicles benefited the most from this, naturally, but it is a given that nearly all 62nd-century, human-manufactured items tend to be extremely resistant to damage. Even the farmer's lowly all-terrain vehicle may be able to survive several gun shots, whereas its distant ancestors would have been severely damaged by the same attack.

This has caused a new problem for military weapon designers: not only are the new vehicles more agile, they are generally tougher too. The best way to harm an armored vehicle is thus to target its weak points: access panels, hatches, movement systems, etc. The more accurate the weapon, the better chance it has of finding a weak point in the outer hull and penetrate to the (comparatively) fragile systems underneath, causing large amounts of damage.

Low-recoil weapons, fast-processing targeting systems, gyrostabilized mounts and guided projectiles all contribute to the great accuracy of 62nd-century weaponry. Their high degree of sophistication allows even a Gear bouncing through rough terrain to hit a dodging opponent at a respectable distance.

4.2 - Offensive Technology

Offensive technology is a broad term that covers the various tools designed to find and remove enemy threats, either by taking away their ability to be a danger to the unit or by destroying them outright. The tools for doing so are generally the many types of weapons currently available to any well-equipped armed force, but they should also include sensors and communications equipment as well. The latter are required to first find and confirm the location of the enemy before the weapons can be brought to bear, making them just as crucial in the whole process as the guns and missiles.

Offensive systems greatly define the design of the vehicle they are mounted upon. They often represent a significant portion of its cost and their physical requirements are reflected in the overall design. It is not unheard of, for example, for a tank or a plane to be literally designed around a particular weapon system. While offensive systems can be hidden, they are generally quite apparent on the hull, turret or arms — mostly from engineering considerations, but also (though few would admit it) to make the vehicle more threatening. Heavy Gears are perhaps the ultimate expression of this psychologically inspired design. Indeed, resembling huge armored troops and carrying huge rifles, Gears exude intimidation. It is hardly a coincidence that the first military Gears were a product of the media-minded United Mercantile Federation.

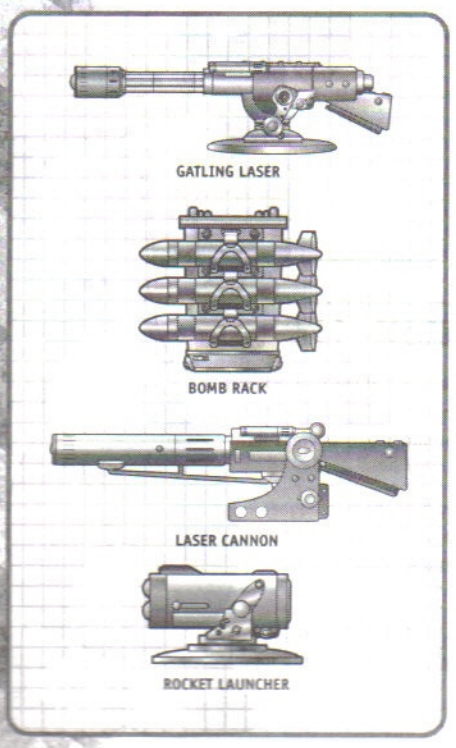
This section briefly examine the technologies used in weapon systems of various types and sizes: how they work, what type of vehicle carries them and so on. Sensors and communication procedures and technologies were already covered in the Basic Engineering Chapter (page 10) and will thus not be repeated here.

4.2.1 - Personal Weapons

Of all the weapons available, the trusty chemical slug-thrower is still the weapon of choice. It is simple, efficient and able to withstand day-to-day punishment without a problem. New materials and ammunition types make it far superior to a bulky laser weapon with its energy backpack and fragile lens array (although it still has its advantages — sniping, for example, is made much easier with a laser rifle). Many Terranovans own a hand-held firearm of some sort (in the Badlands, by necessity, virtually every homestead has one or more). Designs vary, but the automatic or semi-automatic hard polymer handgun is the most common (for weapon statistics, refer to the Personal Equipment and Weaponry chapter of the **Heavy Gear Second Edition** rulebook, page 67).

Infantrymen use automatic rifles or submachine guns. Unless they operate as garrison troops, Terranovan soldiers rarely use caseless ammunition since it is hard to manufacture/recycle in the field (for caseless ammunition rules, see page 79 of the rulebook). Portable heavy weapons are also available, either as small guided missiles or high-powered recoilless rifles.

4.2.2 - Vehicular Weapons



Vehicle-mounted weaponry is also predominantly projectile based. Not only are these weapons efficient and simple to build and maintain, they can sustain an enormous amount of punishment before breaking down, thanks to the advanced materials used in their construction. Cannons are generally equipped with some kind of standard pressure-regulated barrel. The larger guns tend to use the more sophisticated electro-boost system, whereas a constant energy discharge ionizes the propellant throughout the barrel, creating a plasma shock wave on which the shell "rides." Rifling is a thing of the past, as the needle-like shells and penetrators are better stabilized with fin-like projections than with a simple spinning motion.

Missiles and rockets are still popular weapons, mainly because of their small size and high damage potential. Many military vehicles carry at least one rocket pod to provide emergency punch in tight situations. These rockets generally have only limited guidance systems, with some models having none at all. Missiles, on the other hand, have semi-active or fire-and-forget guidance. Both types of weapons must face the electronic counter-measures and point-defense systems of their target, which tend to limit their battlefield effectiveness.

"High tech" weapons such as lasers, electromagnetic railguns and particle accelerators are not considered advanced anymore, but the denomination has stuck — at least until an even more lethal form of weaponry is designed. These "advanced" weapons are rarely carried by ground units because the presence of atmosphere and their large energy requirements prevent their efficient use. Only Earth vehicles used in the War of the Alliance ever carried a significant amount of energy weaponry.

Space-born units are a different matter altogether: here, the situation is reversed, with advanced weaponry being far more effective in the vacuum and enormous distances of space combat. Spacecraft armament is also much more powerful, on average, than their ground equivalent. Lasers need to supply enough energy to punch through armor at range of several thousand kilometers, while missiles equipped with micro-yield tactical warheads need not even reach their target to kill it.

4.2.3 Ammunition Types

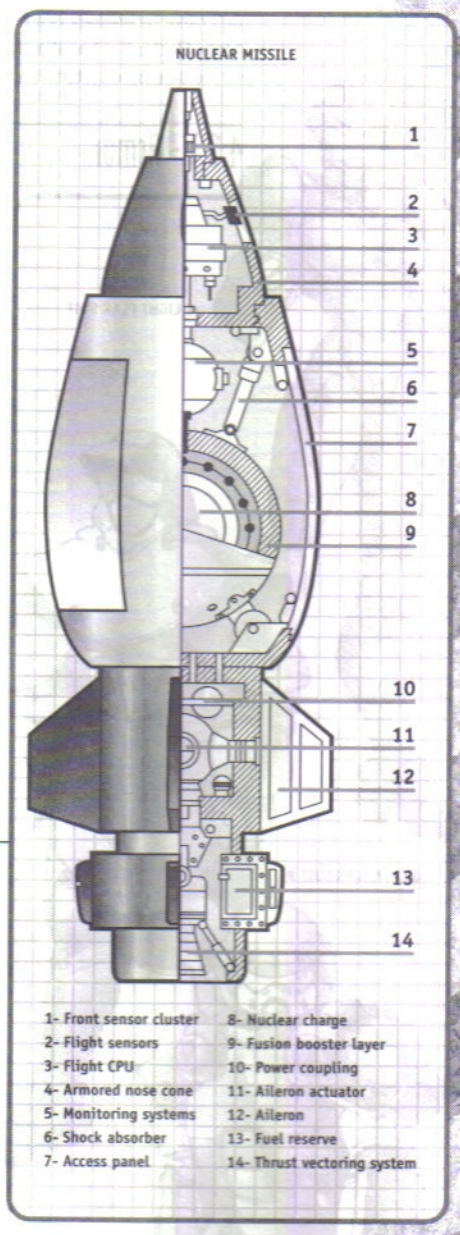
Modern weapons can fire a wide variety of sophisticated ammunition ranging from guided shells to self-propelled rockets. They are also capable of firing simpler ammunition, such as solid shells or high explosive ones, to facilitate resupply in the field.

The standard shell has residual rocket boosters and sports a molecularly aligned steel alloy tip designed for maximum penetration at all ranges. Fins deploy from the rear of the shell to stabilize it and improve accuracy. Some shell types have several tips and are designed to break up in flight, showering the target with sub-munitions. Specialized payloads can also be found, such as micro-mine carriers, saboted shells, incendiary compounds, smoke, chaff and almost any combination in between (game statistics for these ammunition loads can be found in this sourcebook, page 140).

A special type of shell is used by the short-range weapon known as the "snub cannon." The term "snub" here applies not to the weapon itself, but to the shell, which has a rounded and somewhat flattened nose. The multi-stage projectile uses a combination of sabot and self-forging warhead technologies to impart enormous terminal kinetic energy to its target at the cost of range and accuracy. The explosive warhead can also be detonated as normal, making the weapon at least marginally efficient against infantry units.

Projectile weapons still use a chemical reaction to force their load out of the barrel. Gel-type binary propellants, however, have all but replaced solid propellants in shell design, since these new designs are more stable and efficient. The gels are specifically engineered to completely burn upon ignition, with any residue being converted through a heat-activated chemical process into a lubricant for the barrel. With the proper chemical catalysts, the gel from unfired shells can even be converted into raw fuel, although it is a poor substitute for the real thing and is best used only in an emergency (see *Technician's Corner*, Chapter 7, page 153).

Advanced "booster" shells are equipped with a simple flight computer, sensor unit and rear vanes to control flight. Technically, these could almost be defined as cannon-boosted missiles. They are very costly, however, and not used very often. Boosted shells are often equipped with MEPHADA (MEmory Plastic Heat-Activated Deployable Ailerons) technology, where the shells literally "grow" fins upon emerging from the weapon's barrel.



◆ Nuclear Armament

Nuclear technology has been perfected in the last millennia. Both fission and fusion reactions are now well understood and used in a variety of fields, most of them space related. Even primitive anti-matter devices were deployed by Earth forces during the war. This means that nuclear armament can be found in the world of Heavy Gear; it is, however, practically never used.

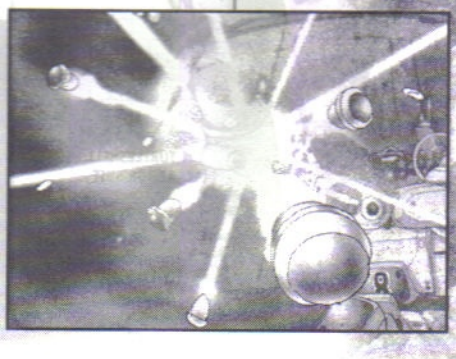
Nuclear weapons are so powerful that although some units could theoretically survive low-yield explosions, most vehicles are going to end up vaporized by the blast (see Mass Destruction Ammo, page XXX). This doesn't translate into a very fun game, although nuclear explosions could be used as part of a clearly defined scenario.

Mass destruction weapons are of no use when trying to conquer resources and territories, as they destroy the very objectives of the military action. Since most of the operations in the world of Heavy Gear revolve around the struggle over resources and territories, nukes are rarely, if ever, used.

◩ Guided or Unguided?

The rocket pods in the Heavy Gear rulebook represent the lowest form of missile weapons in use on Terra Nova. Some have crude guidance systems that allow them to compensate for the target's movements; in simulation terms, these are represented by "F" (Front Arc) rocket pods, reflecting their capacity to hit a target almost anywhere within 180 degrees. "FF" (Fixed Forward Arc) rockets have no guidance system at all — they rely solely on their initial trajectory to make contact with the target, which is why their fire arc is much more limited.

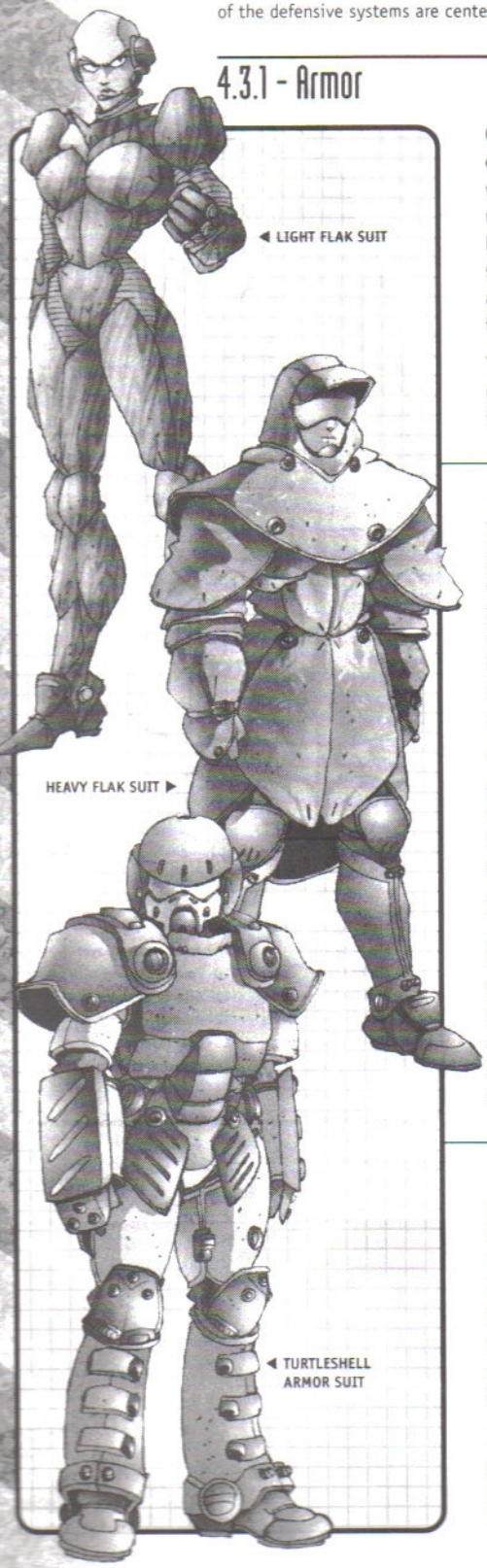
Some weapons have the "Guided" characteristic and can track a target after launching. Although their short burn time at launch limits their arc of interception, these weapons can use their guidance system to track a target and somewhat compensate for its movements. These are generally costlier and much, much deadlier because of their increased payload and accuracy. Anti-Tank Missiles are one example of such weapons. Some weapons can also fire guided shells.



4.3 - Defensive Technology

Defensive technology is a broad term that covers the various items designed to shield and protect a combat unit from detection and harm. Electronics has already been discussed in the *Basic Engineering* chapter (page 10) and so will only be examined in passing. Most of the defensive systems are centered are means to either prevent the enemy from hitting, or absorbing the damage.

4.3.1 - Armor



Over the centuries, a variety of materials have been used to protect a soldier and his equipment from enemy fire. With the power of today's weapons, nothing less than advanced composite layered armor will do. At least, that's the theory. Composite armor, while very advanced, is also costly and hard to repair. Sometimes, a whole armor plate will have to be completely replaced because of a single hairline fracture. That is why many non-combatant vehicles, such as supply trucks, are armored with simple rolled, armor-grade molecular steel, which, while not as strong, is far easier to manufacture and repair. While it may not stop an anti-tank missile or a particle beam discharge, it will stop an infantryman's bullets.

There are many types of armor in existence, their characteristics depending on their intended use (see the *Materials* section for more information, pages 7-8). For ease of reference, armor is divided into two broad categories: personal and vehicular.

Personal Armor ◆

The most common forms of body armor available to infantry are light flak, heavy flak, and "turtleshell." Light flak consists of thin bulletproof clothing resembling normal combat fatigues. It is made of composite synthetic fibers interwoven with alloy threads. When hit by a projectile, the fibers and the threads dissipate the energy of the impact over the whole armor section. A second layer catches any fragments that may come through. Light flak armor stops most shrapnel and light caliber shots, but is almost useless against armor-piercing ammunition and high powered projectiles. It is relatively ineffective against laser and energy weapons, though the synthetic fibers can vaporize to absorb at least some of the attack.

Heavy flak is a bulky suit of flexible body armor worn over normal fatigues. It is similar to light flak armor but incorporates higher grades of material as well as some lightweight alloy or ceramic plates over vital areas. This increases the overall weight and bulk, but affords a greater degree of protection. Some heavy flak armor is customized to fit the wearer for increased mobility and reduced encumbrance.

The nec plus ultra of personal armor is the "turtleshell," a nickname for full suits of polymer or composite plates. Turtleshell consists of several layers of integrated material designed to absorb the maximum possible amount of energy from any incoming projectile. The outer layer is generally a hard ceramic that will shatter a projectile on impact or will vaporize to reduce the efficiency of energy beams striking it. The middle layer is a high-grade polymer composite that further absorbs energy and dissipates it across the entire armor section. The last layer, composed of padded ballistic fibers, catches any spalling or remaining fragments. The armor plates are worn on top of a full body undergarment that permits air circulation and absorbs excess humidity.

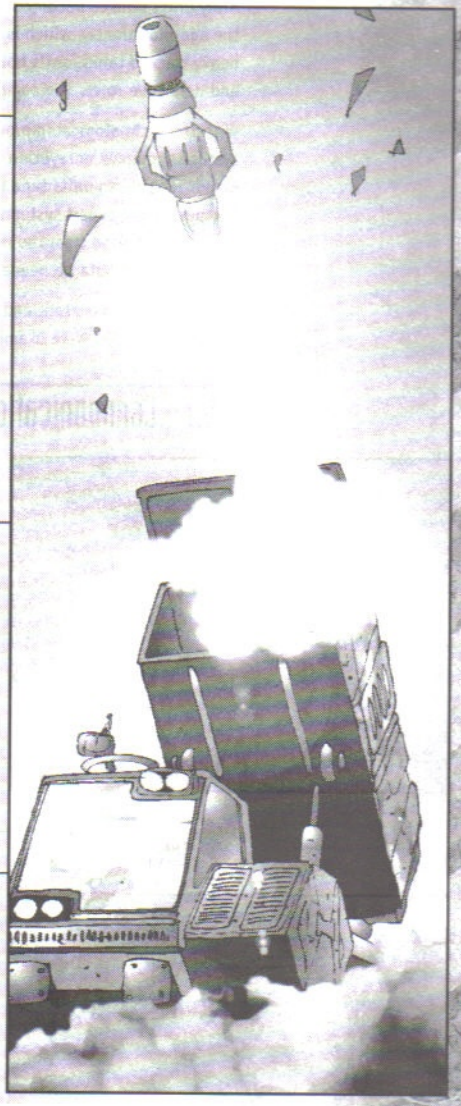
Vehicle Armor ◆

Vehicular-grade armor is even more diversified. Most vehicles are completely unarmored: any weapon hit will, most likely, directly affect their structure and cause damage to their systems. The next step in protection is armor-grade steel, a high quality steel alloy rolled and tempered for maximum resistance. This is the basic material used in weapon penetration tests. Front-line combat units are most likely to be equipped with the best armor composite material. The density and weight of these composites vary immensely, as do their capabilities. Some are treated for resilience, others have additional ceramic layers for heat resistance. Modern vehicular armor is only a few centimeters thick and is very light, while still providing considerable protection.

A variant of vehicular armor is used on the hulls of many spacecraft in the 62nd century. It is not that different from standard armor, although it is submitted to more treatments and contains specialized foamed layers to stop radiation cascading and micro-particle surface abrasion. It also contains more ceramic and polymer compounds, on average, than any other type of armor.

Static Defenses - 4.3.2

Static defenses cover the various weapons that, because of their nature, cannot be employed (or can only serve in a limited fashion) for offensive purposes. This includes minefields, gun emplacements and anti-aircraft laser platforms.



◆ Minefields

Mines have dramatically reduced in size over the centuries — the smaller a mine is, the harder it will be to find, and the more you can cram into one delivery system. Modern mines are made of lightweight, non-reactive plastic to avoid detection. A special timer is often built into the mine's mechanism as a safeguard measure. After the programmed lifespan has expired, the timer releases a molecular plastic dissolver that dismantles the mine, leaving the area safe for the victor. The dissolver is coded at the molecular level to prevent enemy forces from using it to clear minefields. Thus, minefields cease to be a danger to the (hopefully friendly) civilian population once the conflict is over. A counter-enzyme can also be used to make the mines permanent in case of defeat.

The various game characteristics of minefields are covered in the **Heavy Gear** rulebook on page 158. Optionally, more detailed and advanced minefield rules are found in the **Tactical Field Support** sourcebook.

◆ Gun Emplacements

With the resurgence of raiding and low destruction conflicts, gun emplacements have made a limited comeback in warfare. Due to advances in spotting and long-range fire, they are now manufactured as modular units, easy to break down and carry out, and often come equipped with a point-defense system to shoot down incoming missiles. Manned and unmanned versions are manufactured, although the latter tends to be a lot more expensive.

Makeshift and cobbled-together emplacements were also extensively used in the War of the Alliance and in numerous Badlands skirmishes over the years. These are often nothing more than a salvaged vehicular weapon with a makeshift fire control system, placed behind a revetment. They are more vulnerable than ready-made emplacements, but they are inexpensive and easier to set up.

◆ Anti-Aircraft Laser Platforms

Some defensive gun emplacements use megawatt lasers instead of ammunition-based weapons. Laser armament requires a great deal of power, often making it impractical as a front-line vehicle's main weapon. Lasers are more viable in a purely defensive role since they can be connected to a large, stationary power grid. As a result, laser turrets are used to defend permanent installations such as fortresses or city-states. Their (almost) line-of-sight range, combined with their extreme accuracy, make them perfect anti-aircraft and anti-missile platforms.

Electronic Defenses - 4.3.3

Not all means of defense are physical in nature. A good deal of the survivability of modern combat vehicles is due to the electronic systems they carry that enable them to either hide their presence or reduce their signature.

In general, only dedicated electronic warfare or scout vehicles carry a significant amount of electronic countermeasures. Most combat vehicles make do with simple low-emission systems, passive or semi-active sensors and low-power wave absorbers. Although this reduces the range and power of the sensor and communication systems, their sophistication still permits long-range communication.

◆ Electronics in Combat

The range and rating given for the sensor and communication systems of **Heavy Gear**'s vehicles are the combat statistics. Therefore, the sensors mounted on a Hunter-class Gear would be able to acquire a target at up to 2 km under normal combat conditions; that is, with the sensors on low-power, semi-active mode. Likewise, reliable and clear communication, unless specifically blocked by ECM, could be tight-beamed up to 10 km away.

There are times, however, when more range is desirable, even at the expense of detection. By switching to active mode, the listed sensor and communication ranges can be increased, but the vehicle becomes much more likely to be detected by enemy forces nearby.

4.4 - Command, Control and Communication

Army units tend to become smaller and smaller as the centuries go by and the technology used to equip them improves. In addition to the age-old infantry, which is now equipped with advanced body armor and weaponry, the 62nd-century military commander can call on heavy tracked tanks, swift hovercraft and nimble walkers. Sturdy, cheap and versatile, these vehicles can fill a wide variety of offensive and defensive roles. The complete coordination of all these forces is crucial to the success of any operation.

With the technological improvements, the face of war on Terra Nova is very different from that of earlier eras. Reliable communication systems, complex encryption procedures, satellite and drone reconnaissance all contribute to the fragmentation of the chain of command. Terranovan units tend to operate in small groups, coordinating their actions through constant communication with one another. Computers and expert systems help officers sift through the enormous amount of information gathered by the vehicles' sensors, sorting useful information from the noise and updating tactical memory banks on a regular basis. Little might be actually used during combat, but should the data be needed, it will be there.

Because of this, constant and clear communications are vital to the efficiency of a military unit. The actual procedures and mechanisms of communication were examined in Chapter 2, page 10, and so need not be repeated here.

4.4.1 - Communications In The Field



The structure of the communication network of a typical modern army is often referred to as a "hive" configuration, because the loss of one element in the chain will not completely disrupt the entire chain of command. In the "hive," each unit (infantry squad or vehicle) is merely a redundant link in the command chain. If the unit is lost to enemy fire, the entire "hive" network almost immediately perceives the loss and reroute the comm lines automatically, using alternate units to ensure a continuous data feed to all commanding officers. Feeds are generally limited to one or two ranks above and below a given unit to avoid swamping the command structure with unnecessary or irrelevent information.

To ensure a maximum awareness to all members of the team, each vehicle may make its basic sensor input available to any unit that requires it. While the information retransmitted is sketchy at best, battle computers are often able to pull out a surprisingly clear picture of the battle from these diverse points of view.

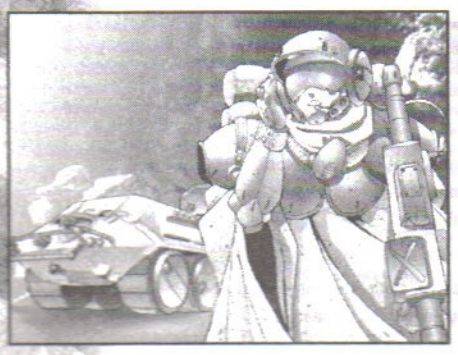
◆ Infantry



Each soldier has his own set of miniaturized sensors, including a micro-camera placed in his helmet. The micro-camera is sensitive to both the visual and infrared portions of the spectrum. Many equipment packages, such as the McKindle RS-87N worn by Norlight army troops, also include low-light equipment for night-fighting, retransmitting their output within the soldier's HUD.

The two-way communication system can operate on broadband frequencies, though it is limited somewhat by the lack of a proper antenna array. The communication system also doubles as a full IFF (Identification Friend or Foe) transponder. If satellite coverage allows it, a GPS (Global Position System) let the commander pinpoint the position of his men to the millimeter. The combat computer incorporated in the helmet pre-integrate all gathered data, serving as a primary filter to avoid overloading the trooper (and ultimately, his commander) with irrelevant information. The computer also monitors the welfare of the soldier through tiny passive sensors imbedded within the uniform.

◆ Combat Vehicles



All vehicles in the squad are patched into the hive, so do not have to maintain squad coherency once in combat (though they usually do to support one another). The tactical information is gathered by the vehicle's combat computer, broken down to its essentials, and "squirted" out to the hive via highly-compressed data packets. This allows all crew to know the position of all other vehicles in the force at all times, drastically reducing the incidence of friendly fire.

These "data squirts" transmissions are affected by enemy electronic countermeasures, and these are often deployed to prevent the commanding officer from guiding his troops with the most efficient tactics. Though each vehicle's onboard computers can extrapolate the relative position of both friends and foes from whatever fragment of information that does manage to make it through, their predictions are usually not accurate enough to allow targeting unless a significant effort is made to transmit the data.

Aerial Warfare - 4.5

Ground warfare was one of Mankind's earliest occupations, and it has kept on being one of its most time consuming. It got a good swift kick in the pants with the advent of flight in the early twentieth-century, however, and has never looked back. Although the development of air and space-capable vehicles greatly modified the balance of power in battle for a few centuries, the advent of powerful anti-aircraft weaponry such as the area defense laser turret (see page 31) and truly efficient man-portable surface-to-air missiles brought an effective end to the concept of air superiority. While this statement is not 100% true — an aircraft is still capable of engaging and destroying several times its weight in ground vehicles — they are not the decisive factor they once were. This holds even more true on Terra Nova, whose harsh weather is not kind to airborne vehicles.

On Terra Nova, short flights between polar locations are fine, but voyages across the Badlands pit aircraft against strong heat-generated convection winds, not to mention the occasional tempest (which will surely bring down any plane, no matter how well-designed it is). Ground and sub-orbital travel is safer and much more efficient. Grunts on the ground usually only see support and transport aircraft, while choppers and hoppers (vectored thrust aerodynes) are used for close support and anti-vehicular duties. Aircraft are poorly suited to raiding and resource acquisition, so ground forces see most of the action.

Many of the best ground support hoppers are produced by Paxton Arms, the huge weapons conglomerate based out of Peace River. Badlanders themselves, the designers at Paxton realize the hardships of desert flight and make fast, reliable and deadly aircraft. Their most popular design is assuredly the Dragonfly hopper. This two-man aerodyne is a nimble attack craft and has become one of Paxton's greatest success stories. Indeed, it is now the standard attack hopper of the Northern Guard. Paxton also manufactures variants of the Dragonfly, most notably the Black Wind stealth hopper. This deadly craft as a well-merited reputation as an aerial assassin.

Military aircraft are designed with stealth characteristics from the outset. Given the power and accuracy of modern sensors and weapons, aircraft and aerodynes are very vulnerable — once acquired, their chances of survival drop considerably. An aircraft's stealth characteristics and the pilot's skills at avoiding the attention of the enemy now go a long way towards ensuring its survival. Similarly, guided missiles, once expected to make "dogfight" combat disappear, are opposed with stealth, decoys and active counter-missile systems. All these factors combined make it very hard to accurately target a combat aircraft from a distance.

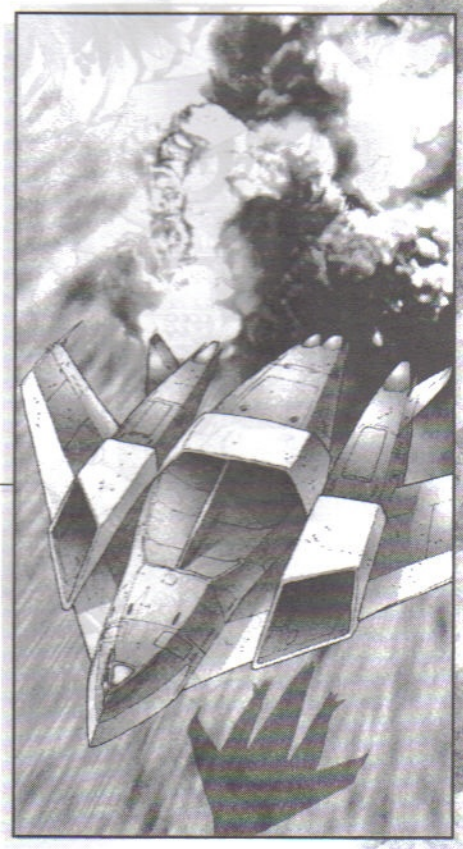
The art of close -in fighting, with most fighter combat occurring within an envelope of ten kilometers or even less, has thus made a comeback — much to the delight of glory-hounds and their adoring fans.

Vehicle Types

Most of aerial missions nowadays are either to support (or stop, depending on which side you are on) the advance of ground forces or transport forces and supplies to the front. These functions imply different performance characteristics and are usually fulfilled by different types of aircraft, although some craft do perform hybrid functions.

Aircraft are divided into three general categories for convenience: conventional, VTOL and rotary wing. Conventional aircraft are fixed wing designs that fly in atmosphere only (though some rare models can reach low-orbit by themselves). Their main strength is endurance and fuel-efficiency, but they are vulnerable to anti-aircraft assets. They are preferred for long range transport, ground support and interception missions.

VTOL (Vertical Take-Off and Landing) aircraft are jet or turbine powered vehicles that can hover in mid-air and use almost any clear surface as a convenient landing pad. They are used mainly for short range ground support and interception, since they require lots of fuel to operate. Rotary wing aircraft use either propellers or rotors for lift, using power from jet or turbine engines. They are less costly than jet-powered VTOLs, but slower. Rotary wing vehicles are ideally suited to close ground support and transport roles, in which they excel.



The Great Bomb Run

During the War of the Alliance, bombers on both sides were used to pound targets into submissions, often taking heavy damage themselves as they ran the gauntlet of interceptors and anti-aircraft fire. The Terranovan craft were hidden in hangars during the day and taken out at night, where they made fast strike against local CEF camps.

The Great Bomb Run was the nickname given to Operation: Pearl String, an ambitious, last ditch attempt by a Northern bomber squadron — the 28th Air Wing — to cause as much destruction as possible before their home base was discovered and destroyed. Colonel McGruger, the base's commander and a fine pilot himself, sent his Buzzard bombers on a string of attacks that would take them from their Badlands base right up to the Northern border. Only two aircraft made it home, but they were credited with the destruction of no less than twenty-eight supply bases in one night.

4.6 - Naval Warfare

Naval warfare, such as it is imagined by the public at large, is practically non-existent on Terra Nova and will in all likeliness never be. All of the planet's main bodies of water are small and land-locked, which means that boats are next to useless for attacking enemy forces directly. Large fleets of ocean-going vessels will never exchange cannon or missile fire on the surface of Terra Nova (though landships do, time and again).

Both the Confederated Northern City-States and the Allied Southern Territories maintain a small fleet of scout boats and large RSW (Rigid Side Walls) naval hovercraft, but these exist primarily for civil patrol duties and general security tasks. Only the navy of the Southern Republic fields any conventional naval vessels on Lake Esperance, though observers are doubtful about their actual combat usefulness — many whisper that they are nothing more than over-gunned pleasure craft for the high ranking officers of the Republican Army.

The Republican fleet goes back to the early days of that league's existence. The SR was born from a program of conquest carried out by the city of Marabou and aimed (initially) at the cities of Siwa Oasis, Ashanti, and Port Oasis. Three of these four cities sprawl on the shore of Lake Esperance and Siwa Oasis is but a short trip up the large Siwa River. This made sea power an important part of the Marabouin program of conquest. Indeed, only Marabou had a significant and well-armed navy and this made all the difference. The small coast guards of the other city-states could not secure their shores, leaving the targeted communities vulnerable to off-shore artillery. Marabou used this tactic mercilessly against Ashanti, which it bombed into the ground in short order. Naval power has remained part of the Republican definition of military pride ever since. Today, both the landship and sea vessel shipyards of the AST are located in Marabou.

Numerous shallow-water craft are used for river and swamp patrols, however. These low-hulled vehicles are rarely more than 10 meters long and cruise along the rivers and deltas of both hemispheres. Using these as high speed "roads" inland, such craft can lend fire support or deliver supplies to a beleaguered unit very rapidly, provided they are near a large enough river. Many of these patrol boat designs carry one or two water-worthy Gears on a platform at the front or rear of the hull for engineering and defensive purposes. Special variations of river boats operate in the underground environment of the MacAllen Cave Network, moving miners and others through the cavernous rivers of this underworld. This is a treacherous world for sailors and light and nimble craft are usually preferable to heavier vessels prone to get tied up in sudden shallows and hidden underwater rocks.

◆ Vehicle Types



Naval craft can be divided into several rough categories. The first is the conventional boat, a vehicle propelled by water screws or jets and using a water-tight hull to float. Their mission types include river patrol, intersettlement transport, and sometimes even fire support, if a battle occurs close enough to the water. Inexpensive to build, they are common only in areas with many rivers and small lakes. Flat, shallow hulled craft are used in the jungle of the South to transport goods and troops between isolated villages.

Hovercraft, vehicles that use powerful blowers to create a cushion of air underneath their hull to ride upon using the ground-effect principle, are another type of water-capable craft. They are quite versatile — they can go over water as well as any relatively flat surface — but they have their own restrictions (see page 55). Rigid Side Walls (RSW) craft are an off-shoot of the hovercraft principle. The flexible skirts are replaced on either side by solid walls, which double as a catamaran hull when the blowers are not active. In effect, they are a combination of hovercraft and conventional naval vessels. The Wing In Ground Effect (WIGE) craft, another vehicle operating on the ground-effect principle, is basically an aircraft that rides on the air cushion created between the wings and the ground. Few Terranovan water surfaces are large enough for these fast vehicles, however. All of these can be used out of the water as well.

The Story of the Swamp Darling ◆

The Southern Republic used river boats in great number when it waged its wars in the southern territories. Small rivers abound in the jungle and can serve as natural "roads" into hostile territory. The Republican army was quick to take advantage of this, building inexpensive river barges to conduct patrols.

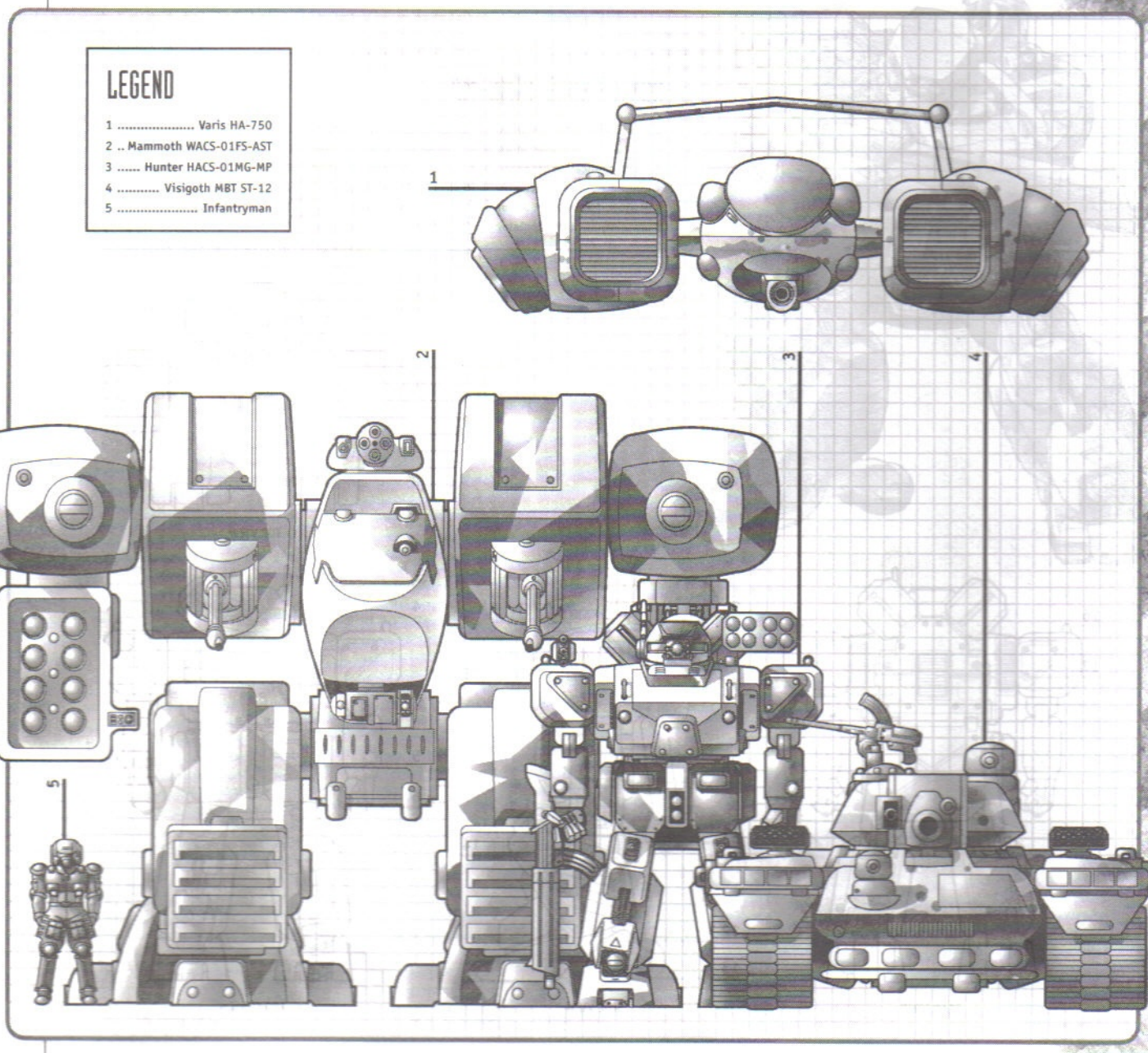
The Swamp Darling is probably the most famous of these boats. The boat became a legend in its own time, serving with distinction during the southern unification conflicts in the late TN 1600s. The crew was notorious for being adept at recovering every bit of spare junk that came across their path, and they even fielded a fully operational Hunter Gear for a short period in TN 1679. The Darling was lost in a catastrophic assault ten cycles later, but her legend lives on in the heart of all naval servicemen.

The Modern Combat Vehicle - 5.1

Vehicles have been in use since the dawn of history, and ever since their invention have been used in all sorts of conflicts. Military vehicles used to be quite similar to their civilian counterparts (after all, a chariot has few moving parts), then slowly evolved to fit new roles that made them very different. By the post-Ice Age and interstellar colonial periods, however, civilian and military vehicles were once more very close in design: even civilians needed protection and mobility on still-savage worlds.

Vehicles provide mobility, protection and offensive power, usually at varying levels. Few vehicles, if any, can provide all three at high levels. Most of the restrictions are centered around the weaponry; though a heavily armored cargo truck will bring some looks, it will merely be seen as an example of extreme prudence by city folk and as good common sense by jungle dwellers.

Few people can claim never to have seen a combat vehicle. All city-states maintain security and militia forces that regularly patrol the streets and the territories surrounding the city-state. There are also tons of hulks remaining from the War of the Alliance. Desert sands shift periodically to reveal the half-corroded remains of a tank or Gear, and crash sites of spaceships can contain anything from hand-sized fragments to a full hull, depending on the speed of the impact.

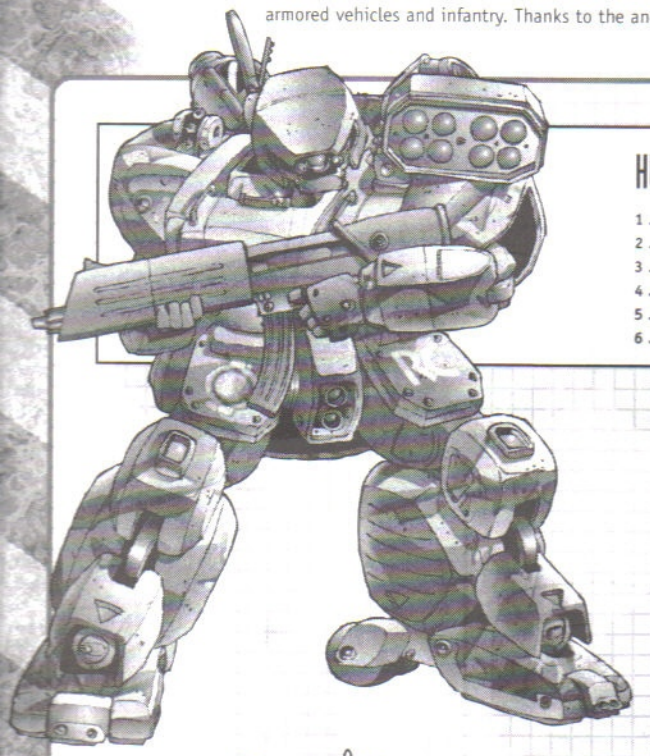


5.2 - Heavy Gear

Heavy Gears (often shortened to just "Gear") are one of the most notable developments in the history of military technology. Although combat walkers had been used as far back as the early third millennium, they were always cumbersome and much too conspicuous to survive the hi-tech battlefield, relegating them to support and engineering duties. This changed with the development of the Gear walker combat vehicle.

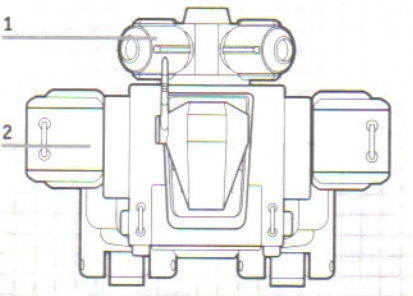
The Gear is actually a compromise between the infantryman's flexibility and the armored vehicle's resilience and firepower. It is, in effect, a one-man IFV (Infantry Fighting Vehicle) that protects the pilot and allows him to carry far more payload and armor than an ordinary soldier. The Gear's smaller size (they rarely stand above 5 meters high) and its mobility (derived from its humanoid shape) allow it to survive where a bigger, more cumbersome walker vehicle might not. Its biggest advantage is, however, its low cost: mass-produced Gears are cheap enough to form a major part of the modern army.

Gears are not the ultimate combat vehicles, but they come darn close. In any marginally rough terrain, they will have the edge over both armored vehicles and infantry. Thanks to the angle of fire afforded by their arms, they can even lay down their own anti-aircraft fire.

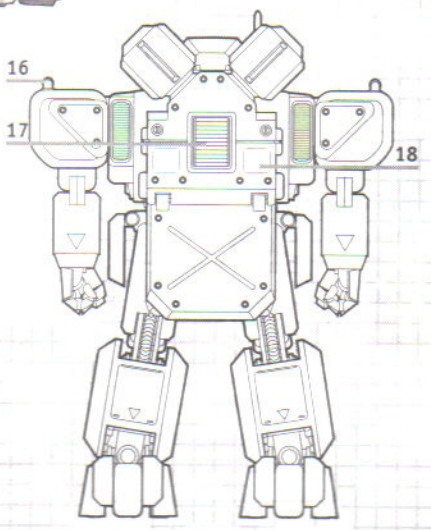


HUNTER HACS-01MG-MP

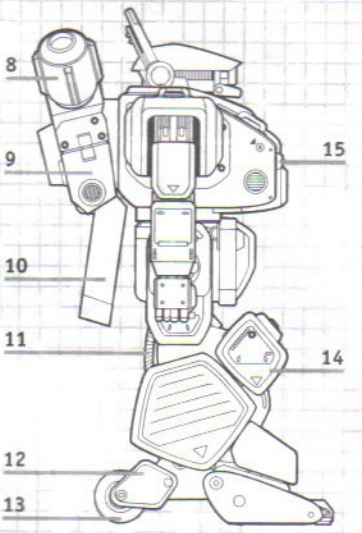
1 ..... Backpack assembly
2 ..... Shoulder block
3 .. Communication antennae
4 ..... Main sensor cluster
5 ..... Front skirt armor
6 ..... Manipulator
7 ..... Hardpoint
8 ... Generator/pump housing
9 ..... V-engine housing
10 ..... Armored fuel tank
11 ..... Power transfer line
12 .. Primary shock absorbers
13 ..... SMS roadwheel
14 ..... Knee block
15 ..... Headlights
16 ..... Handle
17 ..... Main engine radiator
18 ..... Battery housing



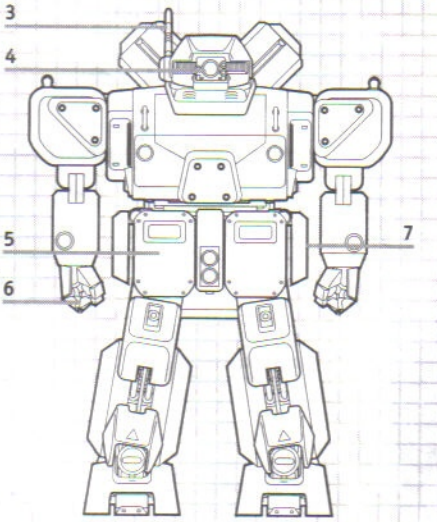
TOP VIEW



REAR VIEW



SIDE VIEW



FRONT VIEW

Heavy Gear Development - 5.2.1

The early walker vehicle experiments date back to the early 21st century, when computers and powerplant technology made the first walker designs practical. Multi-legged beasts were the norm at first, along with "exoskeletons," man-worn armor powered by small motors and capacitor packs. Although early tests and prototypes proved that such vehicles were possible, the concept had several shortcomings. A man clad in such armor was faster and could carry more weaponry than a regular infantryman, but was totally vulnerable to any of the vehicle-mounted weaponry in service. Even lowly soldiers could take the suit out with heavy weapons, knocking the pilot unconscious well before his armor was breached. In addition, the powered armor could not handle the recoil generated by many large weapons, restricting it to missiles and low recoil guns — many of which were powerless against increasingly tough vehicular armor, ECM and point defense systems.

On the other hand, the vehicular-sized walker could carry more armor and weaponry, but it was more vulnerable and much more expensive than a comparably sized wheeled vehicle. Walkers proved extremely mobile and saw limited action throughout the third millennia. They became tougher and more reliable With advances in technology, in the centuries that followed the Emigration Wars. During the Ice Age, walkers were a common sight, ferrying material and people across the frozen and often treacherous wastelands. A notable use of walker vehicles in warfare was during the historical period known as the Crusades, where walker tanks were used along with other, more conventional tools of battle. Most memorable were the Paladin bipedal walkers used by the synthetic, genetically engineered soldiers known as the Prime Knights.

The Colonial Era ◆

By the end of the Ice Age, walkers returned to more peaceful occupations like construction and transport. Then came the Gate Drive and the colonization period. The first interplanetary colonists were suddenly faced with a difficult problem: their new home planets were similar to Earth, but with a number of critical differences. For one, they were wilder and featured uncertain conditions. The best solution was to use the walker type vehicle that was already commonly used in construction and other specialized tasks.

Because the colonial corporations were unwilling to spend large sums of money to transport important quantities of cargo over to Terra Nova, mission specialists had to turn toward modular and highly adaptable components that could serve in a variety of ways and yet be easy to maintain using local resources and material. The first of this new line of equipment was the Hardhat, a rugged cockpit/main body system to which a variety of tool limbs could be attached. The Hardhat was self contained: it carried its own walk-drive computer and sensor pod. Additional sensor and computer modules came with the modular limbs.

The first twenty years of colonization saw the arrival of nearly 1200 Hardhats on Terra Nova. They were adaptable to a huge number of functions, and even discarded units were used as spare parts to build conventional vehicles. The Hardhats served as the basis for the evolution of the walker vehicle on many of the colonial planets.

Terra Nova on its Own ◆

By TN 1467 (5800 A.D.), walkers were used extensively on the rugged terrain and deserts of Terra Nova. When the colonial corporations were forced to withdraw because of the economic crisis on Earth, many settlers armed their machines with makeshift weaponry in the hope of breaking through the spaceports' defensive lines. This was the first use of the humanoid walker as a viable weapon. The technology was still crude, but the potential was obvious.

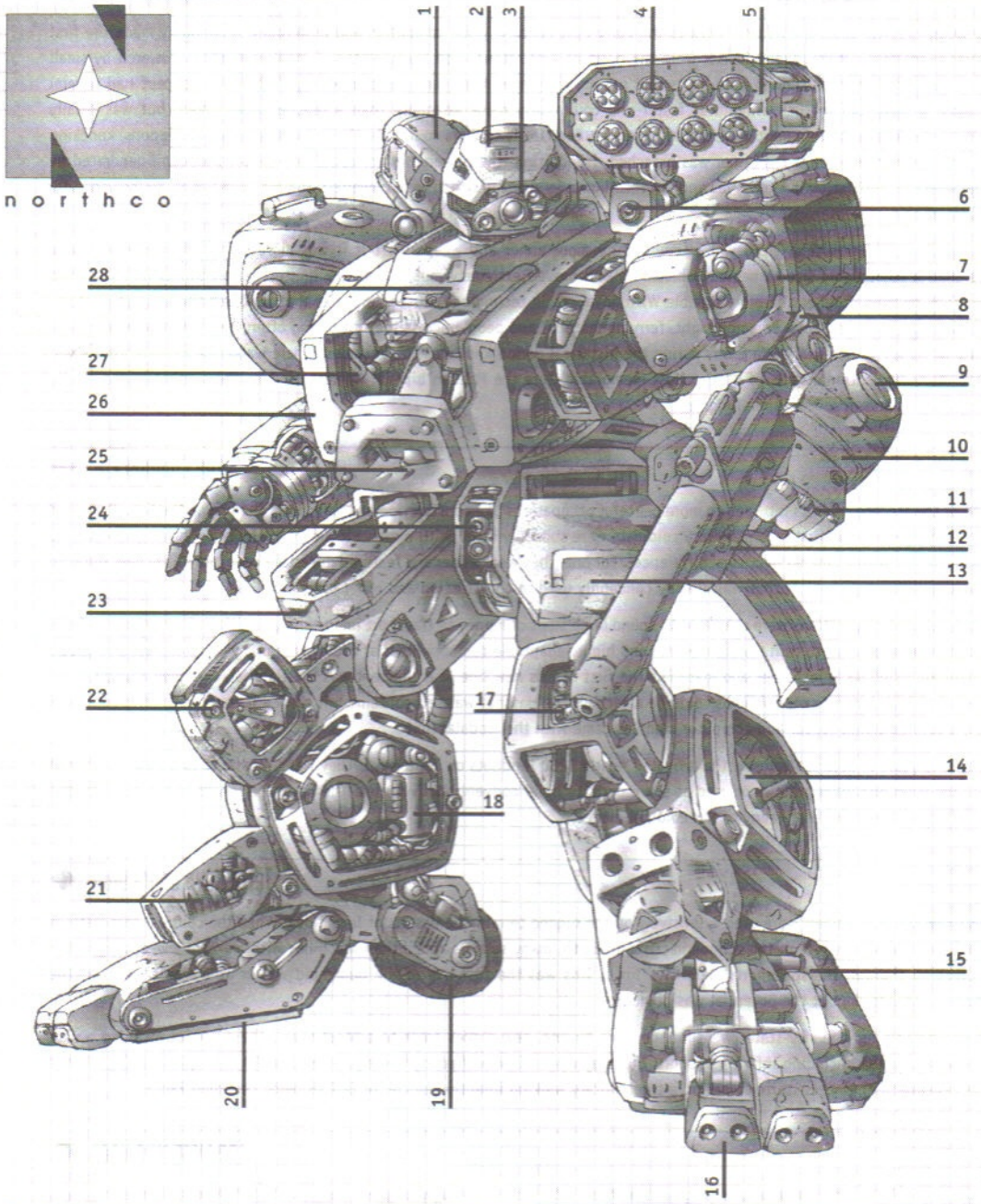
As the cycles passed and the city-states were founded one by one, new armies arose to protect them. These armies included walker vehicles in various roles, including infantry support, but they were still modified civilian equipment. In TN 1674 (5948 A.D.), United Mercantile Federation engineers started work on a true military walking infantry vehicle, or BOT (Bipedal One-man Tank).

The First True Gear ◆

By TN 1678 (5950 A.D.), the result of this program was the GP-01 Hunter, an ugly, rugged, boxy machine that could be easily mass produced and fielded in large numbers. Thousands of Hunters left the assembly line in the next seventy cycles, many of them sold to the UMF's allies in the Northern Confederation. These first Hunters were little more than redesigned construction machines, yet they fared well in their new assignments.

Worried about this new technological development, the Southern Republic tried to acquire a few Hunters by several means — some legal, others definitely not — but to no avail. It was not until TN 1679 (5951 A.D.) that Republican commandos were able to steal one from an advanced Protectorate force in the Badlands, which had itself stolen the design from the Federation. A mere six months later, the Republic was using its own version of the Hunter (renamed Jäger) to force its neighboring Southern states into a coalition led by the Republic. Other than cosmetic and slight mechanical changes, the Jäger was essentially the same machine as its Northern cousin.

So successful was the Hunter that it took several decades for wholly new Gear designs to appear. During that time, the faithful Hunter was modified and reworked for a huge number of operational roles and served on virtually all fronts during the many skirmishes between the various city-states. The rest, as they say, is history.



JAGUAR INTERNAL STRUCTURE AND SYSTEMS

1 ..... Generator/Pump Housing
2 ..... Head Mainframe
3 ..... Sensor Plate
4 ..... Rocket Cluster
5 RP-111 Pepperbox II Launcher
6 ..... Modular Hardpoint
7 ..... Arm Elevation Rotor
8 . Lower Arm Rotation Assembly
9 ..... Elbow Mechanism Housing
10 ..... Forearm Shock Absorbers
11 ..... Digit Rotor
12 .. MR 25 Machinecannon Rifle
13 Upper Leg Rotation Assembly
14 Booster Pumps and Heat Sink
15 ..... Foot Structural Member
16Supp. and Balance Mechanisms
17 . Short Range Forward Scanner
18 ..... Pressure Fluid Tanks
19 ..... SMS Wheel Assembly
20 ... Shock-Absorbing Footplate
21 . Short Range Ground Scanner
22 . Knee Block Structural Frame
23 ..... Forward Hip Armor Frame
24 ..... Lower Forward Scanners
25 ..... Cockpit Foot Plate
26 ..... Torso Mainframe
27 .... Torso Suspension Actuator
28 ..... Upper Hatch Assembly

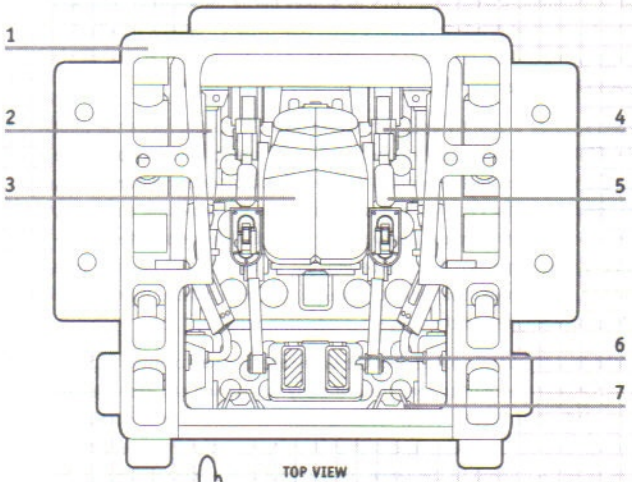
Cockpit - 5.2.2

All Gears can carry one man in a cockpit located in the torso (for obvious internal space reasons). Depending on the design and the machine's intended mission profile, the cockpit can be open topped, sealed, or even pressurized. Most Gears fall in between, with a sealed cockpit and an air circulation system with a minimal internal oxygen supply for emergencies.

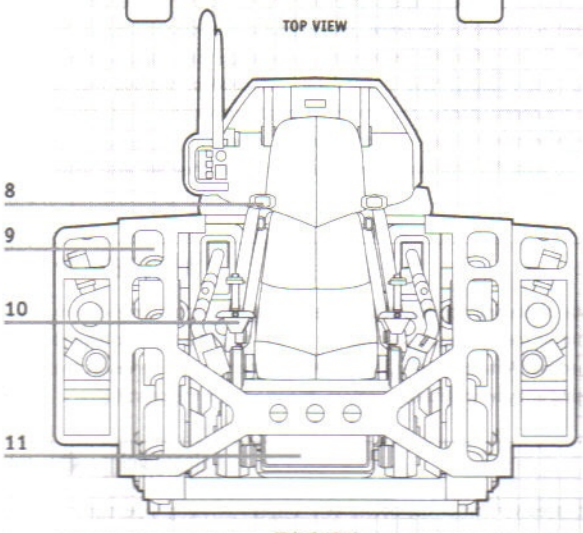
Because of the space required by the machine's internal mechanisms, all Gear cockpits are renowned for their cramped confines. Even heavy fire support Gears like the Northern Grizzly are a tight fit; small scout units like the Southern Iguana or the Northern Cheetah are positively claustrophobic. The older Ferret is even worse and only pilots with a below average stature can hope to pilot one. Even the Jaguar strike Gear suffers from space limitations.

A sturdy seat — reminiscent of those found in fighter planes — occupies the center of the cockpit cavity. The space under and behind the seat is used for electronic equipment, which leaves no room for an ejection system. Sometimes, this equipment is moved to the side consoles to mount an ejection seat, but this is a costly and unpopular option among designers — but not among pilots. A few seat models have roll-bars to secure the pilot in place. This system is more cumbersome than the usual X-shaped belt, but it does offer more protection in case of a collision or fall. Many Gears have special attachments that lock onto the pilot's suit: in that case, the suit has a built-in support web.

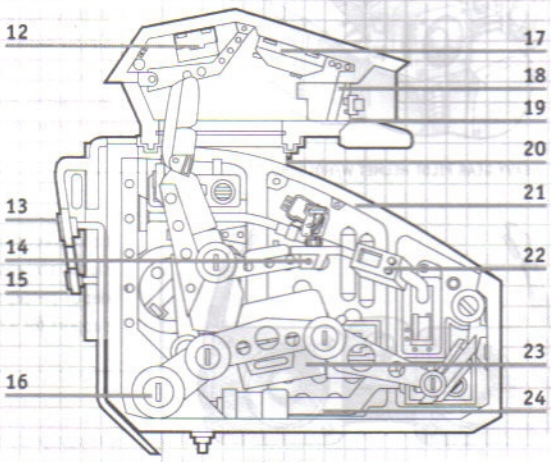
Power feeds and cooling tubes snake along the cockpit walls, completely covering them. This is done on purpose to facilitate emergency repairs on some internal systems. On some smaller models, even the arm rotation sockets at the shoulders are accessible from the cockpit.



TOP VIEW



FRONT VIEW

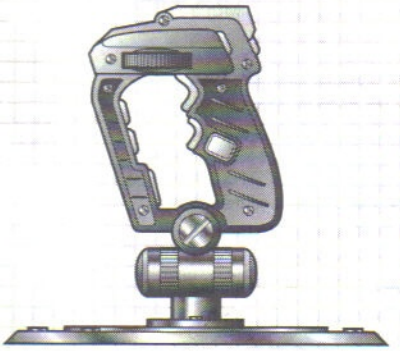


SIDE VIEW

HUNTER HACS-01MG-MP (COCKPIT)

1 ..... Upper torso support ring	13 ..... Pressure line input
2 Main fiber optic computer line	14 ..... Dataglove mount
3 ..... Crash-absorbent padding	15 ..... Power line input
4 ..... Seat support struts	16 ..... Seat shock absorber
5 ..... Padded arm rest	17 ..... Visual sub-processor
6 ..... Foot pedal	18 ..... Armored viewpane
7 .... Front hatch actuator mount	19 ..... Main sensor cluster
8 ..... Safety belt mount	20 ..... Head rotation collar
9 ..... Torso support actuators	21 ..... Main access hatch
10 ..... Control stick	22 ..... Diagnostic panel
11 ..... Footrest	23 ..... CPU housing
12 Communication relay circuitry	24 ..... Coolant conduit

Note: wiring and access hatch actuators omitted for clarity.



HEAVY GEAR JOYSTICK

Control apparatus

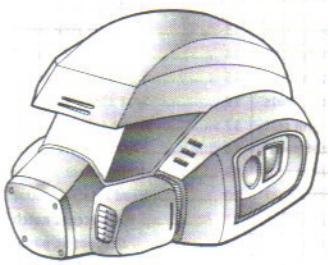
The configuration of the instruments depends on the designers. All are equipped with two joysticks and two foot pedals, but buttons and readouts vary immensely, even between variants of the same model.

The joysticks are fairly complex, sporting several thumb switches as well as finger-activated triggers (see illustration). Combinations of switch, trigger and stick movements are converted into pre-programmed body motion routines called Macromoves (or simply "Macros") by the CPU, much like a 20th century combat video game. Depending on the complexity of the Heavy Gear model and its agility, the joystick can be laden with gadgets and additional controls, making more Macros available to the pilot.

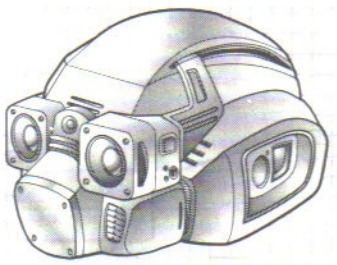
Fine manipulator control is achieved through a small "waldo" harness placed on either side of the seat. Some models use datagloves instead, although their performance is similar to the mechanical waldo harness. The waldo/datagloves system is only used when fine dexterity is required, since standard combat routines have long since been designed for grabbing and lifting using the manipulators.

Customized Grips

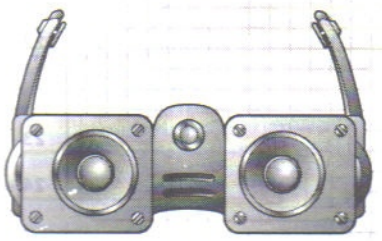
It is crucial that the joysticks of a Gear feel comfortable. Many soldiers have a specialized grip molded to the exact specifications of their hands. Although this is not standard practice, officers have no problem with it because customized joysticks generally increase the pilot's performance levels.



STANDARD HEAVY GEAR PILOT HELMET



HEAVY GEAR PILOT HELMET W/HOLOPROJECTOR



RETINAL HOLOPROJECTORS

Information Display

Early Heavy Gear designs had holographic screens and HUDs to display battle information. This was grossly inefficient as it left blind spots and divided the pilot's attention between several panels. The system was also bulky, further reducing the limited space available in the cockpit (early Hunter pilots were often chosen for their small body size).

With special laser-crystal screens inside a slightly enlarged helmet, the VR system feeds the pilot information processed by the CPU and its visual sub-processor. For all intents and purposes, the trooper can see as if the cockpit were open to the outside. The visual sub-processor automatically redirects the camera array to compensate for changes in position of the eyes, providing a shifting, nearly 270-degree field of view (a camera lens typically only covers about 170 degrees). The remaining 90-degree arc is monitored by the computer, but can be brought to the pilot's attention by a simple vocal or manual command. Sometimes, the helmet is slaved to this function, rotating the entire field of vision when pressure is applied to the helmet's outer neck sensors.

Relevant tactical and battle readouts are superimposed over the landscape by order of priority. Small movement indicators and ID tags enable the pilot to keep track of many targets and can even identify mission objectives. Ranges are indicated beside items, although this option can be modified or deactivated to reduce the visual clutter. A popular alternative is a "range color," where a small distance icon changes color or shade according to the range. The readout can be customized to the pilot's preferences by modifying the display software's parameters. This is done via a small datapad, usually placed on the cockpit wall (a few models have a completely independent datapad that is simply plugged or radio-linked into the control panel). Even more sophisticated helmets using retinal holoprojectors are also in use. The information is projected directly into the eye of the wearer. They are lighter and more comfortable to wear for prolonged periods of time, but they are also more expensive than standard helmets.

Holoscreen

Holoscreens are used for most data displaying applications. While they are not true three-dimensional screens (you must be in front of the display to see what is on it), holoscreens offer limited depth perception as well as perspective. A multi-layered, laser-reactive crystal plate serves as the support for a high speed laser imaging array which literally "paints" the images on the crystal layers.

Holoprojector

Holoprojectors are a more sophisticated version of the holoscreen. Instead of using a permanent, fixed crystal support for displaying the image, the holoprojector uses its environment: any gaseous or liquid medium will do. The resulting image is of lower quality when projected on gases, but thick liquids offer excellent support for a properly calibrated imaging array.

Central Processing Unit

The "brain" of the Heavy Gear is the Central Processing Unit, or CPU for short. It is a small, semi-transparent, 15 cm cube filled with an intricate lattice of molecular-sized neural networks. This network is so complex that it cannot be repaired if damaged, and must be replaced by a new unit. CPUs are built in completely automated factories. Few errors occur since all operations, from laying the basic neural paths to final testing, are automated, resulting in a comparatively low price for such advanced electronics.

The finished network is encased in a special shock-proof polymer or composite case fitted with a fiber-optic connector and an optic chip jack for customized software chips. This case is normally installed under the pilot seat in the chest of the Heavy Gear. It can be easily removed by reaching under the seat and releasing the connections, and is always the first piece of equipment salvaged when a HG is destroyed or damaged beyond repair.

The CPU's neural network is able to learn and establish new connections within itself. This allows non-linear logic processing as new parallel paths are created to handle computing tasks. This ability for "fuzzy," or open-ended, logic makes the CPU much better at handling the complex body motions of the humanoid Heavy Gear than other "standard" neural networks and computers. A CPU first learns to walk in a special training body before being installed in a HG for final "training" by a certified technician. The resulting low-level Artificial Intelligence handles the actual actions of the mechanical body, responding to the control inputs of the pilot (see Control Apparatus, previous page).

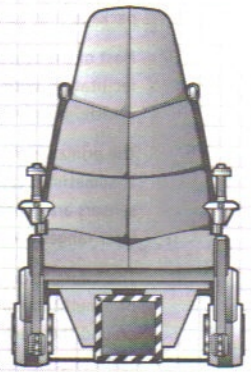
A standard Heavy Gear CPU is not self-aware, although it often gives the impression that it is. It can only respond to simple one- or two-word verbal commands or combat inputs from the cockpit, or follow a simple work routine. Old surplus Heavy Gears can sometimes be seen performing menial or construction tasks in military forces. They cannot move or initiate actions by themselves, although some very complex CPUs have been known to override the security subroutines to take actions of their own in very specific situations (for example, to avoid blows or to protect an unconscious pilot).

CPUs that serve for a long time with the same pilot, in the same Gear, sometimes develop an "affinity" with their controller, much in the same way a dog gets used to its master. Pilots of such machines often comment on the faster control response and all around improved performance. Heavy Gears with this kind of CPU are often referred to as "Warhorse," "Old Dog" or sometimes "Buddy" — depending on the locales and the forces employing them — but the most common term is, by far, Warhorse. Needless to say, a pilot will do the utmost to salvage such a CPU should his vehicle be wrecked (see removal procedure diagrams at right).

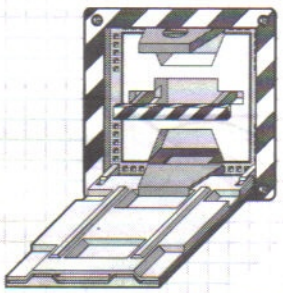
"Relocated" CPUs don't fare as well as new ones, though. Used to a certain type of machine, often a specific one, a CPU will have to accustom itself to its new body. This can take anywhere from a few hours to a few days, depending on the skill of the technician in charge. Other factors to take into consideration are the configuration of the new Heavy Gear and its model type, and how close it is to the original body.

Problems also arise when a new pilot is assigned to an older machine. There is almost always a period of slightly lower performance as the machine lets the pilot act, to better evaluate his/her skills and combat attitude. The Heavy Gear will then appear sluggish and reserved, even timid. If such problems persist over several assignments, many technicians prefer to simply wipe the CPU using a controlled energy pulse to break down the neural paths and reset the system. This is called a "mercy killing."

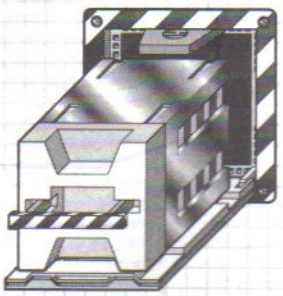
CPU EMERGENCY REMOVAL PROCEDURE



1) Reach under seat



3) Open shock-proof hatch. Release security locks (2) and unlock main CPU handle



4) Pull CPU out of compartment

A Quick Escape

To a veteran Gear pilot, there is little more precious than the CPU of his assigned Gear. It often contains years of training and combat experience which can save the life of the man behind the controls many times. One famous story recalls how a pilot, whose base was under attack, ran out of the barrack and escaped to the nearby town with only his CPU in tow — while completely naked.

Mercy Killings

Mercy killings, although sometimes made necessary by the limitations of neural net technology, are regarded as a grim task by most technicians. There is a tendency amongst people who work for a long time with Gears to start viewing them as living beings rather than inanimate machines. Resetting the NNet is somewhat akin to killing the "personality" within. One technician has compared the experience to putting a wounded riding springer out of its misery.

Pilots find it equally upsetting, especially if one's Gear is the one being wiped. Many armed forces have developed informal rituals around mercy killings. These vary from army to army (and even from base to base), but they almost always take the form of a monumental toasting at the nearest bar. Such rituals are rarely explained to new recruits — the veterans reckon the youngsters would not understand.

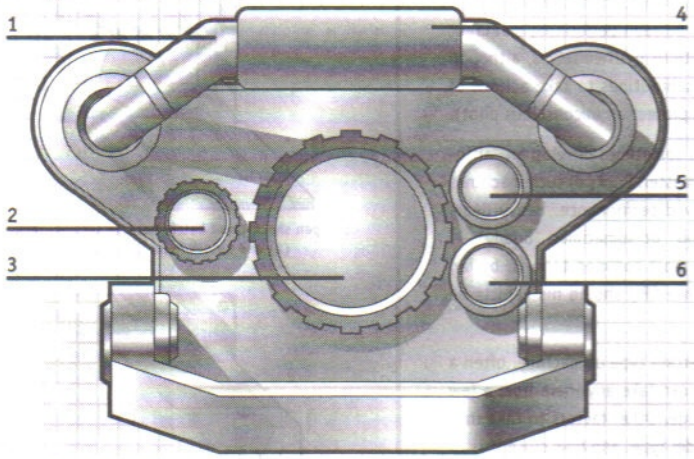
5.2.3 - Sensor Systems

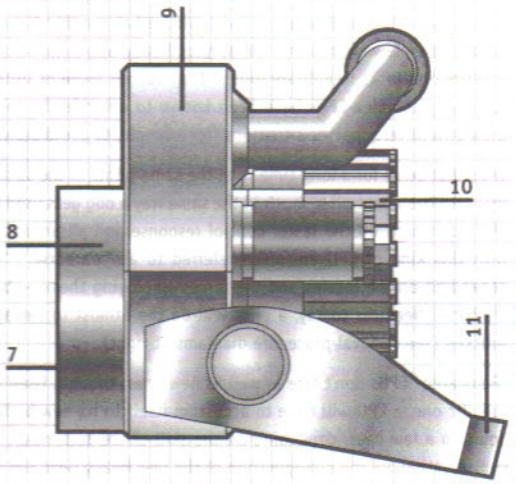
Gears carry a variety of sensor systems that allow both their main CPU and their pilot to relate to the outside environment, both in and out of battle. Without sensors, the pilot would not be able to find his targets, and the Gear would not even be able to move, much less fight. Since Gears are supposed to be inexpensive and easy to maintain, most designs carry only a minimal (but efficient) sensor package that can accomplish both tasks at once.

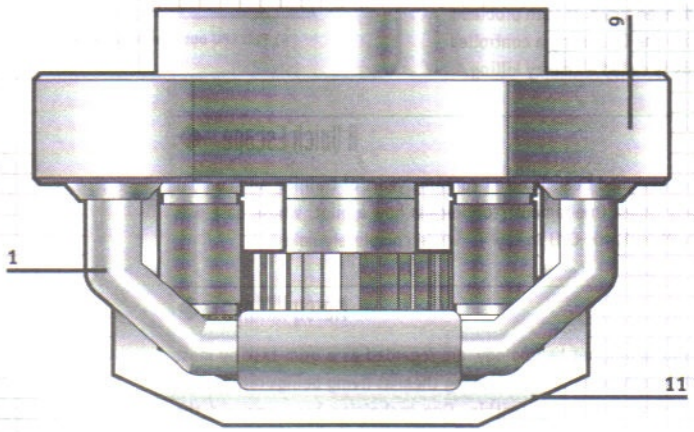
Most of the sensors and their interpretation circuitry are built upon the "black box" and "plug-in" principles, further lowering costs and facilitating both maintenance and upgrades. The sensors and their associated systems are located throughout the structure of the vehicle, coupled with the computer network of the vehicle by high-speed fiber optic links.

The primary sensor system is a small cluster of digital omnicameras, often placed together in what could pass as the Gear's head (what is sometimes called the "canopy" or the "helmet" by technicians and pilots). To facilitate repairs and maintenance, the basic visual sensors are generally mounted on a single articulated plate and armored as a whole. Most models use only one main camera, relying on laser rangefinders and "dumb" stereoscopic cameras for range and depth measurements.

The information so gathered is first processed by the CPU's visual sub-processor, colloquially called "ViSup," "Eyebrain," "Vision Chip" or a multitude of other slang terms depending on the technician in charge. The sub-processor assembles a digital portrait of the world around the machine based on the input of all the cameras. The CPU then combines this information with that from the other sensory systems (see further) to control the Gear's body and perform the actions required by the pilot.







HUNTER MAIN SENSOR CLUSTER

Most of the primary sensors of a Gear are grouped together in the main sensor cluster, a modular assembly attached to the head or upper body of the machine. The cluster is mounted on an articulated powered mount which allows a limited range of movement, although orienting the sensors often requires moving the head. On many Gear models, the sensor cluster is attached to a rail which enables it to be moved through an arc of almost 180°. The exact shape or capabilities of each sensor differ from model to model, the listing below is fairly average.

1- ..... Crash bar
2- ..... Infrared sensor
3- ..... Omnicamera
4- ..... Padding
5- ..... Laser rangefinder
6- ..... Laser scanner
7- .. Fiber optic data line plugs
8- ..... Connector housing
9- . Articulated mounting plate
10- ..... Armored lens housing
11- ..... Sensor crash guard

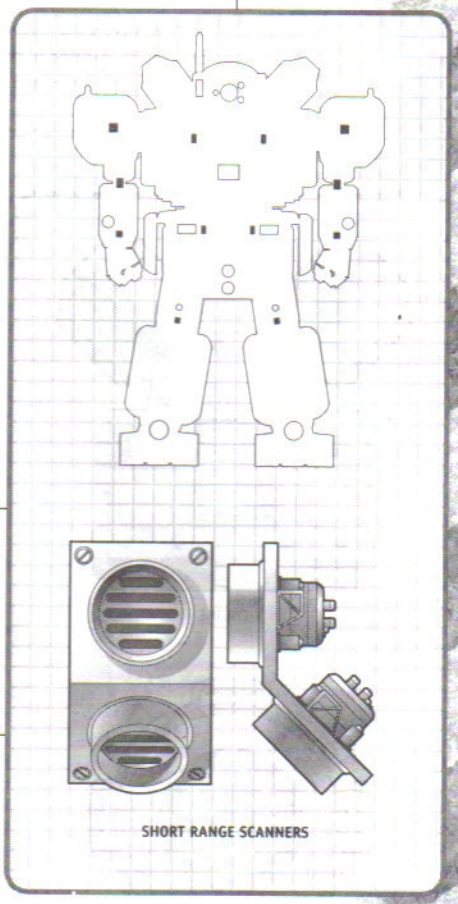
Note: wiring and actuator mounting points omitted for clarity.

Main Sensors

A Gear's sensor package is generally centered around one high resolution omnicamera. Zoom function is standard, although the range depends on the quality of the camera, its lenses and the image enhancement software. Sometimes, a dedicated telescopic lens is added to the camera mount. Light amplification and anti-dazzle protection are usually standard, and a small infrared camera is often mounted in tandem with the main sensor. Ultraviolet and microwave scanners are sometimes used by mission-specific vehicles, but only rarely because of their cost and relative specialization.

A network of motion and vibration sensors are placed throughout the body in small clusters, mainly in the feet, waist and lower arms. Pressure sensors and short-range scanners are used in the feet to gauge the ground's relative softness. Manipulators also have pressure sensors in their fingers, although the repeated abuses they go through during normal use quickly put them out of alignment and often, out of commission.

A laser gyroscope, in conjunction with accelerometers and position sensors in the joints, determines the Gear's attitude and balance. Some older models use a simpler mechanical gyroscope that is unfortunately easier to fool and/or damage. Both types of gyroscopes fit in a 10 cm cubic box generally located behind the pilot's seat. The gyroscope is crucial to the walking movement of the machine, as it provides the CPU with the information it needs to properly maintain equilibrium.



SHORT RANGE SCANNERS

The Sensor Sphere

The term "Sensor Sphere" is often used to describe the area covered by a Gear's sensors. Although most people consider only the main sensor cluster located on the head, a Gear carries several additional clusters of cameras and other sensors distributed all over its body. These allow the CPU to keep track of the entire environment of the machine. In fact, the main stumbling block of the system is often the pilot, who in the heat of battle may disregard his machine's capabilities.

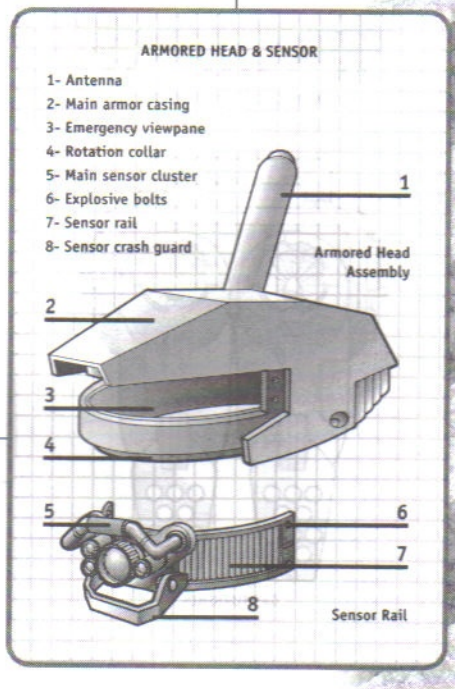
Gyroscope

The tiny gyroscope, hidden behind the pilot's seat in a small electronic bay, is crucial to the good functioning of the Gear. It provides the main balance information to the vehicle's CPU, information without which the Gear would have great trouble just standing up. The gyroscope can be reached from within the cockpit by extending a hand behind the seat, usually on the right side.

Secondary Sensors

All Gears also carry what are referred to as "secondary sensors," or sensors that do not serve a direct combat or movement purposes. The most common of these, found on practically all Gear models in existence, are simple microphones and loudspeakers mounted on the head unit of the machine. These are used when the cockpit is sealed to help the pilot hear what is going on outside and reply without having to open the hatch. Most of the time, a small and inexpensive sub-processor is added to filter out the noises produced by the machine itself. A few rare designs carry more advanced audio equipment, but increased cost and narrow mission profiles often restrict these models to specialist units.

Some types of Gears (almost always recon models) carry magnetometers, short-range high-resolution radar imagers and other advanced sensor equipment such as Geiger radiation counters. These sensors have limited combat usefulness but are invaluable when performing scouting actions or engaging in delicate engineering duties such as mine clearing. Many other types of sensor are also possible, though the above are the most common ones seen on Gears. The total amount of equipment that can be carried by a single unit is limited only by the funds and the miniaturization abilities of the designers. It is not uncommon to have specialist Gears covered with antennae and sensor pods.



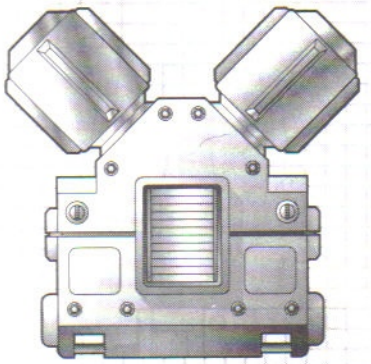
The Sensor Eject Function

Almost all Heavy Gears (and some other vehicles) are equipped with the Sensor Eject function, a last ditch measure intended to keep the vehicle in battle — or at least return to base — even after receiving major combat damage to its sensor array. The sensor array is designed in such a way as to cover an armored transparent viewpane. If the sensors are damaged or destroyed, explosive bolts eject the whole rig out, leaving the pilot with a small but manageable view of the world outside his machine.

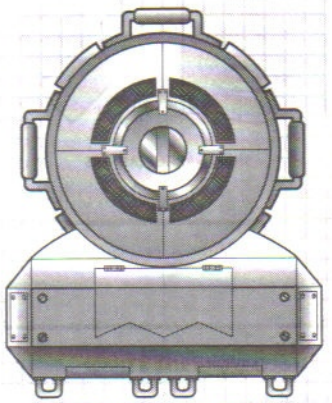
5.2.4 - Mechanical Systems

This section covers the mechanical systems that constitute the actual chassis of the machine and allow it to move about. This includes the powerplant, located in the backpack unit; the transmission, which includes the various means through which the power generated by the engine is transmitted to the various limbs and major systems; and the joints themselves.

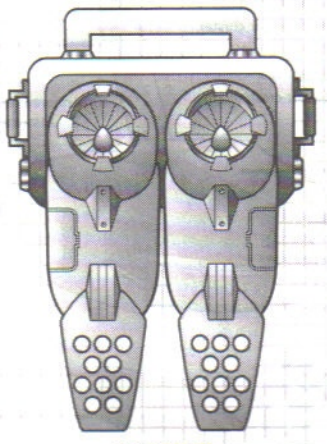
Powerplant



V-ENGINE



SUPER-CONDUCTING BATTERIES



GAS TURBINES

Most Gears use an advanced, very compact internal combustion powerplant called a V-engine. Based on designs developed at the University of the Colorado in the later years of the twentieth century, the V-engine — so named because of its shape — is a twin drive, air cooled powerplant with high efficiency and minimal moving parts.

The core of the V-engine is a support axle made out of high-strength alloy steel. It is truly only a bent bar of metal, and is the strongest part of the engine. Two cylindrical combustion chambers, which look a lot like a revolver's magazine, are slipped over this support axle. These chambers, per their peculiar internal shape, serve as piston housing, distributor cap, lubrication system and cooling fan, all in one. The engine's design thus provides two drive shafts, each delivering equal horsepower. A number of V-shaped pistons (the actual number varies between six and twelve depending on the model) rotate around the support axle, compressing the fuel-air mixture as they go, until the mixture is transferred to the combustion chambers and ignited.

The chambers rotate inside an outer shell made out of a high strength metallic alloy. The engine support pins are molded directly into the shell, as is the air intake. The end result is a fairly compact engine that is rugged, easy to manufacture and easy to repair. The small number of moving parts and the V-engine's ability to use a variety of fuels make it perfectly suited for Heavy Gears.

A few rare Gear models are powered by electrical motors fed by a bank of ambient temperature superconducting coils. The enormous cost of such a system, however, and its inherent limitations, make it unpopular except in specialized "stealth" units or as a back-up system. Its short operating range is also a problem that has yet to be solved. Electrically powered Gears are easily recognized by their distinctive backpack that contains the bulky superconducting capacitors, providing power to a single fluid pump (the generator is obviously not needed in this design).

Experiments were also performed with gas turbines, mostly in the proposed "Hover Gear" programs that have come and gone throughout the years. Some gas turbines have the added advantage of providing residual thrust that is used both for the hoverfans and a limited jumping capacity. Unfortunately, they tend to require extensive maintenance (at least when compared to the more efficient V-engine) and are more expensive to manufacture. Smaller gas turbines with no exhaust jet capacity have been used as back-up powerplants in several stealth designs, where they are used to recharge the battery array when the stealth function is not needed.

Unfortunately, no Terranovan fusion engine was ever made small enough to fit into a Gear — or any other vehicle smaller than a space shuttle for that matter.

Fuel

The advanced design of the V-engine enables it to use a wide range of fuels. As long as the fuel employed is gaseous or liquid and is reasonably combustible, the engine will function (although with a varying degree of efficiency). Of course, the use of improper fuel may result in a reduced deployment range and/or engine life.

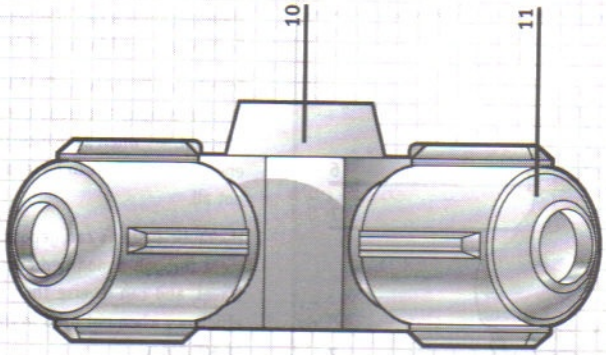
The best fuel is refined vehicle-grade gasoline or kerosene. This is not always available, however (especially when trapped behind enemy lines), and Gears have been known to run on fuels as diverse as natural gas, alcohol, machine oil, liquid rocket fuel and even industrial cleaning solvent! For rules on the effects of improper fuel, see page 153.

Refueling

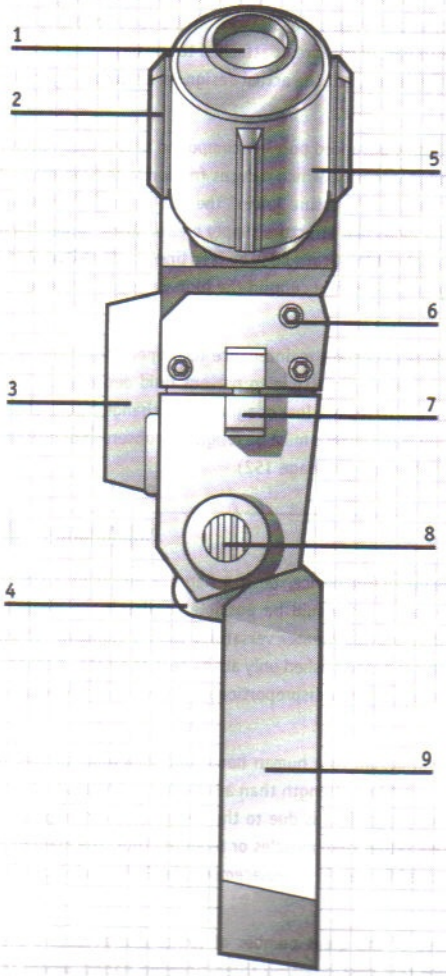
Most Gears carry their fuel within an armored, self-sealing tank located in the rear hip armor plate. The flexible fuel lines are located underneath, well hidden from enemy fire. The refueling ports (there are generally two of them) are also mounted under the plate, but near the side edges. Universal adapters allow the ports to fit almost any size of fuel hoses under 15 cm.

TYPICAL V-ENGINE BACKPACK HOUSING

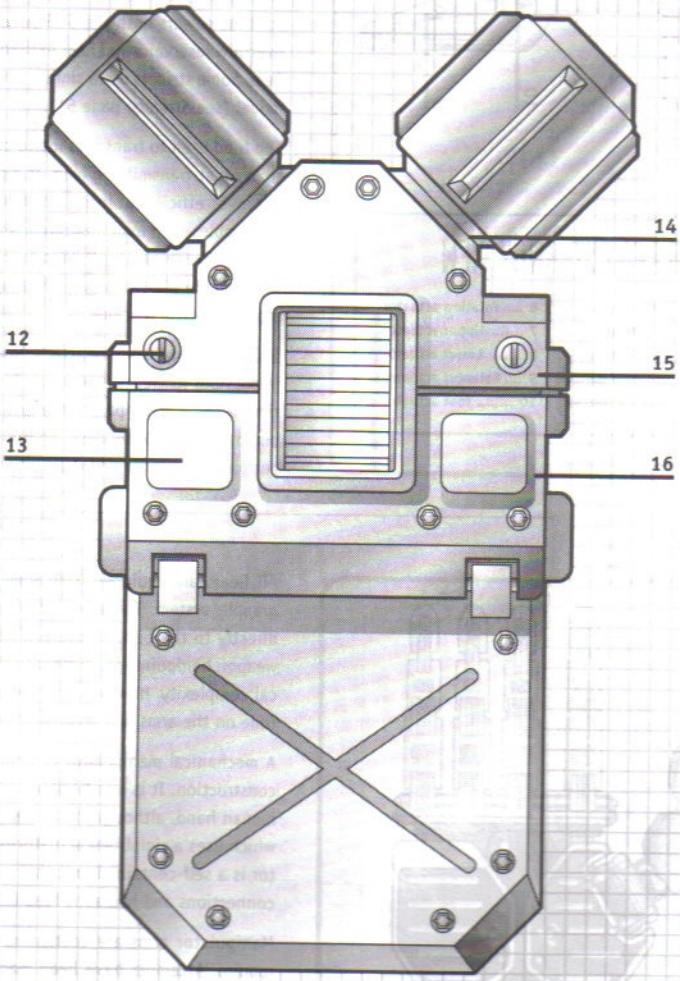
1 ..... Mesh cover	9 ..... Armored fuel tank
2 ..... Reinforcement rib	10 ..... Armored casing
3 ..... Main radiator	11 ..... Upper cover
4 ..... Fuel tank hinges	12 ..... Retaining latch
5 ..... Pump housing	13 ..... Battery access panel
6 ..... Retaining bolt	14 ..... Collar and gasket
7 ..... Connecting latches	15 ..... Upper casing half
8 ..... Multi-connector	16 ..... Lower casing half



TOP VIEW

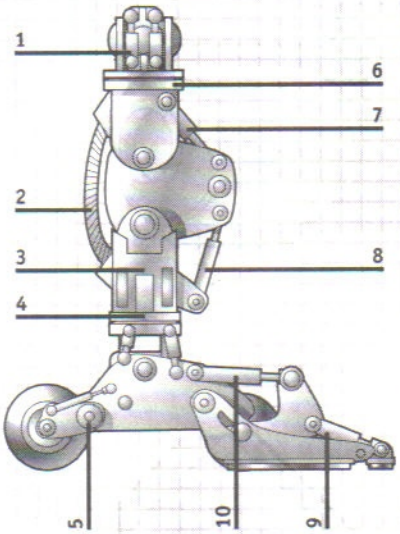


SIDE VIEW



REAR VIEW

Transmission



GEAR LEG CUT-AWAY VIEW

1 ..... Hip actuators	6 .... rotation actuator
2 ..... Power line	7 ..... Upper actuator
3 ..... shock absorber	8 ..... Lower actuator
4 ..... rotation motor	9 .... Balancer actuator
5 ..... shock absorber	10 ..... foot actuator

Transmission is a catch-all term covering the various pistons and motors that move the machine. All Gears use a combination of hydraulic and electrical power to move their limbs.

In a hydraulic system, fluid is used to transfer force from the engine to the limb. Since fluids are incompressible, and little energy is lost through friction and valve interference, the system is very efficient — when bench-tested. Unfortunately, the motions of a humanoid body waste a lot of energy. Some of it can be recovered (walking is a perfect example of partial energy reclamation), but not all.

Hydraulic systems can generate linear movement through the use of pistons, and rotational movement through a modified circular piston called a rotor. Rotors can have a finite or infinite angular travel, and can reverse their movement simply by inverting the fluid supply (pistons tend to lose efficiency when not used in the direction they were designed for). Gears and striders use both types of actuators.

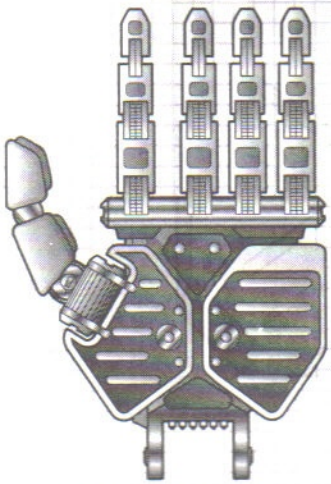
Rotation is sometimes accomplished by off-axis pistons, but this requires slightly more room and a greater number of mechanical linkages. This arrangement is mostly used for "side" or bending motions when internal volume is at a premium.

The hydraulic system is fed by one main pump attached to the engine by a computer-controlled gearbox to maximize efficiency. The second drive shaft of the engine is used for an electrical generator that powers both the SMS (when present) and booster pumps placed in the lower body. Valves, overflow reservoirs and heat exchangers are also part of the circuit attached to the basic frame of the Gear. Some striders use a similar actuator configuration, but the actual design varies according to the model (see *Striders*, page 51).

The fluid used to transmit motive power is a highly advanced polymer compound that is much better than oil at transmitting load. It also has a lower viscosity, which reduces friction in the system and improves efficiency. Technicians nicknamed the fluid "pressure juice." The red-brown fluid is non-flammable, even under high temperature — its molecular structure simply breaks down, producing a caramel-like mess. This fluid is distributed throughout the Gear's body by feed lines made of Duraplast, a composite plastic laced with alloy webbing that can safely contain the high pressures required for rapid, powerful motions.

Such a system, while relatively low-tech, requires constant maintenance to properly function. It is impossible to create a perfectly closed system, nor is it possible to prevent fluid degradation over time. Thus, a major part of the technician's work is to replace lost or aging fluid, change filters, check pumps and do a lot of cleaning up. Such routine maintenance must be religiously observed or else the performance profile will drop off sharply (see *Maintenance*, page 152).

Manipulators



HEAVY GEAR HAND ACTUATOR

All Gears are equipped with some sort of manipulator device, be it a hand, a pincer or a simple grapple system. These are not strictly necessary — it would be possible to attach the weapons directly to the body of the vehicle — but they provide greater versatility than a standard vehicle weapon hardpoint (see further in the text). This is accomplished only at the cost of greater mechanical complexity, however, and technicians usually spend a disproportionate amount of maintenance time on the arms and manipulators.

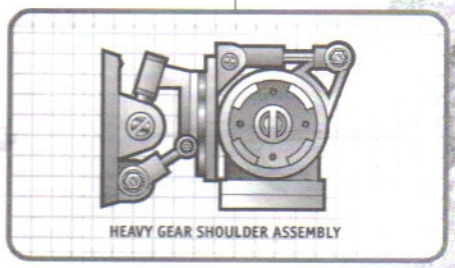
A mechanical manipulator is similar in general design to a human hand, but somewhat simpler in construction. It is less flexible and is able to exert less strength than a hypothetical equivalent-size human hand, although it can bend in inhuman ways. This is due to the design of the manipulator, which uses a simplified actuator-driven system rather than muscles or tendons. Thus, the manipulator is a self-contained unit that may be removed for repair or replacement simply by undoing a few connections and hydraulic feed lines.

Manipulator arms are costly, mainly because of the great number of joints and actuators they require. Attempts have been made to reduce this cost by using three-fingered hands, where the last three digits of a human-styled hand are fused into a single large one designed for holding, leaving the thumb and index for fine manipulation. Other types of manipulators, such as double-thumbed hands, are also often found on construction and heavy-duty machines for enhanced grasping capability.

Joints and Articulations

Most joints are simple, sealed ball-bearing axial mounts using self-lubrication technology to extend their useful lifespan. These are designed to resist great mechanical loads, both in torsion and tension. Magnetic-suspension bearings are also available, but they need to be shielded so as not to interfere with the sensor and radio arrays, making them a bit more expensive than regular bearings.

Joints in the lower body and high stress areas are also equipped with shock-absorber mounts, usually gas piston-spring combinations. A few advanced units employ polymer shock-absorbing sheathing for the joints, making for a more supple and agile machine. Unfortunately, this lengthens the maintenance downtime as the polymer's molecular structure breaks down, requiring that the sheaths be replaced after a few dozen hours of operation.



HEAVY GEAR SHOULDER ASSEMBLY

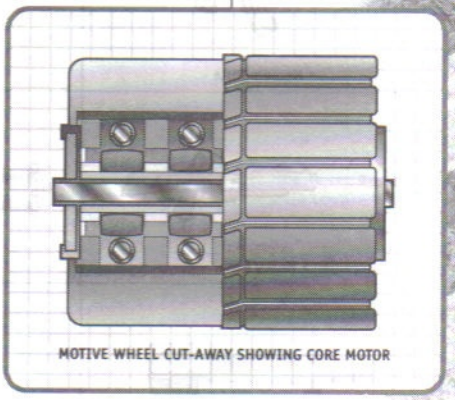
Secondary Movement System

Many Gears have more than one transmission system. This Secondary Movement System, or SMS for short, usually takes the form of wheels or treads placed under the feet of the machine. Although the basic concept may sound ridiculous, one cannot deny the immense increase in speed and efficiency, not to mention versatility, this brings to the Gear weapon system.

Most often, the wheels (or treads) use small but powerful electric motors powered by the generator attached to one of the V-engine's drive shafts. This means that any hit on the back or leg has a chance of cutting off the power supply to the SMS, reducing the system to mere dead weight. To prevent this, some high-end designs channel the SMS power through the structure itself.

Special commands "hardwired" into the CPU change the equilibrium equations to handle high speed "skating" motions. This function can be retrofitted as a software change, but is usually less efficient.

Because of the low ground clearance of the wheels, the SMS is only useful on flat, hard ground like packed sand or concrete. Some SMSs have larger wheels that can be used over broken terrain, but the price of this increased versatility is a bigger, thus more vulnerable, movement system.



MOTIVE WHEEL CUT-AWAY SHOWING CORE MOTOR

Armor - 5.2.5

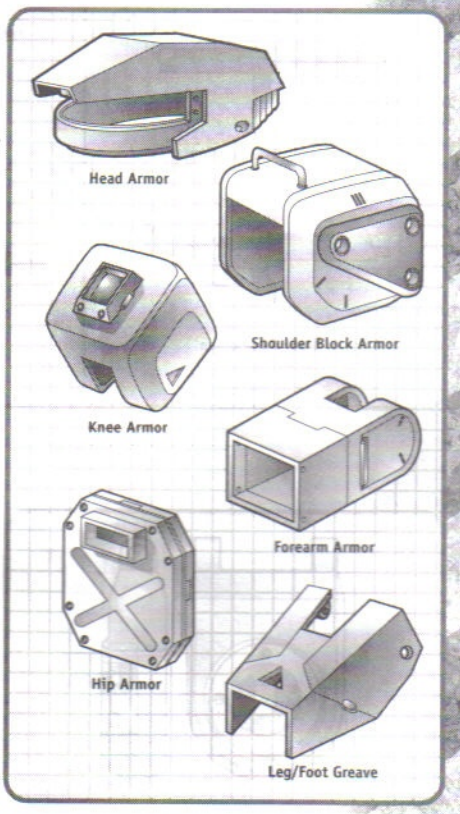
Gears use the same composite armor as all other war vehicles in the 62nd Century. Their tough outer shell is made up of laminated layers of highly resilient metal alloys and ceramics, carefully designed and applied to oppose a maximum of resistance to any type of energy striking them. Unfortunately, the Gears' versatile humanoid shape, so useful for maneuvering, works against them in the domain of physical protection.

Because the limbs of the Gear must have flexibility and a certain amount of space to move, mobile plates and occasional gaps in the armor protection are unavoidable. Some clearance between moving parts is necessary, too, meaning that one cannot just heap on plates or simply add on thickness in the hope of preventing this problem.

All the above factors combine to reduce the potential stopping power of the material used for the armor, leaving weak points that can be exploited by a skilled gunner. Such a complex system of overlapping plates either leaves little room for shot traps or open up plenty of them, all over the surface of the vehicle. Clever solutions have been developed over the centuries to try and improve the coverage, and to some extant modern walker designs are better protected than the ones fielded in the earlier days of the leagues.

As mentioned before, the average Gear carries several centimeters of composite armor. This affords them the same general level of protection as an armored infantry fighting vehicle, which is more or less what the Gear is: a one-man IFV. The thickest armor is found on the main body, the head and the two housings extending from the backpack, protecting the machine's vital area (in this case, the pilot and the powerplant).

Next come the armored casings used to protect the larger sections of the limbs, such as the legs, the forearms and the shoulders. These are often molded in large sections to facilitate repairs and improve their overall resistance. Finally, thinner (and lighter) plates, often mobile, are used to protect the various moving parts such as the articulations. When an armor plate is impractical, ballistic cloth is often employed instead, or the articulation is simply reinforced to withstand incoming fire.



5.2.6 - Weapons

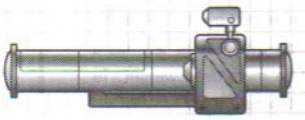

• Light Rifle


• Sniper Laser Cannon

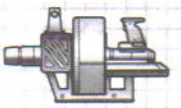

• Medium Rifle


• Light Grenade Launcher


• Heavy Rifle


• Guided Mortar


• Medium Bazooka


• Heavy Grenade Launcher


• Deployable Pack Gun


• Medium Autocannon


• Light Autocannon


• Heavy Autocannon

Gears are rarely designed with built-in weaponry only. The humanoid shape, complete with grasping manipulators, makes the Gear a very versatile tool that can support a wide variety of offensive systems. Nonetheless, it is an accepted practice to standardize a Gear's armament for ease of maintenance, going as far as altering the unit's identification code to reflect the payload being currently carried.

Basic Layout

The typical Gear armament consists of one main weapon, usually hand-held in a rifle or pistol-like form. Rapid-firing, self-loading weapons are preferred, such as autocannons of various calibers or grenade/rocket launchers. The presence of manipulators on the arms of a Gear allow it to change hand-held weapons in the middle of combat and even to pick up enemy rifles (assuming they are not booby trapped, which is often the case).

The main weapon is almost always backed up by another weapon system with a very different but usually completing combat profile. This is generally an indirect fire system such as a rocket pod, guided missile or mortar, but some designs have been known to favor other projectile weaponry as secondary armament.

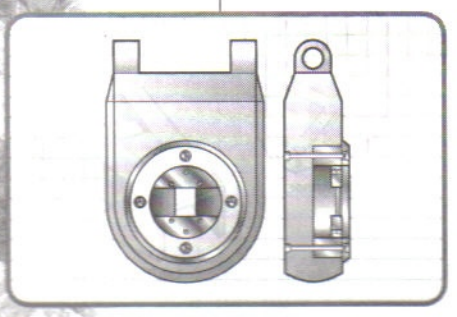
Very few Gears carry energy-based armament, however. Except for some of the larger assault or support models, Gears simply do not have the necessary power output for lasers and particle cannons. They must rely on power packs and heavy batteries, both of which limit their endurance in the field.

External Stores

In addition to the hand-carried main gun, Gears are equipped with hardpoint-mounted support weaponry to give them extra punch, such as a rocket pods located on or near the shoulder(s). Although a trained technician can install new equipment in minutes, such a change is not possible in the middle of a battle.

All Gears possess hardpoints on various parts of their body to accept additional equipment and armament. This often takes the form of either support items (smoke launchers, ECM generators, etc.) or a limited use, hard-hitting weapon for a one-shot-one-kill capability. This equipment can be simply bolted on, with control and power wiring being routed either through the armor or alongside it, but is usually carried in an armored pod to limit the collateral damage should the vehicle be hit.

Hardpoints



Hardpoints are reinforced tabs and pins placed on the hull of vehicles to enable additional weapons and equipment to be attached to the body without taking any interior space. This increases the payload potential of the vehicle as well as its overall versatility.

Most hardpoint designs are standardized to accept a wide variety of optional systems. In addition to the mounting itself, hardpoints have two jacks: one is the electrical feed while the other is the control circuitry feed. The whole assembly is attached via explosive bolts or quick-release connectors, enabling it to be dropped instantaneously if required.

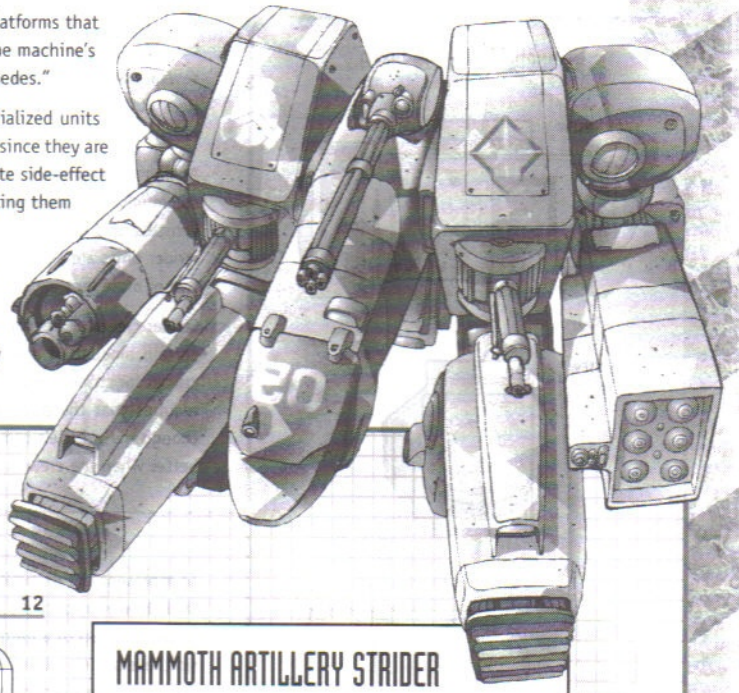
Most vehicles in Heavy Gear carry their armament on reinforced modular hardpoints, if only to simplify repairs. Hardpoint-mounted systems can be dropped at the cost of one action, but cannot be reattached on the field.

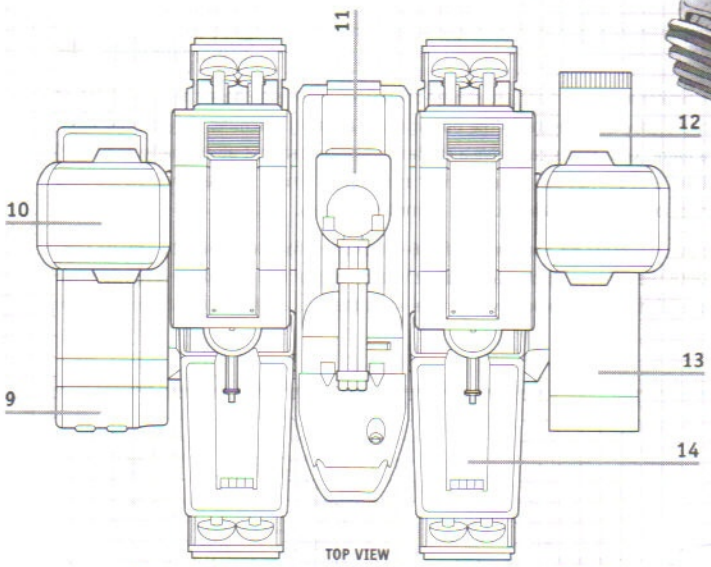
Striders - 5.3

"Strider" is the catch-all term used to designate non-humanoid weapon platforms that use legs for locomotion. The term is derived from the striding motion of the machine's legs. Low-slung, multi-legged walkers are sometimes referred to as "centipedes."

Although they are built using similar technologies, striders are more specialized units than Gears and lack their versatility. They can, however, carry more payload since they are usually bigger and have more powerful engines, but this has the unfortunate side-effect of making them easier to spot (and thus attack) on the battlefield, relegating them mostly to support and artillery purposes.

Most striders have four or more legs and are equipped with large foot plates. This enables them to carry more weight since there is more surface area to distribute it. A few smaller models have only two legs, but the enlarged feet are retained. Traditionally, arms and manipulators are rarely used, with weapon systems mounted on hardpoints and turrets.

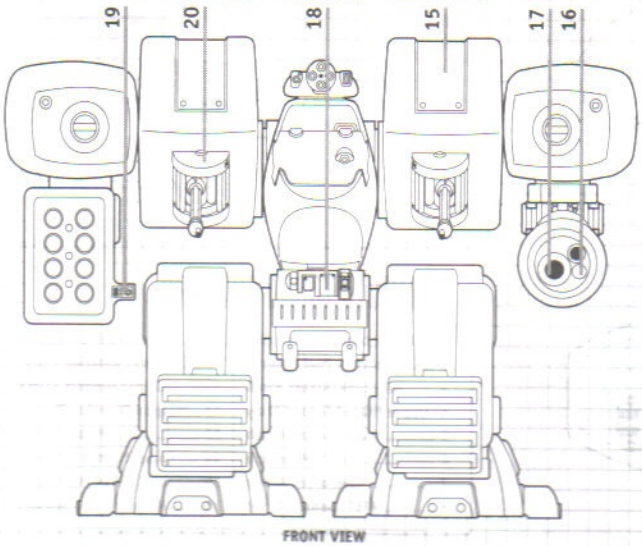




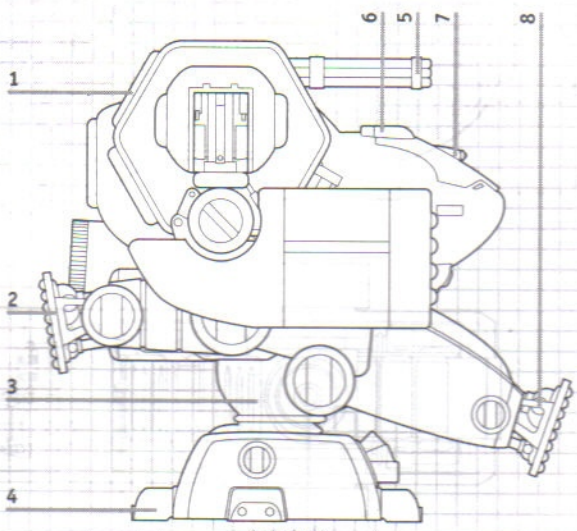
TOP VIEW

MAMMOTH ARTILLERY STRIDER

1 ..... Starboard torso radiator	11 ..... Autocannon turret
2 ..... Rear support plate	12 ..... Ammunition drum
3 ..... Ballistic cloth cover	13 ..... Snub cannon housing
4 ..... Articulated claw	14 ..... Upper leg casing
5 ..... 30 mm autocannon	15 .... Port torso access hatch
6 ..... Cockpit hatch hinges	16 ..... Targeting sensors
7 ..... Periscope	17 ..... Snub cannon
8 ..... Front support plate	18 ..... AFLIC sensor turret
9- .. Missile launcher housing	19 ..... Targeting sensors
10 ..... Shoulder block	20 ..... AP machinegun

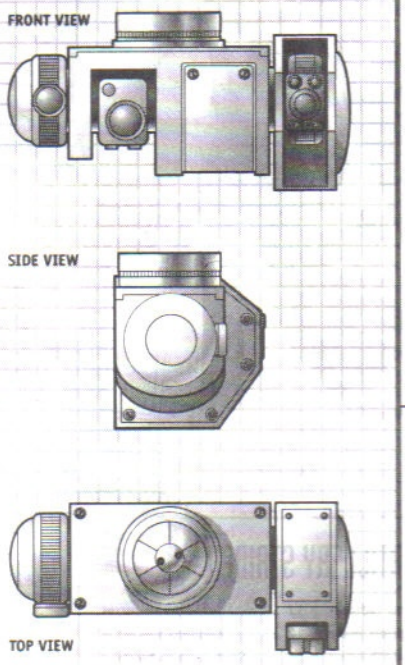


FRONT VIEW



SIDE VIEW

5.3.1 - Cockpits and Sensors



The smaller striders have a helicopter-style cockpit, with the crewmen placed one behind the other. Larger models are closer to tanks with a single crew compartment (called a combat chamber) with several hatches. Otherwise, the rest of the equipment is very similar to that found in the cockpit of Heavy Gears. Often, HUDs with large holoscreens are used instead of the expensive VR helmet apparatus.

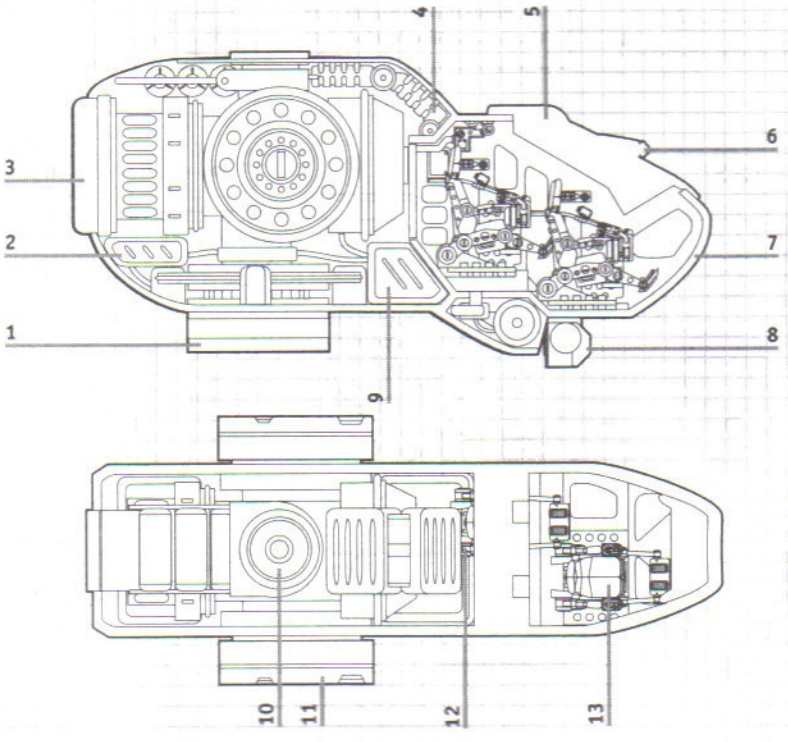
As might be expected, the sensor system is slightly more sophisticated, with radar and long-range communication capabilities available. Striders are sometimes used as battle coordinators or artillery vehicles, and the electronics carried vary with the design and the mission profile. Like Heavy Gears, strider units are equipped with a neural network to control the delicate balancing act of moving on two or more legs.

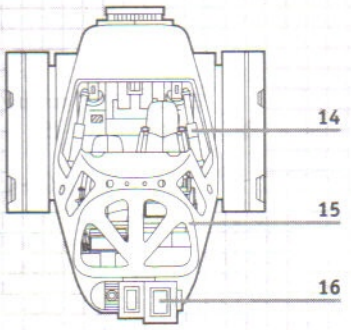
Strider crews are special as far as soldiers go. Although any multi-crewed military vehicle requires a certain amount of coordination and teamwork to function effectively in battle, synchronicity is crucial for strider crewmembers. The perpetual juggling act required by the machine's walking nature requires that the pilot and gunner(s) be "in sync" so as not to hamper each other's work. Even though the vehicle's computer will prevent any serious coordination problem, striders generally work better when the crew is used to working together.

Strider Operation ◆

To represent the dissimilar nature of Gear and strider operations, they each have their own Piloting skill. However, because they both relate to the operation of a walker machine, they can be interchanged — up to a point. Gear pilots can drive a strider and vice-versa, but at a penalty of two (2) skill levels (i.e., a level 3 Gear Pilot can drive a strider as if he had Strider Pilot at level 1). Gunnery skills, however, cannot be exchanged and must be learned separately.

A strider crew must train together for a minimum of 1d6+2 months before being able to operate their machine properly. Until they are ready, they are subject to a penalty of one (1) skill level (i.e., a new strider crew will have all its skills lowered by one level until the allocated months of training have passed).





MAMMOTH TORSO CUTAWAY

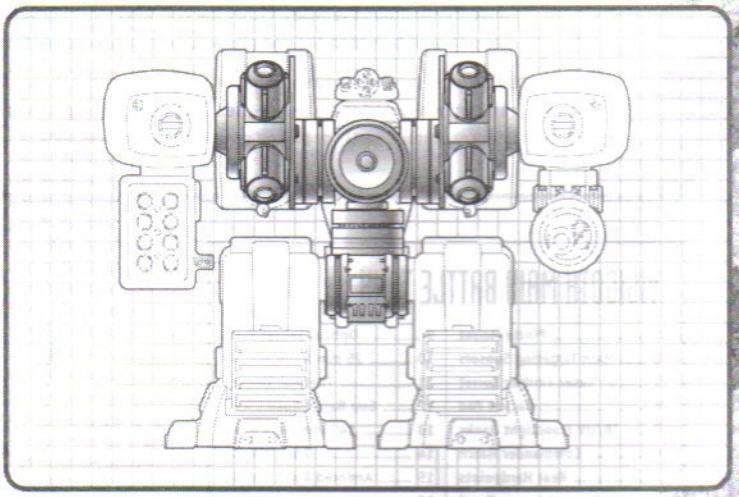
1 ... Upper torso support ring
2 ..... Secondary Fuel Reserve
3 ..... Heat Sink/Access Panel
4 Upper Phased Sensor Array
5 ..... Main Cockpit Hatch
6 ..... Pilot's Periscope
7 ..... Reinforced Armor
8 ..... AFLIC Sensor Turret
9 ..... Forward Fuel Reserve
10 ..... Turret Rotation Collar
11 .. Shoulder Support Frame
12 . Weapon Operator Station
13 ..... Pilot Station
14 .... Cockpit Hatch Actuator
15 ..... Torso Mainframe
16 ..... Main Imaging Sensors

Powerplant - 5.3.2

Striders require a lot of energy to move their mass around. While the big walkers rarely weigh more than a light battle tank, they still pack quite a few kilos in those armored limbs. The inertia alone forces them to apply considerable force and torque to move their limbs about with any kind of speed, which in turn requires a strong powerplant.

A larger version of the V-engine has been developed for heavy vehicles and many strider designs are equipped with it. Sometimes, several V-engines are hooked together to provide increased power and redundancy. Diesel engines are also a viable alternative, as are high capacity batteries (though this greatly limits the vehicle's autonomy).

Secondary engines are not unheard of, especially on large striders that require lots of power in their limbs. These secondary engines drive booster pumps and are generally electric motors powered by either a generator located in the main body or superconducting loops placed within the limbs.

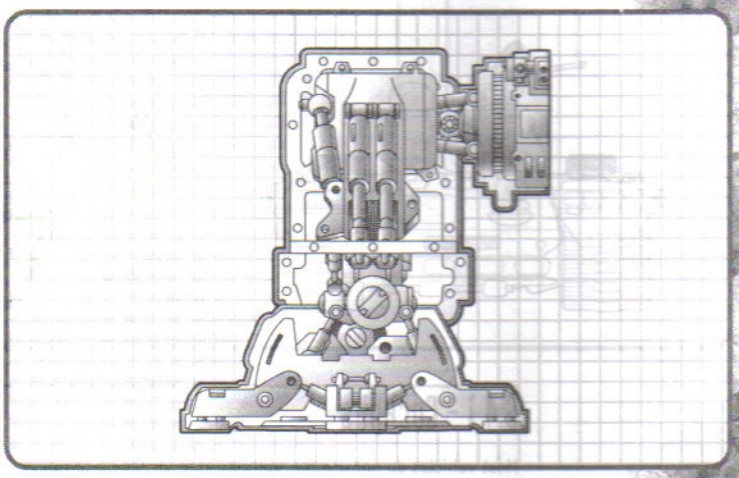


Transmission - 5.3.3

Striders share the same general transmission system as their smaller walker brethren, only stronger and more rugged. Hydraulic fluid is compressed and used to power great actuators that do the actual work, assisted by smaller motors distributed through the frame.

The internal layout of the joints, frame and actuators is slightly different from the configuration used in most Gears because the movement ranges are not quite the same. Striders tend to have longer moment-arms to provide the necessary power to their limbs without having to resort to impossibly huge engines, and this tends to be reflected in their outside appearance.

The actuators are larger and more powerful versions of those used in construction machinery. An interesting concept was found that increased battle survival: grouping several small sub-actuators into an armored sheath instead of relying on a single large piston. Thus, should the actuator be damaged, only a fraction of the total motive power is lost, rather than all of it.

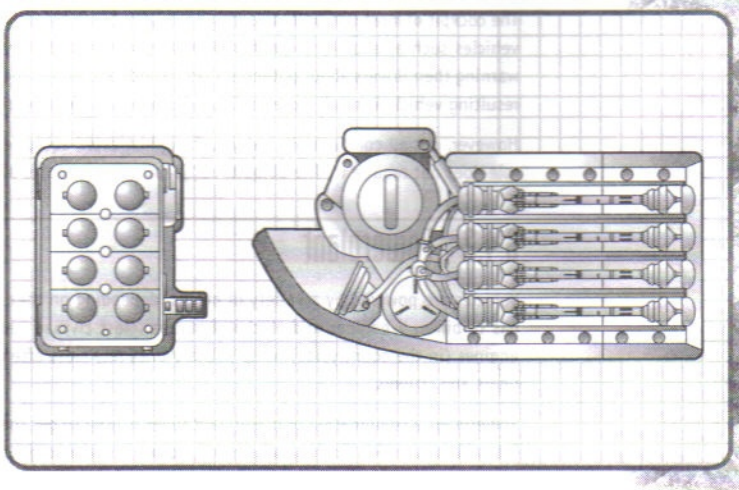


Weapons and Armor - 5.3.4

Because they are inherently more stable and powerful combat platforms than Heavy Gears, striders are able to carry heavier weapons and armor. Striders are commonly used as artillery carriers in regions where a tracked or wheeled carrier would bog down and airlifting is impractical.

Striders are able to transport and use high recoil weapons. These are generally mounted on the main body to ensure the walker's stability (even then, most machines must stop and anchor themselves before firing). Small caliber guns are frequently placed in turrets for anti-personnel purposes.

Strider armor is similar in composition to that used on tanks and Gears. Massive cast plates are used to protect the limbs and the main torso from damage. Smaller plates are segmented and articulated to allow a wide range of motion, yet still afford considerable protection. Even then, the joints of a strider remain a prime target for hostile units.



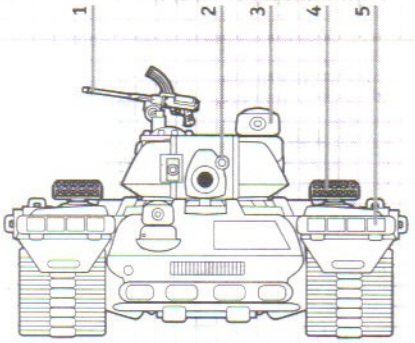
5.4 - Ground Vehicles

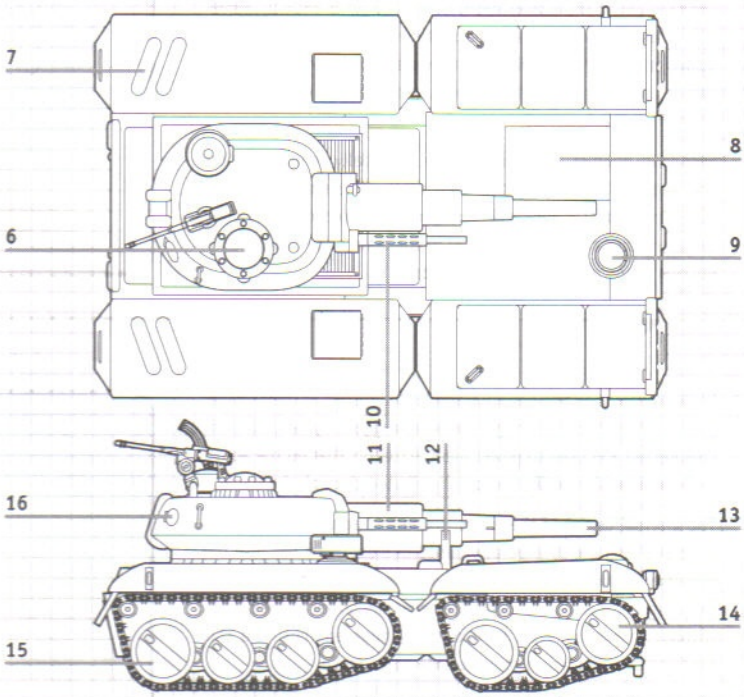
Conventional ground vehicles, either tracked, wheeled, or hover, are still widely used in the 62nd century. They are cheaper, sturdier and easier to maintain than the complex walker mechanisms of their more recent brethren.

Unfortunately, while they are superior on open terrain, vehicles fare poorly on broken or difficult ground. This has led to specialization: conventional vehicles are widely used for assault, transport and support duty while walkers are used either as powerful, highly mobile infantry units (Gears), or broken terrain transports (striders).

VISIGOTH MAIN BATTLE TANK

1 ..... Pintle Mount	9 ..... Optical Sensor Pod
2 ..... Main Targeting Sensors	10 ..... 25 mm Autocannon
3 ..... Laser Emitter Turret	11 ..... Thermal Sleeve
4 ..... Rocket Pod	12 ..... Gun Barrel Road Lock
5 ..... IR/UV Floodlight Banks	13 ..... 140 mm Field Gun
6 ..... Commander Hatch	14 ..... Drive Wheel
7 ..... Rear Hardpoints	15 ..... Armored Road Wheel
8 ..... Forward Access Panel	16 ..... Ejection Port





5.4.1 - Cockpits

Most vehicles do not use the sophisticated VR set-up of Heavy Gears because they don't need it. Either the crew has the means to look directly outside or it has a complete computer generated HUD to help operate the vehicle. Most tanks are equipped with a holographic display that is both easier to use and less cumbersome than Gear-mounted equipment. Sensory information is fed to the display using small sensor pods mounted on the hatches, turret or main body of the vehicle.

The cockpit of most line units ties into a neural network for increased control. Although the NNet is not specifically required for ground vehicles such as a tank, it was found that those that did carry one were better able to cope with the changing terrain conditions, warning their drivers about potential road hazards and improving the response time between the various parts of the transmissions. The resulting vehicle is much more useful and can maneuver more effectively in battle.

However, not all combat units carry such sophisticated equipment, either because of cost limitations or simply because their tactical role does not require it. The ubiquitous "jeep" or all-purpose, all-terrain vehicle is a good example of this design philosophy.

5.4.2 - Powerplant

Vehicles are powered by a variety of means, depending on their function. Common powerplants include internal combustion engines, gas turbines, V-engines and electrical motors. Most civilian vehicles are powered by electrical power (in large cities) or simple fuel engines (in the countryside) while military ones rely most often on advanced ceramic gas turbines and V-engines similar to those on Gears and striders.

Sometimes, a combination of powerplant types is used to get the advantages of both. For example, several scout vehicles have both an internal combustion engine and electric motors in order to get the range of gas power and the low signature of electric.

Transmission - 5.4.3

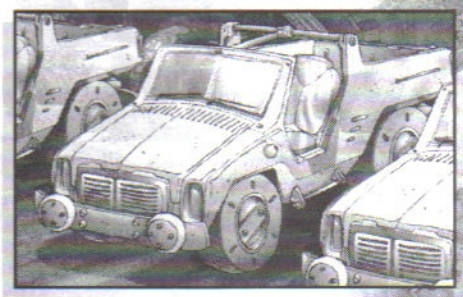
The great majority of fighting vehicles on Terra Nova are mounted on all-terrain wheels or treads. Advanced rugged suspensions and solid foamed-polymer core wheels absorb most of the shocks of off-road high speed travel, making military-grade wheeled suspension comparable to treads in performance (and in cost/complexity, unfortunately). Many front-line tanks have a hybrid suspension: they are mounted on road wheels that are quite capable of handling the vehicle's weight, yet are still surrounded by treads for enhanced rough terrain performance and reduced ground pressure.

Ground effect vehicles, although useful in the large deserts of the Badlands, have the unfortunate tendency to kick up lots of dust, making them hard to conceal. GE vehicles are most often used for quick transport between towns, both by military forces and civilians. Their ground-effect skirt, made out of multiple layers of composite cloth, is segmented and self-sealing.

Wheeled ◆

The wheel was one of the earliest and most useful inventions developed by Mankind, and it endures to this day. Wheeled vehicles are simple and cheap to produce, and consequently very popular and widespread. Out side the city-states, Terra Nova is still very much a frontier world, characterized by rough conditions. Super-highways exist at the poles, but they have a hard time crossing the desert Badlands, not to mention swamps and mountains. Most Terranovan wheeled vehicles hence have sturdy off-road suspension, making them suitable to the rough environment of the planet.

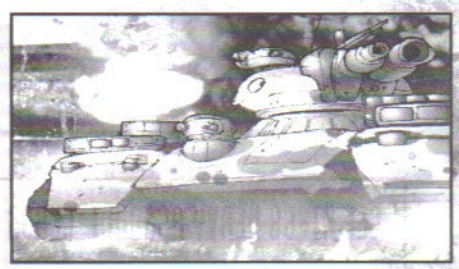
Badlanders are especially demanding on their vehicles and even off-road suspension has its limits. Many desert dwellers use tracked vehicles or riding beasts instead. Traditionalist prefer animals simply because they are low maintenance.



Tracked ◆

The problem with wheels is that they do not fare well on rough surfaces. Tracked vehicles solve the problem by effectively carrying their own road wherever they go. The road wheels drive wide articulated bands of metal elements called treads that distribute the weight of the vehicle over a wider section of the ground.

Tracked vehicles are more complex than a basic wheeled suspension, however, making them more prone to break-downs and meaning they require more day-to-day attention. They make up for this because they can drive into more types of terrain than wheeled vehicles. Among everyday civilians, this is not a beneficial trade-off and tracked vehicles are rare; for those who have to get into rough terrain, however, it's the best deal around.



Hover ◆

Hover vehicles move about on a cushion of air created by powerful blowers between the hull and the ground. Multi-leaf skirts, often armored with segmented panels for increased resistance, are used to hold the cushion in place to reduce the replenishment rate and thus increase the fuel efficiency. Hovercraft maneuver poorly but are extremely fast. Since they ride slightly above the ground, they can go anywhere on clear terrain, including sand, water, plain, etc. Hovercraft are rarely used on Terra Nova, however, mostly because there are few terrains suited to their use: the planet features few large bodies of water, and its plains and deserts harbor many debris and jagged rocks that can tear into the air cushion. Hovercraft also kick up a lot of dust in the Badlands, making them a poor choice for military operations, and there are too many forests and slopes at either poles.

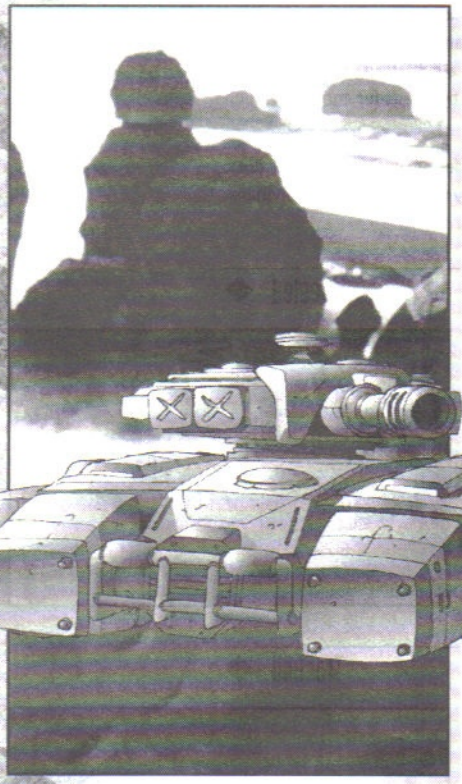


Weapons and Armor - 5.4.4

Vehicles can carry a large variety of offensive and defensive systems. Exactly what systems are used depend greatly on the vehicle's intended role. For example, a scout car will boast powerful sensors, but very little in the way of weaponry, while a MBT (Main Battle Tank) will almost always mount a large caliber gun or missile launcher.

Just like the offensive payload, the defensive capacity can vary a great deal between vehicles. Non-combat or light attack vehicles such as jeeps or RRVs (Rapid Response Vehicles) rely on the sturdiness of their alloy frames and their superb maneuverability to survive combat, while tanks and IFVs (Infantry Fighting Vehicles) sport several centimeters of layered alloy and/or composite armor designed to stop a hyper-kinetic penetrator dead in its tracks.

5.5 - Hovertanks



When Earth attempted to invade Terra Nova in 6120 A.D., the military forces of Terra Nova were confronted by hovertanks for the first time. Early reports led Terranovan generals to think that Earth had discovered anti-gravity during the many years of separation. This confusion was easy to understand since scouts reported tanks without treads dropping out of aircraft and shuttles and floating to the ground. Fortunately for the Terranovan defenders, Earth had not progressed that far.

The hovertanks were Earth's answer to the unknown conditions their troops would face on the colony planets. A standard tank chassis is mounted on two or more powerful turbofans similar to those used on VTOL-capable jets. Atmospheric gases are taken in through armored intakes located on the upper surfaces of the vehicle. The thrust generated is channeled through articulated nozzles placed around the hull of the tank, making it more maneuverable than normal ground-effect vehicles. Although the engines are powerful enough to actually lift the tank off the ground, the machine usually rides on a cushion of air created underneath its body by the shape of the tank's hull, using the extra engine power only to jump above obstacles that might stand in its way. The resulting vehicle is fast and reasonably agile, though its autonomy is quite low when compared to other types of fighting vehicles.

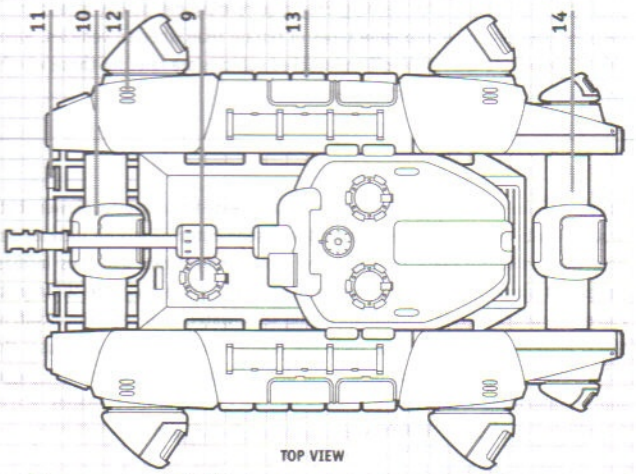
Hovertanks are combat units that are perfectly suited to the tactics and politics of the New Earth Commonwealth. They are fast and deadly, striking here one second, there the next. They were not exactly discrete, being awfully loud as they streaked low over the ground toward their target, kicking up clouds of dust as they did so. Hovertanks were the perfect war machines for an expansionist, aggressive government — but they make poor defensive weapons.

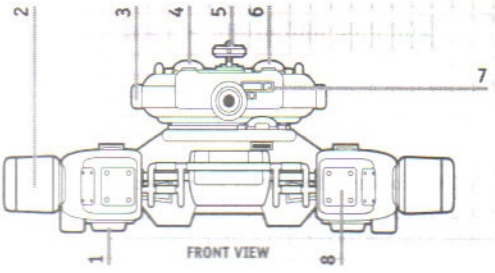
The first power Terranovan to use hovertanks was Port Arthur, a community of CEF expatriates who use salvaged HT-68s and other CEF models, usually stripped down with lesser weapons for easy maintenance. The Southern Republic has recently put into limited action its Scythian hovertank and the Humanist Alliance is also at work on its own model, developed with the help of Port Arthur.

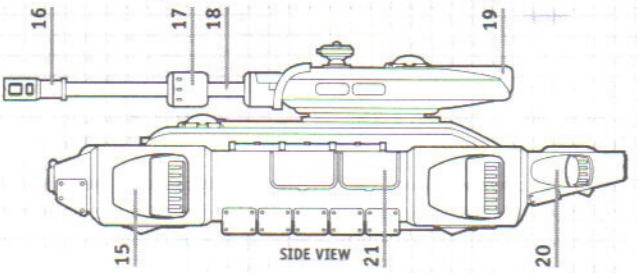
CEF HT-68 HEAVY ASSAULT-CLASS HOVERTANK

1 ..... Starboard front lift fan
2 ..... Starboard front thrust nozzle
3 ..... Starboard EM sensor array
4 ..... Commander hatch
5 ..... Optical sensor pod
6 ..... Tactical officer hatch
7 ..... Main gun targeting sensors
8 .... flight sensor and avionics array
9 ..... Pilot hatch
10 ..... Front airflow controller
11 ..... Crash bar
12 ..... Airflow sensors
13 ..... Starboard lift skirt armor
14 ..... Aft airflow controller
15 ..... Port front thrust nozzle
16 ..... Radiation shield emitter
17 ..... Drive coil power booster
18 ..... Particle accelerator
19 ..... Armored ring capacitor banks
20 ..... Port aft control nozzle
21 ..... Turbine maintenance hatch

Note: landing gear shown in retracted position.



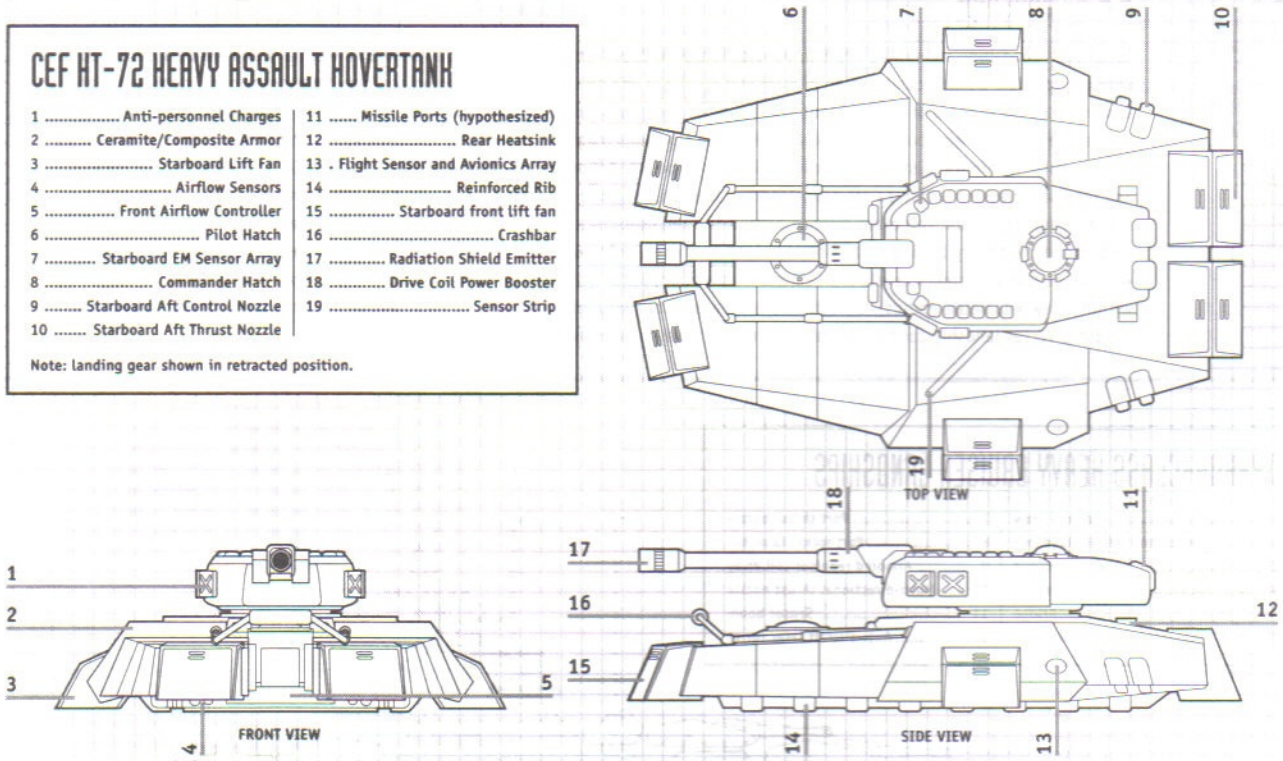




CEF HT-72 HEAVY ASSAULT HOVERTANK

1 ..... Anti-personnel Charges
2 ..... Ceramite/Composite Armor
3 ..... Starboard Lift Fan
4 ..... Airflow Sensors
5 ..... Front Airflow Controller
6 ..... Pilot Hatch
7 ..... Starboard EM Sensor Array
8 ..... Commander Hatch
9 ..... Starboard Aft Control Nozzle
10 ..... Starboard Aft Thrust Nozzle
11 ..... Missile Ports (hypothesized)
12 ..... Rear Heatsink
13 . Flight Sensor and Avionics Array
14 ..... Reinforced Rib
15 ..... Starboard front lift fan
16 ..... Crashbar
17 ..... Radiation Shield Emitter
18 ..... Drive Coil Power Booster
19 ..... Sensor Strip

Note: landing gear shown in retracted position.

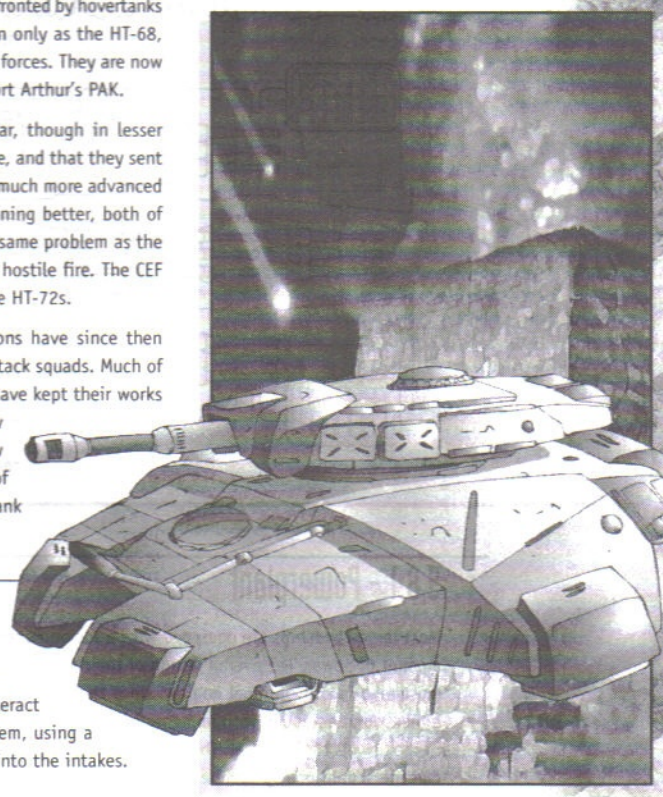


Deployment - 5.5.1

When Earth attempted to invade the planet in TN 1913, Terranovan forces were confronted by hovertanks for the first time. The main body of the force was composed of a vehicle known only as the HT-68, pictured at left. A few of the HT-68 hovertanks were left behind by the invasion forces. They are now either in museums or with independent local forces, mostly serving with the Port Arthur's PAK.

A second type of hovertank, known as the HT-72, was fielded during the War, though in lesser quantities. Terranovan strategists believe it is the NEC's present mainstay vehicle, and that they sent a few to round out the "old war stock" they loaded the CEF with. The HT-72 is a much more advanced combat vessel than the older model. Its turbines are stronger and its streamlining better, both of which contribute to a significant increase in speed. The HT-72 suffers from the same problem as the older HT-68, however, in that its control surfaces and exhausts are exposed to hostile fire. The CEF has likely used the industrial planet of Caprice to produce larger numbers of the HT-72s.

Taking a hint from their one-time adversaries, many of the Terranovan factions have since then attempted to copy the hovertank design for use in their own cavalry and fast attack squads. Much of the advances have been accomplished by the Humanist Alliance, though they have kept their works extremely secret so far. The Southern Republic has also managed to field a few hovertanks of their own, mostly variants of their Scythian design. There are few reports of progress by the Northern powers, however; whether this is because of technical set-backs or because they do not put as much trust in the hovertank concept as their Southern counterparts, is currently unknown.



◆ Tactics

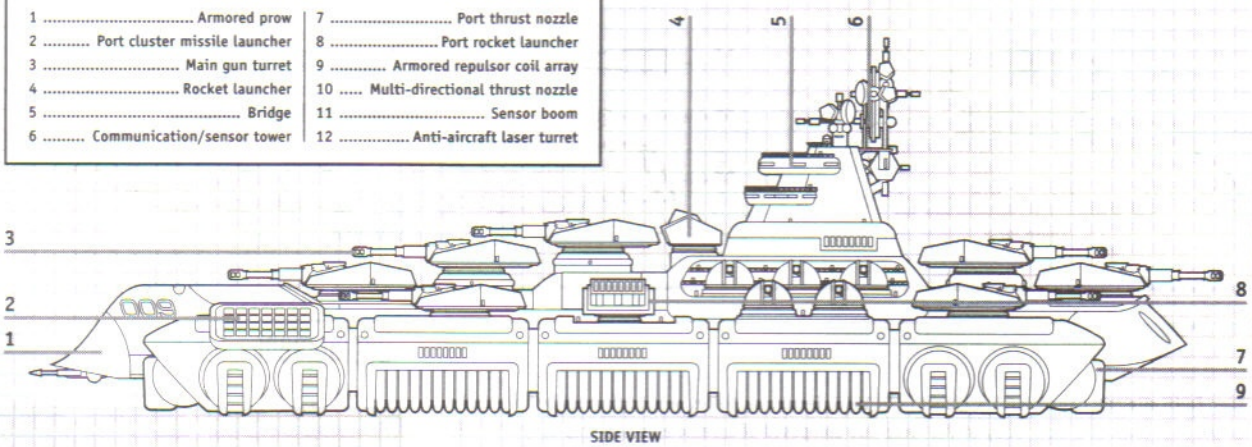
Most of the combat tactics used by forces deploying hovertanks are centered around hit-and-run strike where speed rules above anything else. Once their true nature was understood, many new strategies had to be developed to counteract the highly mobile vehicles. Heavy Gears performed surprisingly well against them, using a number of special tactics like throwing bags of corrosive Badlands white sand into the intakes.

5.6 - Landships

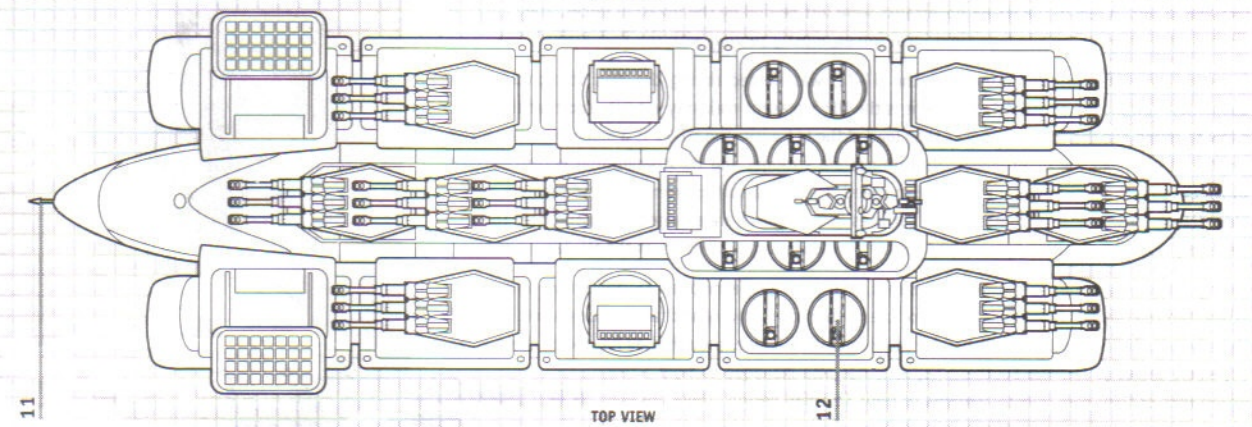
Terranovan Landships are quite a sight to behold. Together, they form the planet's equivalent of a wet navy and are best described as land-going ships. Using a combination of magnetic repulsion and ground effect technologies, these behemoths glide mere centimeters above the sandy surfaces of the Badlands and the polar savannahs, patrolling them as they would oceans. Landships would have been impossible anywhere else but on Terra Nova: the planet's peculiar magnetic properties, strengthened by the presence of large quantities of monopoles within its crust, allow considerable mass to be lifted if one knows how to generate and regulate the specific field required. The repulsor arrays of landships are calibrated precisely to avoid the deadly radiation and heat effects normally associated with high energy magnetic fields. The exact science behind the repulsors is still vague; it is said that only a handful of scientists ever fully understood the theory behind it, and new designs are merely extrapolations of their work. Most engineers agree that these repulsors work on deeper sub-atomic levels than simple magnetic repulsion (the energy normally required to lift such mass would fry anything within a few kilometers radius). Landships are expensive to build and maintain, so each league only has a few of the largest ones. Landship versus landship confrontations are rare and always very spectacular.

TYPHON-CLASS HEAVY CRUISER LANDSHIPS

1 ..... Armored prow
2 ..... Port cluster missile launcher
3 ..... Main gun turret
4 ..... Rocket launcher
5 ..... Bridge
6 ..... Communication/sensor tower
7 ..... Port thrust nozzle
8 ..... Port rocket launcher
9 ..... Armored repulsor coil array
10 ..... Multi-directional thrust nozzle
11 ..... Sensor boom
12 ..... Anti-aircraft laser turret



SIDE VIEW



TOP VIEW

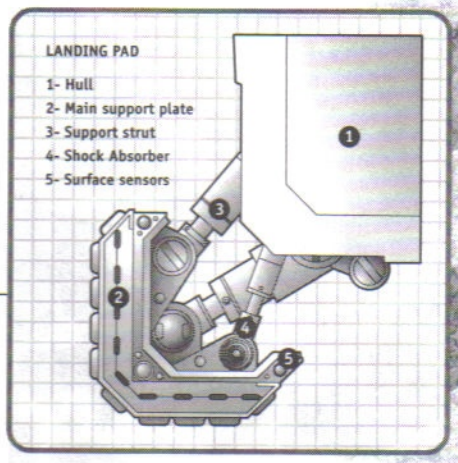
5.6.1 - Powerplant

Most large Landships are equipped with a fusion generator since their magnetic repulsors and immense turbines require an enormous amount of power. The overall design of their engine room is similar to the one found aboard space ships. Smaller Landships, however, must rely on conventional engines since their size precludes the installation of a complex fusion plant. These Landships have large boiler rooms equipped with immense turbines that drive the generators. All Landships have a large armored engine room located deep in the bowels of the vessel. The hoverfans and magnetic repulsors are mounted in separate compartments to prevent catastrophic chain damage should one system be damaged or destroyed.

Transmission - 5.6.2

Landships have massive hoverfans hidden under their armored hull. These only provide extra power for motion, however, as most of the lifting is accomplished by repulsor arrays that use the planet's magnetic properties to lift the vessel off the ground. These repulsors are heavily shielded and computer controlled to prevent them from interfering with the ship's internal systems and crew. Much of the repulsors' technology is derived from the science behind the fantastic particle accelerators and field generators of the Tannhauser Drive.

The underside of the Landship is heavily armored to protect the fragile repulsor coil elements. Even the fans and their intakes are shielded by mesh screens and thick baffles. Large reinforced pads are placed at many points to support the weight of the vehicle at rest.



The Danger Zone

The Danger Zone is the area directly below the landship's hull. It is called so because of the intense electromagnetic field generated by the ship's repulsor arrays. Although the field is fairly contained, ground crew are advised to wear protection when working near the hull. The Zone is one reason why Landship operations are usually limited to the Badlands and certain areas of the poles.

Cockpits and Sensors - 5.6.3

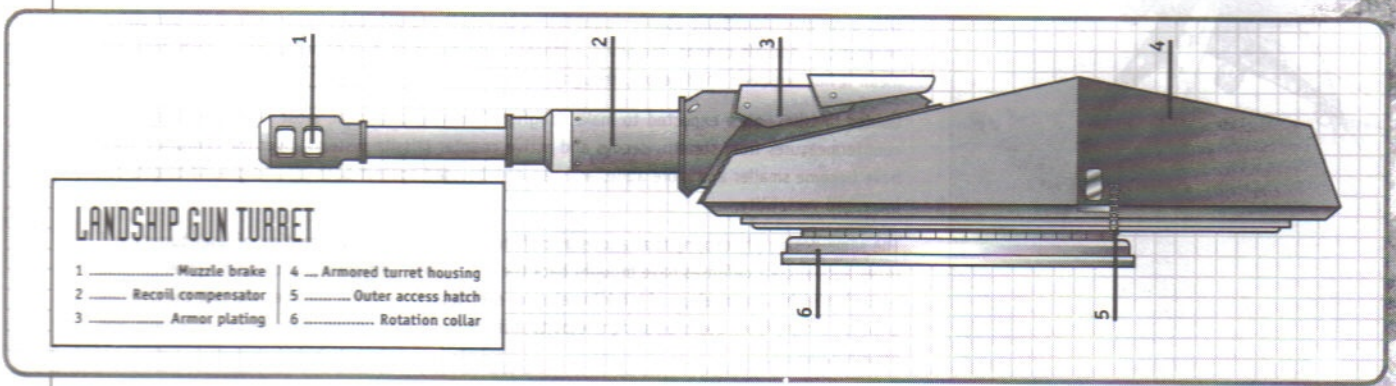
Landships do not have cockpits, but bridges. The bridge is usually located within a heavily armored "conning tower" located in the middle or rear of the ship, although some designs bury it in the hull for additional protection. The internal layout of the room is very similar to naval surface vessels of Earth's past, with piloting, navigation, sensor and command crew stations all grouped together around the captain and first officer's seats. Large holographic displays and computer-designed tactical screens fill the place, bathing the bridge and its crew in a ghastly electronic glow. See page XX for deck plans of typical bridges.

To provide the crew with the information it requires to function, Landships carry sophisticated sensor suites, often capable of detecting enemy units at great distances both on the ground and in the sky. Retractable mast-mounted "sweeper" radars and ladars provide excellent coverage of the surrounding countryside, while sensor pods located in armored housings in the ship's hull provide accurate and up-to-date information on the immediate vicinity. In addition to ship-carried sensors, many Landships have automated vehicle bays which house drones capable of flying deep into enemy territory.

Weapons and Armor - 5.6.4

Most of a Landship's armament consists of large projectile weapons and missile racks. Energy weapons, mostly anti-aircraft lasers, are sometimes used to take advantage of the powerplant's large energy reserve. Most of the armament is mounted in armored turrets to ensure a maximum field of fire. Often, the turrets can be lowered into the hull to protect the comparatively fragile weapons contained within, "popping up" only to fire.

Vehicle bays are built right into the hull, ready to disgorge their contents in the middle of the battlefield. Ramps, and sometimes cranes, are used to lower the vehicles to the ground. Landships are heavily armored, especially along their lower hull, to protect the fans and generators underneath. The destruction of these systems would not be critical, as the ship is barely floating above the ground, but it would completely immobilize it — not a good thing in modern warfare. Landships have often been likened to mobile bunkers. The heavier models can carry more than half a meter of composite armor on their turrets and sensor blisters, while the main hull can sport up to a meter (or more). Electronic countermeasure packages and point-defense weaponry complete the behemoths' defenses.



5.7 - Aircraft



Aircraft are still used in a variety of roles. Their general design has not changed much throughout the centuries. Planes of the 62nd century are lighter, more powerful and reliable, but they are still built along the same general lines as a 21st century vehicle. Airframes are sculpted with computer-aided techniques for better aerodynamics. Composites are used for most of the structure, while the engines are made out of ceramic components. The wings and/or rotors are able to slightly modify their shape to respond to outside conditions. All controls are routed through a "fly-by-wire" system, and planes can practically fly themselves.

Most if not all military aircraft are designed with stealth characteristics from the outset. Given the power and accuracy of modern sensors and weapons, aircraft and aerodynes are very vulnerable — once acquired, their chances of survival drop considerably. An aircraft's stealth characteristics go a long way towards ensuring its survival. The equipment generally varies from simple radar-elusive shapes and exhaust baffling to a complex and expensive absorbing skin that literally "drinks" the radar waves striking it.

The rules for designing flying vehicles are found on page 69 of this sourcebook. Military aircraft are often designed with the "Stealth" Perk to represent their radar-eluding shape and electronic equipment. Ratings vary from zero (civilian aircraft) to 5 (combat vehicles).

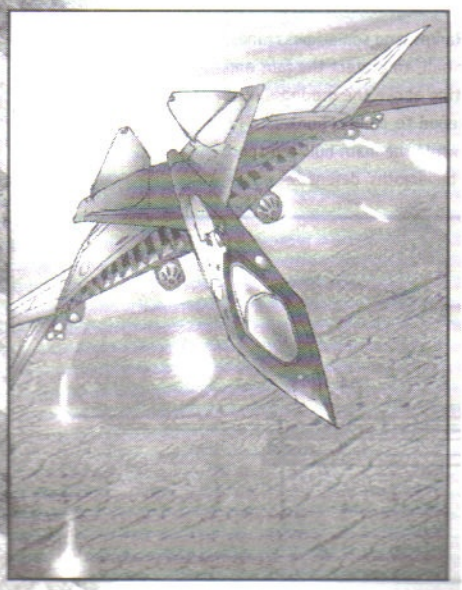
5.7.1 - Cockpit and Sensors

Aircraft, particularly combat ones, have greatly benefited from the advance of computer and data display technologies. Even the lowliest plane can now be equipped with a tiny flight computer, no larger than a matchbox, that monitors the health of the plane and assist the pilot in guiding it.

Modern flight displays are very similar to the ones used in ground combat vehicles, with ergonomically designed controls and several types of reprogrammable displays and HUD devices. Combat aircraft automatically integrate information from the aircraft's sensor systems and make them available to the pilot at the touch of a control. Some types of display even allow the pilot to fly the vehicle through a computer-generated environment, placing him "outside" the craft for a better view of both threats and surroundings.

Aircraft do have a great advantage over their ground cousins: their sensors and communication systems benefit from both a better perspective and a better platform to operate from. All those flat surfaces make great mounting points for electronic receptors, which are often woven directly into the outer skin of the vehicle.

5.7.2 Weapons and Armor



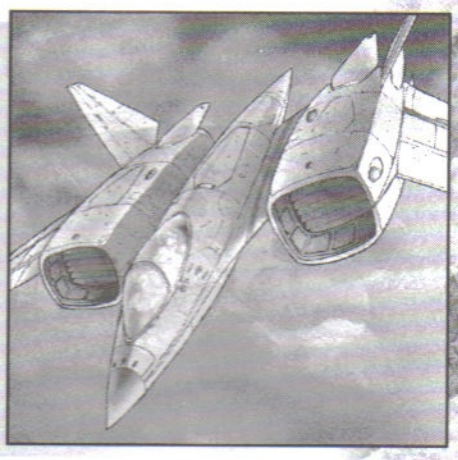
Mass remains, as always, a crucial element of aircraft design. For this reason, few aircraft carry actual armor, relying instead on agility and stealth to avoid damage. Some planes are fragile, flimsy things where toughness has been sacrificed for performance; others are built around extraordinarily tough structure that can take awesome amounts of damage before collapsing.

On the offensive side, payload is generally less varied than for ground vehicles. The usual standard consists of several missiles and at least one rapid-fire weapon, generally a projectile cannon of some sort. Bombs (missiles without propulsion systems) can be carried and dropped on enemy objectives with great precision. Some planes mount lasers, but their energy requirements make them somewhat impractical. Aircraft cannot, for obvious reasons, use melee or dueling weaponry (which does not mean it has not been tried before, though).

Guided missiles, once expected to make "dogfight" combat disappear, must face several layers of countermeasures from stealth, decoys and active counter-missile systems. Over the centuries, they have become smaller and more agile, and can now be used against both air and ground targets for increased versatility.

The same design philosophy that allows aircraft to survive the deadly attention of laser turrets and other anti-aircraft defenses have brought back the art of close -in fighting, with most fighter combat occurring within an envelope of ten kilometers or even less. Once more, the aces will rule the skies — until a burning laser beam or a high velocity missile bring them down, like Icarus, to a swift and dishonorable death.

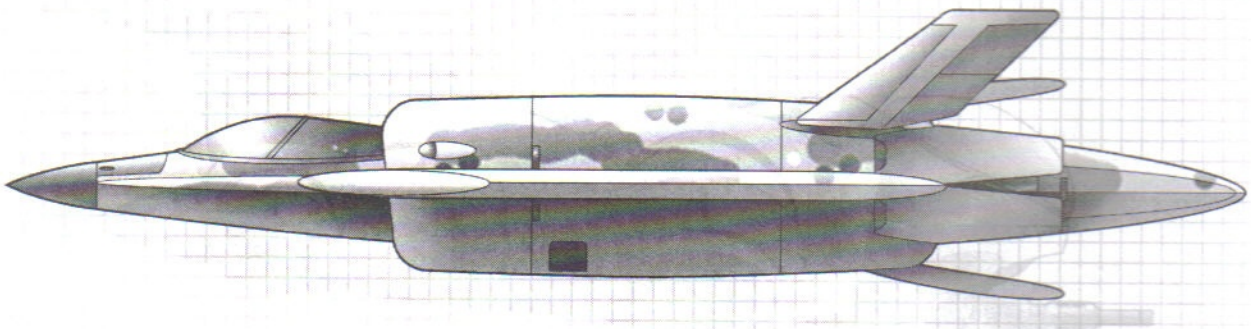
Conventional Aircraft - 5.7.3



The term "conventional aircraft" refers to the fixed wing designs that have been used by Mankind for the past few millennia. They are jet or turbine powered, with wings supplying the lift they require to stay aloft. Their main strength is endurance and fuel-efficiency, and they are thus preferred for long range transport, ground support and interception missions. This also makes them the fixture in the civilian market, with almost all civilian cargoes, passenger liners, and recreation aircraft being of the fixed wing type. Planetary weather conditions have made recreational flight relatively rare on Terra Nova, but it does exist. The Flitter one-man flyer is a popular sport vehicle, for example.

A few types of fighters can reach low-orbit by themselves by using hybrid engines, but they are somewhat inefficient and thus rare. It is generally better to have a sub-orbital transport carry the planes to their destination, and have dedicated combat spacecraft permanently in orbit, where they do not have to carry the useless mass of wings and air-breathing engines.

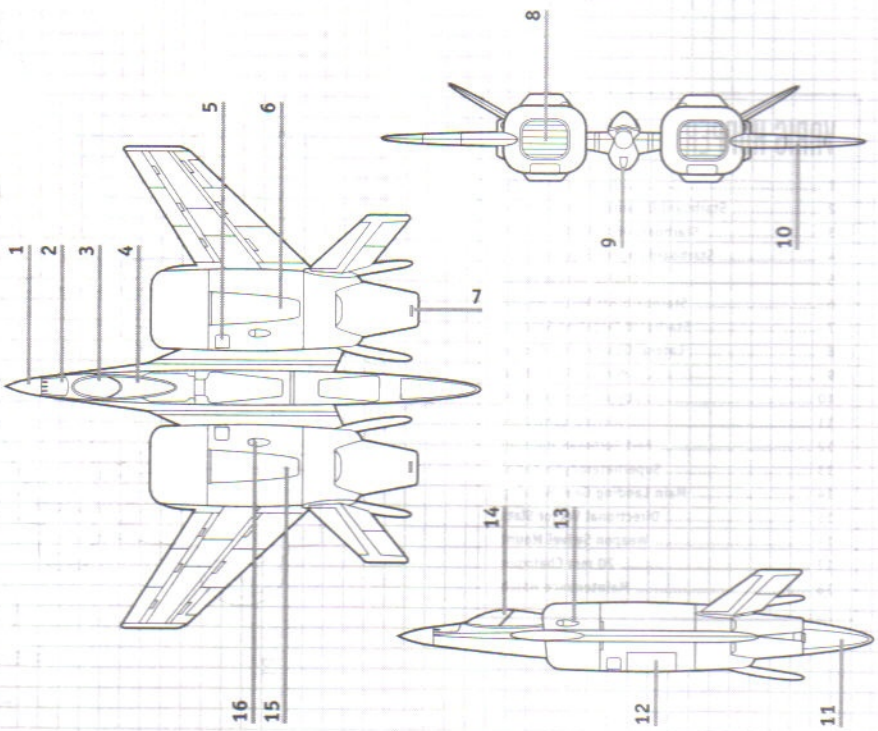
Conventional aircraft are very vulnerable to anti-aircraft assets, mainly missiles and laser weapons. They must keep out of sight, either by flying far enough from the action or by using the ground to mask their movement. While aircraft can be equipped with NOE (Nap Of Earth)-capable flight avionics, their speed and need to move forward at all times makes NOE flight almost as dangerous as facing enemy weapons.



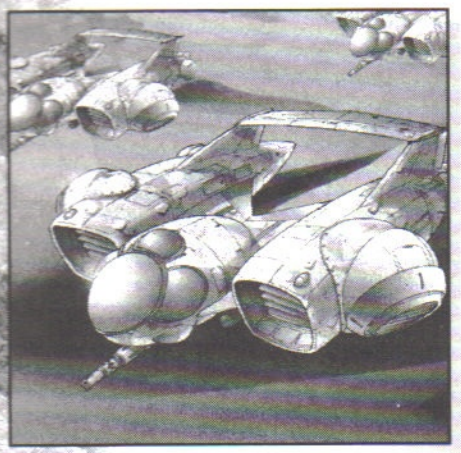
QUETZAL FIGHTER-BOMBER

1 ..... Radome
2 ..... Upper Sensor Panel
3 ..... Commander Position
4 ..... Weapon Operator Position
5 ..... Access Panel
6 ..... Upper Airbrake
7 ..... Exhaust Masking Surface
8 ..... Starboard Intake
9 ..... Nose Landing Gear Housing
10 ..... Mission Adaptive Wing
11 ..... Aft Electronic Pod
12 ..... Main Landing Gear Housing
13 ..... Port Targeting Sensors
14 ..... Polarized Canopy
15 ..... Port Engine Access Panel
16 ..... Starboard Upper EM Sensor Array

Note: landing gear shown in retracted position.



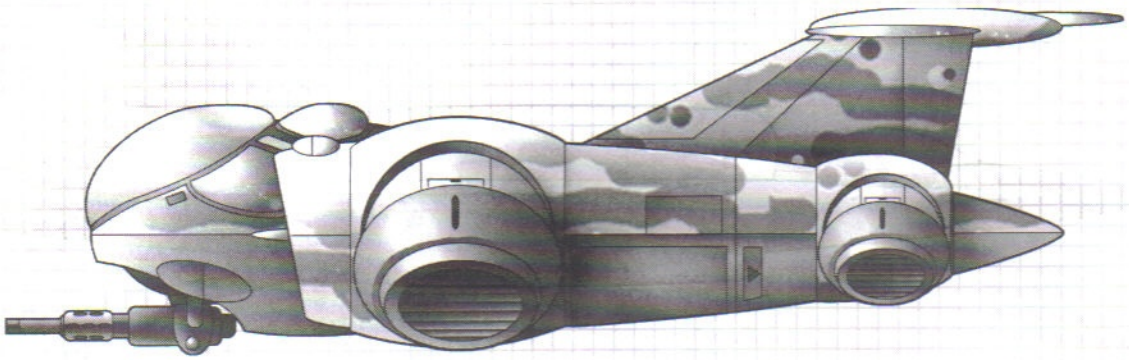
5.7.4 - VTOL Aircraft



VTOL (Vertical Take-Off and Landing) aircraft are jet or turbine powered vehicles that use direct thrust for lift. They can hover in mid-air and use almost any clear surface as a convenient landing pad. This category includes fixed wing planes with articulated thrust nozzles and the vectored thrust aerodynes commonly referred to as "hoppers." This type of aircraft is used mainly for short range ground support and interception, since VTOLs require lots of fuel to operate. They can, however, use nap-of-earth flying to improve their chances of survival, concealing themselves behind terrain features and using pop-up attacks.

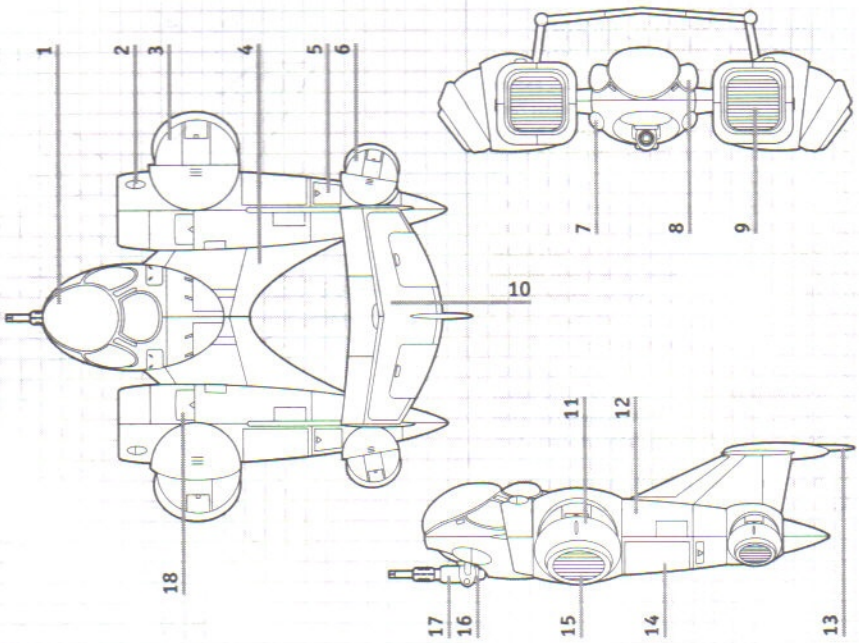
VTOL craft have several serious disadvantages, however, that limits their distribution. In addition to the aforementioned lack of endurance, they are highly vulnerable to engine hits, since they often rely entirely on their propulsion system for lift. This, in turn, means a high infrared signature, unless additional stealth devices are installed.

Vectored thrust vehicles can also be used for other types of missions if the environment is too difficult for rotary wing VTOL, such as search-and-rescue in hard weather. The Grasshopper is a popular VTOL offered both in a hopper and tilt-rotor models. The latter is most popular in the Badlands, where endurance and frugality are appreciated, but the first variant is faster.



VARIS HOPPER

1 ..... Polarized Canopy
2 ..... Starboard Upper EM Sensor Array
3 ..... Starboard Main Vertol Nozzle
4 ..... Starboard Engine Support Strut
5 ..... Engine Access Panel
6 ..... Starboard Aft Vertol Nozzle
7 ..... Starboard Targeting Sensors
8 ..... Lateral Observation Blister
9 ..... Port Engine Intake
10 ..... Upper Sensor Panel
11 ..... Airflow Controller
12 ..... Port Turbofan Housing
13 ..... Superheterodyne Aerial
14 ..... Main Landing Gear Housing
15 ..... Directional Vector Slats
16 ..... Weapon Swivel Mount
17 ..... 20 mm Chaingun
18 ..... Maintenance Hatch

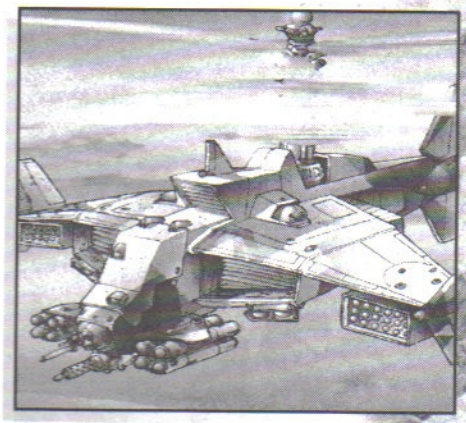


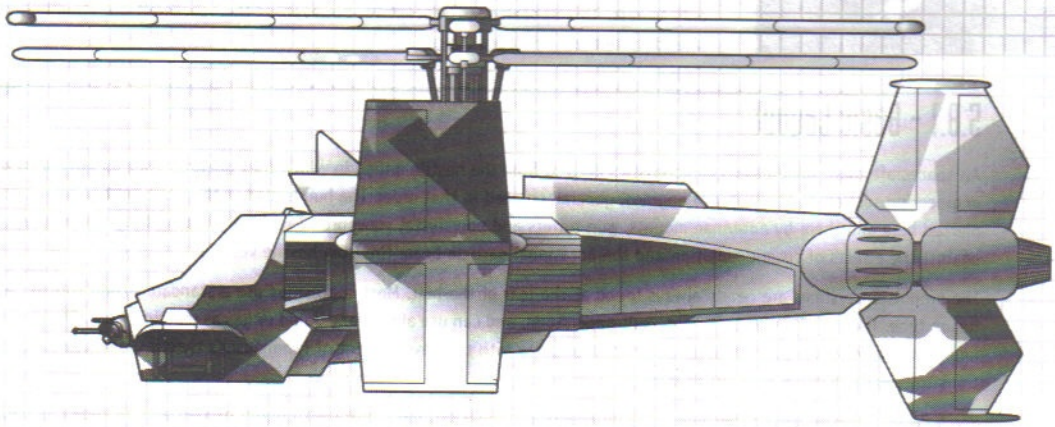
Rotary Wing Aircraft - 5.7.5

Rotary wing aircraft use either propellers or rotors for lift, using power from jet or turbine engines. They are less costly than jet-powered VTOLs, but slower due to the aerodynamics involved with rotary wings. Rotary wing craft are sometimes hybridized with other types of propulsion systems to improve their flight performance, using configurations such as tilt-rotor designs or additional jet propulsion.

Rotary wing vehicles are ideally suited to close ground support and transport roles, in which they excel. Unlike vectored thrust vehicles, they have a built-in abort capability in case of engine failure: they can disengage their transmission and auto-rotate to safety. They can also use nap-of-earth flying to improve their chances of survival, using the same techniques as other types of VTOL. They do have some disadvantages, however. Most rotors have large "foot prints," requiring a comparatively large cleared area for take-offs and landings. Rotors are also somewhat noisy (the noise level depending on many factors), making them unsuited to infiltration and ambush missions.

Rotary wing craft have a secure place in the military for the reasons listed above, and each confederate army field heavy attack helicopters (the Northern Scorpion and Southern Titan). They also are very popular in the civilian aircraft market.

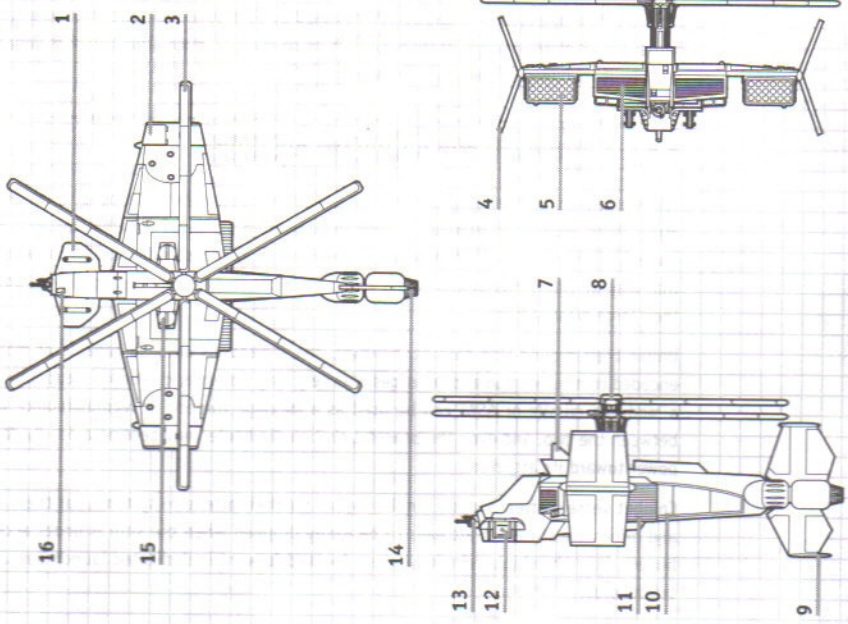




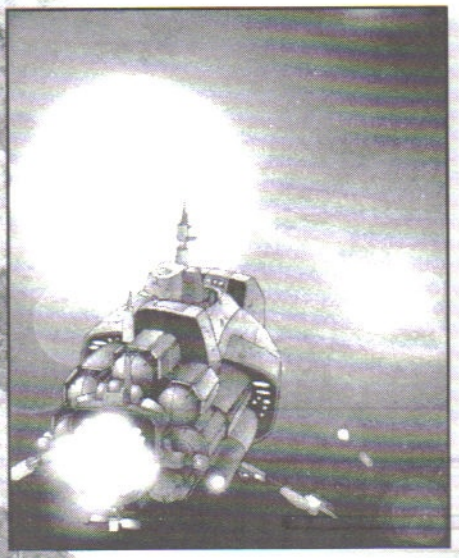
SCORPION GUNSHIP

1 ..... Forward Canard Surface
2 ..... Starboard Wing
3 ..... Composite Rotor Blade
4 ..... Armor Baffle
5 ..... Rocket Pod
6 ..... Starboard Turbine Air Intake
7 ..... Upper Aerial
8 ..... Mast Sensor Pod Hardpoint
9 ..... Rear Emergency Skid
10 ..... Lateral Heat Shield
11 ..... Turbine Exhaust
12 ..... Forward Missile Hardpoints
13 ..... Main Sensor Array
14 ..... Secondary Propulsion Nozzle
15 ..... Port Secondary Sensor Array
16 ..... Pilot's Backup Vision Block

Note: landing gear shown in retracted position.



5.8 - Spacecraft



Spacecraft were first developed in the middle of the twentieth century, and they have been in use ever since. Of course, they have changed quite a bit since the days of the early space efforts: they have become more powerful, longer ranged and much, much safer. They still obey the laws of physics, however, and provide a pressurized, temperature-regulated environment for their crew as they take them from one planet to the other — or from one star system, through an interstellar Gate into a new system that lies beyond.

All current spacecraft are utilitarian or military in nature; space is too dangerous and costly to live in to have many other uses. Ships have thus evolved a somewhat blocky and pragmatic look, with massive hulls studded with antennae and sensor blisters. Ablative and reflective coatings, alloy and ceramite plates combine to give a dull greyish, patchwork appearance to all ship hulls, the faded patina of which is broken only by the phantom remains of a long-eroded garish paint scheme. Streaks of scorched paint and coating mark battle damage and uncleaned exhausts from overtasked maneuver engines.

The interior of the vessels generally has not fared much better, at least for the ships still in service with the various colonial navies. While they are scrupulously maintained and cleaned by their crew — after all, their lives depend on the good functions of the vessel — the corridors and rooms appear grimy and tired, as if they had been hurled from one side of the system to the other and now wished only to rest. This appearance is deceptive, however, as the spacecraft are strudily built and quite safe, despite their well-aged looks.

5.8.1 - Basic Layout

All spacecraft share some basic characteristics derived from the hostile milieu in which they operate. They all have a crew section, an engineering section and a cluster of engines, generally placed in that order. The hull is clad in thick but light composite armor plates, pierced here and there by antennae mounts, gun turrets and polycrystal viewports. Layers of rad-absorbing material protect the crew against the effects of cosmic radiation and the occasional particle beam fire from hostile vessels.

The propulsion systems are nearly always found at the rear of the hull. Most spaceships use a standard fusion thruster array called a fusion tube. These systems are efficient, well-understood, and can use almost any liquid or gas as reaction mass. They are based on the improved understanding of sub-atomic physics that came with the development of Tannhauser's theories, and use subquantic interactions to liberate massive amounts of energy.

Some vessels, mostly the smaller ones, rely on chemical propulsion, most often with liquid oxygen and hydrogen as fuel. Disposable solid fuel boosters are widely used to help reach higher velocity as they pose less problem than complex fuel pump systems and are less likely to break down. This is the case for small interstation shuttles and personal propulsion devices.

A third propulsion system is also sometimes used by deep space vehicles: the ion engine. This type of propulsion is capable of producing thrust for extended periods of time without much reaction mass. This thrust is very feeble, and cannot be used for large and/or rapid vessels; it is, however, very hard to detect.

5.8.2 - Offensive and Defensive Systems

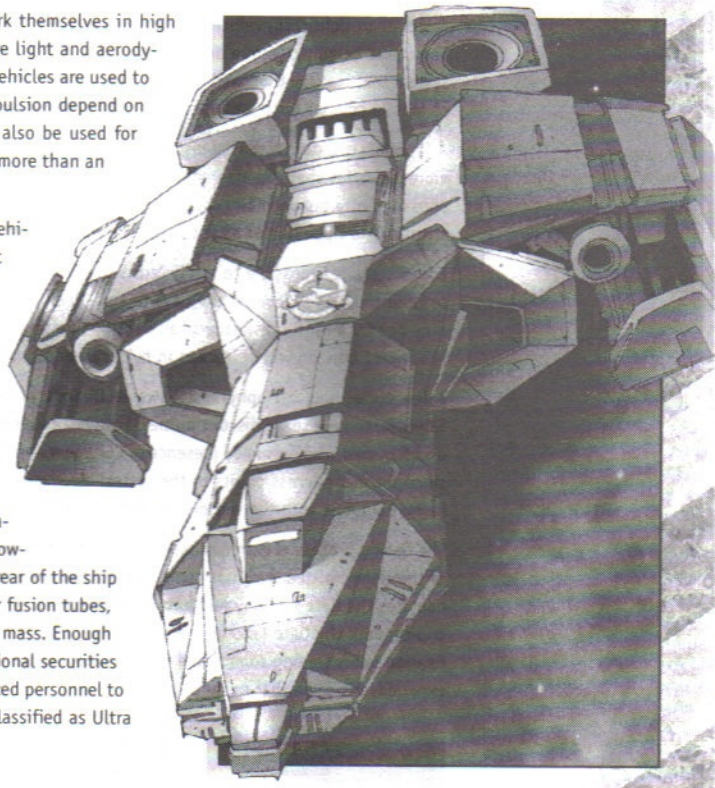
Space is a very special environment for weaponry due to the absence of atmosphere and gravity. Increased range and lack of an atmospheric medium drasticallly change the operative profile of existing weapon systems. Most ship-borne weapons are simply more pwoerful versions of the systems used planetside. The main lasers develop megawatts and gigawatts of energy in order to affect a target that may lie thousands of kilometers away, while the missiles are equipped with powerful nuclear warheads that engulf the target in their large blast radius.

Unlike their ground-side cousins, however, space weapons are also capable of more than destruction. Lasers can be used to pulse encoded communication and messages over very long distance; kinetic kill weapons use the same basic technology as a reaction engine; a modified missile or ASAT can be used as a message torpedo or reconnaissance probe. For this reason, the lines sometimes blurs between the two, and even the peaceful civilian ore hauler may become a deadly danger if it turns its microwave radar emitter at full power toward its attackers.

Combat vessels often adopt a similar layout for their offensive systems, for their appearance is dictated by their functions. Drones and mines are stored in aft bays to be easily dropped when the ship is under acceleration, while ASATs and other missile systems benefit from the ship's velocity and are located forward in dedicated launch bays. Gun and laser turrets, when present, are located on the side.

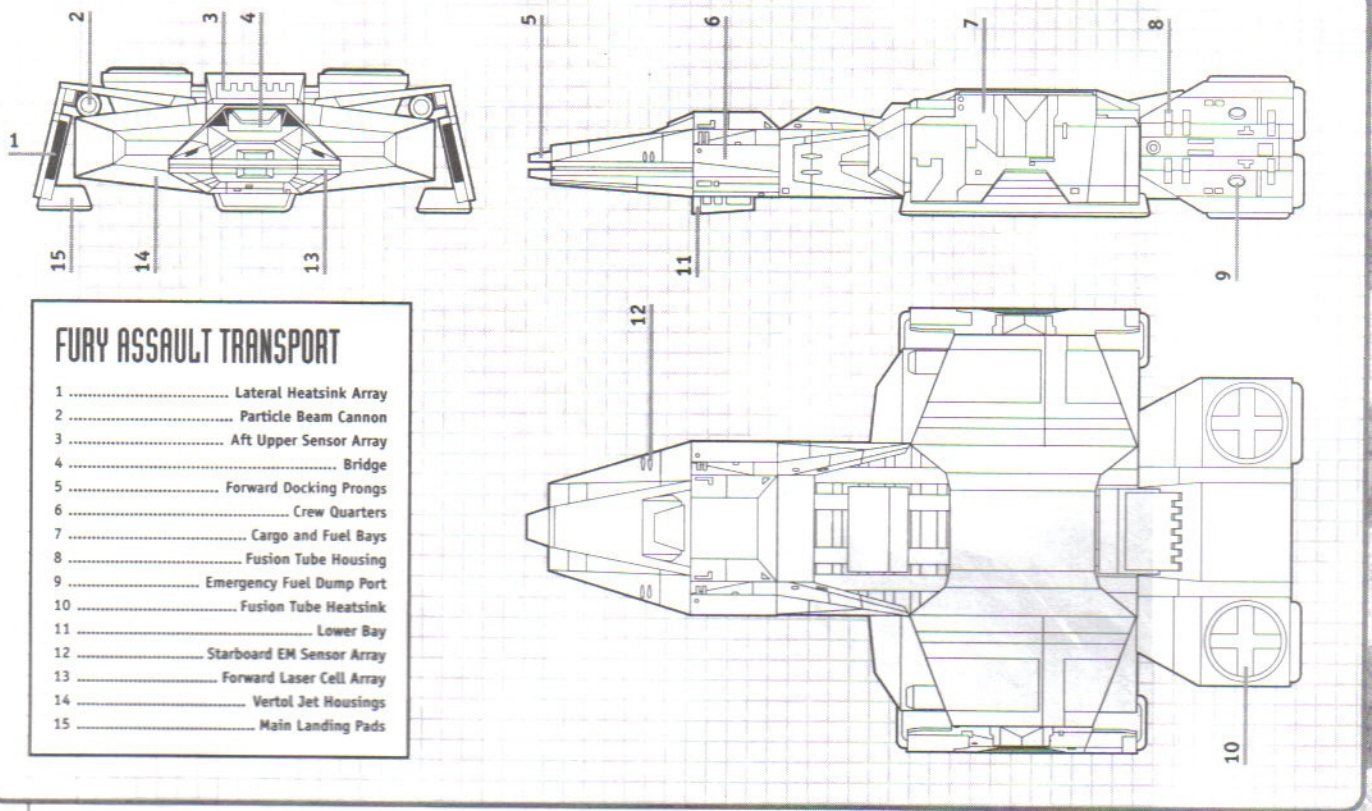
Aerospace Vehicles - 5.8.3

Gateships are too massive to descend onto a planet's surface. They can park themselves in high orbit, but that's about it. Most spaceships are not much better: very few are light and aerodynamic enough to be atmosphere-capable. Because of this, a wide variety of vehicles are used to fill the gap between orbit and ground. Their shape, size and method of propulsion depend on their function (cargo, passenger, military, etc.). These interface ships can also be used for fast planet-side transport via sub-orbital flight. no location on the planet is more than an hour's flight away.



The Fury-class Intersystem Assault Transport is a good example of interface vehicles. This fusion-powered spacecraft was already in the work prior to the start of the Interpolar War, but progress remains slow and impaired by the need for secrecy. Much of the craft's main hull and system are derived from the CEF's Sleipnir-class space plane, an advanced ground-to-orbit shuttle designed to carry high priority personnel and cargo across conquered planets. According to current Terranovan intelligence, the Sleipnir was itself based on the older Tarantula assault lander developed by the New Eurasian Commonwealth during World War III (see *CEF Spacecraft*, page 67).

The hull of the Fury is fairly angular due to the numerous stealth surfaces built into the design. The underside of the main body is covered with high temperature cerametal composites to withstand re-entry, while the rest is clad with low-density armor giving it strong protection all around. Hatches on the side and rear of the ship allows easy egress from the two main cargo bays. The Fury is propelled by four fusion tubes, all of the same modular design, that can use any high density fluid as reaction mass. Enough reserves are carried to get from a planetary surface to a Gate and back. Operational securities on all fusion tubes are patched to main ops and may be deactivated by authorized personnel to cause the vessel to self-destruct. All works on the Fury program is currently classified as Ultra Secret; knowledge of its existence is Need To Know Only.



FURY ASSAULT TRANSPORT

1 ..... Lateral Heatsink Array
2 ..... Particle Beam Cannon
3 ..... Aft Upper Sensor Array
4 ..... Bridge
5 ..... Forward Docking Prongs
6 ..... Crew Quarters
7 ..... Cargo and Fuel Bays
8 ..... Fusion Tube Housing
9 ..... Emergency Fuel Dump Port
10 ..... Fusion Tube Heatsink
11 ..... Lower Bay
12 ..... Starboard EM Sensor Array
13 ..... Forward Laser Cell Array
14 ..... Vertol Jet Housings
15 ..... Main Landing Pads

5.8.4 - FTL Vehicles

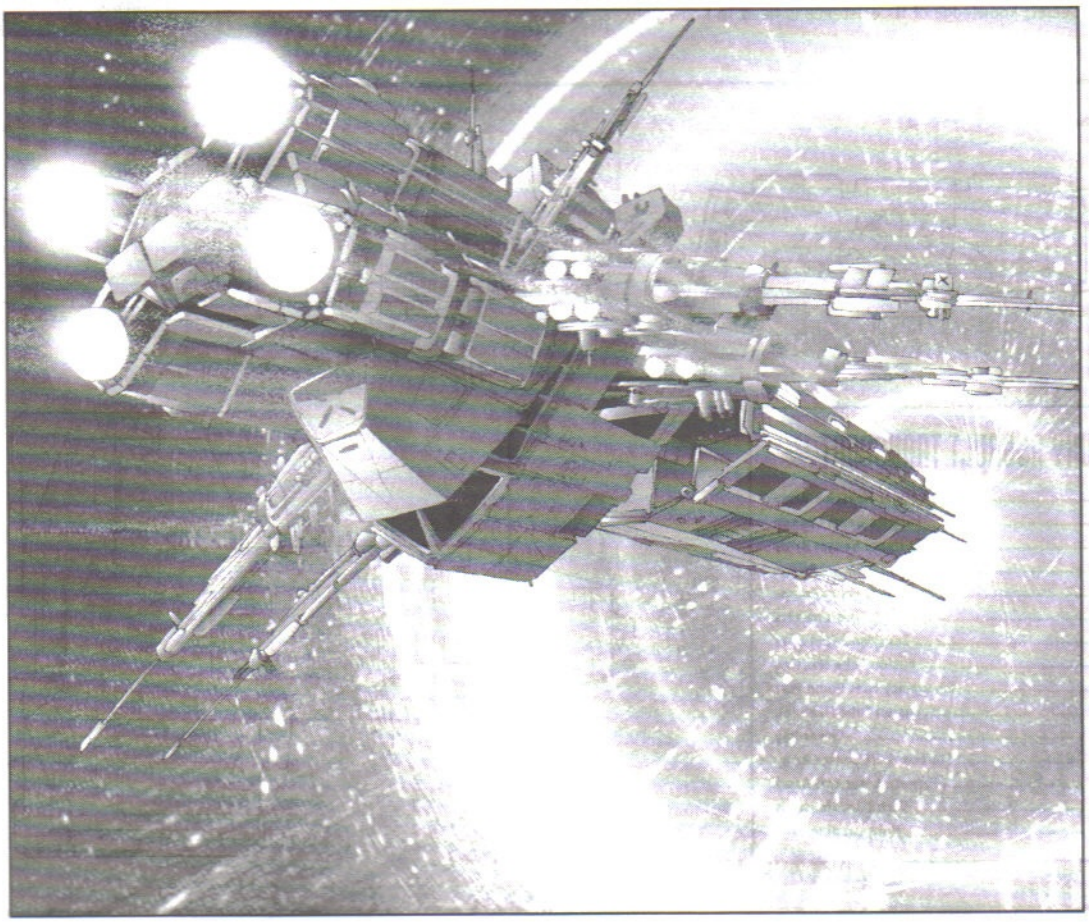
Faster-than-light (FTL) vehicles are large spaceships built around a massive and very specialized particle accelerator called a Gate Drive. They must be quite large in order to house the multiple fusion generators required to power the accelerator and open a Gate to a solar system that may lay thousands of light-years ahead. This, in turn, makes them extremely slow and ponderous, and they thus tend to act as mobile combat fortresses ases rather than combat spacecraft.

A Tannhauser Gate is a spatial discontinuity, a tiny point in space like a miniature black hole, only with a gravity field hundreds of times more powerful than its size should allow. This gravity field bends space to the degree that it folds back upon itself, creating a consanguinity between two distant points. An object entering the event horizon of the discontinuity would be crushed by the tidal stresses and ripped apart as it crossed the discontinuity and existed in two places at the same time.

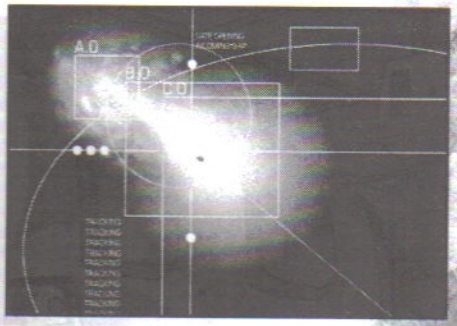
Fortunately, it is possible to safely "cross over" by supplying a catalyst, a specially modulated beam of antimatter and exotic particles, to raise the energy level of the Gate to the "Opening Threshold." This alters the consanguinity so that the farther point becomes the only one for an infinitesimally small fraction of a second and creates a region of foldspace. An object close enough to the discontinuity's event horizon will be sucked in by a momentary surge in the gravity field and transferred to the far point.

A few cycles ago, astrophysicist Gawaïne Di Smit wrote an advanced thesis on the dynamic structure underlying the genesis of the Tannhauser-type space discontinuities. In layman's terms, it postulates the possibility of microscopic anomalies — additional Gates yet undiscovered. The presumed presence of CEF agents on Terra Nova (see opposite page) only confirms the existence of such "mini-Gates," since the main access points to the system are guarded day and night by the Terranovan fleets. The Gateship UMFGS Laban Emuros is being equipped with the sensors needed to search for these new anomalies.

The Gating process is extremely spectacular, due to the huge amount of energy invested in it. The Gate itself is largely invisible; most of the light emitted does not come from it, but from the interaction of the affected region with normal space. This "friction" rapidly depletes the Gate's energy and lowers its threshold, which causes the opening to collapse unless supplied with additional energy. The trip through the Gate lasts only a short while, but the experience is very unsettling. It has been described as being somewhat akin to hearing odors, seeing sounds and tasting colors while having a headache in the big toe. There are no lasting physical effects, but the experience is somewhat perturbing.



CEF Vessels - 5.8.5



CEF forces have used a large variety of spacecraft in attacking Terra Nova, and they retired with many of them still intact. Foremost among them is the AC-56 assault lander, code-name "Tarantula." The Tarantula was developed by the New Eurasian Commonwealth during World War III. The design later lead to the CEF's Sleipnir-class space plane, and Terranovan analysts believe that more variants and derived vessels may also be in use. The fusion-powered spacecraft is likely still deployed on Caprice and other Earth-held worlds, if any, to transport troops across vast distances.

The Colonial Expeditionary Force also fielded a large number of warships and fighters in their assault and escaped with many of them during the debacle that followed the war of the Alliance. It is believed they still have a sizable fleet stationed in the Caprice system. According to historical files, the planet is also ringed with orbital defense platforms to protect it against the system's frequent asteroid storms.

◆ Gate Coffin



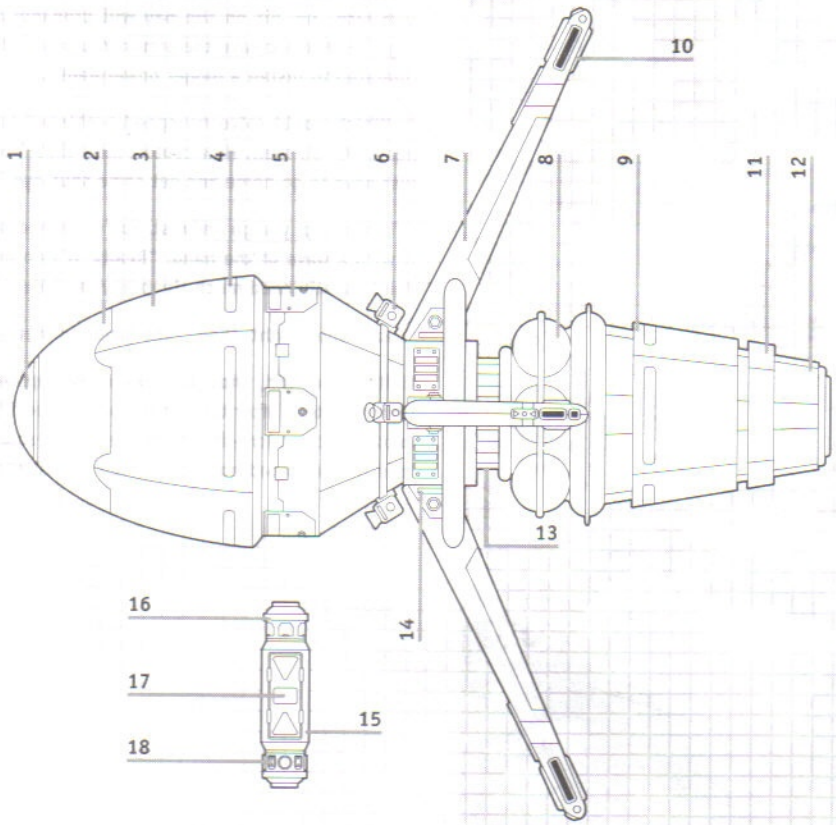
The recent discovery of the existence of the Gate Coffin, a small inter-system transport vehicle, has shocked the intelligence operatives of Terra Nova. The vehicle is extremely well stealthed and capable of taking one operative from one system to another, landing them without any other external sign than a banal meteor storm. One such vehicle was captured purely by coincidence; it is fairly certain to assume that several have been sent to Terra Nova, and probably other planets, by the CEF.

Current studies of the Earthers' project are known only by the code name of "Falling Star." All knowledge about Falling Star is currently considered Ultra Secret to avoid alerting New Earth Commonwealth sympathizers already in place. Knowledge is distributed on a need to know basis; even major government officials have been kept in the dark.

GATE COFFIN

1 ..... Nose Cone
2 ..... Primary Ablative Shield
3 ..... RAM Coating
4 ..... EM Sensor Array
5 ..... Forward Hull Release Mechanism
6 ..... Breaking Thrusters
7 ..... Maneuver Engines Support Arm
8 ..... Primary Reaction Mass Reserve
9 ..... Thermal Core Housing
10 ..... Attitude Verniers
11 ..... Exhaust Collimator
12 ..... Exhaust Shield
13 ..... Main Hull Heatsink
14 ..... Support Arm Hinges (locked position)
15 ..... Delivery Pod
16 ..... Parachute Housing
17 ..... Cryo-tube Main Hatch
18 ..... Guidance Sensors

From its overall shape, it is assumed that the vehicle is towed to the Gate and then pushed through to make its way unassisted to the target planet. The vernier support arms probably fold back against the main hull for easier transport.



6.1 - Designing Vehicles in Heavy Gear

This chapter covers the generation process for the statistics of the vehicles used in the game. It is not necessary to go through the construction system to play; there are hundreds of pregenerated vehicles available in the various **Heavy Gear** books. But to many, designing new vehicles and testing them is definitely an enjoyable part of the game.

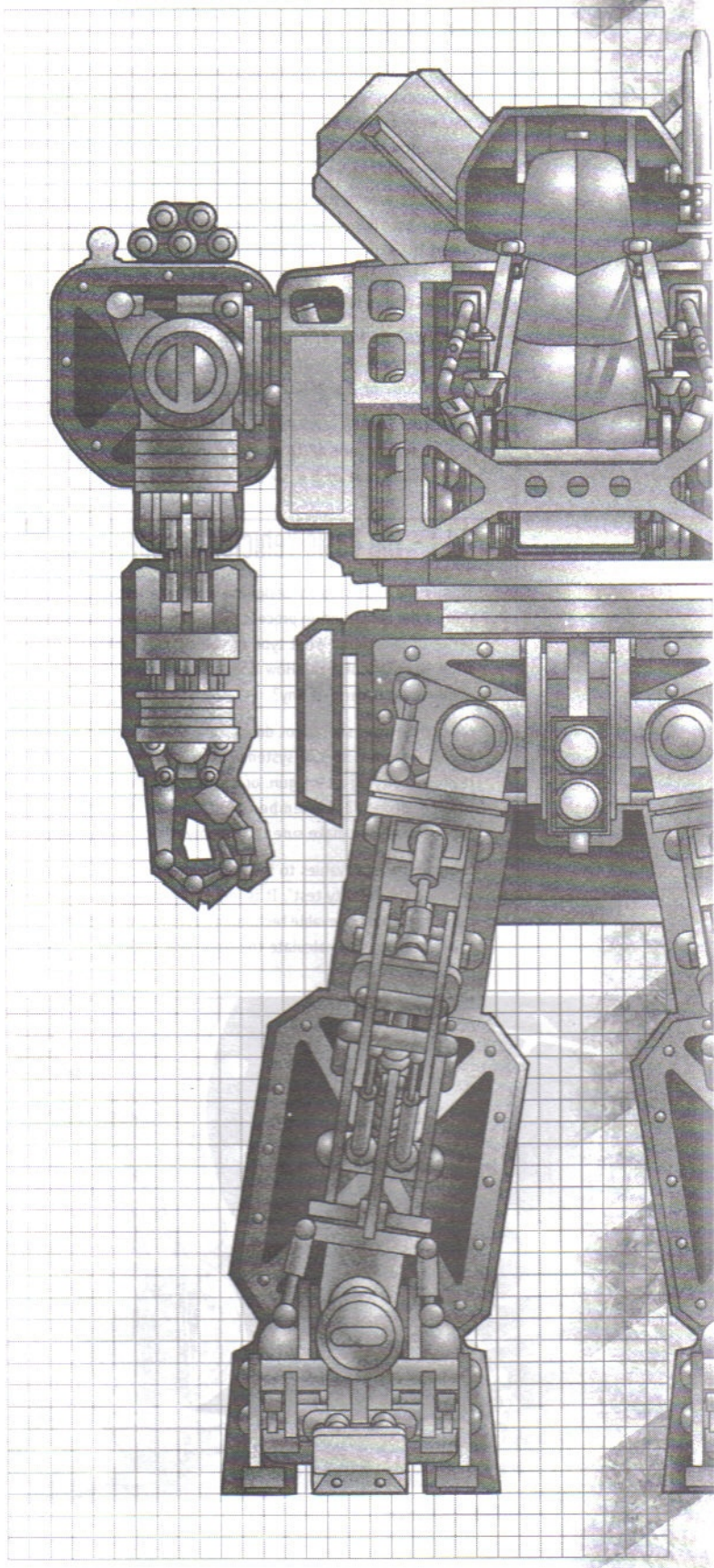
The Silhouette vehicle construction system (sometimes refered to as VCS) is quite liberal compared to the ones found in many other games. It is meant to provide interesting, "real" vehicle designs instead of just mere sets of game statistics pulled out of charts and complex formulas. It is based on the concept that, given a certain technological level, one can design a vehicle to almost any specification. There are no artificial space or weight limits placed on the components: if the vehicle *must* have a certain piece of equipment, the engineers will find a way to make it fit — even if they have to drill a hole through the hood to let that turbocharger through, or use that costly new ultra-light material just developed by the research lab on the moon.

However, while it is *theoretically* possible to build a tank that will sport heavy armor and weapons while still performing like a race car, there is a catch: the cost. That one tank will probably cost more — in resources, time and money — than an entire brigade of more regular tanks, and since it is so complex, it will probably be riddled with unavoidable defects (see *Lemon Rolls*, page 135). What's more, it probably be far too advanced for the **Heavy Gear** game world. Guidelines and technological limits are included and must be followed to prevent abuses of the sort, but one could still build monsters if left unchecked... Technical limitations should be respected.

Since this system was created to handle any vehicle type, it is non-linear in nature and does involves some calculations. These have been broken down in several easily manageable formulas for ease of play and reference, so they should not prove to be a problem. The trick here is not to let oneself be turned off by the few calculations necessary (see the *Roots and Exponents* sidebar). It is assumed that the reader has already read the basic and tactical rules set out in the main rulebook, and is reasonably familiar with them. In any case, all relevant game terms are fully defined in the Glossary (page 184).

Sharp-eyed players will notice that no limits have been placed on the number of weapons and equipment carried by a vehicle. This is intentional and is meant to simplify the game and the construction system. So what is preventing engineers from mounting twelve heavy autocannons on a single Gear? Nothing, except basic common sense. After all, the Gear would need a *huge* engine to move it (possible, but very costly) and the autocannons would have to be special recoilless ultra-light models (which means higher costs — if the technology is available at all). Anyway, the pilot could use no more than one or two autocannons, unless he is willing to take a -12 penalty to all his actions, or link them all and take his chance on missing with half of them. And just watch that Offensive Threat Value skyrocket...

Remember, nothing in life is free. Not even payload.



◆ Roots And Exponents

Although Silhouette is a fairly simple rules system, some math was bound to creep its way in. Roots and exponents, for example, were needed because of the non-linear nature of the construction system. Fortunately, most calculators have both the root and exponent functions, or at the very least the exponent function (refer to the calculator's manual if needed). If the calculator used is of the latter type, roots are still possible. Just invert the exponent (see examples below). The following format is used throughout: Squares are exponent 2, and Cubes are exponent 3. Higher levels of exponents are not used.

EXPONENT OF NUMBER = NUMBER ^{EXPONENT}:

square of 2 = 2^2 = 2 x 2 = 4

cube of 2 = 2^3 = 2 x 2 x 2 = 8

ROOT OF NUMBER = NUMBER$^{(1/ROOT\ NEEDED)}$:

square root of 16 = $16^{(1/2)}$ = 4

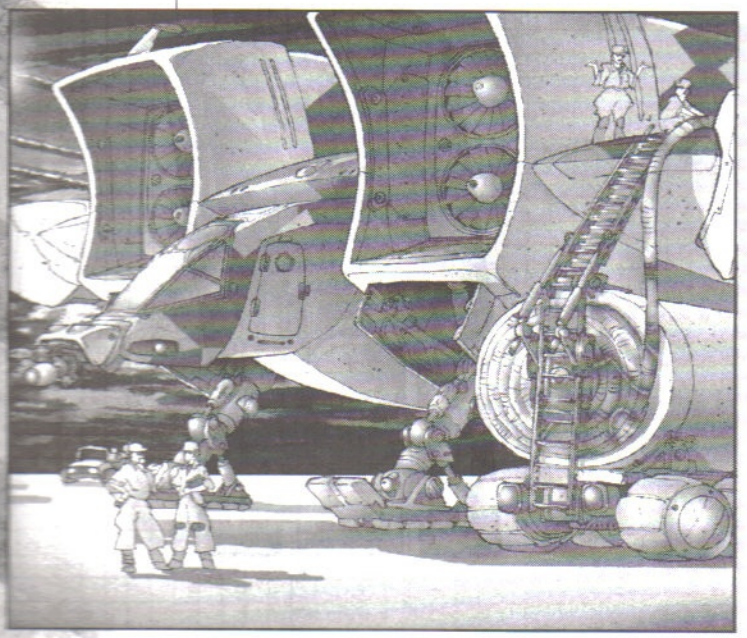
cube root of 8 = $8^{(1/3)}$ = 2

6.1.1 - The Basic Vehicle Concept

This is the first step in designing a vehicle, although it is not part of the construction process per se. The Player must answer a series of questions. What type of vehicle is it? What is its task? What does it look like? How does it move? What kind of armament would it carry, if any?

Next, the Player should jot down some statistics on paper (Size, speed, weapons, special systems, etc). Now, would a Scout Gear really be carrying a tank gun, or a tank really move at 200 kph on broken ground? Remember that the costs can increase exponentially, so make sure to use only what's really needed.

Compare the stat values to those provided for real vehicles. This is called the "reality test". It is important that the new creation remains within believable technological limits. Once this is done, the next step is to calculate the basic statistics.



◆ Target Size

It is a good idea to choose a reasonable Size value for the vehicle. Size is related to both weight and volume, in that it determines the actual weight of the vehicle, the amount of damage it will cause in the event of a collision, and the number of hexes it occupies on the tactical map. Some vehicles occupy more space than their Size would indicate — lighter-than-air craft, for example. This will be detailed further on.

Vehicles are assumed to occupy a basic volume (in cubic meters) equal to (Size/2 +1) cubed, rounded up. This includes access and maintenance space around it and within the hull. Knowing the volume is *not* required for the design process but is useful when doing "reality checking."

DETERMINING SIZE:

Maximum Mass = ((Size + 0.5) x 3) cubed

Size = ((cube root Maximum Mass)/3) - 0.5

The maximum mass for all Size categories is in kilograms (divide by 1000 to get metric tons). The mass is rounded up for all Sizes for simplicity. A pre-generated Size to Mass Table is available on page 102.

6.1.2 - Crew

How many individuals are required to operate the vehicle? Large crews improve a vehicle's combat efficiency, but they also increase expense and vehicle Size. Large vehicles often need sizable crews while small vehicles cannot cram many people inside. Don't forget that human crew can be replaced by automated systems (see *Perks and Flaws*, page 112).

Theoretically, the designer could maximize a vehicle's performance by allotting it an unusually large crew. A crew member, however, occupies almost two cubic meters of space (with seat, instruments and egress/ingress space) — sixteen people will not fit comfortably in a sub-compact car!

What's more, a good crew is expensive. Training and paying each crewman costs hundreds of thousands of marks or dinars. In fact, the crew is often worth more money than the vehicle, so most designers will put only the minimum amount of crew required for the job. In general, the minimum number of crew per ten Size points (or part thereof) is one.

Most combat vehicles have more than one crewmember to handle all the systems, with the exception of the Gears. In fact, the main distinction between striders and Gears is that the latter have only one crew; if a walker vehicle has two or more crew, then it is a strider.

◩ Design Example

Kurt is designing a mass-produced, soldier Gear to form the basis of his armed forces. Since all Gears are single-man vehicles, Kurt writes down "Crew: 1". The pilot will be sitting in the chest of the machine, using standard Gear controls. Kurt considers adding some automated systems to decrease the pilot's workload, but decides against it to keep costs down.

6.1.3 - Movement Systems

Movement types define how a vehicle moves along. Each movement type confers some advantages and some disadvantages, depending on the environment where the vehicle operates. Some are more versatile than others.

A vehicle may have more than one movement type. Common examples of this are fully amphibious vehicles (Ground and Naval), Gears with SMS (Walker and Ground), or any combination thereof. Although there is no limit to the number of movement types a vehicle may use, few have more than one or two — the cost simply outstrips the added flexibility. Having more than one movement type does not represent an actual transformation; all movement types are available at all times.

◆ Flight:

This movement type is used by all flight-capable vehicles. This includes aircraft of all types, helicopters and vectored thrust vehicles. Each aircraft's peculiar flight characteristics are provided by suitable Perks and Flaws (see *Perks and Flaws*, page 112).

◆ Ground:

Any wheeled or tracked vehicle. Wheeled vehicles are assumed to be equipped with large wheels and strong suspension for rough terrain and thus are grouped with tracked vehicles in the Ground movement type for simplicity. Ordinary wheeled vehicles such as city cars have the Poor Off-Road Capacity Flaw to represent the low clearance of their drive system (see *Flaws*, page 128).

◆ Hover:

This movement type is used by all vehicles which travel above but near the ground, such as ground-effect hover craft and other air-cushion vehicles. Ground-effect systems only work within an atmosphere; they are useless in vacuum.

◆ Naval:

Any conventional water vessels and hydrofoils, or anything that can float. This only makes the vehicle's hull water-tight, however: it is still susceptible to flooding and capsizing if swamped or turned upside-down.

◆ Rail:

Any vehicle which uses a rail or guide of some kind to move about is part of this category. This includes classic steel railroad trains, MagLevs, monorails and many others. These vehicles can only move along a rail line, and the rail(s) must be of the same type as the one the movement system was designed for.

◆ Space:

A vehicle equipped with reaction thrusters uses this movement system. This movement type does not confer the ability to perform standard atmospheric flight or reentry — these must be purchased separately.

◆ Submarine:

This movement type covers underwater craft of all sorts, which are fully watertight. Most Submarine vehicles also have the Naval movement type, but it is not required (some submarine vehicles fare very poorly on the surface).

◆ Walker:

This represents a multi-legged walking vehicle. The exact number of legs present is totally up to the designer and has no bearing on either speed and toughness, which are determined separately (see *Speed* below, and *Perks and Flaws*, page 112).

◆ Speed

A Top Speed, measured in kilometers per hour, must be selected for each individual movement type. Each Top Speed is divided by six (6) to get the Top Speed in Movement Points (MPs), rounding to the nearest whole number. The Top Speed MP value is divided in half to obtain the Combat Speed MP value for each movement type, rounding up.

Movement Point Formulas:

MPs (50 meters hex) x 6 = speed in kilometer per hour
Speed in kilometer per hour/6 = MPs (50 meters hex)

A vehicle's intended purpose often influences its speed. The Speed Table below lists some good movement speed values for most types of vehicles. These values should be the maximum speed possible for new designs. This is primarily a game balance tool for tactical combat — special vehicle designs can exceed them in a roleplaying setting, with the approval of the Gamemaster. The speed values below are assumed to be under optimum conditions (flat, clear ground/water).

Speed Table

Walker	
Sizes 1-7	72 kph/12 MP
Size 8+	48 kph/8 MP
Ground	
Walker's Secondary Mov.	90 kph / 15 MP
Sizes 1-5	240 kph/40 MP
Sizes 6-8	180 kph/30 MP
Size 8+	144 kph/24 MP
Hover	
Sizes 1-3	240 kph/40 MP
Sizes 4-5	210 kph/35 MP
Size 6+	180 kph/30 MP
Naval	
Hull	90 kph/15 MP
Hydrofoil	180 kph/30 MP
Submarine	
Sizes 1-3	120 kph/20 MP
Sizes 4+	90 kph/15 MP

◆ Special Case: Flight

The Flight movement mode includes all manner of flying machines, excluding hover-based movement. The movement mode does not discriminate between fixed and rotary wing crafts. There is, however, a fundamental difference between VTOL (vertical take-off and landing) crafts and other types of aircraft: the Stall Speed.

All vehicles with the Flight movement mode are given a Stall Speed. This indicates the minimum possible speed at which the aircraft can travel before stalling and falling out of the sky. A VTOL craft has a Stall Speed of 0, which means it can actually hover in place.

Most non-VTOL aircraft have a secondary movement type (usually Ground) to taxi around the runway, though it does not necessarily have to be motorized. In such case, the second system's speed is 0, and its MPs come from the Flight MPs. Many aircraft with Ground speeds have the Reduced Maneuverability Flaw. VTOL crafts rarely have a secondary movement type, as they often do not need to taxi.

Air Combat MPs represent about 30 kilometers per hour each, instead of 6 kph for vehicles in the basic tactical game.

◆ Special Case: Space

The Space movement mode includes all manner of thrust-based movement. As usual, precise description of how the vehicle functions is left to the designer. Space Combat MPs represent acceleration rather than speed: about 1 m/s² each (0.1 g), instead of the 6 kph for vehicles in the basic tactical game. Note that fractional MPs are allowed for vehicles with very low acceleration (solar sails, ion drives).

◆ Designer's Hint: Movement

The Silhouette vehicle construction system does not require the designer to buy a powerplant. It is assumed that the engineers in charge of the project know their job and will select an efficient engine that fits the chassis for the desired movement systems and speeds. If they don't... well, that's what Lemon Rolls are for (see page 135). It is always nice, but not required, to know exactly how the vehicle is powered, if only to give the game additional atmosphere.

Vehicles with multiple movement modes are rarely as fast as those with only one. If the design incorporates two or more, it would be wise to drop a Movement Point or two.

◩ Design Example

Kurt wants his Gear to have both the Walker and Ground movement types. He wants a walking Top Speed of 42 kph (divided by 6, giving 7 MP) and a rolling Top Speed of 72 kph (divided by 6, giving 12 MP). This means that his Gear will have the following Combat Speeds: 21 kph walking (4 MP) and 36 kph rolling (6 MP).

Kurt writes down "Combat Speed: Walking 4 MP (21 kph)/ Ground 6 MP (42 kph)" on one line and "Top Speed: Walking 7 MP (42 kph)/Ground 12 MP (72 kph)" on the next line of his worksheet.

6.1.4 - Maneuver

Assign the vehicle a Maneuver Rating. This is how maneuverable and responsive the vehicle is. The Maneuver Rating also indicates how the craft reacts to its pilot; two otherwise similar vehicles can have different Maneuver Rating is they handle differently under the same conditions.

Zero is a generic "average" Rating for Gears, but more often than not, other vehicles are assigned lower values. Positive values denote nimbleness while negative values indicate a slower reaction time or poor turn radius.

MOVEMENT TYPE MANEUVER RANGE

Movement Type	Typical Maneuver
Walker	+3 to -3
Ground	+2 to -3
Hover	0 to -4
Naval	-2 to -10
Flight	+2 to -5
Rail	-2 to -10
Space	0 to -10
Submarine	-2 to -10

DETAILED MANEUVER RATING LIST

Maneuver	Typical Vehicle
+3	Very advanced, top-of-the-line Gear prototype
+2	Nimble Scout Gear, Dirt Bike
+1	Nimble Gear, Motor Bike, Dirt Buggy
0	Gear, Nimble Car
-1	Assault Gear, Car, Nimble Hovercraft
-2	Nimble Walker, Car, Hovercraft
-3	Large Walker, Truck, Tug Boat
-4	Large Hovercraft, Large Truck
-5	Patrol Boat, Unloaded Train
-6	Small Naval Vessel or Landship
-8	Large Naval Vessel or Landship
-10	Supertanker, Space Station

◆ Designer's Hint: Maneuver

If the vehicle is exceptionally agile, +1 or maybe even +2 (in exceptional cases) may be added to the suggested value for that type of vehicle. If the vehicle is slow to respond, perhaps -1 or possibly -2 should be added to the suggested value.

The Maneuver Rating also partly represents the sophistication of the vehicle's controls. An agile vehicle that is next to impossible to control in battle will earn a low Maneuver Rating. By using this in conjunction with the correct Perks and Flaws, extra "personality" can be given to the vehicle.

◩ Design Example

Kurt wants his Gear to have an average maneuverability, so he writes down "Maneuver: 0."

6.1.5 - Deployment Range

The Deployment Range of the vehicle is selected next. It should be a whole number — i.e, no decimals. This is the maximum distance (expressed in kilometers) the vehicle can cover without refueling or maintenance, barring combat damage and any crew needs such as food and rest. This generally has no direct influence in the tactical combat game, but is extremely important in a campaign. It can also be used to establish scenarios and can be referred to in extended campaigns.

Just how much endurance to give the vehicle will depend in large part on its nature and intended function. Combat vehicles often have somewhat inefficient engines that guzzle their fuel or electric charge in just a few hours. Most ground vehicles can cover somewhere between 200 and 800 km before needing to be refueled or otherwise serviced. Understandably, aircraft tend to have pretty large Deployment Ranges. Fixed-wing planes have more autonomy than rotary wing aircraft: averages for the former range from 800 to 5,000 km, while for the latter it rarely exceeds 1,000 km. High performance machines will only be able to cover small distances before refueling or servicing. Others will have large fuel tanks and/or rugged systems that allow them to travel further.

In short, the Deployment Range really depends on the individual machine, so no "standard" value is given. One must remember, though, that the Deployment Range is factored in the total cost. The "generic" cost-efficient value for all designs is 500 km, though small vehicles will probably have a lower range.

In the course of the game, some vehicles may idle for a long while, spending fuel and energy as they do so. Space vehicles obviously cover far larger distances and, thanks to inertia, may not even need to expend fuel to do so. To cover these two special cases, consider that each hour of operation is functionally equivalent to one kilometer of Deployment Range.

◆ Designer's Hint: Deployment Range

Military vehicles need to have enough fuel to reach their objective, perform their mission, and return. This means that their effective combat range is normally a bit less than half of their listed Deployment Range because the vehicle must conserve enough fuel to return from its mission and maintain an extra reserve to consume in case of emergencies or combat. This is normally referred to as "Bingo" fuel, the minimum reserve required to go home safely.

Scout vehicles need to operate for long distances without access to support units, and thus require a slightly above average range. Fire support and siege vehicles generally have poor Deployment Ranges since they have near constant access to fuel and service. Urban and civilian vehicles also tend to have poor Deployment Ranges (in the low hundreds), for the same reason.

Though Terranovan vehicles have rugged engines capable of guzzling down a large variety of fuel, the use of non-standard fuels may well diminish the performances of the unit, if not wreck it in the short term (see *Non-Standard Fuels*, page 153). If the designers give their creation a low DR, expecting them to "live off the land," so to speak, they should also be prepared for extra maintenance time.

◆ Reaction Mass

This step applies only to vehicles with the Space movement type. Some kind of reaction mass (or fuel, in the case of older chemical engines) must be provided in order to propel the vehicle forward. The Reaction Mass Rating shows how many Burn Points (BPs) of reaction mass may be carried internally (one BP produces one MP of thrust).

The weight of the reaction mass will be added to the final weight of the vehicle after the design is completed; the *Burn Points Per Ton* table is used to determine its weight. It is important to note that the acceleration of the spacecraft, as selected in the Movement section, already takes this extra weight into account so that the stats will not have to be recalculated.

Reaction Mass and Deployment Range are the twin factors that will determine the autonomy of a space vehicle. It is useless to carry more reaction mass than can be used in the vehicle's entire Deployment Range, though the reverse is possible (the vehicle can always coast partway to its destination).

If the vehicle is intended to have ground-to-orbit capacity, it must carry enough Reaction Mass to allow its thrusters to operate long enough to reach escape velocity. This will be covered in the **Tactical Space Support** sourcebook.

The amount of Burn Points per ton will depend on the type of reaction mass used. Fusion tubes are extremely efficient, while primitive fuel rockets will often carry many times their empty weight in fuel.

Burn Points Per Ton

RM Type	Weight Multiplier	Volume per Weight
Hydrogen	0.00001 x total BP	0.071 ton/m³
Helium-3	0.00002 x total BP	0.142 ton/m³
Water	0.0002 x total BP	1 ton/m³
High Efficiency Rocket Fuel	0.01 x total BP	2 ton/m³
Low Efficiency Rocket Fuel	0.05 x total BP	5 ton/m³

Multiply the above Weight Multiplier by the empty mass of the craft to know the mass of the reaction mass or fuel.

The Volume per Weight is given for transporting Reaction Mass as payload in a cargo bay.

Design Example

Kurt wants his Gear to have a good operating range for extended operations. He thinks 500 km is a good range and should cover most situations (modern tanks can generally cover between 300 to 600 km), so he writes down "Deployment Range: 500 km" on his work sheet.

6.1.6 - Armor

Choose the Armor Rating for the vehicle. Even if the vehicle is not armor-plated, it still has an Armor Rating. This represents the mass of the vehicle stopping the damage. This Rating defines how resistant the vehicle will be to acident and weapon fire. No vehicle can have an Armor Rating below 1.

Just like weapon Damage Multipliers, armor value progression is not linear, that is, Armor 10 is not just twice as strong as Armor 5, it is *four* times as strong. The Armor Rating does not only represent the thickness and angle of the armor plating, but also the general resistance of every component in the vehicle averaged together. In fact, the Armor Value represents the best defense the vehicle can offer against an attack.

For the military enthusiasts, the Armor Rating of a vehicle is related, as per the following *Armor Thickness Comparison* formula, to a *very* approximate real world armor equivalence in millimeters of armor-grade rolled steel. By the way, most late twentieth century tanks have Armor Ratings between 14 and 25 (between 200 to 600 mm equivalence).

ARMOR THICKNESS COMPARISON

Base Armor Rating = Square Root (mm of armor grade steel)

The number of damage points required to produce Light Damage, Heavy Damage and Overkill results are equal to once, twice and three times the Base Armor Rating, respectively.

Typical Armor Ratings

Civilian Vehicle	1 to 8
Utility Vehicle	3 to 8
Heavy Gear	10 to 20
Armored Personnel Carrier	10 to 20
Large Walker	15 to 30
Tank	20 to 40
Typical Car	4
Typical 6-wheel Truck	6
T-72 Tank (20th Century)	16
Challenger Tank (20th Century)	22
M1A1DU Tank (20th Century)	25
Battleship Hull (20th Century)	50 to 150

Designer's Hint: Armor

A good rule of thumb for choosing a vehicle's Armor Rating: unarmored or slightly armored vehicles have Armor Ratings roughly equal to their Size Rating to represent their structural strength. Lightly armored vehicles have Armor equal to roughly twice their Size. Moderately armored vehicles have Armor equal to about two and half times their Size. Heavily armored vehicles have Armor equal to roughly three times their Size. Anything with an Armor Rating greater than three times its Size is either incredibly slow or completely unrealistic.

Due to the severe weight restrictions required by the mechanics of flight, aircraft rarely have an Armor Rating that is more than twice their actual Size. For military craft, the Armor Rating is usually just under that limit.

Design Example

Kurt wants his Gear to have armor that is comparable to a 20th century T-72 tank. After a bit of reflection, he decides to make his Gear's armor just a bit weaker than that of the T-72, if ony to save a bit on the point value. Noting that the T-72 has a base Armor Rating of 16, Kurt writes down "Base Armor Rating: 15" (or about the equivalent of 225mm of steel plate).

6.1.7 - Weapons

Choose the weapons that the vehicle will be armed with, if any. Also, choose the arc of fire of each weapon. The following table is an abbreviated version of the vehicular weapon section. For more detail about the different weapon systems, the reader is invited to refer to the *Weapon Tables* section (page 76).

Weapon descriptions are intentionally left vague. Only the actual game effects (as identified by the weapon's code, such as LAC, LRP/24, and so on) are rigidly defined. It is up to the designer to assign both name and form to his vehicle's armament. The actual location of the weapons has no bearing on the game mechanics, but is nice to know — again, designer's choice.

Ammunition must be purchased for each weapon. The Maximum Ammunition Load table (shown on the lower next page) show how many shots can be carried for each weapon by cross-referencing the Min. Size with the difference between it and the vehicle's planned final Size. This is only the maximum value — the actual amount of ammunition carried can be lower than this.

For example, an average Gear (Size 6) cannot carry more than 160 shots for its light autocannon (Min. Size 4, +2 difference with Size). Transporting a lot of ammunition for a given weapon system makes it bigger and heavier, effectively raising the Size required to carry it.

Handheld Weaponry Option

If Manipulator Arms are present on the vehicle, any of its weapons can be designed as "hand-held" in a rifle-like mount. Rifles are somewhat more fragile, since they depend on the arm carrying them, but they are also more flexible tactically.

Weapons in rifle form use the arm's Size Rating for Minimum Size determination. Each arm can handle up to one and a half (rounded down) its Size Rating in weapons. For example, a Rating 6 arm can bear a LAC and a LGL (4 + 4 is lower than 1.5 x 6), but not two HACs (2 x 5 is higher than 1.5 x 6). Multiple arms can be used to carry oversized rifles.

Rifles can be picked up or put away at the cost of one action, as long as the manipulator is still functional. It costs no action to drop a rifle. If the Manipulator Arm is destroyed, or if the rifle is dropped, the rifle can be picked up by another Manipulator-equipped unit that has a free hand. Hand-held weapons are affected by any damage suffered by the arm.

Designer's Hints: Weapons

Vehicles should have a weapon complement that reflects their mission. Fire support models have weapons capable of guided attacks or area saturation. Scouts carry light weapon loads because they are supposed to avoid combat. General purpose combat vehicles carry an assortment of medium-strength weapons to deal with a variety of situations.

Loading down a vehicle with tons of weapons just for the sake of having more is not only pointless, but wasteful. Most vehicle crews are only capable of firing one or two weapons per combat round without incurring penalties. Linking two or more weapons provides a solution, but tends to be costly in ammunition if the gunner misses.

Choosing a balanced amount of ammo for each weapon is also very important. Vehicles often get disabled in battle; when that happens, all the points spent on extra ammo and guns are wasted. Better to assign a reasonable ammunition load and buy more vehicles than build a single gun-bristling monster that can be disabled by one lucky hit.

A good indicator of the number of weapons that can be carried by a vehicle is its Size Rating. While it is not a hard limit, if there are more weapon systems than Size points, the design is probably overarmed. Another suggested control method would be to say that a vehicle can carry one weapon of its own Size, then (Size - Min. Size)^2 for lesser weaponry. For example, a Size 12 vehicle could carry two Min. Size 11 weapons, or thirty-six Min. Size 6 weapons.

Design Example

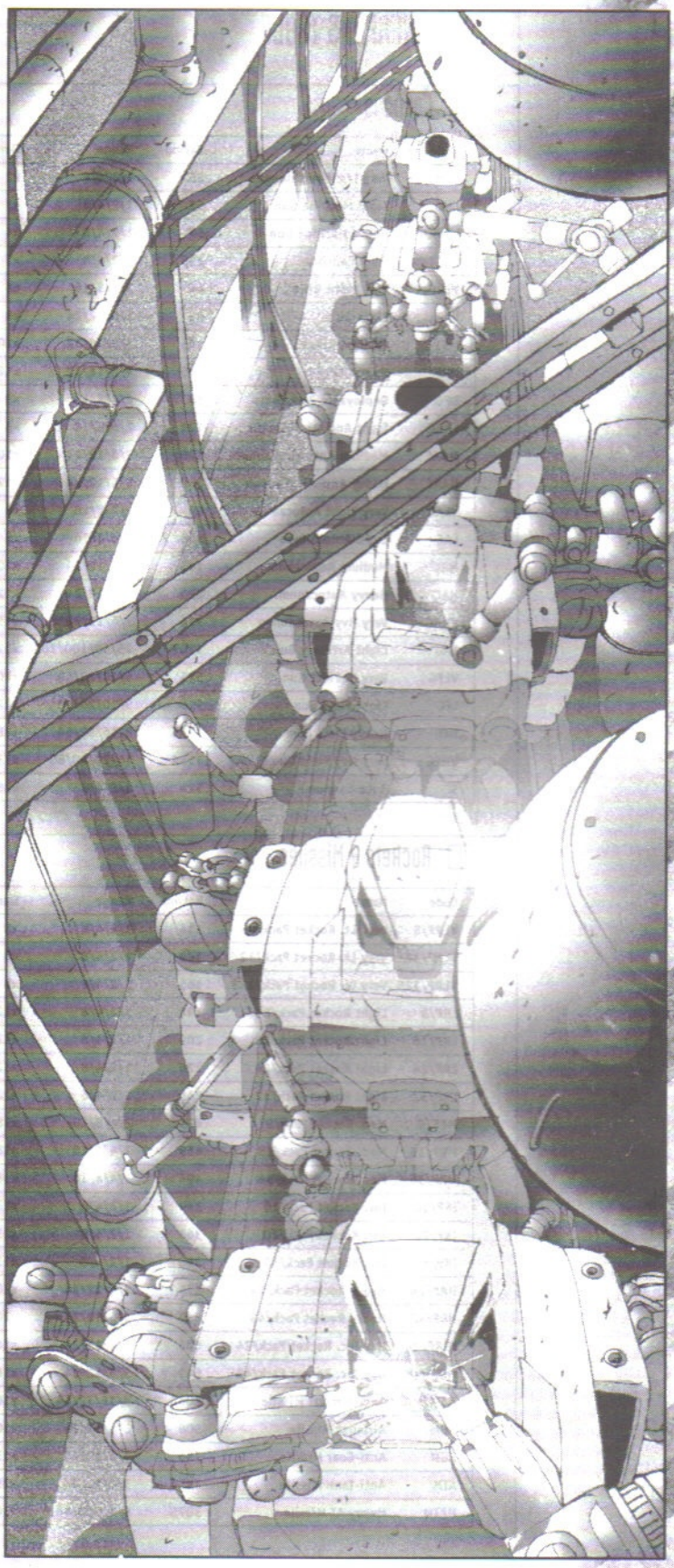
Kurt chooses his Gear's weapons: a hand-held 25mm Riley M222 light autocannon (LAC), a shoulder-mounted 52mm RP-109 "Pepperbox" rocket pack (LRP/24), and a 44mm Mk IV grenade launcher (APGL) for anti-personnel work. Three hand grenades (HG) and a vibroknife (VB), both hip-mounted, complete the armament.

He notes all of these weapons down, along with their cost. He also adds a few extra ammo packs, just in case.

Maximum Ammunition Load Table

Increase in Weapon's Minimum Size* Weapon's Base						
Min. Size	0	+1	+2	+3	+4	+5
1	625	2500	10,000	40,000	160,000	640,000
2	80	320	1280	5120	20,480	81,920
3	25	100	400	1600	6400	25,600
4	10	40	160	640	2560	10,240
5	5	20	80	320	1280	5120
6	3	12	48	192	768	3072
7	2	8	32	128	512	2048
8 to 9	1	4	16	64	256	1024
10 to 19	1	3	9	27	81	243
20+	1	2	4	8	16	32

*The Increase in Weapon's Minimum Size is the difference between the weapon's Min Size and the vehicle's final Size.



6.2 - WEAPONS TABLE

Cannons

Code	Name	Rating	Range	Dam.	Acc.	RoF	Ammo (ea.)	Min. Size	Special
VLMG	Very Light Machinegun	25	1/2/4/8	x2	0	+3	0.02	2	Anti-Inf.
LMG	Light Machine Gun	52	1/2/4/8	x3	0	+4	0.05	3	Anti-Inf.
HMG	Heavy Machine Gun	59	1/2/4/8	x4	0	+3	0.09	3	Anti-Inf.
FGC	Frag. Cannon	195	1/2/4/8	x7	+1	0	0.75	5	Anti-Inf., Frag Ammo
VLRF	Very Light Rifle	44	2/4/8/16	x6	0	0	0.18	3	-
LRF	Light Rifle	92	3/6/12/24	x8	0	0	0.36	4	-
MRF	Medium Rifle	165	4/8/16/32	x10	0	0	0.66	4	-
HRF	Heavy Rifle	209	4/8/16/32	x12	0	0	0.85	5	-
DPG	Deployable Pack Gun	58	2/4/8/16	x8	-1	+2	0.15	3	Disposable
LAAC	Light Anti-Air. Cannon	121	2/4/8/16	x8	0	+6	0.28	4	-
MAAC	Medium Anti-Air. Cannon	176	3/6/12/24	x10	0	+4	0.51	4	-
HAAC	Heavy Anti-Air. Cannon	230	3/6/12/24	x12	0	+3	0.68	5	-
VLAC	Very Light Autocannon	69	2/4/8/16	x6	0	+2	0.18	3	-
LAC	Light Autocannon	108	2/4/8/16	x8	0	+2	0.28	4	-
MAC	Medium Autocannon	163	3/6/12/24	x10	0	+1	0.51	4	-
HAC	Heavy Autocannon	220	3/6/12/24	x12	0	+1	0.68	5	-
VHAC	Very Hvy Autocannon	324	3/6/12/24	x15	0	+1	1.01	5	-
LAG	Light Artillery Gun	1107	25/50/100/200	x12	-2	+1	4.4	8	Ind. Fire, AE=0, Min. Range 10
VLFG	Very Lt Field Gun	525	5/10/20/40	x20	-1	0	2.10	6	Indirect Fire
LFG	Light Field Gun	915	5/10/20/40	x22	0	0	3.65	8	Indirect Fire
HFG	Heavy Field Gun	1945	8/16/32/64	x28	0	0	7.78	10	Indirect Fire
VHFG	Very Hvy Field Gun	3134	10/20/40/80	x33	0	0	12.54	12	Indirect Fire
SC	Snub Cannon	524	1/2/4/8	x28	-1	0	2.10	6	-

Rockets & Missiles

Code	Name	Rating	Range	Dam.	Acc.	RoF	Ammo (ea.)	Min. Size	Special
VLRP/8	Very Lt. Rocket Pack/8	114	1/2/4/8	x8	-1	+3	0.26	3	Indirect Fire
VLRP/32	Very Lt. Rocket Pack/32	129	1/2/4/8	x8	-1	+4	0.26	3	Indirect Fire
VLRP/128	Very Lt. Rocket Pack/128	165	1/2/4/8	x8	-1	+6	0.26	3	Indirect Fire
LRP/8	Light Rocket Pack/8	194	1/2/4/8	x12	-1	+1	0.58	3	Indirect Fire
LRP/16	Light Rocket Pack/16	209	1/2/4/8	x12	-1	+2	0.58	3	Indirect Fire
LRP/24	Light Rocket Pack/24	226	1/2/4/8	x12	-1	+3	0.58	3	Indirect Fire
LRP/32	Light Rocket Pack/32	245	1/2/4/8	x12	-1	+4	0.58	3	Indirect Fire
MRP/9	Med. Rocket Pack/9	425	2/4/8/16	x18	-1	+1	1.33	4	Indirect Fire
MRP/18	Med. Rocket Pack/18	469	2/4/8/16	x18	-1	+3	1.33	4	Indirect Fire
MRP/36	Med. Rocket Pack/36	494	2/4/8/16	x18	-1	+4	1.33	4	Indirect Fire
IRP/10	Inc. Rocket Pack/10	339	1/2/4/8	x13	-1	+1	1.02	4	Ind. Fire, Slow Burn Inc.
IRP/20	Inc. Rocket Pack/20	363	1/2/4/8	x13	-1	+2	1.02	4	Ind. Fire, Slow Burn Inc.
IRP/30	Inc. Rocket Pack/30	390	1/2/4/8	x13	-1	+3	1.02	4	Ind. Fire, Slow Burn Inc.
HRP/24	Heavy Rocket Pack/24	596	3/6/12/24	x20	-1	+3	1.71	5	Indirect Fire
HRP/48	Heavy Rocket Pack/48	623	3/6/12/24	x20	-1	+4	1.71	5	Indirect Fire
HIRP/24	Hvy Inc. Rocket Pack/24	606	3/6/12/24	x16	-1	+3	1.70	5	Ind. Fire, Slow Burn Inc.
HIRP/48	Hvy Inc. Rocket Pack/48	641	3/6/12/24	x16	-1	+4	1.70	5	Ind. Fire, Slow Burn Inc.
AAM	Anti-Aircraft Missile	2066	8/16/32/64	x10	+1	0	8.30	7	Guided, Min. Range 10
ABM	Airburst Missile	508	3/6/12/24	x10	0	0	2.00	6	AE=1
AGM	Anti-Gear Missile	756	3/6/12/24	x15	+1	0	15.12	4	Guided,Indirect Fire
ATM	Anti-Tank Missile	1956	3/6/12/24	x25	+1	0	39.12	6	Guided, Indirect Fire
HATM	Heavy AT Missile	3075	5/10/20/40	x30	+1	0	61.50	9	Guided, Indirect Fire

Recoilless Weapons

Code	Name	Rating	Range	Dam.	Acc.	RoF	Ammo (ea.)	Min. Size	Special
LPZ	Light Panzerfaust	14	1/2/4/8	x10	-1	0	-	2	Disposable
MPZ	Medium Panzerfaust	30	1/2/4/8	x15	-1	0	-	2	Disposable
HPZ	Heavy Panzerfaust	55	2/4/8/16	x20	-1	0	-	3	Disposable
RFB	Rapid-Fire Bazooka	278	1/2/4/8	x14	0	+2	0.79	4	-
LBZK	Light Bazooka	234	2/4/8/16	x15	0	0	0.93	4	-
MBZK	Medium Bazooka	409	2/4/8/16	x20	0	0	1.63	4	-
HBZK	Heavy Bazooka	634	2/4/8/16	x25	0	0	2.53	5	-

Support Weapons

Code	Name	Rating	Range	Dam.	Acc.	RoF	Ammo (ea.)	Min. Size	Special
LFL	Light Flamer	14	0/0/0/0	x5	+1	0	0.06	2	Slow Burn
MFL	Med Flamer	68	0/0/0/1	x7	+1	+1	0.17	2	Slow Burn, Indirect Fire
HFL	Heavy Flamer	134	0/0/1/2	x9	+1	+2	0.27	3	Slow Burn, Ind. Fire
APM	Anti-Personnel Mortar	95	2/4/8/16	x4	0	0	0.36	3	Anti-Inf., Ind. Fire, AE=0, Min Rg 2
LGM	Light Guided Mortar	304	3/6/12/24	x15	-1	0	6.05	4	Guided, Ind. Fire, Min Range 3
HGM	Heavy Guided Mortar	632	5/10/20/40	x20	-1	0	12.60	5	Guided, Ind. Fire, Min Range 5
LFM	Lt. Field Mortar	522	4/8/16/32	x15	-1	0	2.09	5	Indirect Fire, AE=0, Min Rg 4
MFM	Med. Field Mortar	947	5/10/20/40	x20	-1	0	3.79	6	Indirect Fire, AE=0, Min Rg 5
HFM	Hvy Field Mortar	1516	6/12/24/48	x25	-1	0	6.06	7	Indirect Fire, AE=0, Min Rg 6
APGL	Anti-Personnel G.L.	29	1/2/4/8	x3	-1	0	0.10	2	Anti-Inf., Indirect Fire, AE=0
LGL	Light G.L.	316	1/2/4/8	x15	-1	+2	0.90	4	Indirect Fire
HGL	Heavy G.L.	529	2/4/8/16	x20	-1	+1	1.63	5	Indirect Fire

Advanced Weapons

Code	Name	Rating	Range	Dam.	Acc.	RoF	Ammo (ea.)	Min. Size	Special
LPA	Light Particle Acc.	270	2/4/8/16	x10	+1	0	1.07	6	-1 Dam. per R.B., Haywire
HPA	Heavy Particle Acc.	672	3/6/12/24	x15	+1	0	2.68	8	-1 Dam. per R.B., Haywire
LRG	Light Railgun	603	5/10/20/40	x14	0	+2	1.93	7	-
HRG	Heavy Railgun	3339	10/20/40/80	x35	0	0	13.35	12	-
SLC	Sniper Laser Cannon	371	5/10/20/40	x12	+1	0	1.48	4	-1 Dam. per R.B.
HGLC	Gatling Laser	350	2/4/8/16	x16	+1	+1	1.06	4	-3 Dam. per R.B.
LLC	Light Laser Cannon	483	5/10/20/40	x16	+1	0	1.93	5	-2 Dam. per R.B.
HLC	Heavy Laser Cannon	623	5/10/20/40	x20	+1	0	2.48	5	-3 Dam. per R.B.
LPLC	Lt Pulse Laser Cannon	474	3/6/12/24	x20	+1	0	1.90	5	-3 Dam. per R.B.
HPLC	Hvy Pulse Laser Cannon	642	3/6/12/24	x24	+1	0	2.57	5	-4 Dam. per R.B.

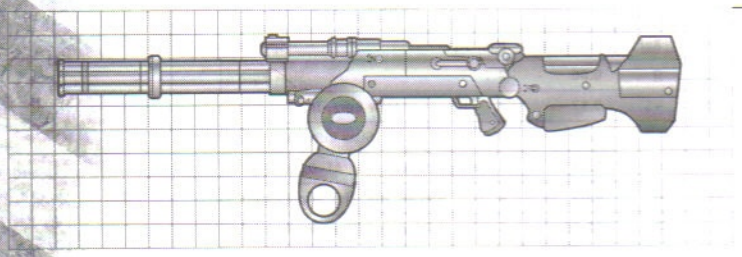
Close Combat

Code	Name	Rating	Range	Dam.	Acc.	RoF	Ammo (ea.)	Min. Size	Special
CR	Chassis Reinfor.	Veh. Size	0/0/0/0	+1 Dam.	0	0	n/a	n/a	Physical Attack Only
MF	Mauler Fist	61	0/0/0/0	x9	+1	0	n/a	3	Armor Crushing
HWP	Haywire Whip	110	0/0/0/0	x7	+1	0	0.44	4	Entangle, Haywire
CS	Chain Sword	20	0/0/0/0	X9	0	0	n/a	3	-
VB	Vibroblade	16	0/0/0/0	x8	0	0	n/a	3	Physical Attack Only
VR	Vibrorapier	27	0/0/0/0	x6	+1	0	n/a	3	Armor Piercing
VA	Vibroax	34	0/0/0/0	x10	-1	0	n/a	3	Armor Crushing
SKG	Spike Gun	38	0/0/0/0	x12	-1	0	0.15	3	-
HSKG	Heavy Spike Gun	66	0/0/0/0	x14	-1	0	0.27	4	Armor Piercing
HWG	Haywire Grenade	10	0/0/0/0	x10	-1	0	n/a	2	Haywire
HG	Hand Grenade (1)		0/0/0/0	x15	-1	0	11	2	Anti-Infantry
HHG	Heavy Grenade	21	0/0/0/0	x25	-1	0	n/a	2	-
SDG	Self-Destruct Grenade	60	0/0/0/0	x30	-1	0	n/a	2	AE=0

Cannons

Cannons include any weapon that can accelerate one or more projectiles using a chemical explosion. Various types of cannons are the basic weapon type used by armored vehicles on Terra Nova. The high caliber fully automatic autocannon class of weapons is featured on almost every military Gear on the planet, while single-shot rifles and anti-infantry machineguns are mainstays of tanks and striders. Regardless of their application, they are all rugged, adaptable and effective, which is why they are very popular. They are also easy to maintain and the ammunition can be readily manufactured with minimal facilities, unlike complex guided missiles or capacitor banks.

Cannons can take a variety of forms, from single barrelled guns to rotating multi-barrelled "gatling"-type weapons. Most modern cannons include an autoloader and/or a belt-feeder mechanism, or are clip-fed for easy reloading. Advanced heat-resistant alloys make them less dependent on cooling systems than was previously the case, permitting greater rates of fire. The Riley M222 autocannon is undoubtedly the most popular cannon in the North.

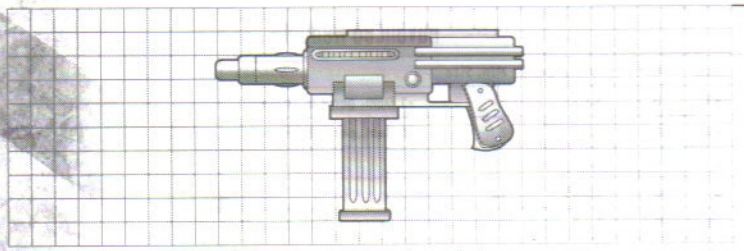


Very Light Machinegun

Purpose:	Anti-Infantry
Effective Range:	400 m
Penetration:	5 mm
Accuracy:	Average
Mode of Fire:	burst
Usual Ammo Load:	1000-5000 bullets

The Very Light Machinegun is a standard infantry support weapon that has been adapted for vehicular use. It is usually attached to a motorized pintle mount to avoid exposing the gunner. While the machinegun is useful against unprotected infantrymen, it is nearly worthless against vehicles, even unarmored ones.

The Brucker M769 is a functional and rugged machinegun capable of firing belt-fed, standard 7 mm cased ammunition. It is often pintle-mounted on jeeps, trucks and other support vehicles.

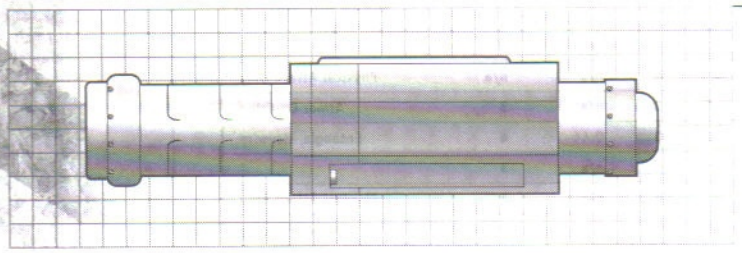


Light Machinegun

Purpose:	Anti-Infantry
Effective Range:	400 m
Penetration:	15 mm
Accuracy:	Average
Mode of Fire:	burst
Usual Ammo Load:	800-5000 shells

The Light Machinegun is a small caliber, rapid-fire cannon used mostly for anti-personnel purposes. It has a lower damage potential than other vehicle-mounted weapons, but has a vastly increased rate of fire. This makes Light Machineguns expensive to field (rapid wear of the barrel(s), high ammo cost, etc.).

The 7.7mm Territorial Arms MGU-77 Minigun is a typical Light Machinegun used by the Spitting Cobra Gear. Infantrymen have learned to fear this gun as "the Death Buzzer" because of the high pitched sound it makes when fired.



Heavy Machinegun

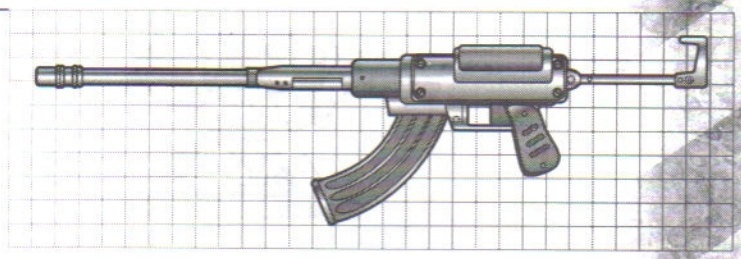
Purpose:	Anti-Infantry
Effective Range:	400 m
Penetration:	18 mm
Accuracy:	Average
Mode of Fire:	burst
Usual Ammo Load:	400-3000 shells

The Heavy Machinegun is a bigger machinegun with a larger caliber. This allows it to cause more damage, but at the cost of a slightly lower rate of fire. HMGs are also sturdier than LMG.

A typical HMG is the 10mm NORTHCO GU-10 Gatling Unit, the main anti-personnel weapon of the Grizzly Gear. It is a rare design in that it is fixed on the left side of the Gear's body, just under its ammo bin.

Very Light Rifle

Purpose:	Anti-Vehicle
Effective Range:	800 m
Penetration:	38 mm
Accuracy:	Average
Mode of Fire:	burst
Usual Ammo Load:	60 shells

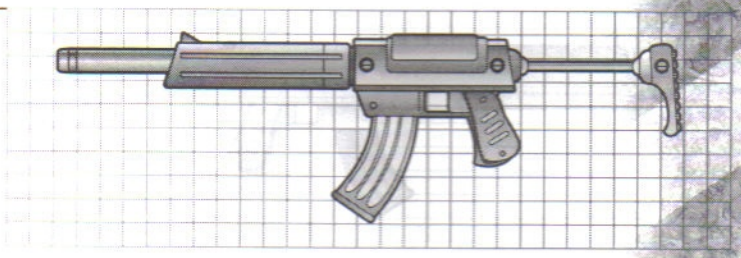


The Very Light Rifle is a very small vehicle gun designed as a backup weapon for light scouting vehicles. Its 20 mm shell can pierce the skin of most light vehicles, but not much else. It is popular with rovers because its simplicity makes it easy to maintain in the field.

The "R"-series includes single shot weapons ranging from light guns to field artillery. The R127 VLRF is a single shot cannon that has been likened to an enlarged infantry gun. Its battlefield usefulness is limited except when delivering custom ordnance.

Light Rifle

Purpose:	Anti-Gear
Effective Range:	1200 m
Penetration:	65 mm
Accuracy:	Average
Mode of Fire:	single
Usual Ammo Magazine:	30 shells

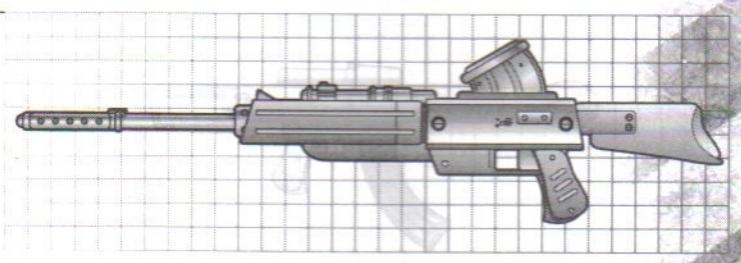


The Light Rifle is a simpler version of the Light Autocannon, but does not have the capacity for automatic fire. The barrel is slightly longer with a correspondingly superior accuracy and it fires higher caliber bullets.

The Riley R223 is a rework of the well-known Riley M222 20 mm autocannon. Both weapons use the same ammunition, but the R223 has a slightly longer barrel and a simplified breech mechanism. The rifle is also manufactured without the stock and the identification R224.

Medium Rifle

Purpose:	Anti-Gear
Effective Range:	1600 m
Penetration:	105 mm
Accuracy:	Average
Mode of Fire:	single
Usual Ammo Magazine:	25 shells

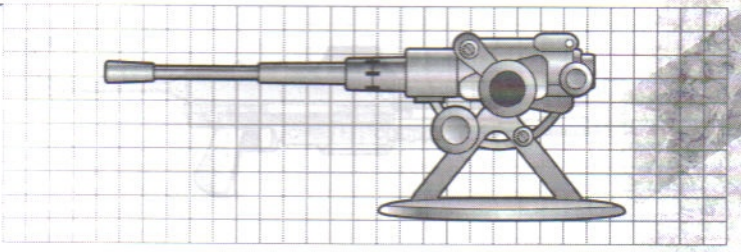


The Medium Rifle is similar in overall performance to the Medium Autocannon, though the caliber and barrel length are both increased at the expense of the automatic fire capacity. Medium Rifles make good Heavy Gear weapons because of their increased range compared to autocannons (the standard Gear weapon).

The Rucker Group RF-12 Medium Rifle is an alternate weapon selection for most front-line units. The RF-12 is rugged, reliable and easy to maintain, and it can fire a large variety of specialized ammunition.

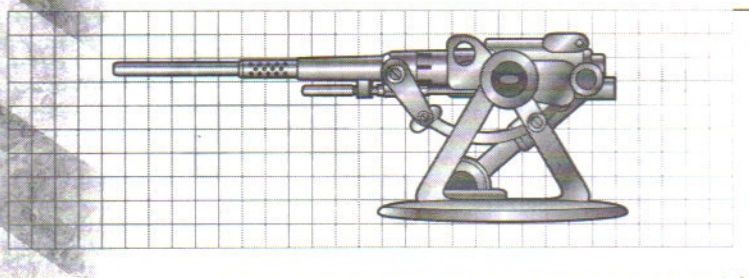
Heavy Rifle

Purpose:	Anti-Gear
Effective Range:	1600 m
Penetration:	150 mm
Accuracy:	Average
Mode of Fire:	single
Usual Ammo Magazine:	15 shells



The largest rifle-type weapon, the Heavy Rifle is the poor man's light tank gun. Most heavy rifle designs use either binary liquid or gel propellants and, in certain cases, an additional electro-thermal plasma boost. They are prized for their ability to fire a variety of ammunition, just like the larger tank guns, but without the associated cost.

The Rucker Group RF-19 Heavy Rifle is, in every way, a standard Rucker product: rugged, reliable and inexpensive. Many armored car designs use it as a main turreted gun.

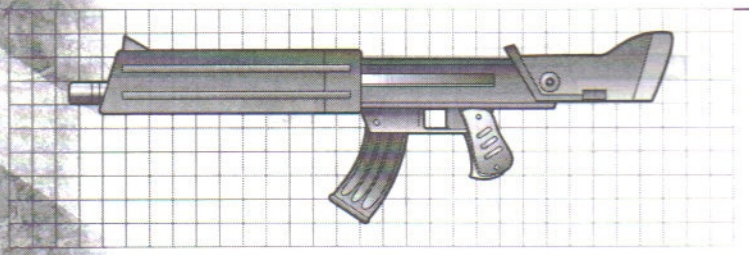


Very Light Autocannon

Purpose:	Anti-Gear/Anti-Infantry
Effective Range:	800 m
Penetration:	38 mm
Accuracy:	Average
Mode of Fire:	burst
Usual Ammo Load:	60 shells

The Very Light Autocannon lies somewhere between a heavy infantry machinegun and a vehicle-mounted autocannon. Although its armor-piercing shells are not very useful against infantry, the VLAC is a perfect back-up, anti-armor weapon for light vehicles.

The Riley M202 is a well-known example of the Very Light Autocannon. The single barrelled, air-cooled weapon fires non-standard 15 mm shells, but will accept similar rifle ammunition of the same caliber.



Light Autocannon

Purpose:	Anti-Gear/Anti-Infantry
Effective Range:	800 m
Penetration:	65 mm
Accuracy:	Average
Mode of Fire:	burst
Usual Ammo Load:	60 shells

Light Autocannons are popular weapons because they are rugged, simple to design and inexpensive to field. Most come in the form of a Gear-sized rifle which uses clip or belt-fed ammunition. They are mounted in the turret and hull of several armored vehicles as secondary weapons.

The 25mm Riley M222 Autocannon is one of the most reliable weapons ever produced. It is used by almost all Hunter-class Gears and has been the basis for several designs. The southern Jäger trooper Gear uses a practically identical weapon made by Paxton Arms.

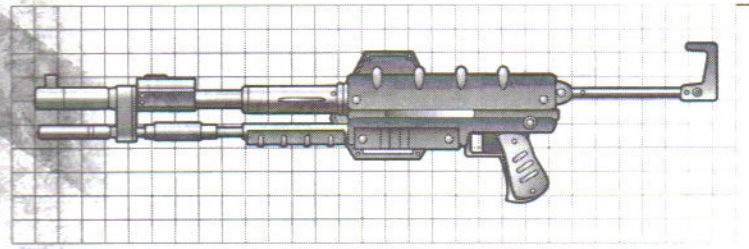


Medium Autocannon

Purpose:	Anti-Gear
Effective Range:	1200 m
Penetration:	105 mm
Accuracy:	Average
Mode of Fire:	burst
Usual Ammo Load:	50 shells

Medium Autocannons are the next most popular Gear weapons. Caliber and barrel length are both increased at the cost of the high rate of fire, resulting in a higher damage and range.

The 30mm Paxton MR25 Machinecannon is standard issue for the Black Mamba Gear. The Jaguar's main weapon, formerly a smaller autocannon, has been upgraded to a similar weapon.



Heavy Autocannon

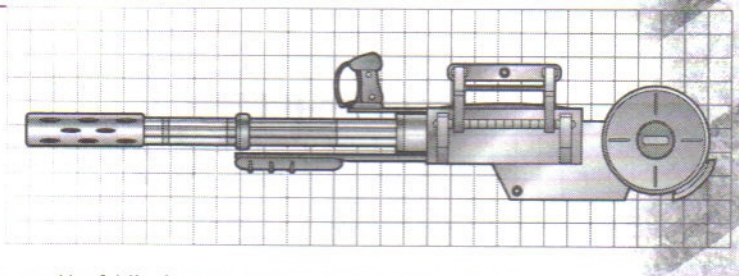
Purpose:	Anti-Gear
Effective Range:	1200 m
Penetration:	150 mm
Accuracy:	Average
Mode of Fire:	burst
Usual Ammo Load:	30 shells

A large rapid-loading automatic cannon, the Heavy Autocannon is often the main armament of light tanks and the heavier Gear models. Most of the weapon's mass is taken up by the barrel (or barrels, as many heavy autocannons follow a gatling-like setup) and the large autoloading system. Although most of the handheld Gear versions are clip fed, heavy autocannons are generally belt fed.

The 40mm Riley M225 and its counterpart, the Paxton MR60 Autocannon, are heavy autocannon rifles designed to be carried as main armament by the large Gear models such as the Grizzly or the Spitting Cobra.

Very Heavy Autocannon

Purpose:	Anti-Gear/Anti-Armor
Effective Range:	1200 m
Penetration:	230 mm
Accuracy:	average
Mode of Fire:	burst
Usual Ammo Load:	30-60 bursts

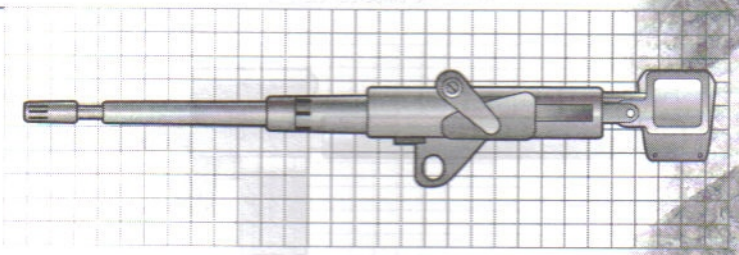


The Very Heavy Autocannon is an electrically-driven multi-tube weapon capable of delivering an awesome amount of ammunition in a very short time. Even in "single fire" mode, each shot sends many tightly-grouped rounds hurling toward the target.

A typical VHAC is the awesome Junglemower-10 autocannon carried by the Support Cobra. This six-tube weapon is electrically driven, air-cooled and fed through a rear-mounted ammunition drum that contains 400 bullets (enough for 40 "single" shots).

Very Light Field Gun

Purpose:	Anti-Armor
Effective Range:	2000 m
Penetration:	400 mm
Accuracy:	poor
Mode of Fire:	single
Usual Ammo Load:	60 shells

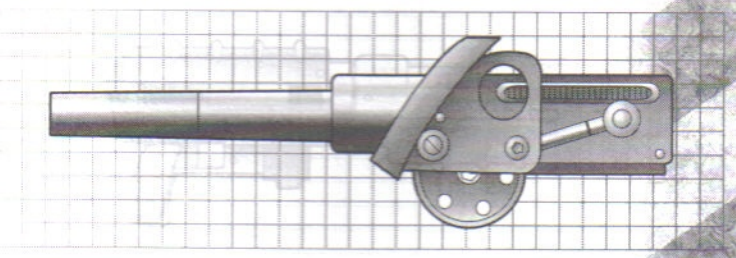


The Very Light Field Gun is the smallest single-shot, anti-armor weapon in use at the moment. It is slightly less accurate than other weapons of its type, mainly because of its short barrel. It can be easily carried by a large Heavy Gear. VLFGs are also often mounted on gun carriages and defensive bunkers.

The LTV-28 is a VLFG mounted on the back of the Support Cobra. The clip-fed weapon is mounted on an articulated hydraulic hardpoint and fires over the Gear's shoulder.

Light Field Gun

Purpose:	Anti-Armor
Effective Range:	2000 m
Penetration:	490 mm
Accuracy:	Average
Mode of Fire:	single shot
Usual Ammo Load:	50 shells

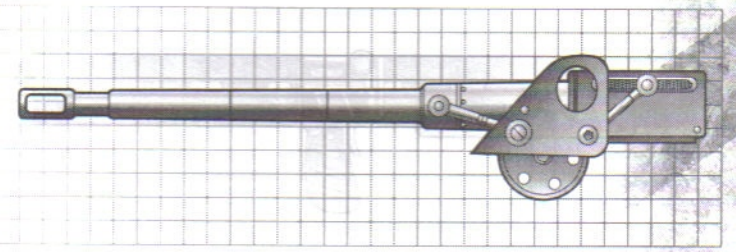


Unlike autocannons, field guns do not have any rapid-fire capacity. They make up for it with a longer range and higher hitting power. Most use Advanced Hyper-Kinetic Penetrator (AHKP) technology, with a secondary burn stage and molecular-aligned shaped alloy tips.

The 90mm Rucker Group LAU-44 is a self-loading cannon mounted in the turret of some of the Hun light tank variants. The gun has good penetration and accuracy considering the short length of its barrel.

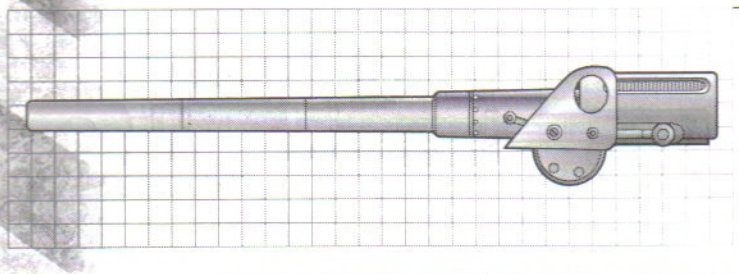
Heavy Field Gun

Purpose:	Anti-Armor
Effective Range:	3200 m
Penetration:	800 mm
Accuracy:	Average
Mode of Fire:	single shot
Usual Ammo Load:	40 shells



The Heavy Field Gun is a large gun capable of crippling or destroying an armored target in one shot. It is much too heavy to be carried by Gears and often constitutes the main armament of battle tanks. Heavy Field Guns use some of the most powerful types of gel propellants, sometimes relying on binary liquid compound injection for primary projectile acceleration.

The 140mm Ebirus Co. MAGISTER II Cannon is the main weapon of the main battle tanks used by the forces of the Southern Republic. It is a rugged, reliable cannon with good performance.

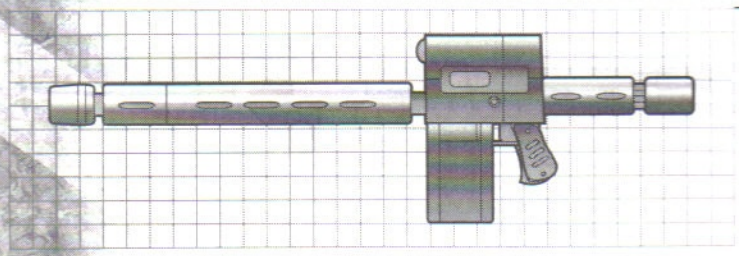


Very Heavy Field Gun

Purpose:	Anti-Armor
Effective Range:	4000 m
Penetration:	1100 mm
Accuracy:	Average
Mode of Fire:	single
Usual Ammo Load:	10 shells

The Very Heavy Field Gun is practically an artillery piece. Its wide 200 mm barrel can propel shells nearly 4 km and still hit and destroy a moving target with unnerving accuracy. The shells it fires are similar to the ones used by Snub Cannons, except that they are boosted faster and further by the gun's long barrel.

VHFGs are only carried by landships and the largest of tanks. The PK-12 shown in the illustration below is normally mounted in the front turret of the Empereur-class landship of the Southern Republic.

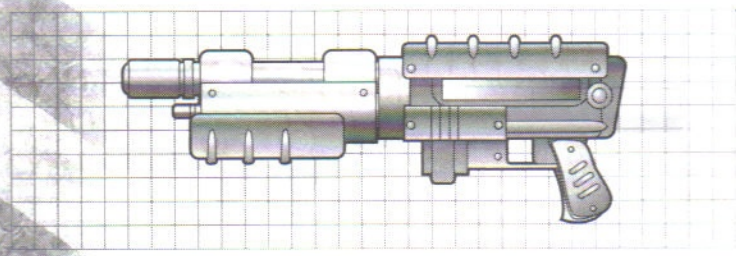


Snub Cannon

Purpose:	Anti-Armor/Anti-Infantry
Effective Range:	400 m
Penetration:	1000 mm
Accuracy:	poor
Mode of Fire:	single shot
Usual Ammo Load:	3 shells

The Snub Cannon is a heavy auto-loading cannon with a smooth bore and a short or medium barrel. It is mostly used for demolition and tank-hunting purposes. Its stubby ammo can transfer massive amounts of kinetic energy at short range, butwith little accuracy.

The 106mm Paxton LGPC "Little Joe" Snub Cannon is commonly assigned to one Gear in a squad. This gunner Gear provides the team with hard hitting, if slightly inaccurate, firepower.

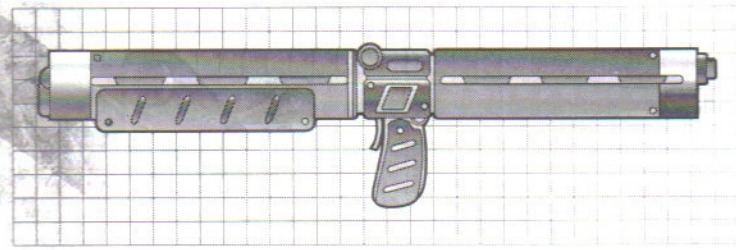


Fragmentation Cannon

Purpose:	Anti-Infantry/Anti-Gear
Effective Range:	400 m
Penetration:	50 mm
Accuracy:	good
Mode of Fire:	single shot
Usual Ammo Load:	16 shells

The Fragmentation Cannon is a cousin of the Snub Cannon. Its main function is to provide highly accurate firepower at close quarters; the gun usually fires fragmentation ammunition to increase the chance of a solid hit.

The 45mm Territorial Arms SG20 Fragmentation Cannon is a Gear-sized shotgun which was first designed for the Water Viper Gear. The weapon is well designed and deadly. It fires a special ceramic "Buckshot" ammunition which is very effective.



Disposable Pack Gun

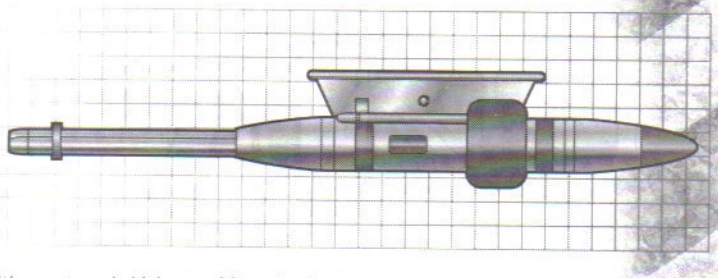
Purpose:	Anti-Gear
Effective Range:	800 m
Penetration:	65 mm
Accuracy:	poor
Mode of Fire:	burst
Usual Ammo Load:	30 shells

A Disposable Pack Gun is a polymer auto-loading weapon that can be stored on the hip plates or the backpack of the Gear. It is similar to a light autocannon in its general performance profile, but with a lower accuracy due to its shortened barrel. In its folded ("packed") position, it takes very little space. Once empty, the gun is generally discarded and a new one used.

The 25mm Riley M25 "Pack Gun" Disposable Rifle is a standard scout Gear weapon. However, it is so versatile that many other units carry one for backup firepower. Several versions of the Grizzly carry one folded under their left arm or on their left hip armor plate.

Light Anti-Aircraft Cannon

Purpose:	Anti-Aircraft
Effective Range (air):	4000 m
Penetration:	65 mm
Accuracy:	Average
Mode of Fire:	burst
Usual Ammo Load:	200-1000 shells

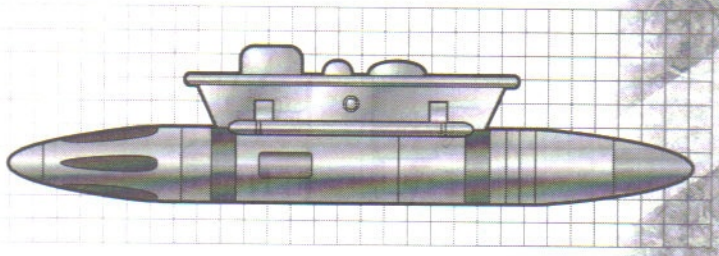


The Light Anti-aircraft Cannon is a high velocity, small-caliber weapon with an extremely high rate of fire, allowing it to fill a large area with deadly projectiles. An electric auto-loader brings fresh ammunition rounds, often caseless, from a magazine.

The LAAC-76 20 mm cannon mounted on Norlight attack planes is representative of this class of weaponry. The cannon is placed in an external pod underneath the fuselage, while its ammunition is carried in a helicoïdal magazine in the pod's rear section.

Medium Anti-Aircraft Cannon

Purpose:	Anti-Aircraft
Effective Range (air):	6000 m
Penetration:	100 mm
Accuracy:	Average
Mode of Fire:	burst
Usual Ammo Load:	200-1000 shells

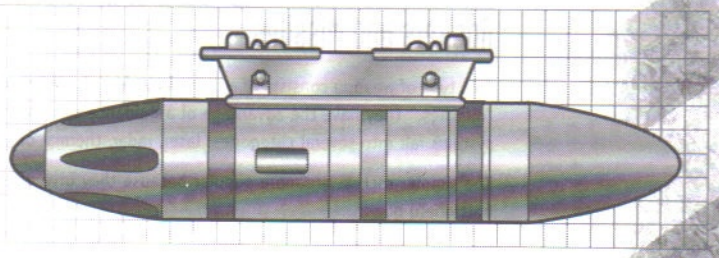


The Medium Anti-aircraft Cannon is a larger version of the previous weapon. It has a slightly lower rate of fire, but makes up for it with bigger shells, usually in the 30-40 mm caliber. Each shell has either a collapsed alloy penetrator for increased damage or a light explosive charge. Often, both are mixed within the magazine for optimum effect.

The Territorial Arms' Air Division Model 954 autocannon is a rugged multi-barrelled gun that is liquid cooled and automatically belt-fed. The ammunition is held in an easy to reload magazine that can be slipped in and out of the aircraft in a few minutes.

Heavy Anti-Aircraft Cannon

Purpose:	Anti-Aircraft
Effective Range (air):	6000 m
Penetration:	144 mm
Accuracy:	Average
Mode of Fire:	burst
Usual Ammo Load:	200-1000 shells

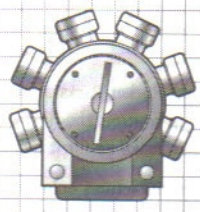


The Heavy Anti-Aircraft Cannon is the largest high velocity, rapid-fire cannon available. Its electric loader labors to feed its ravenous appetite for large 40 to 50 mm shells. Its overall rate of fire must be limited to prevent excessive barrel wear and overheating.

The monster Matrel Mark IV HAAC is composed of five ceramic composite barrels activated by a heavy duty electric motor. The overall length of the weapon (over six meters) takes up almost half the fuselage of the HF-12 air and ground attack plane.

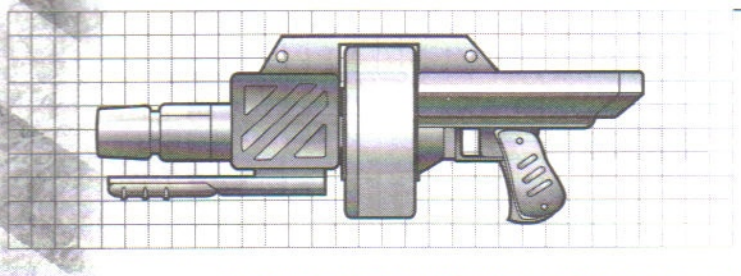
Anti-Personnel Grenade Launcher

Purpose:	Anti-Infantry
Effective Range:	400 m
Penetration:	9 mm
Accuracy:	poor
Mode of Fire:	single shot
Usual Ammo Load:	6 grenades



Also translated as All Purpose Grenade Launcher, the APGL is a generic code for short range, small payload, low-velocity cannons. They are mostly used to launch anti-personnel grenades (hence the designation), but can be loaded with any of the small grenade types (smoke, gas, etc.). Their standard anti-personnel load covers an area nearly 25 meters in radius with deadly shrapnel.

The 44mm Dimaean MK IV is a small grenade launcher built in a barrel-like configuration. Each grenade has its own launch tube and propellant cartridge which spin the unit when fired to place a new barrel in firing position.

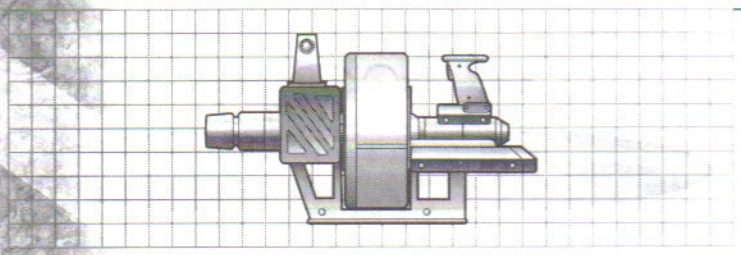


Light Grenade Launcher

Purpose:	Anti-Infantry/Anti-Vehicle
Effective Range:	400 m
Penetration:	225 mm
Accuracy:	poor
Mode of Fire:	burst
Usual Ammo Load:	20 grenades

The Light Grenade Launcher fills the battlefield gap between the direct-fire autocannons and field guns and the indirect fire guided mortars. Although not very accurate, the weapon offers good firepower. It is also very versatile since it can fire a variety of grenades.

The 60mm direct-fire Grenade Launcher made by Ankerson Works (a subsidiary of Northco) is a fully automatic grenade rifle designed to be handheld by most Heavy Gears. It stores the grenades in a drum-shaped ammo clip which is quick to replace and reload.



Heavy Grenade Launcher

Purpose:	Anti-Vehicle
Effective Range:	800 m
Penetration:	400 mm
Accuracy:	poor
Mode of Fire:	burst
Usual Ammo Load:	12 grenades

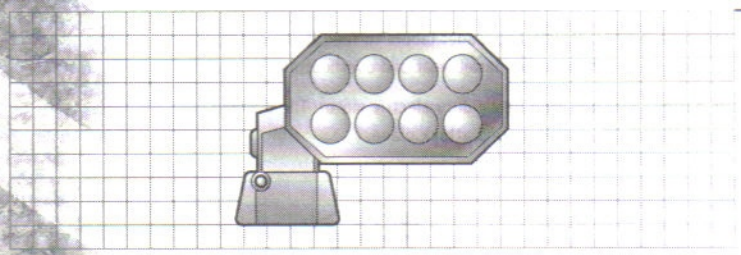
A larger version of the Light Grenade Launcher, this weapon packs a considerable punch and a good rate of fire at the cost of accuracy. The Heavy Grenade Launcher can also propel its grenades much further than its smaller brother. The grenades used can be of several different types. Unfortunately, because of the grenades' large size, the ammunition capacity is often quite small.

A large weapon, the 70mm LK-70 Heavy Grenade Launcher offers the triple advantage of good rate of fire, long range and high firepower. The autofire capacity is very effective in laying down a curtain of fire. As with other grenade launchers, ammunition capacity is low.

Rockets and Missiles

This type of weapon consists of a high-explosive, shaped charge warhead propelled by a rocket motor. Guided rockets are referred to as "missiles." They have the advantage of a guidance system and control vanes capable of redirecting the missile in flight; the guidance systems fall into several categories: laser, radar, thermal or visual (nose camera).

The simpler rockets are more popular because they give effective firepower to light vehicles unable to handle the recoil of the large battlefield guns.



Very Light Rocket Packs

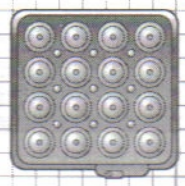
Purpose:	Self-defense
Effective Range:	400 m
Penetration:	65 mm
Accuracy:	poor
Mode of Fire:	burst
Usual Ammo Magazine:	8, 16, 32 or 128 rockets

Very Light Rocket Packs are loaded with little more than explosive charges sitting on top of a miniature rocket motor. Sometimes, a small chip controls the fins, permitting minimal flight control. Individually, Very Light Rockets are not very accurate or powerful, but more than make up for it by saturating the target area and attacking multiple targets at once.

Paxton manufactures only one type of VLRP, the semi-modular Paxton RP-070 launcher. The RP-070 consists of a fire control computer mated with a launch rack housing up to eight 45 mm rockets. The rack is mounted on rails that can be hooked to a storage bin, enabling more rockets to be quickly and efficiently loaded into the launcher.

Light Rocket Packs

Purpose:	Anti-Vehicle
Effective Range:	400 m
Penetration:	140 mm
Accuracy:	poor
Mode of Fire:	burst
Usual Ammo Load:	8, 16, 24 or 32 rockets

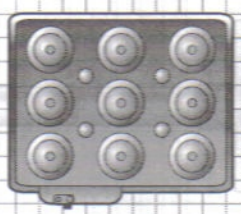


Light Rocket Packs are loaded with little more than explosive charges sitting on top of a rocket motor. A small chip controls the fins, allowing minimal flight control. They are not very accurate, but make up for it by saturating the target area.

The 52mm Paxton RP-109 "Pepperbox" is standard equipment on many front line and scout Gear models. It is not very accurate or powerful, but the large number of rockets in the pack allows for rapid covering fire.

Medium Rocket Packs

Purpose:	Anti-Armor
Effective Range:	400 m
Penetration:	325 mm
Accuracy:	poor
Mode of Fire:	burst
Usual Ammo Load:	9, 18 or 36 rockets

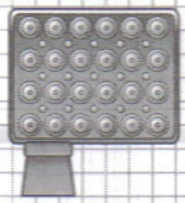


Medium Rocket Packs are very similar to LR packs. They simply use larger rockets, which allows each projectile to carry a bigger warhead and more fuel for as longer range.

The 71mm Territorial Arms Vesper-A MRP is commonly seen as a secondary weapon on the shoulder hardpoints of many Gears. It is cheap and rugged and provides extra firepower at crucial moments.

Heavy Rocket Packs

Purpose:	Anti-Armor
Effective Range:	1200 m
Penetration:	400 mm
Accuracy:	poor
Mode of Fire:	burst
Usual Ammo Load:	24 or 48 rockets

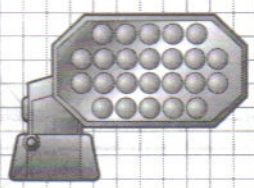


Heavy Rocket Packs use some of the largest unguided rockets on the battlefield. They are most often used for fire support and area saturation. The weapon occupies most of the back of the vehicle on which it is mounted and is fired overhead in an arcing trajectory.

The 82mm Territorial Arms SCRP Heavy Rocket Pack is a common support weapon. Its simple design and high rate of fire have made it extremely popular with commanders and pilots alike. Because of the SCRP abbreviation and the weapon's massive damage potential, enemy troops often call this weapon the "Scrapper."

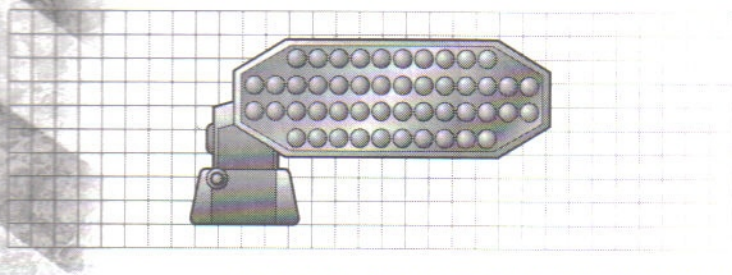
Incendiary Rocket Packs

Purpose:	Anti-Gear/Scorched Earth
Effective Range:	400 m
Penetration:	170 mm
Accuracy:	poor
Mode of Fire:	burst
Usual Ammo Load:	10, 20 or 30 rockets



The Incendiary Rockets are similar to the Light Rockets but carry an incendiary warhead (most often a white phosphorous/napalm type chemical gel). They are mostly used for mass destruction.

The 59mm Paxton RP-114 "Chilibox" is a nasty weapon. Its rockets are equipped with chemical warheads that spray the target with a burning compound that sticks and keeps on burning for several minutes.

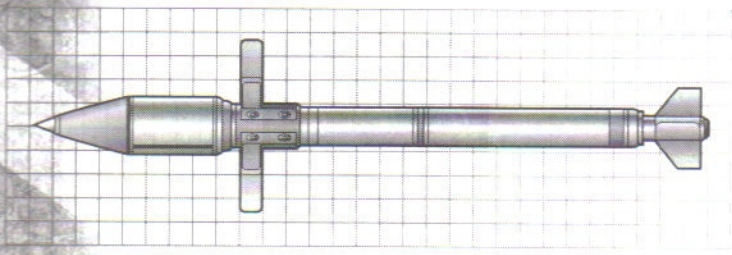


Heavy Incendiary Rocket Packs

Purpose:	Anti-Vehicle/Scorched Earth
Effective Range:	1200 m
Penetration:	260 mm
Accuracy:	poor
Mode of Fire:	single or ripple
Usual Ammo Magazine:	24 or 48 rockets

Heavy Incendiary Rockets are similar to Heavy Rockets, but carry an incendiary warhead (usually a white phosphorous/napalm-type chemical gel). The warheads spread a viscous burning liquid that keeps affecting the target for some time after the hit.

Northco does not produce many rocket launchers (or weapon systems for that matter), but their 24-rocket HI-8 pack is well known for its brutal efficiency and smooth operation.

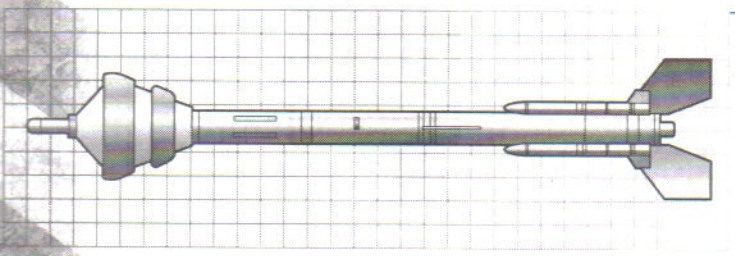


Anti-Gear Missile

Purpose:	Anti-Gear
Effective Range (air):	6000 m
Penetration:	225 mm
Accuracy:	good
Mode of Fire:	single
Usual Ammo Magazine:	2 to 4 missiles

The Anti-Gear Missile is a smaller, lighter version of the anti-tank missile. The warhead is useless against heavy armor, but can handle just about any other armored vehicle. The majority of AGM designs are wire guided using a very thin optic fiber, but a few models are laser or radio guided. Because of their reduced size, multiple AGMs can be carried within a single launcher.

The Hammerstrike-II missile can be fired from a ground launcher or, with the aid of an additional solid fuel booster, from an aircraft or other vehicle. The small projectile is powerful enough to dispose of most light armored vehicles and, of course, Gears.

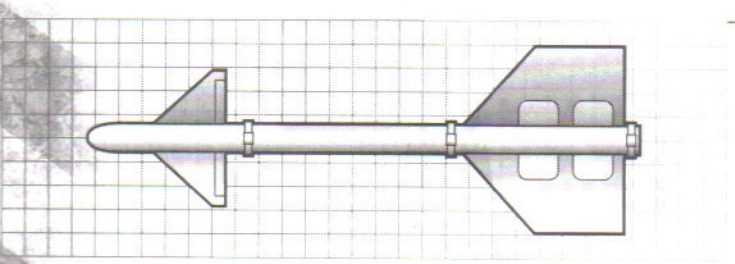


Anti-Tank Missile

Purpose: Anti-Armor	
Effective Range:	1200 to 2000 m
Penetration:	625 to 900 mm
Accuracy:	good
Mode of Fire:	single
Usual Ammo Load:	1 missile

The name Anti-Tank Missile covers a variety of anti-vehicular guided missiles. The majority of ATM designs are wire-guided through a very thin optic fiber, but a few are laser or radio guided. The ATM comes in many shapes. If a launcher can accommodate more than one missile, the notation is ATM/# where # is the number of missiles in the launcher. One missile can be launched per action. A heavier, larger version of the missile also exists. It has a similar flight performance but carries a more destructive warhead and has more fuel.

The DiMaean RAVEN Missile System is the main armament of the Klemm light tank used by the Northern Lights Confederacy.



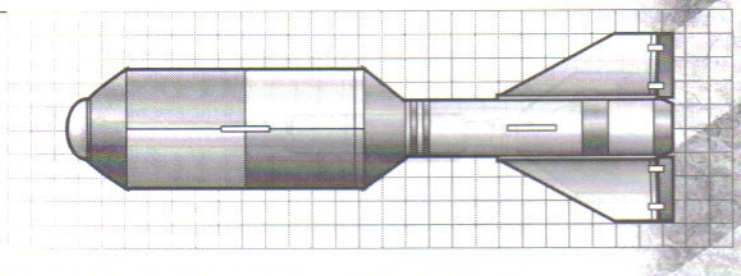
Anti-Aircraft Missile

Purpose:	Anti-Aircraft
Effective Range (air):	16,000 m
Penetration:	100 mm
Accuracy:	very good
Mode of Fire:	single
Usual Ammo Magazine:	1 or 2 missiles

The Anti-Aircraft Missile is primarily an air-to-air weapon, although a ground-launched version is available for specialized air defense units. Its solid fuel booster requires nearly 2000 meters to reach its peak thrust, making close-range operation difficult at best. However, once past that range, its advanced seeker warhead almost guarantees a kill every time.It can use both TV and millimeter wave radar to acquire its target and can discriminate against most counter-measures, which make it almost impossible to shake off.

Airburst Missile

Purpose:	Area Saturation
Effective Range (air):	6000 m
Penetration:	100 mm
Accuracy:	average
Mode of Fire:	single
Usual Ammo Magazine:	2 missile



The Airburst Missile is a rather large missile that contains several smaller sub-projectiles. Once the missile approaches its target, the nose cone splits open and fires its sub-munition payload to cover a larger area at once. Airburst missiles are very effective for engaging several targets at once.

The Agerstond ASM-588 contains a simple auto-guidance system that uses data downloaded from the aircraft's fire control system just prior to firing. It contains 21 armor-piercing warheads that can cover a zone nearly 150 meters across.

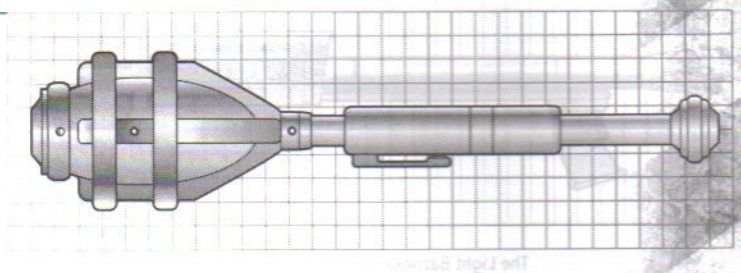
Panzerfausts

Panzerfausts (Eurogermanic for "armored fist") are used for hard-hitting firepower and one-shot-one-kill capacity in combat situations. They are composed of a heavy anti-armor warhead mounted on a quick-burning propellant charge. The projectile is held within a simple launch tube equipped with an electric trigger. The Gear only has to point the Panzerfaust toward the target and thumb the ignition; recoil is counteracted by a stream of gases ejecting out of the launch tube.

Panzerfausts require the presence of a functional Manipulator Arm in order to be used. They are HEAT weapons and are affected by both anti-missile fire and HEAT-resistant armor.

Light Panzerfaust

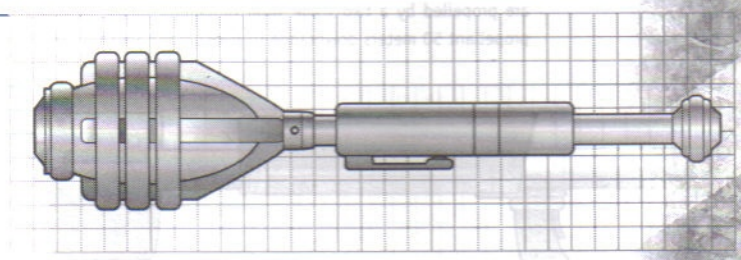
Purpose:	Anti-Armor
Effective Range:	400 m
Penetration:	100 mm
Accuracy:	poor
Mode of Fire:	single
Usual Ammo Load:	single shot



Light Panzerfausts were originally manufactured by the early settlers during the chaotic years of the Age of Isolation. By modifying standard shaped-charge digging explosives and mounting them on simple rockets, the settlers produced a cheap but effective weapon that could breach almost any kind of armor. In those troubled times, it was not uncommon to see modified Work Gears carrying several of these weapons on top of their makeshift armor.

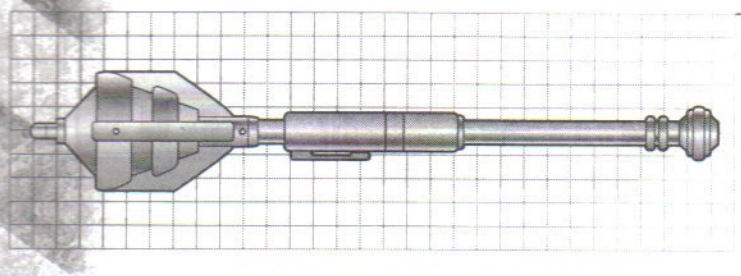
Medium Panzerfaust

Purpose:	Anti-Armor
Effective Range:	800 m
Penetration:	225 mm
Accuracy:	poor
Mode of Fire:	single
Usual Ammo Load:	single shot



As the city-states emerged on Terra Nova and started assembling armies, it was found that the classic makeshift weapon called Panzerfaust was an excellent and inexpensive way to deal with enemy armored forces. Although their simplicity made them poor conventional vehicular weapons, Panzerfausts proved very popular with the new soldiers known as Gear pilots, who finally found a weapon that took full advantage of the humanoid nature of their combat vehicle. Panzerfausts allow even a simple Gear to hold its own against much larger opponents, though its operating range is too short for comfort.

The PKSF-65 is a standard Medium Panzerfaust manufactured by Republic Weapon Technology. Its technical simplicity allows Republic to manufacture it with unskilled labor and simple robot machine tools. Many MILICIA units have been issued this inexpensive weapon.



Heavy Panzerfaust

Purpose:	Anti-Armor
Effective Range:	1200 m
Penetration:	400 mm
Accuracy:	poor
Mode of Fire:	single
Usual Ammo Load:	single shot

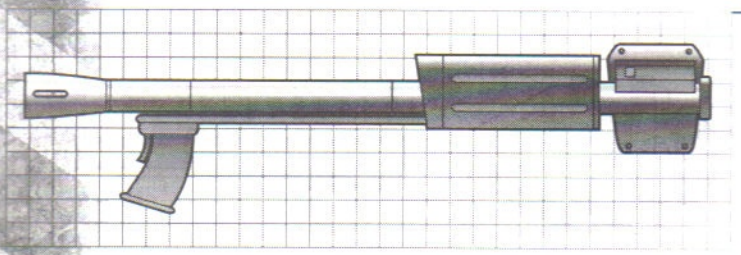
The extremely heavy composite armor of large MBTs simply soaks up the light warhead used by most panzerfaust designs. To resolve the problem and keep the low cost advantage of the panzerfaust weapon system, engineers modified a field mortar shell to serve as warhead on a heavier and deadlier version. The weapon can now take on MBTs , but its short range and inaccuracy make it dangerous to use.

The UBP-100 is a typical Heavy Panzerfaust derived from the well-known UBM-100-6 mortar shell used by several Northern forces. Although the warhead lost much of its area effect, the projectile is still feared by tankers for its ability to penetrate the heaviest armor.

Bazookas

Bazookas are heavy rocket cannons. They are used for hard-hitting firepower and one-shot-one-kill capability in combat situations. The main drawback of bazookas is their poor ammunition capacity.

Bazookas are generally used by Gears on heavy assault missions, because they can be used to punch through tanks and striders with decent accuracy. They do have relatively short ranges, however, which explains why most tanks use guided missiles or field guns as their main anti-armor weapons. Mounted on a fast Gear, however, a bazooka can be deadly.

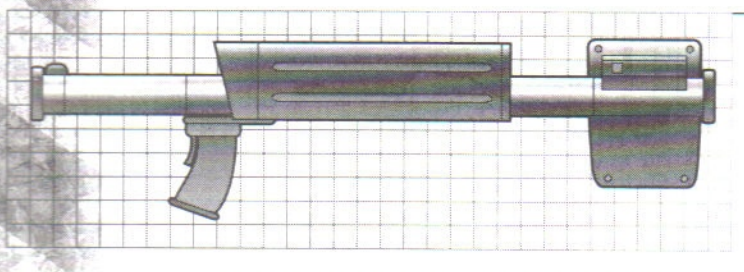


Light Bazooka

Purpose:	Anti-Armor/Anti-Gear
Effective Range:	800 m
Penetration:	250 mm
Accuracy:	Average
Mode of Fire:	single shot
Usual Ammo Load:	5 rockets

The Light Bazooka is a recoilless rocket cannon which is commonly used by Gears for dependable, hard striking firepower. Although a bit large, the Light Bazooka is a good compromise between weight and firepower. The rockets are usually loaded in clips that can be rapidly exchanged for reloading. The projectiles are typically short, the primary ejection charge being stored separately within the main body of the bazooka itself.

The SureFire-60 Recoilless Cannon is a sturdy weapon which was designed especially for Gears. It fires tiny dart-shaped rockets which are propelled by a two-stage solid propellant motor. A small charge ejects the rocket out of the barrel, and the rocket ignites its propellant 50 meters downrange to boost it for another 150 meters.



Medium Bazooka

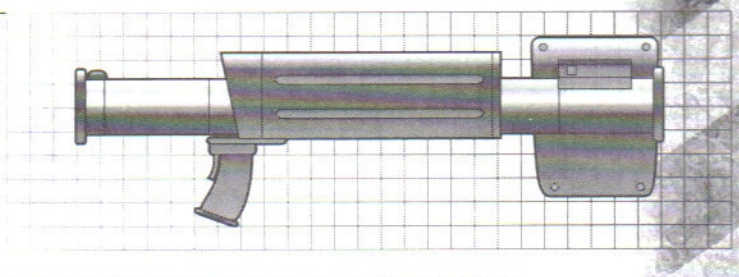
Purpose:	Anti-Armor/Anti-Gear
Effective Range:	800 m
Penetration:	450 mm
Accuracy:	Average
Mode of Fire:	single shot
Usual Ammo Load:	3 rockets

The Medium Bazooka is a larger model of recoilless cannon which can cause great amounts of damage to a target. The rockets are contained within a detachable magazine which can be quickly replaced by a fresh one; Gears often carry several additional ammo packs for this weapon. Like the Light Bazooka, a separate charge ejects the rocket from the barrel, the motor igniting nearly 60 meters from the muzzle to prevent any damage to the firing unit.

The Riley B-300 and Territorial Arms LRB-17 are two classic examples of a medium-sized bazooka which can be carried as the main weapon of a Gear on a strike mission. Both rely on clipped ammunition for ease of reloading and a steady rate of fire. Most experienced Gear pilots can change a clip in under ten seconds.

Heavy Bazooka

Purpose:Anti-Armor/Anti-Gear	
Effective Range:	800 m
Penetration:	625 mm
Accuracy:	Average
Mode of Fire:	single shot
Usual Ammo Load:	3 rockets

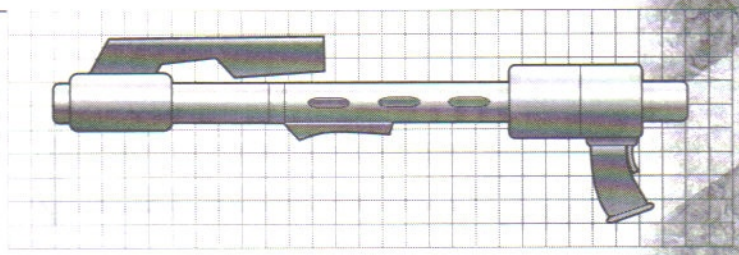


The largest recoilless cannon available on the battlefield, the Heavy Bazooka is so large and unwieldy that only assault Gears and front-line combat vehicles can carry it. Although it has a shorter range, the bazooka's damage is comparable to an ATM's.

The Territorial Arms LRB-30 has been described as "one darn big gun" by the soldiers using it. The LRB-30 uses rockets which are practically anti-tank missiles with the guidance system removed, making ammunition cheap and easy to come by.

Rapid-Fire Bazooka

Purpose:Anti-Gear	
Effective Range:	400 m
Penetration:	200 mm
Accuracy:	Average
Mode of Fire:	burst
Usual Ammo Load:	30 rockets



Take a standard infantry rocket launcher; make it bigger, tougher, and fully automatic; give it a good-sized clip, and you get a good description of the Rapid-Fire Bazooka. This rocket cannon is especially deadly when used in burst fire mode.

The Paxton RFL-2 "Soothsayer" Rapid-Fire Bazooka uses the same ammo as the common Paxton infantryman's rocket launcher, so ammunition is easy to come by. It is light and compact and thus often carried by light Gear designs.

Mortars

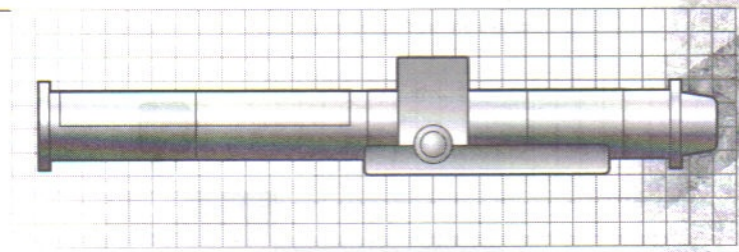
Mortars are weapons that accelerate one or more projectiles using a chemical explosion. Because of their configuration, they lob the shell along a very high trajectory. This makes mortars unsuitable for close fighting, but allows indirect firing. There are two basic types of mortars, field mortars and guided mortars. The major difference is the latter's guided warhead, but the weapons themselves also include fire-control and guidance systems absent in simple field models.

Because they are more powerful and less accurate than mortars firing guided ammunition, field mortars are usually reserved for general area bombardment. Guided mortars are more commonly used by attackers targetting specific units, even infantry. They are more common on Gears, included in both the standard Grizzly and Spitting Cobra designs.

Terranovan mortar designs take a variety of forms. In the case of Heavy Gears, mortars are often mounted on the backpack, firing over the head of the machine. In some designs, stabilizer struts extend from the mortar assembly to transfer the gun's high recoil directly to the ground, greatly reducing the stress on the Gear's legs. This is only the case when using especially heavy mortars, however, and can be risky because it reduces maneuverability.

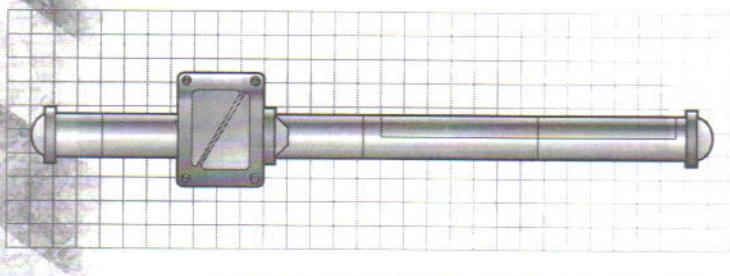
Anti-Personnel Mortar

Purpose:	Anti-Infantry
Effective Range:	800 m
Penetration:	15 mm
Accuracy:	Average
Mode of Fire:	single shot
Usual Ammo Load:	9 shells



The Anti-Personnel Mortar is a small caliber mortar for use against opposing infantry units. Its indirect fire capability and explosive charge are very effective for this task, allowing a vehicle to clear a path without endangering itself too much. The blast usually covers a radius of nearly 25 meters.

The 50mm NORTHCO MR-3 Mortar is a simple mortar unit which was specifically designed to get rid of enemy infantry units in cover. It is cheap and easily made. Each mortar is factory loaded and discarded once empty.

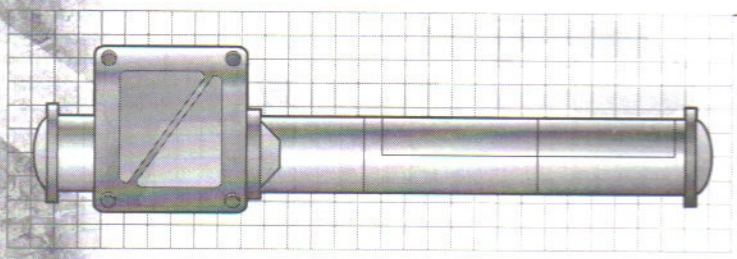


Light Field Mortar

Purpose:	Bombardment
Effective Range:	1600 m
Penetration:	225 mm
Accuracy:	poor
Mode of Fire:	single
Usual Ammo Load:	20 shells

The Light Field Mortar is a low-velocity howitzer that lobs large warheads in an arcing overhead trajectory. Although very similar in operation to the Guided Mortar, the Field Mortar trades its more sophisticated cousin's accuracy for increased range and punch. This is accomplished by replacing the shell's guidance system with a larger warhead.

The 90 mm UBM-22 is an inexpensive mortar unit that was specifically designed for area bombardment. It fires a high explosive shell similar in destructive power to a Gear's hand grenade, but can also fire other types of ammunition such as smoke rounds.

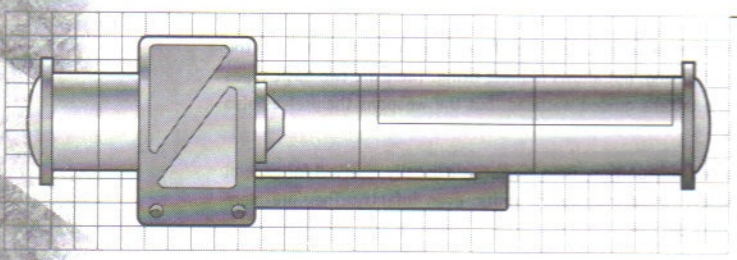


Medium Field Mortar

Purpose:	Bombardment
Effective Range:	2000 m
Penetration:	400 mm
Accuracy:	poor
Mode of Fire:	single
Usual Ammo Load:	12 shells

The Medium Field Mortar is a slightly larger version of the Light Field Mortar. It fires a bigger shell and has a longer barrel to boost the projectile further. Superficially, the MFM is very similar to the more sophisticated Heavy Guided Mortar, and the two are sometimes confused. Performance-wise, the Guided Mortar is more accurate, but the Field Mortar has a larger area effect.

The UBM-100 Mortar Unit is a Medium Field Mortar carried by the Rabid Grizzly. Since it uses the same mounting brackets as the Northco FSGM Heavy Guided Mortar, the UBM-100 is sometimes used on other Grizzlies when guided ammunition is in short supply.

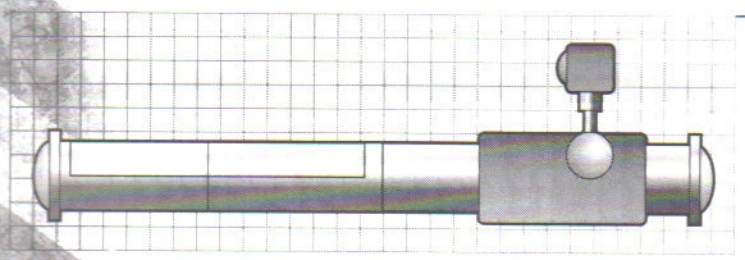


Heavy Field Mortar

Purpose:	Bombardment
Effective Range:	2400 m
Penetration:	625 mm
Accuracy:	poor
Mode of Fire:	single
Usual Ammo Load:	5 shells

A large bombardment weapon, the Heavy Field Mortar is sometimes classed in military registers as an artillery piece. It can hit a mobile target over 2.5 kilometers away: The shell used is composed of several sub-warheads for greater area coverage. Heavy Field Mortars are usually mounted on tracked vehicles since they are very heavy and have a high recoil.

The SDpzk-16, also affectionately known as the "Stormhammer," is a typical Heavy Field Mortar. The rugged 160 mm weapon has an air-cooled armored jacket for extended firing and general protection. It is most often mounted on a modified Klemm light tank chassis.



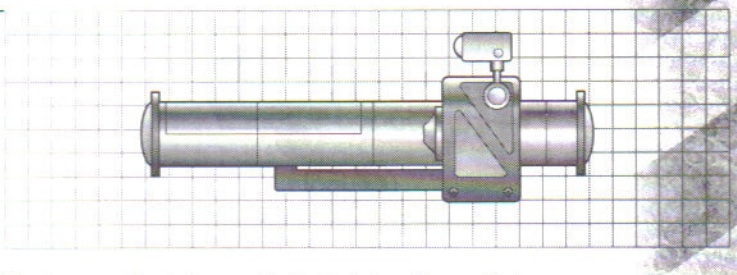
Light Guided Mortar

Purpose:	Anti-Armor
Effective Range:	1200 m
Penetration:	225 mm
Accuracy:	Average
Mode of Fire:	single shot
Usual Ammo Load:	12 shells

The Light Guided Mortar is a low-velocity cannon that lobs its warheads in an arcing overhead trajectory. The warheads have some limited control over their flight path through small fins that extend from the back of the shell once it clears the barrel. Using the laser seeker sensor in their tip, the projectiles can be directed to a target illuminated by a friendly spotting unit with a target designator.

Heavy Guided Mortar

Purpose: Anti-Armor	
Effective Range:	2000 m
Penetration:	400 mm
Accuracy:	Average
Mode of Fire:	single shot
Usual Ammo Load:	6 shells



The HGM is a heavy vehicle-mounted mortar designed for range and offensive power. Its shells are guided to their target by an allied target designator, vastly increasing the probability of a hit.

The 102mm NORTHCO FSGM (Fire Support Guided Mortar) has been designed specifically to be mounted on the back of the Grizzly. The mortar fires shells which are small missiles guided by a tight beam laser transmission to their target. The FSGM is very useful for attacking well-defended positions.

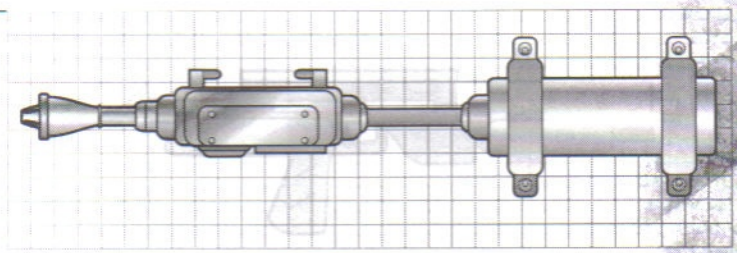
Flamers

Flamer are vehicle or fortification-mounted versions of the classic infantry flamethrower. Instead of using projectiles or energy to damage their target, flamers propel a stream of highly flammable liquid or gas that is ignited once it leaves the weapon's nozzle. This creates a wide and very hot cloud of flames that engulfs the target. Targets who are unprotected, most especially infantry, suffer catastrophic damage when trapped in this deadly cloud.

Flamers, although somewhat short-ranged, are very useful. The large stream of flames means that the weapon requires little aiming, bathing the target in searing heat and practically incinerating it on the spot. Flamers are also very powerful psychological weapons: Northern entrenched infantry has been known to beat a rapid retreat when the Flammjägers begin their advance. Flamers are also used for brush clearing and demolitions.

Light Flamer

Purpose:	Demolition
Effective Range:	1 to 20 m
Penetration:	N/A
Accuracy:	good
Mode of Fire:	single
Usual Fuel Capacity:	15 shots

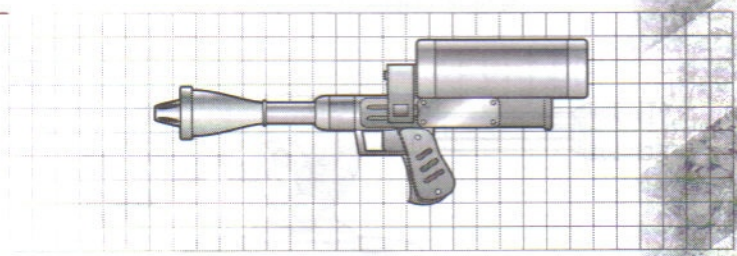


The Light Flamer is a small vehicle-mounted version of the infantry flamethrower. Like its portable cousin, it propels a stream of burning liquid toward the target. The large stream of flames requires little aiming, and is very effective against unprotected infantrymen.

The Paxton Matchstick II is a typical Light Flamer designed for anti-personnel work. It is compact and efficient and is usually mounted in a fixed position on the hull. Some Heavy Gear variants have been known to carry it on forearm mounts.

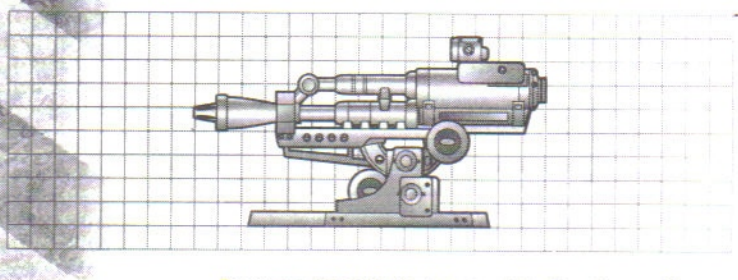
Medium Flamer

Purpose:	Demolition
Effective Range:	1 to 60 m
Penetration:	N/A
Accuracy:	good
Mode of Fire:	burst
Usual Fuel Capacity:	25 shots



The Medium Flamer is a larger version of the Light Flamer that was exclusively designed to be mounted on vehicles. The higher pressure and greater tank capacity allow more area coverage, while keeping the large cloud of flames that makes aiming less important with flamer weapons. The stream of burning liquid can even be propelled above intervening cover such as walls.

The Medium Flamer shown in the illustration below is the common Firemoth-16 flamer, a sturdy rifle-like weapon used almost exclusively by Heavy Gears. The Firemoth-16 is entirely self-contained, the fuel being found in twin top-mounted armored canisters. Each canister holds only one of two chemical gels; both are required for combustion. This reduces the risk of accidental detonation should the flamer be hit by enemy fire.



Heavy Flamer

Purpose:	Demolition
Effective Range:	1 to 120 m
Penetration:	N/A
Accuracy:	good
Mode of Fire:	burst
Usual Fuel Capacity:	30 shots

The Heavy Flamer is the largest vehicle flamethrower. Its powerful hose can bathe a large area with seething flames, igniting any flammable material almost instantly. Even when used for short bursts, the weapon lets out a large tongue of fire that engulfs the target. Like the Medium Flamer, the Heavy Flamer is powerful enough to propel the stream of fuel over intervening cover.

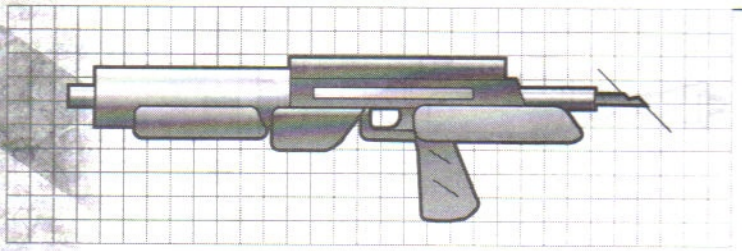
The BURN-9p is a typical Heavy Flamer. This brutal weapon is mounted in the forward turret of the Hittite, a dangerous anti-infantry vehicle based on the successful Hun light tank chassis.

Laser Weaponry

Laser is an acronym for Light Amplification by Stimulated Emission of Radiation. This type of weapon fires a beam of coherent energy, generally light, in the near-visible frequency range using millennia-old High Energy Laser (HEL) techniques.

Almost all battlefield lasers are cumbersome, specialized weapons whose efficiency is impaired by the presence of atmospheric dust and water vapor. Their main advantage is their high accuracy: there is no lead time, and an acquired target is quite simply a dead target. This makes lasers prefered anti-aircraft weapon.

Because of its limitations and expense, laser weaponry is generally only employed in two capacities: for commando operations and as anti-aircraft weapons. In the former situation, lasers provide stealth Gears with sniper capabilities that make them extremely deadly. In the latter function, lasers provide effective AA coverage for most main battle tanks and some light tanks.

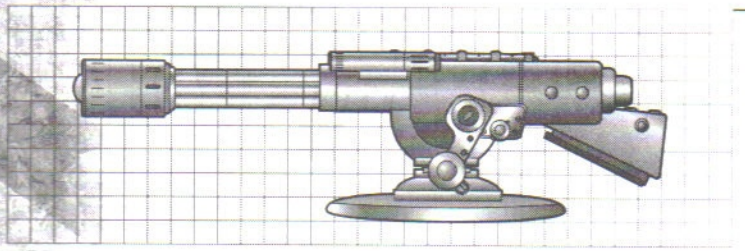


Sniper Laser Cannon

Purpose:Anti-Vehicle Sniper	
Effective Range:	2000 m
Penetration:	145mm (up to 250 m range)
Accuracy:	good
Mode of Fire:	single
Usual Energy Charge:	20 shots

The Sniper Laser is an energy cannon which is designed for long range performance: efficient power converter, slow beam dispersion, superior focusing lenses. Although the weapon is an energy hog — each superconducting loop powering it can only hold enough juice for a few shots — it is extremely efficient for sniper operations because of its range and high penetration.

The Territorial Arms TU-16 sniper laser rifle is the main weapon of the South's dreaded Snakeye Black Mamba stealth/commando Gear. The TU-16 is capable of picking off enemies at 2 kilometers with deadly accuracy.



Gatling Laser Cannon

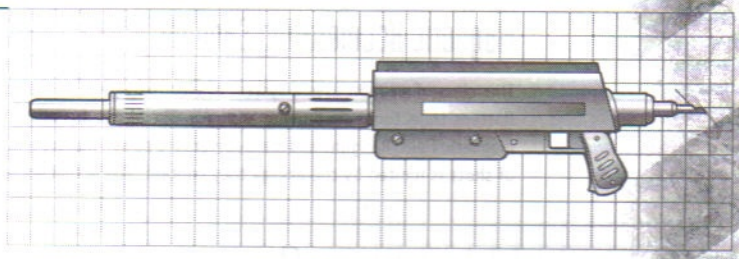
Purpose:	Anti-Vehicle
Effective Range:	800 m
Penetration:	260 mm (up to 100 m range)
Accuracy:	good
Mode of Fire:	burst
Usual Energy Charge:	40 shots

The Gatling Laser is a specialized, rapid-firing energy beam weapon that uses multiple lasing chambers to recharge its capacitors faster and to better dissipate the heat of continuous fire. The resulting "machinegun effect" can be used to attack multiple targets. Although the increased energy pumped into each shot dissipates quickly in atmosphere, the Gatling Laser can spread its fire over a larger area than other continuous-firing lasers.

FyStar Weapon Works recently introduced its brand new Helios-series high-power laser. Although it is low-powered for a battlefield weapon, the Helios uses three 10 MW lasing chambers located around a central core, activated by an electric motor on a separate circuit.

Light Laser Cannon

Purpose:	Anti-Vehicle
Effective Range:	2000 m
Penetration:	196 mm (up to 250 m range)
Accuracy:	good
Mode of Fire:	single
Usual Energy Charge:	15 shots

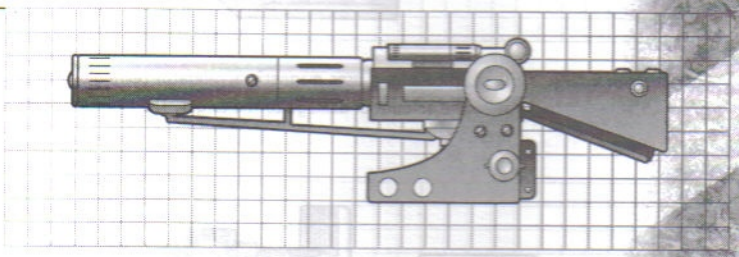


A larger version of the common Sniper Laser, the Light Laser Cannon delivers more raw energy to the target. Atmospheric attenuation and beam dispersion drops the damage fairly rapidly over distance, but the gun's high accuracy and (almost) line of sight range makes it useful for a variety of tasks. It shares a laser's tendency for high energy consumption.

The SRWI LZ-213 is a manipulator held Gear laser rifle used by the Hooded Cobra lon-range combat Gear.

Heavy Laser Cannon

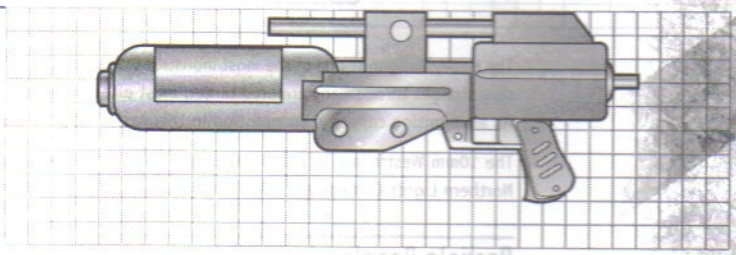
Purpose:	Anti-Vehicle
Effective Range:	2000 m
Penetration:	400 mm (up to 250 m range)
Accuracy:	good
Mode of Fire:	single
Usual Energy Charge:	10 shots



The largest vehicle-mounted battlefield laser, the Heavy Laser Cannon is popular for its high punch and lack of recoil. Although powerful, the HLC is nonetheless greatly limited by beam attenuation, which diminishes the damage over long distances.

Light Pulse Laser Cannon

Purpose:	Anti-Vehicle
Effective Range:	1200 m
Penetration:	400 mm (up to 150 m range)
Accuracy:	Average
Mode of Fire:	single
Usual Energy Charge:	15 shots

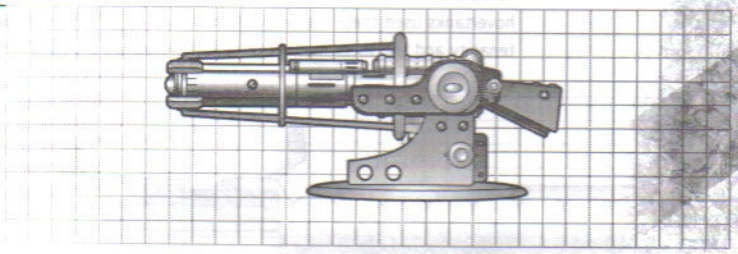


A weapon similar to the Light Laser Cannon, the Light Pulse Laser concentrates all its power in a single, highly concentrated pulse of energy. Although this reduces the range because of increased beam attenuation, it also causes a lot more damage to the target. Light Pulse Laser Cannons have an output of around 15 to 20 mW, depending on lasing efficiency.

The Sergon Optics A-20 Lightbearer is a 17.5 MW free-electron pulse laser mounted in the upper turret of the Aller Main Battle Tank. Sergon Optics is a division of Hyperion Works and is well known for its quality lasers.

Heavy Pulse Laser Cannon

Purpose:	Anti-Armor
Effective Range:	1200 m
Penetration:	575 mm (up to 150 m range)
Accuracy:	Average
Mode of Fire:	single
Usual Energy Charge:	10 shots

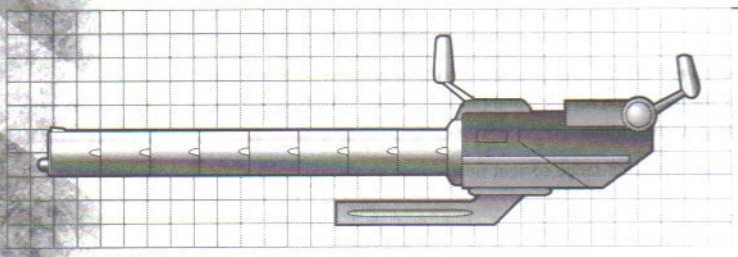


Like the lighter PLC, the Heavy Pulse Laser concentrates all its power in a single, highly concentrated pulse of energy. Although the beam rapidly loses coherence and power, the weapon is still very accurate for its large size and packs quite a punch. Heavy Pulse Laser Cannons have an output of around 25 to 35 mW and require large capacitor banks that take a long time to recharge.

The 35 MW HA Armorwerks PLC-35 is, without a doubt, the largest vehicular laser system currently in use. Pieced together from the remnants of crashed Earth ships' weapon arrays, the PLC-35 is a powerful battlefield laser capable of outperforming most projectile weapons at close range. Unfortunately, interaction with airborne particles greatly reduces its penetration depth over a longer range.

Magnetic Acceleration Cannons

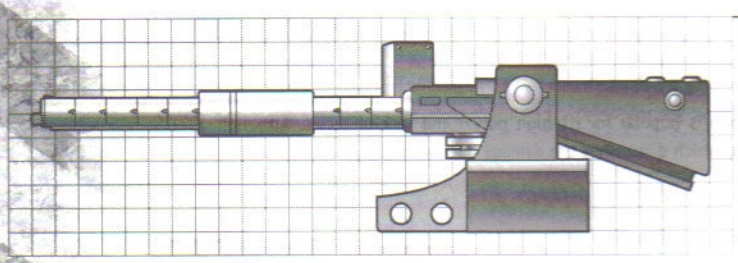
This class of weapon uses a system of electromagnets to launch projectiles at an extremely high velocity. This reduces lead time and flattens trajectories, improving accuracy. The shells are small chunks of shaped composite or plastic with a metal "skirt" to grip the magnetic field. Railguns and mass-drivers are power-hungry and include dedicated capacitor banks to feed them; even then, the number of shots is limited by the energy they contain. The actual ammunition is not a problem since the individual shells are so small.



Light Railgun

Purpose:	Anti-Tank
Effective Range:	2000 m
Penetration:	200 mm
Accuracy:	Average
Mode of Fire:	burst
Usual Energy Charge:	60 shots

The Light Railgun uses magnetic accelerator technology to propel one or more lightweight projectiles to fantastic speed, causing an awesome amount of damage to the target. The Light Railgun's open bore and rapid capacitor recycling allow a machinegun-like rate of fire.



Heavy Railgun

Purpose:	Anti-Armor
Effective Range:	4000 m
Penetration:	1225 mm
Accuracy:	Average
Mode of Fire:	single shot
Usual Energy Charge:	24 shots

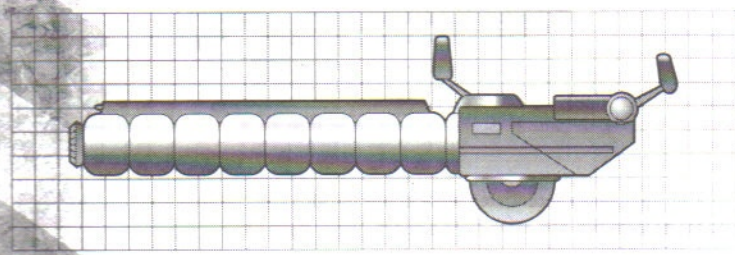
The Heavy Railgun is one of the most monstrous weapons available on the modern battlefield. Magnetic acceleration sends a hypersonic slug straight through any armored target, most often killing it. The large energy requirement of the gun limits its rate of fire as well as its ammunition capacity, ammunition in this case being the capacitor energy banks.

The 10mm Westfellow Technologies THOR is one of the rare advanced weapons seen on the battlefield. It is the main weapon of the Northern Lights Confederacy's Aller main battle tank. The gun has a separate engine to recharge its super-conducting capacitors.

Particle Accelerators

This class of weapon emits beams of atomic particles at velocities near the speed of light. Particle accelerators require large amounts of energy in order to function and are not very efficient in an atmosphere. Particle accelerators cause damage through both impact and electronic disruption. Most are equipped with an integral "leading" laser system to "burn" an ionized path to the target, but they still lose energy and hitting power over long distances through beam diffusion and atmospheric interactions.

Particle accelerators have become infamous on Terra Nova as the weapons of choice of the Colonial Expeditionary Force. The CEF's deadly hovertanks used these weapons as their main armament with devastating effect in the early days of the war. It was only Terranovan tenacity and the sheer number of defending troops that bogged down the relentless invasion before it was too late.



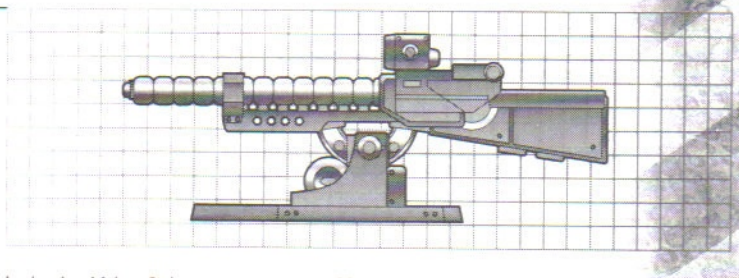
Light Particle Accelerator

Purpose:	Anti-Vehicle
Effective Range:	400 m
Penetration:	100 mm (+ electrical damage)
Accuracy:	good
Mode of Fire:	single shot
Usual Energy Charge:	20 shots

The Light Particle Accelerator is small enough to be carried by the largest Gear models. It is thus the most common weapon of this type seen on the battlefield. Although the weapon itself is heavy and cumbersome and does not cause much damage when compared to a conventional weapon, its electronic disruption effects are a boon to salvage-minded commanders.

Heavy Particle Accelerator

Purpose:	Anti-Vehicle
Effective Range:	800 m
Penetration:	225 mm (+ electrical damage)
Accuracy:	good
Mode of Fire:	single shot
Usual Energy Charge:	15 shots



The Heavy Particle Accelerator is the largest particle weapon carried by land vehicles. It has a range comparable to many projectile weapons and its massive electrical discharge can sometimes burn out everything aboard an enemy vehicle in one shot — including the crew. Most current models of HPA are based upon the energy weapons salvaged from wrecked Earth hovertanks.

The particle accelerator carried by the CEF's HT-68 heavy assault hovertanks were frightening effective weapons and Terranovan engineers have yet to fully reproduce their capabilities. Only the Korps of Port Arthur have authentic CEF HPA technology, and even they are rumored to now be using downgraded models because of maintenance problems.

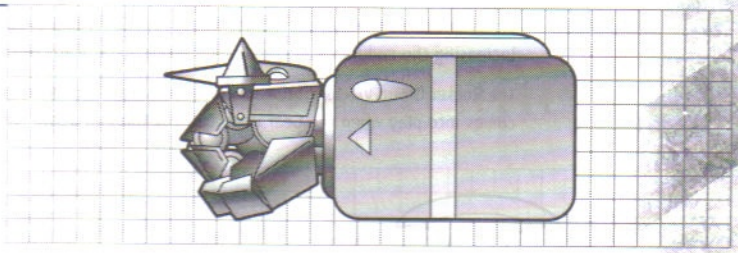
Close Combat Weapons

The development of humanoid fighting vehicles has led to the creation of several new weapons designed for use in close combat between vehicles. In most cases these are simple adaptations of infantry weapons to a larger scale, be it melee weapons like the vibroknife of hand-grenades. In-depth rules for most advanced melee weaponry is found in the **Duelist's Handbook**.

These weapons are almost entirely reserved for Gears because they depend on the presence of manipulator arms to handle and a humanoid structure to actually participate in close combat. Indeed, many are specialized weapons designed for Gear dueling. Some tanks and other vehicles do feature specially adapted versions of these weapons, however. A logging tractor might have a powerful vibroblade appendage to cut through foliage, although it would not resemble the large knife of a Gear vibroblade.

Chassis Reinforcement

Purpose:	Close-Combat Anti-Vehicle
Effective Range:	point blank
Penetration:	varies
Accuracy:	Average
Mode of Fire:	n/a
Usual Ammo Load:	n/a

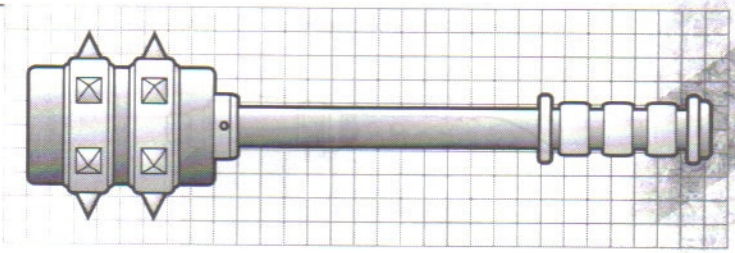


The Chassis Reinforcement is a simple welded plate of alloy designed to cause additional damage in physical combat. Gears are the vehicle type that use them the most, since their humanoid form enables them to deliver particularly effective physical blows, but other vehicles use them as well in the form of bumper plates and the like. They add +1 to the DM of a successful physical attack.

Most field technicians use a combination of forearm spikes and additional armor plating to increase a Gear's ability to punch or kick. This is a common modification made in the field, usually requested by pilots who got into close combat with enemy machines. Duelists and other hotshot pilots often have custom reinforcements, with characteristic spike arrangements.

Mace

Purpose:	Dueling
Effective Range:	3 m
Penetration:	64 mm
Accuracy:	Poor
Mode of Fire:	N/A
Usual Ammo Magazine:	N/A

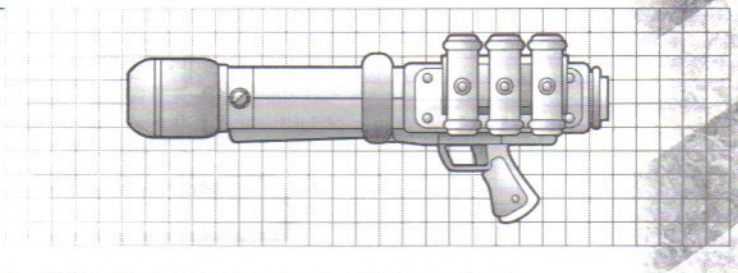


Heavy Gear maces are very simple close combat weapons used to pound an opponent into submission. They are usually of the short, one-handed variety, but larger two handed maces also exist. The most popular maces are studded balls of steel, but hammers and spiked maces are also widely used. These variations make very little difference against the armored skin of a Gear, but pilots often have a stylistic preference. One-handed weighted staffs are also used by some, often with one in each hand of the Gear.

Maces are extremely common and easy to manufacture, but Sage Industries in Smyrna produce the best known series of them. Hammers and maces are widely used in the Gear jousts of Smyrna as a secondary weapons for close-combat skirmishing.

Net Gun

Purpose:	Dueling and animal hunting
Effective Range:	400 meters
Penetration:	25 mm
Accuracy:	Average
Mode of Fire:	Single fire
Usual Ammo Magazine:	3



Originally developed to be mounted on vehicles aimed at capturing giant wildlife such as barnabus iguanas or armadillo beasts, the net gun has found a second home in underground dueling arenas. Sometimes tied to a powerful winch, the net gun is used to paralyze an opponent at range. Dueling versions can be set so that the net does not expand, cauisng damage due to concussive force.

The Wildman net gun from Garan Wild Supplies is the model most commonly used in dueling.

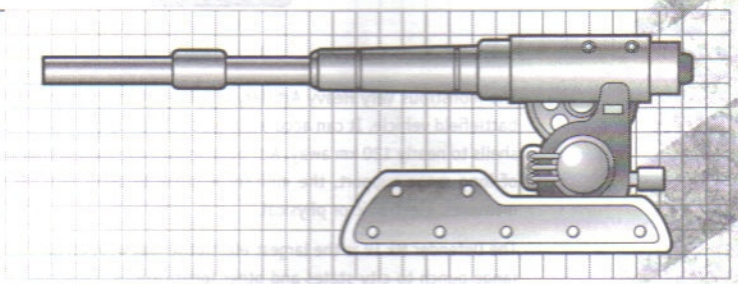
Tube Artillery

Tube Artillery is a blanket term that covers a variety of indirect fire support weapons. Although they might actually be howitzers, mortars, massdrivers or cannons, all of these weapons achieve similar game effects for simplicity and ease of bookkeeping. Tube artillery weapons have been divided into Light, Medium, Heavy and Very Heavy Artillery Guns.

All artillery pieces fire "salvos," a burst of projectiles bound for the same target point. Although a salvo consists of several shots, each firing of the weapon consumes only one salvo. The area effect of the weapon represents the arrival of the salvo's multiple shells/warheads. Firing just one shell is possible (see Ranging Shot, page 23), but the damage effect from its impact should only be worked out in a roleplaying campaign (each shell does half the regular damage, without a tactical AE).

Light Artillery Gun

Purpose:	Artillery/Fire Support
Effective Range:	10 km
Average Penetration:	145 mm
Area Effect:	15 m radius
Accuracy:	Average
Mode of Fire:	single
Usual Ammo Magazine:	40 salvos

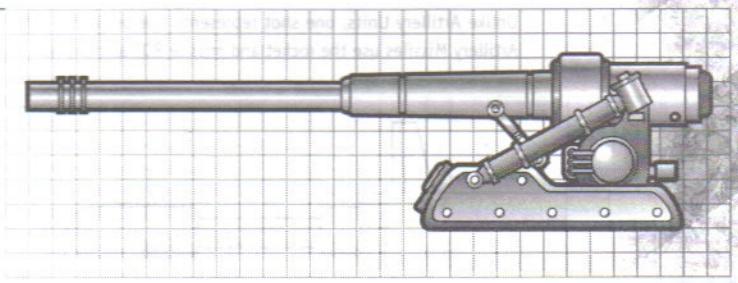


The Light Artillery Gun is a large cannon or howitzer. The usual caliber is around 100 mm, though some units use a smaller caliber and advanced binary propellants or electrothermal technologies to achieve a similar performance. A few rare designs have been based on massdriver technology, but their power requirement and technological complexity have made them unpopular.

The AMD-7 is a Southern massdriver artillery gun. Its drive coils can accelerate packets of kinetic penetration ordinance for normal fire or can load special ammunition canisters for special effects such as smoke. Its high maintenance requirement has prevented its wide distribution to front line units, however.

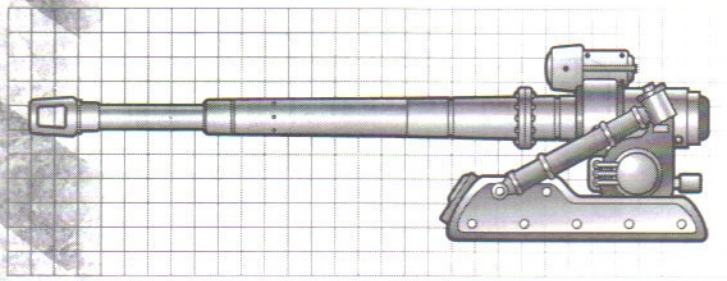
Medium Artillery Gun

Purpose:	Artillery/Fire Support
Effective Range:	12 km
Average Penetration:	325 mm
Area Effect:	25 m radius
Accuracy:	Average
Mode of Fire:	single
Usual Ammo Magazine:	30 salvos



The Medium Artillery Gun is very similar to its smaller brethren, but uses shells in the 130 to 160 mm range. Some Medium Artillery Guns are actually built around a massdriver, delivering dozens of smaller shells at a time. Medium Artillery Guns are a popular choice for emplacement defenses, but few vehicles have been designed with these weapons so far.

The D7 howitzer is part of the highly successful "D" series manufactured by Dressen, a distinguished Humanist Alliance design and production team. The D-series weapons are renowned for their accuracy and reliability. Dressen is currently under close Republican scrutiny because of rumors that they are holding back their next, more advanced, design.

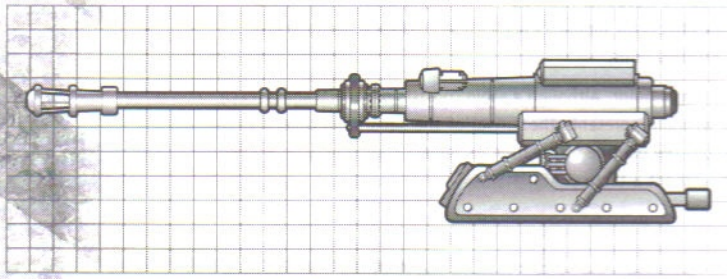


Heavy Artillery Gun

Purpose:	Artillery/Fire Support
Effective Range:	16 km
Average Penetration:	485 mm
Area Effect:	50 m radius
Accuracy:	average
Mode of Fire:	single
Usual Ammo Magazine:	15 salvos

The Heavy Artillery Gun is even larger than the MAG and uses shells in the 170 to 200 mm range. To get excellent performance without unnecessarily reinforcing the gun, many HAG designs use electrothermal cannon technology, or ETC. ETC is relatively old and well understood, but still costly to built into a weapon. ETC weapons inject an electrically ionized gas behind the shell as it travels the barrel, eliminating the loss of performances caused by the normal gas expansion. ETC is often coupled with an autoloader.

The M576 is a close cousin to the 200 mm cannon mounted on the Verder heavy self-propelled gun. Its carriage has been designed for installation in fortification or landship turrets.



Very Heavy Artillery Gun

Purpose:	Artillery/Fire Support
Effective Range:	24 km
Average Penetration:	900 mm
Area Effect:	125 m radius
Accuracy:	average
Mode of Fire:	single
Usual Ammo Magazine:	10 salvos

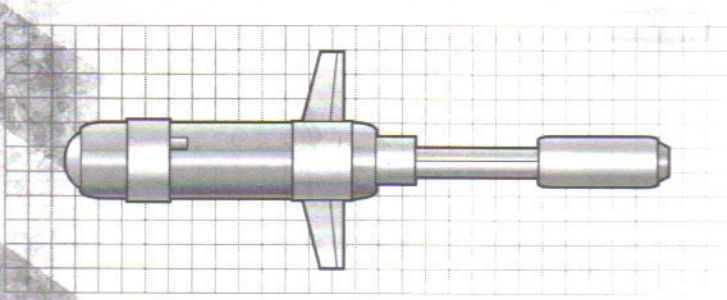
The monstrous Very Heavy Artillery Gun looks like it belongs more on a landship (on which VHAGs are commonly mounted) than on a battlefield vehicle. It can accurately place shells up to 24 km away in battlefield conditions, and special tests have sent rocket-assisted shells to nearly 120 km away. Although many have argued that missiles may prove a better (and less expensive) solution to the problem of long range support, the military is quick to point out the relative impunity of the VHAG's hypersonic shells to enemy counter-measures, electronic or physical.

The Defender Mk IV is the largest electrothermal weapon on Terra Nova. It is commonly mounted in fortification turrets to provide long range punch to city-states and other fortifications. Each shell is almost as tall as a man and must be loaded by a small crane.

Artillery Missiles

Light, Medium, Heavy and Very Heavy Artillery Missiles are long-range battlefield bombardment weapons. They can carry large payloads and are often salvo or ripple-fired to produce maximum area saturation. Most of the launcher designs use high velocity missiles that sprint to the battlefield in one minute or less, even though the battle may be taking place 50 or 60 km away, and dodge all but the most accurate anti-missile fire. This explains the high price of these weapons, especially when compared to the slower cruise missiles.

Unlike Artillery Units, one shot represents one projectile with a single high explosive warhead or multiple scattering submunitions. Artillery Missiles use the rocket and missile ROF ammunition expenditure rule and can be attacked by anti-missile systems.



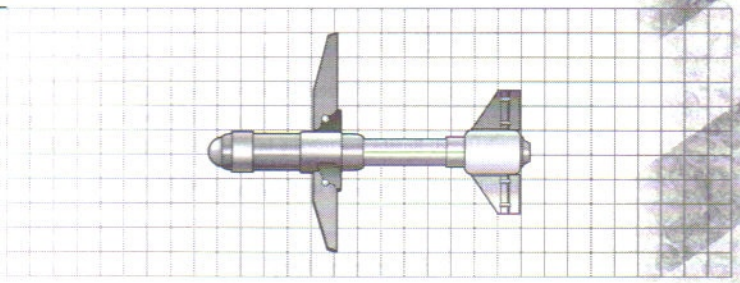
Light Artillery Missile

Purpose:	Artillery/Fire Support
Effective Range:	20 km
Average Penetration:	145 mm
Area Effect:	15 m radius
Accuracy:	poor unless guided
Mode of Fire:	burst
Usual Ammo Magazine:	16 missiles

The Light Artillery Missile lies just above the Heavy Rocket in the military arsenal. It carries a heavier fragmentation warhead, but can also be fitted with a variety of ammunition depending on the mission requirements. LAMs are steerable and can receive course corrections in mid-flight from an allied target designator.

Medium Artillery Missile

Purpose:	Artillery/Fire Support
Effective Range:	24 km
Average Penetration:	325 mm
Area Effect:	25 m radius
Accuracy:	poor unless guided
Mode of Fire:	burst
Usual Ammo Magazine:	8 missiles

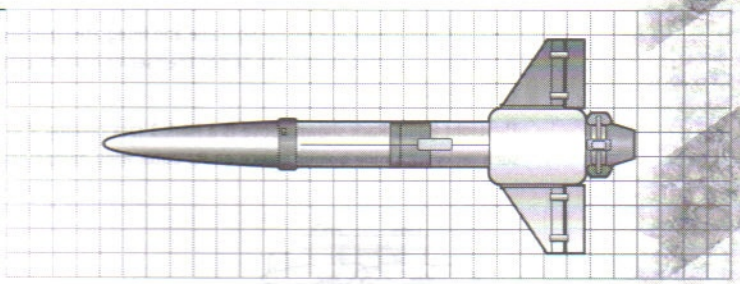


The Medium Artillery Missile is rarely seen on the battlefield. The launcher is usually mounted on a tracked or legged platform and placed far from the action, ready to rain sub-munitions on the field. MAMs are capable of limited steering while in flight and are equipped to use the data provided by allied target designators.

The Hellbringer tactical artillery missile makes the Northern Vandal artillery platform a deadly combatant indeed. Its two huge Hellbringers dominate its chassis, based on the Aller MBT.

Heavy Artillery Missile

Purpose:	Artillery/Fire Support
Effective Range:	36 km
Average Penetration:	485 mm
Area Effect:	50 m radius
Accuracy:	poor unless guided
Mode of Fire:	burst
Usual Ammo Magazine:	4 missiles

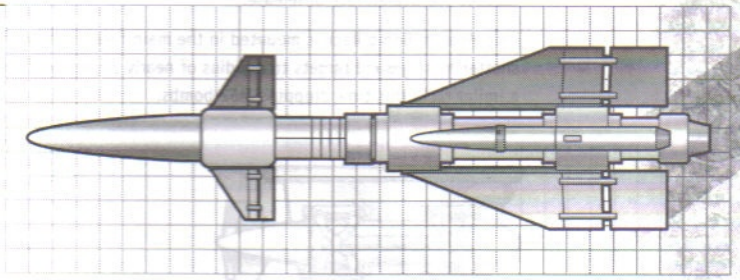


The Heavy Artillery Missile can hit a mobile target from nearly 36 kilometers away if provided with course correction data. Their long range and their large payload make them an extremely powerful form of battlefield artillery. The missiles are small enough to fit a mobile platform but are also often found in fixed defensive positions. Forward observer units deployed ahead of HAM positions can, with the use of a laser designator, destroy the largest of battlefield units.

Paxton Arms manufactures the PAM series of artillery missiles and its main seller is the larged PAM-17, nicknamed the Godhammer by PRDF artillery men. Godhammers are becoming popular in the South and Patriarchal Masao has dropped several on his rebel territories, most especially Basal.

Very Heavy Artillery Missile

Purpose:	Artillery/Fire Support
Effective Range:	60 km
Average Penetration:	900 mm
Area Effect:	125 m radius
Accuracy:	poor unless guided
Mode of Fire:	burst
Usual Ammo Magazine:	2 missiles



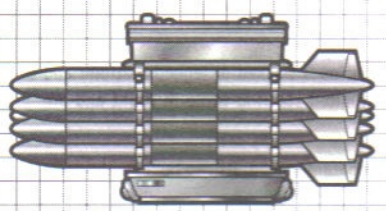
Unlike its smaller brethren, the Very Heavy Artillery Missile is so large and powerful it is often fired singly rather than as part of a salvo. The multiple warheads contained in its nose cone cover the attack zone very efficiently. Like the other artillery missiles, the VHAM can carry a large variety of specialized ammunition.

The Riley AR-75 Guided Artillery Missile is among the most widely deployed VHACs in the northern hemisphere. Riley has made significant progress in entering the Badlands market by lauding the AR-75 as a deterence weapon system for small desert communities. With growing global tensions, this sales tactic has worked like a charm.

Bomb Racks

Bomb racks are specialized hardware designed to hold freefall explosive charges. They are attached to hardpoints on the underside of an aircraft or inside a bomber's weapons bay. All types of bomb racks fit on similar universal mounting points and can be quickly exchanged. Bombs are usually laser-guided and have small fins to control their trajectory for precise, pin-point targeting.

Bomb racks can only be used by flying vehicles.

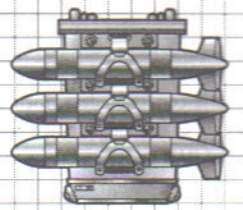


Light Bomb Rack

Purpose:	Area Saturation
Effective Range:	depends on initial speed
Penetration:	100 mm
Accuracy:	average (if guided)
Mode of Fire:	single or saturation
Standard Rack:	9 bombs

The Light Bomb Rack is a mounting frame and integrated guidance system for carrying dead-fall ordinance to the target, almost always in the form of guided bombs. The bombs themselves have no propulsion system, but do have some maneuvering ability to "home in" on their target.

The Light Bomb Rack shown above is a Mark 3 rack holding M36 laser guided bombs. The HF-12 fighter-bomber sometimes carries two such racks with nine bombs apiece on its outer wing hardpoints for ground attack operations.

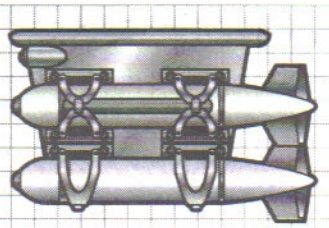


Medium Bomb Rack

Purpose:	Area Saturation
Effective Range:	depends on initial speed
Penetration:	225 mm
Accuracy:	average (if guided)
Mode of Fire:	single or saturation
Standard Rack:	6 bombs

Like the Light Bomb Rack, the Medium Rack is a mounting frame and integrated guidance system for carrying guided bombs. The rack is heavier and sturdier and can support more powerful bombs, although the reinforced frame causes more delay when dropping them and reduces the overall rate of release.

This Medium Bomb Rack is mounted in the main fuselage bay of the Republican RL-5A Quetzal fighter-bomber. Its Mark 78 bombs can shatter most ground targets to a radius of nearly 30 meters from the impact point. The Northern B-3 Buzzard heavy bomber also uses a imilar rack, this time dropping M62 bombs.



Heavy Bomb Rack

Purpose:	Area Saturation
Effective Range:	depends on initial speed
Penetration:	400 mm
Accuracy:	average (if guided)
Mode of Fire:	single or saturation
Standard Rack:	3 bombs

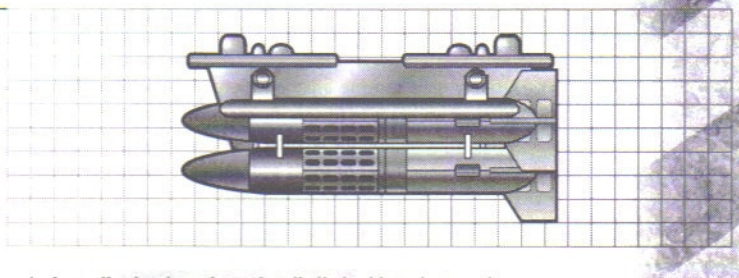
The Heavy Bomb Rack is a highly potent weapon: the bombs it carries can vaporize even the toughest armored target if it is guided to a direct hit. A laser sensor in the nose of the bomb controls small fins that can modify the trajectory of the projectile. The bomb's heavy warhead has an effective kill radius of more than 75 meters from the impact point, and even if it should miss, the concussion effects alone will take out most unprotected targets.

Some racks can be modified to carry heavy bombs equipped with nuclear warheads, although international treaties ban mass-destruction weapons. It is a commonly known, but rarely voiced fact that all major powers have these weapons nevertheless. Indeed, the UMF's armed forces have made use of them on several occasions, most notably to repel the CEF during the War of the Alliance

The Mark 108 bombs carried in the inner wing bays of the Azrael bomber are typical examples of Heavy Bombs. Each rack holds 3 bombs apiece, more than enough for a bombing run.

Fuel-Air Explosive Bomb Rack

Purpose:	Large-scale destruction
Effective Range:	depends on initial speed
Penetration:	1225 mm
Accuracy:	poor
Mode of Fire:	single or saturation
Standard Rack:	1 or 2 bombs



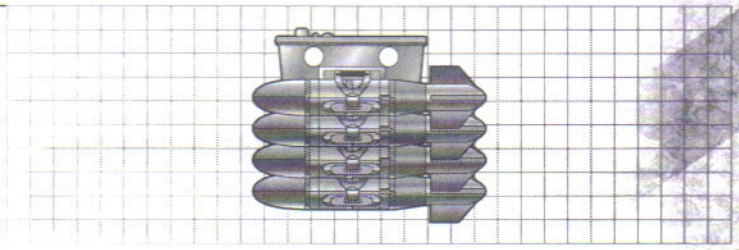
The Fuel-Air Explosive (FAE) Bomb Rack is very powerful, although its explosive radius has been intentionally limited in order to reduce collateral damage. The Fuel-Air Bomb contains a highly volatile gas mixture that is dispersed over a large target area and then ignited. The force of the explosion is followed by additional damage wrought by the intense heat of the detonation, igniting all combustibles at the impact point.

There are some even bigger FAE designs in existence that have an area effect comparable to a small nuclear explosion, but they are generally not seen on the tactical battlefield because they represent too great a danger to both sides.

The FAE-90 bomb carried in the ventral armament bay of the Azrael bomber is its main weapon, capable of a devastating attack against large and powerful targets. Because of the bomb's size and cost, only two are carried per plane. This, however, is considered more than enough, give their devastating power.

Cluster Bomb Rack

Purpose:	Area Saturation
Effective Range:	depends on initial speed
Penetration:	65 mm
Accuracy:	Average
Mode of Fire:	single or saturation
Standard Rack:	10 bombs



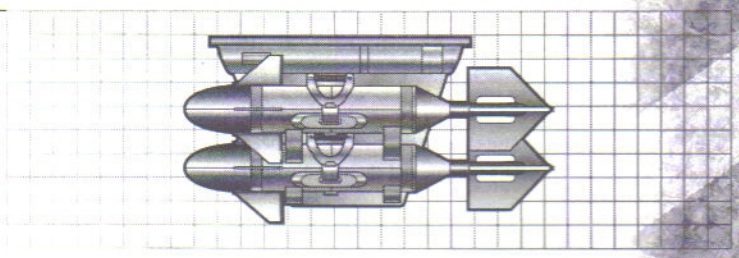
The Cluster Bomb consists of a large aerodynamic container that splits open when above the target area and releases hundreds of small explosive bomblets. The bomb is guided to the target via information downloaded from the launcher's fire control and, just before impact, by a sensor placed in the bomb's nose. The rack itself can release up to two bombs at once and holds up to ten. A trained crew can time the sub-munitions' release to completely saturate a large area in only a few seconds.

The MC-675 bomb contains 120 bomblets which are scattered by an ejection device over a zone nearly 150 meters across. The high bomblet density is very dangerous for any target in the dead zone.

Cluster bomb racks are not part of the standard armament of the major polar bomber designs (the Azrael and Buzzard), but several models have been fitted with these racks in wartime. Indeed, the modification is relatively easy and many militray airfields contain standard kits for refitting the bombers stationed there.

Heavy Cluster Bomb Rack

Purpose:	Area Saturation
Effective Range:	depends on initial speed
Penetration:	144 mm
Accuracy:	Average
Mode of Fire:	single or saturation
Standard Rack:	5 bombs



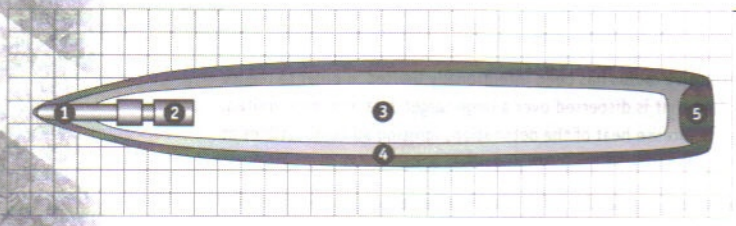
The Heavy Cluster Bomb is very similar in shape and function to its smaller brother, but it contains even more sub-munitions. These are designed to hit a large, but well defined area, yielding a higher saturation of the target zone. Each bomb contains hundreds of small bomblets equipped with a specialized warhead and a timer.

The bomblets are generally a mix of anti-personnel fragmentation warheads, high-armor piercing warheads, incendiary devices and area cratering shells (note that for playability purposes, the actual effects of the bomblets' many types of warheads have been averaged into the cluster bomb's damage multiplier and Area Effect).

The Territorial Arms's Air Division CB-500 "super" cluster bomb is in fact a large profiled container slung under the belly of the plane. It contains 500 high explosive canisters that are ejected over the target to ensure maximum saturation effects.

Artillery Ammunition

Artillery guns can fire a large variety of ammunition to achieve diverse battlefield objectives. Likewise, artillery missiles can carry different warheads to fit specific needs. When a fire mission is called in, the Forward Observer (FO) will always request the type of round which will compose the mission (whether these rounds are available or not is another matter completely). The following text lists the most common types of shells and warheads used by artillery units, and their game equivalents.

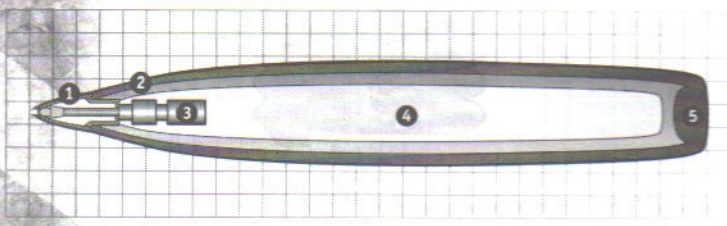


High Explosive

1	Fuse
2	Booster Charge
3	Explosive Charge
4	Fragmentation Liner
5	Base Plug

This is the standard artillery projectile. It carries a large explosive charge housed within a fragmenting body for increased damage. A pre-programmable fuse located in the nose of the shell can be set to detonate the shell on contact, with a delay or above the target. The gunner will normally select the most appropriate fuse setting for the job at hand; it is then automatically downloaded to the shell prior to firing or manually set by the loader on less high-tech weapons.

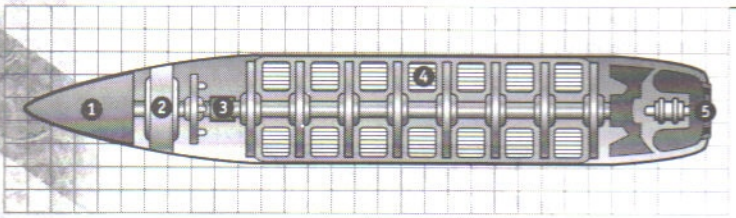
High Explosive is the default ammunition type used by all artillery weapons (cannons and missiles alike). Unless another type of ammunition is requested by the Forward Observer, the battery will always use HE.



Cratering

1	Reinforced Piercing Fuse
2	Standard Shell Body
3	Booster Charge
4	Explosive Charge
5	Base Plug

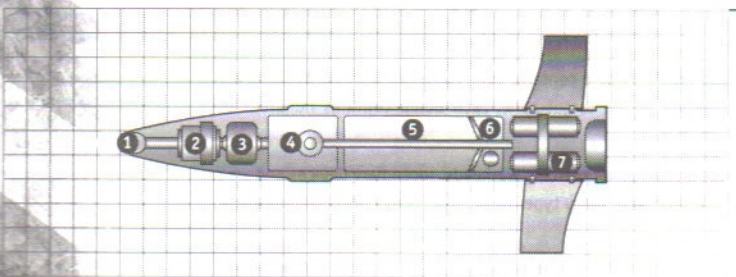
This type of shell is equipped with a special concrete-piercing fuse designed to damage or destroy buildings and other man-made structures such as roads, bridges and bunkers. The heavy piercing fuse enables the shell to burrow within the target before exploding, thus blowing out large chunks of material and weakening the overall structure. The concrete-piercing fuse fares less well against armored or soft targets, since it does not have the right penetration profile.



Flechette

1	Time Fuse
2	Detonator Charge
3	Explosive Charge
4	Flechette Block
5	Base Plug

Also called a beehive, this warhead has been specially designed to harm infantry units and other soft targets. It explodes just above the target point and showers it with thousands of pre-fragmented ceramic shards.



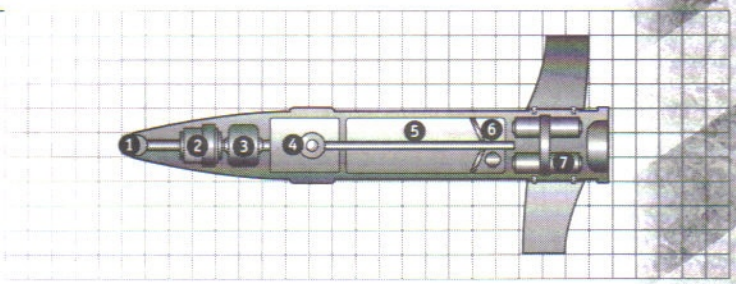
Seeking

1	Sensor
2	Laser Guidance System
3	Forward Warhead
4	Fuse
5	Main Explosive Charge
6	Flight Gyroscopes
7	Battery

Seeking warheads are a rare type of missiles. The laser sensor array in the nose of the shell allows it to seek a target. The projectile can eve correct its trajectory in flight to try a second time, should it miss on the first pass.

Guided

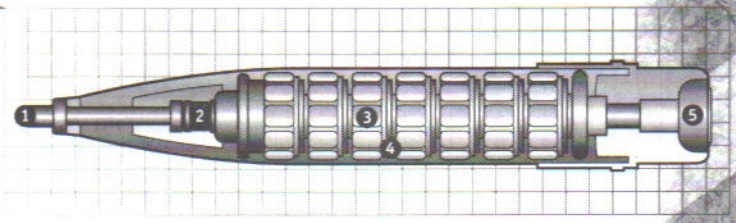
1	Sensor
2	Laser Guidance System
3	Forward Warhead
4	Fuse
5	Main Explosive Charge
6	Flight Gyroscopes
7	Battery



For all intents and purposes, guided shells are cannon-launched missiles. The laser sensor array in the nose of the shell allows it to seek a target and correct its trajectory in flight. Guided shells gain accuracy versus targets that have been "tagged" by an allied target designator within communication range. Attacks versus targets marked by a target designators do not need forward observers.

Illumination

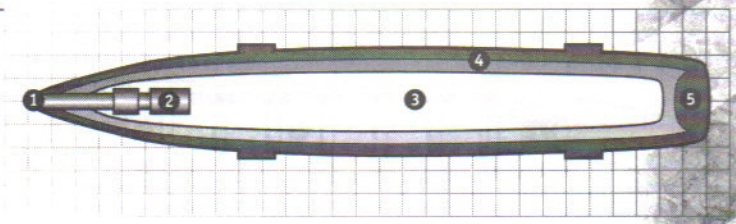
1	Delay Fuse
2	Ejection Charge
3	Flare Canisters
4	Folded Parachutes
5	Ejectable Base Plug



This type of shell carries a series of small parachute-equipped flares. When the shell bursts high above the battlefield, it releases and ignites the flares. These provide several thousand foot-candles each, making the area underneath as clear as day.

Incendiary

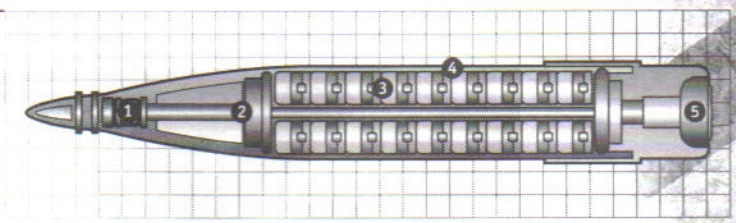
1	Fuse
2	Expulsion Charge
3	Incendiary Material
4	Combustible Liner
5	Base Plug



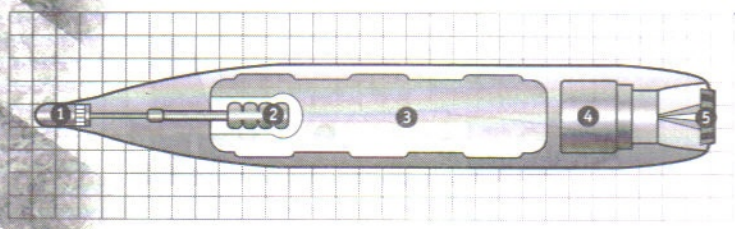
These shells are filled with an incendiary compound such as napalm or white phosphorus. The fuse is generally set to detonate the shell before impact so the burning agent will be spread out as widely as possible.

Minelayer

1	Delay Fuse
2	Separation Charge
3	Mines
4	Fragmentation Liner
5	Ejectable Base Plug



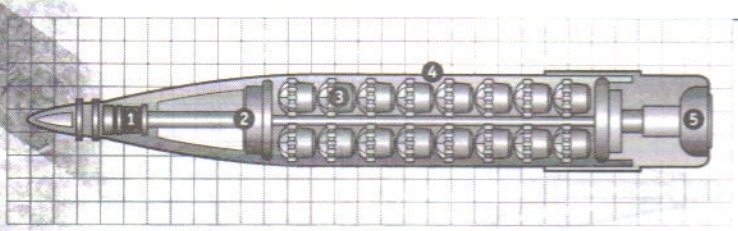
Also known as FASCAM (Field Artillery SCAtterable Mines) or ICM (Improved Conventional Munition) shells, Minelayer shells saturate an area with land mines. Although some shells carry anti-personnel mines and others only anti-vehicular mines, great success has been obtained with mixed loads fitted with variable timers. The mines are set to self-destruct over a certain period, usually between 24 to 48 hours after impact.



Rocket-Assisted Projectile (RAP)

1	Fuse
2	Booster Charge
3	Explosive Charge
4	Rocket Motor
5	Reinforced Nozzle

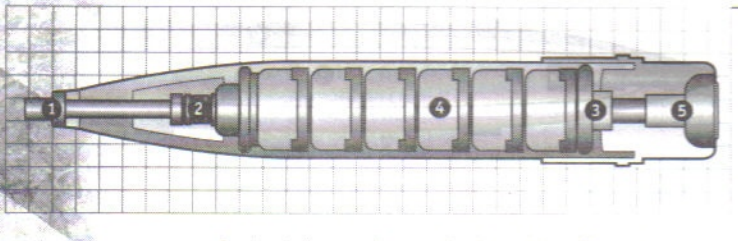
RAP shells are enhanced ammunition fitted with a small, fast-burning rocket motor. Some designs have low thrust/continuous acceleration motors or multi-stage propulsion units for more predictable flight characteristics. All RAP shells and rockets have greatly extended ranges. RAP shells are represented by Boosted Range ammunition (see p. XX).



Seeker

1	Delay Fuse
2	Separation Charge
3	Seeker Sub-munitions
4	Fragmentation Liner
5	Ejectable Base Plug

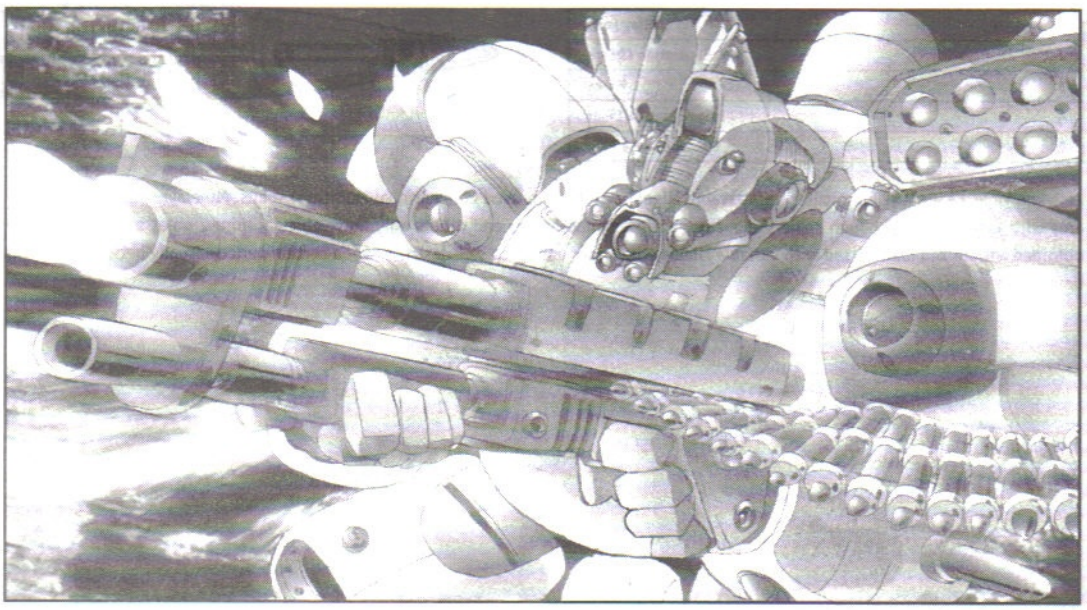
So-called seeker shells are a very specialized type of ammunition designed to attack armored vehicles. It is a "smart" weapon that can provide its own terminal guidance once released. Each shell contains several sub-munitions, each equipped with a miniaturized sensor array and a parachute. As the sub-munitions fall, they seek any large, dense mass nearby. Once a sub-munition finds a target, its explosive charge turns a plate of dense metal into a hypervelocity penetrator that strikes the armored target through its weakly protected top. Seeker shells are represented by Boosted Damage ammunition (see p. XX).



Smoke Shell

1	Fuse
2	Ejection Charge
3	Ejector Rail
4	Smoke Canisters
5	Ejectable Base Plug

Smoke shells contain several sub-munitions filled with a volatile gas mixture that vaporizes into thick smoke of whatever color was chosen. The artillery-fired Black Fog shells contain smoke but also chaff, flares and electronic dummies to interfere with the sensors of hostile forces. Smoke rounds are represented by Smoke and Black Fog ammunition (see p. XX).



6.1.8 Fire Control

Fire Control modifies all of the vehicle's weapon attacks and represents the targeting computers and weapon mounts. Most combat vehicles have a standard military system (Fire Control Rating of zero), which includes rangefinders, gyro-stabilized mounts and recoil compensators for their weapons.

Very high tech vehicles have even sophisticated Fire Control systems, earning them a +1 or maybe even a +2. Simple, cheap or crudely built vehicles often have poor (in term of combat performance) Fire Control systems, rated at -1 or lower.

The minimum value for Fire Control is -5: a metal sight on a wobbly hinge, with pull-cord trigger. The table below shows the typical systems included for each Rating (which include all the systems listed before).

If the vehicle is a non-combat vehicle with no weapons, a Fire Control Rating should still be assigned to represent its potential for mounting them. Most non-combat vehicles have fire control Ratings of -3 or less — they don't have built-in dedicated targeting computers or gyro-stabilized mounts. Pintle-mounted weapons do not use the Fire Control system (see the *Pintle Mount* Perk, page 123).

Typical Fire Control Systems

Rating	System
-5	No HUD, Iron Sights
-4	Dampened Weapon Mount
-3	Horizontal Stabilization
-2	Vertical Stabilization
-1	Basic Targeting Radar; Basic HUD Reticle
0	Gyro Stabilization
+1	Improved Lead Tracking Software
+2	Full Leading Reticle
+3	Self-correcting Weapon Systems
+4	Advanced Radar*
+5	Enemy Weakness Analysis*

*Hypothesized

Designer's Hint: Fire Control

Fire control systems can send the vehicle's cost through the roof, so moderation should be applied when selecting a Rating. If extremely accurate attacks are desired, individual weapons with high Accuracy may be a better choice. Taking a negative Fire Control instead of zero may sound suicidal, but is a good way to stuff more powerful weapons in the vehicle. Just remain stationary before firing.

Design Example

Kurt assigns his Gear an adequate but otherwise unremarkable mass-produced fire control system. He writes down "Fire Control: 0."

6.1.9 Sensors

The quality and the Range (in kilometers) of the vehicle's sensor array is chosen at this point. The Sensor Rating represents the resolution and processing speed of the vehicle's detection systems and is crucial for battles in obscured environments. The actual type of sensors carried is left to the designer's choice, and has little relevance to the rules.

A generic military sensor array has a Rating of 0. Poor or incomplete sensor systems are rated with negative values (the minimum value is -5), while high quality sensors have positive Ratings (up to +5). If the vehicle has no built-in sensors of any kind, "N/A" is written down in both entries and the No Sensor Flaw is added (see *Perks and Flaws*, page 112); both Rating and Range count as zero for calculation purposes. The table below shows the typical systems included for each Rating (which include all the systems listed before).

Battlefield vehicles normally have Sensor Ranges of at least 2 km. Sensor Ranges are rarely greater than 7 or 8 km — mainly because that is about how far the horizon is on an Earth-Sized planet when seen from a combat vehicle. This passive base Range can be extended by turning to Active mode and supplying power to the system (see page 17), but this makes the emitter quite visible to hostile sensors.

Sensors mounted on a flying vehicle benefit from a higher vantage point and much less background clutter, allowing them to reach further for the same power. When the aircraft is in the air, the Range of its sensor array is multiplied by ten *while in the air*. Thus, if a plane had a 2 km Sensor Range on the ground, it would be able to passively detect other objects up to 20 kilometers away in the air.

Spacecraft-mounted sensors have an even better environment to work in, since there is no atmosphere to distort the readings. The Range of a spacecraft's sensor array is multiplied by one hundred. Thus, if a spaceship had a base 2 km Sensor Range, it would be able to passively detect other objects up to 200 kilometers away *while in space*.

Typical Sensor Systems

Rating	System
-5	Hand-held Sensor Devices
-4	Basic Optical
-3	Basic Infrared or Ultraviolet
-2	Low-Light
-1	Basic Radar, Motion Detection
0	Ladar, Integrated Sensors
+1	Thermographic, Hi-rez Imaging
+2	Magnetic Resonance, Ultrasonics
+3	Broadband High Power Sensor Suite
+4*	Multiscanner
+5*	Sub-Atomic Resonance

*Hypothesized

◆ Designer's Hint: Sensors

The Sensor Range should be equal to or higher than the Extreme Range of the most powerful weapon system aboard the vehicle. If not, the crew will not be able to use the weapon to its maximum capability. The basic Sensor Range can be boosted (see page 135 of the rulebook), but doing so makes the emitter much more visible to the enemy.

◩ Design Example

Kurt wants his vehicle to have average quality sensors, so he writes down "Sensors: 0." He chooses to give his Gear only short ranged sensors to reduce costs, so he adds "Sensor Range: 2 km" beside his previous entry.

6.1.10 Communications

The quality and the Range (in kilometers) of the vehicle's communications array is chosen at this point. A generic military communications system has a score of 0. Poor systems are rated with negative values (minimum is -5), while high quality systems have positive Ratings (maximum +5). If the vehicle has no communication system, "N/A" is written down in both entries and the No Sensor Flaw is added (see *Perks and Flaws*, page 112); both Rating and Range count as zero for calculation purposes. A communication system can also play back standard data disks. The table below shows the typical systems included for each Rating (which include all the systems listed before).

Communication systems normally have a ground Range of at least 10 km. This can be extended by supplying more power to the system, but makes the emitter more visible on sensors (see page 17). Some Perks can affect the Rating and Range of the Communication system (see *Perks and Flaws*, page 112).

Because there are fewer obstacles to get in the way of radio waves, communication systems have a better range in the air and in space. Communication Range is automatically multiplied by ten at no cost, *while in the air*, for Flight-capable vehicles. Range is automatically multiplied by 100, *while in space*, for space-based communication system.

◫ Typical Communication Systems

Rating	System
-5	Signal Flags, Lights, Horns
-4	Short-range Hand-held Comm Devices
-3	Basic Radio
-2	Shortwave Radio w/basic scrambler, GPS
-1	Military Radio w/Scrambler
0	Laser Comm
+1	Advanced Descrambler
+2	Dedicated Comm Suite
+3	Broadband High Power Comm Suite
+4	Neutrino Comm Receiver
+5*	Sub-Atomic Wave Comm

*Hypothesized

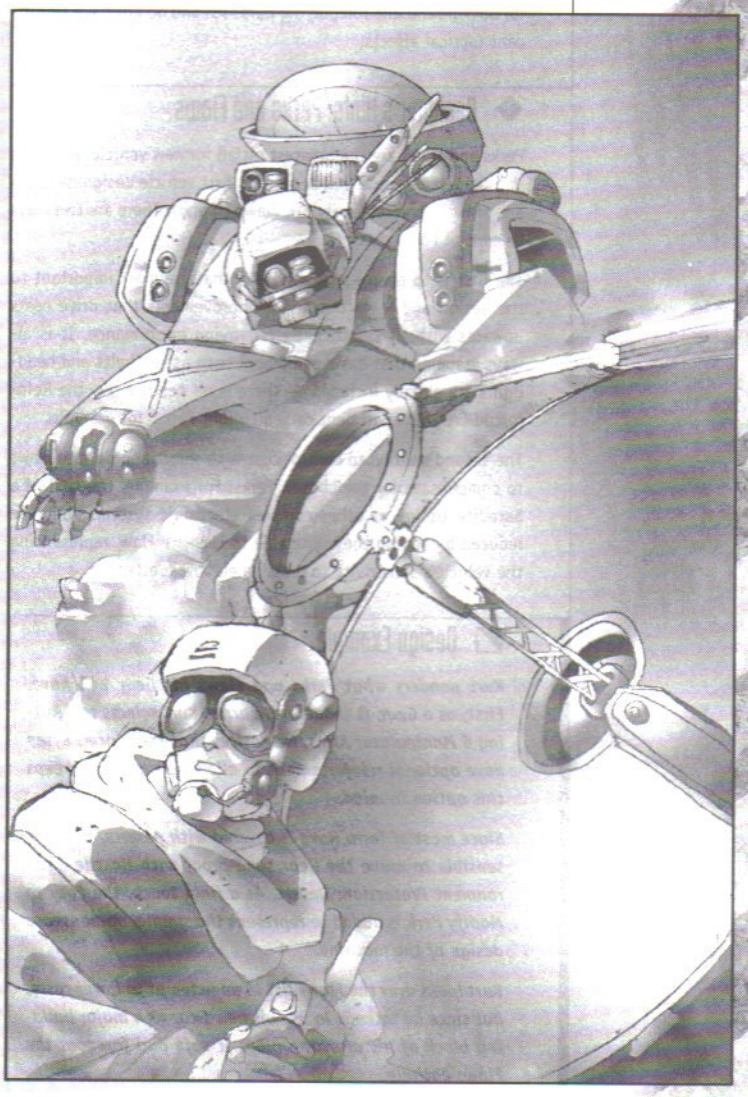
◆ Designer's Hint: Communications

A functional Communication system is more important than it seems. It allows the vehicle to receive coordinates for indirect fire, transmits the correct IFF signal to friendly defense installations such as minefields and automated turrets and can be used to control remote drones. A vehicle without a functional Communication system is cut off from its combat group and cannot receive Command Points.

Non-combat vehicles like transports often have poor communications systems, which doesn't mean they are cheap — they are just not designed to cut through the military electronic fog. They rate a -2 or -3 and have a base Range of less than 10 km.

◩ Design Example

Kurt wants his Gear to have a serviceable military communication system. 10 km seems like a good Range for his comm system. He writes down "Communications: 0, Communications Range: 10 km."



6.1.11 - Perks and Flaws

Many vehicles have special features, such as ejection systems and cargo bays, that are not covered by the vehicle's tactical statistics. These features are represented by characteristics called Perks and Flaws. Perks are systems or design features that give additional capabilities to the vehicle; numerous Perks can make a vehicle very complex. Flaws are design shortcomings or defective systems that impair the vehicle. Sometimes these defects are planned into the vehicle as a cost cutting measure, at other times they are the result of design errors.

A complete explanation of each Perk and Flaw follows. Those that apply should be noted along with their Rating (if applicable) and their point cost. All Flaws have a negative cost — they reduce the total Perk/Flaw cost of the vehicle. When calculating the Threat Value of the vehicle (see page 134), the minimum cost of the Perks and Flaws is 0.

Perks whose name is followed by AUX are defined as Auxiliary Systems for damage purposes. Perks whose name is followed by R have a Rating. The Rating of the Perk is listed after the name of the Perk on the design sheet. Many Perks are primarily intended for background and roleplaying purposes and do not have significant tactical effects.

◆ Designer's Hints: Perks and Flaws

Perks and Flaws are the greatest pitfall for new vehicle designers in Silhouette. Typically, a beginner's first vehicle design has dozens of Perks and relatively few Flaws (if any). There are two ways to control Perk costs.

The first is to cherry-pick the Perks that are most important to the design and leave out minor improvements that drive costs upwards without significantly improving performance. It is always assumed that basic equipment such as seatbelts and headlights are already included — there is no need to buy the Reinforced Crew Compartment or Searchlight Perks, for example.

The second method to control cost is to select appropriate Flaws to compensate for the chosen Perks. For example, the cost of a Satellite Uplink or other complex electronic systems could be reduced by adding the Vulnerable to Haywire Flaw, representing the vehicle's sensitivity to massive electrical attacks.

Design Example

Kurt ponders what Perks and Flaws his Gear will have. First, as a Gear, it should have arms. Kurt selects two Rating 6 Manipulator Arms. He notices that these arms often have optional reinforcement to allow punching. He keeps this option in mind.

Since most of Terra Nova is covered with deserts, it seems sensible to make the Gear sand-proof with Hostile Environment Protection: Desert. As a final touch, the Easy to Modify Perk is added to represent the simple, no-nonsense design of the machine.

Kurt looks over the Flaws list in an attempt to lower costs, but since he intends to use his new Gear as a major building block of his army, he plays it safe and foregoes the Flaws entirely.

Perks

◆ Ablative Armor R

One (or more) facing of the vehicle is covered with a special armor plating which shatters under kinetic stress or vaporizes when hit. This absorbs incoming damage, but the ablative armor must invariably be replaced after each battle. The maximum amount of ablative armor that may be carried is equal to half the Armor Rating of the vehicle, rounded down. Each defensive arc (Front, Sides and Rear) must be protected separately.

When the vehicle is hit, the current Perk Rating is added to the Armor Rating of the vehicle. Ablative armor automatically loses 1 point from its Rating per ten points of damage every time it is hit. This is in addition to the normal Armor damage of the vehicle, if applicable. The Ablative Armor loses points on every hit of ten or more points of damage, whether the attack inflicts a system damage result to the vehicle or not.

Cost = Rating/2 (per defense arc)

◆ Acceleration Protection

Aircraft and spacecraft with this Perk have been modified to reduce the strain of acceleration on their crew, either through special cockpits, G-seats or advanced flight suits. Crew have a +1 bonus whenever they have to make a FIT roll due to sharp turns or other effects of acceleration. Only Flying and Space vehicles can take this Perk.

Cost = 1

◆ Acrobatic Handling AUX R

The maneuvering systems of battlefield Gears are designed with overall motion in mind. War machines must be able to move quickly and efficiently over varying terrain, but elaborate jumps are well beyond the needs of the military. All these factors are important in duels as well, but there is an added need for close-combat maneuverability. Being able to jump and flip the Gear through tight obstacle courses and to avoid multiple tackling opponents is not only useful but extremely crowd pleasing.

The Rating of Acrobatic Handling is added to the Gear's Maneuver score for close combat attacks and defenses and when defending against point-blank attacks. The Perk gives no advantage for any attack made from Short Range or further. Acrobatic Handling also modifies any rolls made for jumps, flips or kicks.

No Gear may take a Rating in Acrobatic Handling higher than one above their Maneuver Rating. Gears with negative modifier Ratings and vehicles without the Walker movement type may not take Acrobatic Handling.

Cost = Rating x 6

Advanced Controls

The vehicle has a very advanced, user-friendly control interface. The great ease of its use allows the vehicle to have one extra action each combat round, regardless of the number of crew members aboard. This type of system is fairly complex to design, and as such very few vehicles feature it.

Cost = 10

Advanced Neural Net

Advanced neural nets are the "smart" computers that form the core of the newest generation of Terranovan military vehicles. They were developed in part with technology recovered from destroyed or abandoned Earth vehicles and spaceships. Advanced neural nets are harder to manufacture and more expensive than regular NNets, but they give incredible response time to all of the vehicle's on-board electronic systems.

Advanced neural nets are highly responsive. If the crew spends one action at the beginning of the turn, it can add a +1 modifier to the vehicle's Maneuver Rating for the entire combat turn. Advanced neural nets also automatically get the learning ability (see *Neural Network*, page 11, for more detail).

Cost = 10

Airdroppable

The vehicle is equipped with a parachute or an equivalent device that allows it to be dropped from high altitude onto a battlefield. The vehicle's suspension and drive train have been specifically designed to absorb the shock of landing without suffering any damage. For example, the vehicle can be built with high-impact actuators in its suspensions along with reinforced hardpoints along its upper hull to attach a parachute pack.

The Airdroppable Perk should be added to vehicles that will be parachuted in with airborne units. Note that the maximum mass of an airdroppable unit is 25 tons, as listed in the **Tactical Air Support** sourcebook (page 94). Machines with the Airdroppable Perk tend to be light armored vehicles or advanced Gear models. This Perk has limited tactical applications, unless the scenario specifically allows this type of deployment, but it could lead to some interesting (and potentially spectacular) roleplaying and tactical campaign opportunities.

Cost = 4

Airlift Ready

Airlifting can be used to deploy a vehicle rapidly or to allow it to cross major obstacles. Vehicles with this Perk have been equipped with quick-connect hardpoints and are reinforced in a manner that makes them easy to airlift by VTOLs and rotary wing aircraft (the latter just have to lower slung load cables and wait for the vehicle's crew or techs to attach them).

A vehicle with the Airlift-ready Perk can be prepared for take-off in half the time normally required to do so for a vehicle of its Size. See *Airlifting*, page 23 of **Tactical Air Support**.

Cost = 1

Airlift Winch AUX R

The aircraft is equipped with a rugged system which enables it to airlift troops and/or cargo without having to land. In most cases, this is a simple crane on a rugged swing arm that extends out of the aircraft's cargo bay.

The Perk's Rating gives the maximum number of troopers that can be airlifted in a single Air War or tactical round, or the maximum Size of any airlifted cargo. The Perk Rating cannot be higher than half the final Size of the aircraft.

This Perk is only useful to VTOLs, since the vehicle has to be airborne, stationary and at altitude level 0 or 1. Only Flying vehicles can take this Perk.

Cost = Rating

Ammo/Fuel Containment System

The vehicle's ammunition and fuel bays are reinforced and equipped with additional blast-control panels. The system goes above and beyond the safety devices normally installed in a a vehicle of that type.

The system completely absorbs the first hit when an "Ammo/Fuel Hit" result is obtained on the Fire Control Damage Table — there is no further damage beyond the lost Armor points, but the Perk is destroyed. The Perk's effect can be restored by normal repair if a technician works on the vehicle after combat.

Cost = 4

Ammo Storage

The vehicle is equipped to store some or all of its spare ammunition clips in an armored compartment to protect them against damage. If there is no Manipulator Arm or ammo-reloading Tool Arm mounted on the vehicle, the crew must reload the weapon manually, at a rate of one shot per action. The clips are not counted as AUX systems and can only be destroyed when actually in the weapon. The cost is one point per ten TV points of ammunition stored, regardless of how they are divided into clips.

Cost = 1 per 20 TV points of ammo stored (rounded up)

Amphibious

The vehicle is adapted for occasional water travel such as river crossings and amphibious assaults. The lower hull is watertight, though it does not necessarily allow the vehicle to float, and a snorkel let the engine function normally. Often, wavebreakers and additional floatation skirts can be attached to the hull.

In the tactical game, the vehicle may travel across Water hexes, paying MP according to its normal movement type (*not* as a Naval vessel). In the roleplaying game, the vehicle is amphibious, but is not intended for extended aquatic activity. This Perk does not grant the vehicle Submarine movement.

Note that the amphibious Perk is only available to vehicles with either the Walker or Ground movement systems.

Cost = 5

◆ Anti-Missile System

Anti-missile systems (AMS) are designed to detect and destroy missiles before impact. They usually take the form of rapid-fire, small-caliber machine-guns, though small counter-missiles or shotgun-like devices are also used. All these missiles are mounted in small independent turrets on top of the hull to ensure both a rapid response time and complete coverage of the surrounding area. Anti-missile systems are most often used on slow and ponderous vehicles such as heavy tanks and landships, because their weight and clumsiness prevents them from dodging.

In game terms, each functional anti-missile system grants the vehicle an additional special defense roll versus projectiles such as missiles and rockets. Anti-missile systems can be activated or deactivated at the cost of one action (it is assumed they are "on" at the start of the battle). Active anti-missile systems do not use up actions and roll versus every incoming missile or missile cluster (burst attacks). If not currently in active mode, they can also be fired as normal weapons (x1 Damage Multiplier, ROF 3 with a Base Range of 1) at the cost of one action.

The anti-missile system has a Skill level of two, plus its Rating. It can attack any type of mortar shell, rocket, or missile, but not bazooka projectiles. If the result of the anti-missile system is greater than the attacker's roll, the anti-missile system shoots down the missile. The AMS completely destroys the missile when successfully used versus a single shot attack. When used to defend versus a missile cluster (ROF attack), the same technique is used, but each point of the MoS reduces the incoming cluster's ROF bonus by one. If the ROF bonus drops to zero or below zero, all of the incoming missiles have been effectively destroyed.

The amount of shots spent each time the system is fired is equal to five minus the MoS, with a minimum ammunition cost of 1. The maximum number of units of ammo that can be carried is equal to ten times the vehicle's final Size. There is no limit on the number of AMS carried per vehicle, but no AMS may have a Rating higher than 3.

Cost = (Rating x 5) + (0.1 x units of ammo)

Example:

Gear Alpha fires an anti-tank missile at Tank Beta. Gear Alpha's final attack roll, after modifiers, is 5. Tank Beta's total defense roll is a 2. Fortunately, Tank Beta has two Rating 2 anti-missile systems, both currently active. The two systems roll 2 and 4, modified to 4 and 6 by their Rating. Since the second system's roll is better than Alpha's attack roll, the second anti-missile system shoots down the incoming missile (the first one just misses). The systems spend five and four units of ammunition, respectively (no MoS for the first one, MoS 1 for the second).

Seeing this, Gear Alpha's teammate, Gear Gamma, launches a ROF 3 rocket salvo toward the tank. Its total attack roll is 5. Tank Beta rolls another 2 for defense, so the anti-missile system activates again (it does not use actions and attacks every incoming missile attack). The first one rolls a 6, modified by 2, for a total of 8. The MoS is equal to 3, so the ROF bonus of the attack drops to zero. Of the salvo, only one rocket will strike the tank. If the second AMS hit as well, nothing will reach the tank.

◆ Anti-Personnel Charges AUX R

Anti-Personnel (AP) charges are directional fragmentation mines mounted on the hull of a vehicle as a deterrent to close assault by infantry units. When an infantry squad closes to within 25 meters of the vehicle, a small proximity sensor detonates one or more charges in the direction of the unit, slicing through their ranks and showering them with deadly shrapnel. Fortunately for infantrymen, the system is not fool-proof and sometimes either fails to function or does so too late, allowing the attackers to get to cover before the blast hits.

AP charges can be turned on or off at the cost of one action. They are either all on or all off — it is assumed they are "on" at the start of a battle. They have a Damage Multiplier of 3 and roll two dice for their attack roll, adding their Rating to the dice roll. No AP system may have a Rating lower than one (1) or higher than three (3).

Each firing of the system consumes one die's worth of charges. The range of the AP charges is 0 (Point Blank only — the infantry must be in the same hex as the vehicle) and they have a "T" firing arc. Firing AP charges does not use up actions — the system automatically attacks all infantry units (friend or foe) in the hex once per turn until the infantry unit is destroyed, leaves the hex, the system runs out of charge or is turned off.

The hull-mounted position of the charges makes them very vulnerable to enemy fire. Anti-personnel charges count as auxiliary systems, but damage is applied differently for them. On Light damage result, two dice's worth of charges are destroyed. On Heavy damage result, all charges are detonated and lost. It is not possible to armor or otherwise protect the AP charges, as this would reduce their performances below acceptable level.

Cost = (3 x Rating) + (0.02 x number of charges carried)

◆ Aquatic Sensors AUX

The vehicle is equipped with various underwater sensors such as sonars, magnetic anomaly detectors, and specialized cameras. These allow the vehicle to use its sensors effectively underwater. Vehicles with this Perk do not suffer obscurement effects from water terrain. A vehicle may be equipped with aquatic sensors in addition to its normal sensors, or it may be equipped exclusively with aquatic sensors. Vehicles with only aquatic sensors use the sensor range that would have been used by their "normal sensors," if they had any. Vehicles with both must specify the range of both types of sensors.

Aquatic sensors must normally be immersed in water to function. In tactical terms, this means that the vehicle only ignores the Obscurement effects of water while in water itself. Some vehicles, often aircraft, have aquatic sensors that do not need to be immersed in water to function. However, they must be within a minimum distance (often under a kilometer) from the body of water they wish to scan.

If aquatic sensors can be used out of water to detect targets in water, an additional +1 is added to the cost per 100m (2 tactical hexes) of distance this ability extends to.

Cost = 2 (if only aquatic sensors) or
2 + 1/2 of Range in km of aquatic sensor (if both)

Artificial Intelligence R

The vehicle is capable of independent action and decision making. The Perk counts as one crewmember. No live crew need be added. Additional "crewmembers" on an AI-controlled vehicle are often added using the Automation Perk.

The Rating of the AI is used as the Skill level of the "crew." AI are not true intelligences: they lack personality and flexibility. They also lack the rapid learning ability of more advanced neural nets, but are better at independent action because of their extensive data banks and expert systems.

Artificial Intelligence is not affected by "Crew" hits; any such damage is ignored, though Armor is lost as usual.

Cost = 25 + 25 x Rating

Audio System AUX

The vehicle has an audio system, similar in function to a 21th century car stereo. The audio system is fully digital and can serve as a radio receiver or play back standard datadisks. It also includes large speakers capable of high decibel output. This system has no tactical game effect, but offers roleplaying opportunities.

Cost = 0.5

Automation R

This Perk substitutes mechanical and electronic systems for real crew members. They can be anything from an autoloader for the main gun or additional computers for the sensor system — all that matter is the extra "manpower" they supply.

The Rating of the system is equal to the number of crew members the Perk simulates. The vehicle must have at least one live crew member or the Artificial Intelligence Perk, except if it is a remotly-controlled vehicles (see page 13).

Cost = 10 + Rating

Autopilot AUX

Autopilots are devices that can take over the piloting tasks. They can keep the vehicle going in a straight line, avoid large obstacles and steer the vehicle towards a prespecified location. In tactical terms, an autopilot is very limited. It can be used to keep a vehicle moving in a straight line or performing 60° (one hex-facing) turns. Autopilots cannot fire any weapons and dodge attacks as a level 1 pilot. They can, however, be used to ram large targets as a level 1 pilot without endangering the crew (who just exit the vehicle).

Cost = 5

Backup Communications System

The vehicle may ignore communication system damage effects of the first Auxiliary System Hit on the Systems Damage Table. All non-communication auxiliary systems take normal damage effects. The Perk's effect can be restored by a normal repair if a technician works on the vehicle after combat.

Cost = 2

Backup Fire Control

The vehicle may ignore the first "Fire Control Destroyed" result on the Fire Control Damage Table. The Perk's effect can be restored by a normal repair if a technician works on the vehicle after combat.

Cost = 5

Backup Life Support

The vehicle has backup life support systems that allow the vehicle to continue providing life support functions long after the primary system has been disabled. In game terms, the vehicle continues to have life support even if the vehicle has all of its auxiliary systems destroyed. The vehicle must already have a life support system (see *Life Support*) to take this Perk.

Cost = 2

Backup Sensors

The vehicle may ignore the sensor damage effects of the *first* Auxiliary System Hit on the Systems Damage Table. All non-sensor auxiliary systems take normal damage effects. The Perk's effect can be restored by a normal repair if a technician works on the vehicle after combat.

Cost = 5

Battle Arm R

The vehicle has a rudimentary arm to carry and orient weapons or other pieces of equipment. Battle Arms are merely flexible projections and are common only on striders.

While battle arms are not nimble at all, they can lift objects (provided these have been attached to the arm) whose Size score is equal to the arm's Rating. No matter the Rating of a battle arm, a vehicle cannot lift an item whose size is greater than twice its own size. If a vehicle has multiple arms, it can use these together to increase its lifting ability. Add one half the Ratings of the weaker arms to the full Rating of the strongest arm to determine the lifting strength of multiple arms.

Battle arms can be designed to punch opponents: they then end in a reinforced battering ram or other brawling weapon. This attack type has a damage score equal to the lifting capacity of the arm. This ability modifies the Offensive Score of the vehicle.

Cost = 0.2 x Rating for each arm

Camo Netting

The vehicle is covered with a heat-absorbent tarp which has a net attached to it. Leaves and other camouflage material can be attached to it, while heat is absorbed by the tarp. This gives a +1 to Concealment when in Woodland or Jungle hexes. The camouflage tarp is custom designed for each vehicle type, ensuring that it covers most of the hull and blurs the overall silhouette. Most tarps are made to be easily stored and installed. This Perk is only effective when the vehicle is stationary.

Cost = 1

◆ Cargo Bay

A cargo bay is a large hollow place within the vehicle to put miscellaneous material. Cargo bays can be designed for unusual cargo: some cargo bays are meant to carry only liquids, like the tank of a fuel truck. Others are compressed gas containers, like a tank of fire fighting foam. Of course, cargo bays can always be simple hollows intended to store boxes of goods. Although specialized cargo bays often cost more to design and build, their inherent lack of flexibility cancels this — thus no extra TV points are charged for them.

Cargo bays are rated in terms of their volume in cubic meters. The intended type of content of each cargo bay must be specified at the time of construction: solid, liquid or gaseous. Cargo bays are enclosed within the vehicle. Open-topped bays are also possible, but material carried in such a bay is counted as an AUX system for damage location purposes.

It is important to note that the cargo space bought represents only the actual space dedicated inside or on the hull of the vehicle, not an increase in the power of the engine. Thus, the cargo's weight counts as "towed" material for game purposes. Cargo bays have a minimum dimension of one meter, square or cubic. It is always preferable, when designing the vehicle, to state the actual dimensions and shape of the bay to see what can be fitted in it. Vehicles are assumed to occupy a volume roughly equal to (Size/2 + 1) cubed, rounded up.

Very small Cargo Bays (under one cubic meter) are not required to carry a crewman's personal effects, because every vehicle automatically has a small storage space for the crew's normal belongings. Only large amounts of personal gear might require a proper cargo bay.

FOR ENCLOSED CARGO BAY:
Cost = cube root (volume in cubic meters)

FOR OPEN CARGO BAY:
Cost = (cube root (surface area in square meters) ÷ 10)

◆ Catapult Hook AUX

This Perk enables any non-VTOL aircraft to take off from a carrier with the help of a catapult (which is included in the carrier's vehicle bay cost). This also enables any such aircraft to use the ship's short landing strip. Non-VTOL aircraft without this Perk can still take-off and land on a carrier ship, but must make a Piloting roll vs. 7 and 8, respectively, or crash in the attempt. A crash-landing is treated as a ramming attack against the carrier for damage purposes.

Cost = 2

◆ Chaff/Flare Dispenser AUX R

Chaff and Flare dispensers are used to confuse and defeat the radar and infrared guidance systems of incoming missiles. In game terms, each use of a Chaff/Flare Dispenser grants the aircraft a defense bonus versus missile and guided weapons. The dispenser's Rating is added to the pilot's defense roll. If the result of the vehicle's modified defense roll is greater than the attacker's roll, the countermeasures have successfully misled the missile(s) away from the target vehicle.

Use of a Chaff/Flare Dispenser does not cost an action in the Air War scale, but does cost one action per use in the Dogfighting scale. There is no limit, other than the dispenser's ammo load, to the number of chaffs or flares that can be used in one round, but only one shot is expended per defense roll.

Cost = (Rating x 5) +(Ammo/20)

◩ Example:

Infantryman Alpha launches a ground-air guided missile at fighter Beta. Alpha's attack roll is a 6. Beta's defense roll is a 4. Fortunately, fighter Beta has a Chaff/Flare Dispenser (Rating 2). The Rating is added to the defense roll, giving a final result of 6. Since the modified defense roll is equal to Alpha's attack roll, the chaffs and flares have misguided the missile.

◆ Climbing Apparatus

The Climbing Apparatus is a set of special footplate spikes, ropes and claws used by humanoid vehicles for climbing. Since the claws can hold the unit securely against the cliff face, weapon fire during climbing is now possible, albeit at a -2 modifier. The Climbing Apparatus also reduces the climbing Piloting test's Threshold by one. The climbing equipment is much too clumsy and cannot be used as a weapon.

A vehicle must have both the Walker movement mode and at least two Manipulator Arms capable of lifting it to make use of this Perk.

Cost = 2

◆ Counter-Battery Sensor AUX R

A Counter-Battery Sensor (CBS for short) is a set of specialized radar and sensors designed to locate an enemy artillery unit based on the trajectory and signature of its fire missions. When an indirect fire attack is incoming, an attempt can be made by any CBS-equipped unit within half sensor range of the target hex to locate the attack's origin, allowing effective counter-fire.

Activating the CBS costs one action. The operator "attacks" the enemy unit using Electronic Warfare as the Skill and the CBS as the weapon. The opponent must reveal in which range band the firing unit is located, relative to the CBS vehicle. The CBS's Base Range is equal to its Rating times the base Sensor range of the unit; it has +0 Accuracy and does no damage.

A successful roll locates the last known firing position of the firing unit. Obviously, if the enemy battery moved immediatly after firing, the information is much less valuable (though saturing the area with artillery strikes might just do the trick anyway). A failure does not yield any information. On a Fumble, the operator gets a phantom echo — any counterattack automatically deviates by a number of hexes equal to the result of three dice. Rather than read the dice normally, the results are added together.

Cost = 4 + Rating

Crew Accommodations

The vehicle has proper sleeping quarters for its crew. Two quality levels of crew accommodations are available. Military grade crew accommodations are spartan in design and provide little privacy or comfort. Luxury accommodations, on the other hand, include private sleeping quarters and personal hygienic facilities. A vehicle with numerous crew accommodations of either type also includes a few common rooms such as galleys and lounges. Luxury common rooms are obviously more numerous and more posh.

Cost = 10 + number of crew members (military) or 20 + number of crew members x 2 (luxury)

Diving Wings

Fixed wing aircraft with this Perk have their wings in a distinctive shape which enhances their ability to pull out of a dive. Any such plane gives a +1 bonus on Piloting Skill rolls for pulling out of Dives, Stalls or uncontrolled falls. Only Flying vehicles can take this Perk.

Cost = 2

Easy to Modify

When this Perk is selected, the designers are paid enough to break the golden rule of military contract engineering ("Make it as complicated as possible"). The vehicle is designed in such a manner as to be easy to modify (standardized parts, modular aspects). A +2 modifier is added to all technical Skill rolls to modify and repair the vehicle.

While this type of design is a joy to service or modify and often lasts longer in the field, it is generally more difficult to design. The materials used for Easy to Modify models are usually of higher quality, further adding to the basic cost. For this reason, Easy to Modify is a fairly rare Perk (to date, common only on the Hunter and its clones). Easy to Modify models rarely have many other innate features and are usually modified whenever new functions are needed. They also tend to be popular or common machines.

Cost = 10

Ejection System AUX

The vehicle is equipped with an ejection system to give the crew a chance to escape if the vehicle suffers an Overkill damage result (or before that, if desired). See *Ejection* (page 159 of the rulebook) for more details. This Perk also covers the various pieces of survival equipment such as life preservers and inflatable lifeboats on marine vehicles.

Every pilot would like to have an Ejection System in case of disaster. Despite this, very few ground vehicles have ejection seats. The reason is simple: if a ground vehicle crew is unable to crawl out of their vehicle, they are probably dead already. Aircraft crews, especially fighter pilots, are an entirely different matter. Aircraft are more easily destroyed than ground vehicles because even relatively minor movement damage can cause the vehicle to crash. Ejection Systems allow pilots in this predicament to eject and avoid death.

Cost = 1 + (number of bonus actions due to crew)

Electronic Countermeasures AUX R

Electronic CounterMeasures (ECM) are devices that are used to jam sensors and communication systems. Using ECM to jam requires one action per roll. Roll an Electronics Warfare Skill test, adding the ECM Rating as a modifier. Unless the roll fumbles, the result of this roll is the Threshold of all communications or sensor action tests (both use EW Skill) within the vehicle's ECM range. The jammed sensors and communications must pass this test each round just to be functional. ECM range is identical to the vehicle's base Sensor range.

Electronic warfare is a dirty game that should only be played by those who are competent enough to do it right. Everyday combat and civilian vehicles rarely carry either ECM or ECCM equipment. Scouts often carry a limited amount of ECM to help shield them and their allies during combat. Dedicated electronic warfare vehicles have full ECM and ECCM suites and are often capable of camouflaging their allies while picking out their enemies. ECM is especially useful to prevent Command Point distribution, forward observation and drone operations.

Cost = Rating x 2

Electronic Counter-Countermeasures AUX R

Electronic Counter-CounterMeasures (ECCM) are devices that are used to block jamming systems and/or punch through their effects. Using ECCM to prevent jamming requires one action. Roll an Electronics Warfare Skill test, adding the ECCM Rating as a modifier. Unless the roll fumbles, the result of this roll is the Threshold of ECM action tests (uses EW Skill) within the vehicle's ECCM range. The blocked jammers must pass this test each round just to be functional. ECCM range is identical to the vehicle's Sensor range.

Cost = Rating x 2

Emergency Medical

Emergency medical care is often a key to saving an injured pilot. A vehicle with this Perk includes features like instant casts for broken limbs and stimulant/pain-killer injections to prevent loss of consciousness. In tactical game terms, this Perk prevents one "Crew Stunned" result on the Systems Damage table. In roleplaying terms, the vehicle will prevent the character from losing consciousness due to injuries. In addition, the emergency medical features will prevent wound degeneration for up to one full day.

Emergency Medical is a Perk that was often viewed as a useless frill by most military designers. After all, if the pilot is injured seriously enough to need emergency medical treatment, then he is probably already dead or dying. However, the unplanned use of the emergency medical facilities as a source of stimulants quickly proved battle worthy, and the use of the package, while unpopular because of the additional cost, grew over time. No one can deny the advantage of being able to ignore a single "Crew Stunned" damage result, and the automated medical facility may often be the only thing that stands between a group of isolated Player Characters and a lonely, bleeding death on some far away, dusty battlefield.

Cost = 0.1 x number of crew and passengers (per use)

◆ Emergency Power Surge AUX R

Emergency Power Surges (EPSs) systems are a rare feature, mostly because they tend to damage the vehicle they are mounted on. A vehicle with this Perk can, for a short time, boost some of its statistics by unleashing emergency capacitors, nitro injections, etc. In game terms, the EPS system "spends" its Rating points to gain a set of benefits.

This Perk allows the vehicle to increase one of the following Attributes by one for a single combat round per Rating point spent: Maneuver, Top Speed MP, number of Actions, weapon Damage Multiplier or weapon Base Range. Each Attribute can be raised up by a maximum of three points (so the maximum EPS points usable during a single round is equal to 15). A vehicle could spend all of its Rating points in one round for one glorious burst of power, or conserve the points for emergencies.

It is also possible to "overburn" the EPS system, doubling the effects but damaging the vehicle. If this option is used, each EPS point counts as two, but the system affected drops by one point afterward. If actions drop below zero, the vehicle must "buy" back the penalty before applying the action. For example, a one-man vehicle at -2 actions would have to take extra actions (and associated penalties) to act.

EPSs burn themselves out during use. Therefore, they do not regenerate their Rating. EPS repairs usually require complete vehicle overhauls. EPS use must be declared during the declaration phase and does not require an action.

Cost = (Rating)²

◆ Fire Resistant

The vehicle is made of fire-resistant materials and provides adequate heat protection for the crew. In game terms, the Intensity of any flame attacks against the vehicle is halved before damage is calculated.

Cost = 8

◆ Fuel Efficient

The engine and systems of the vehicle are extremely efficient: a greater Deployment Range than normal is possible. As long as the vehicle remains at Combat Speed, each point of Deployment Range provides more kilometers of distance. One and a half, twice and three times the range are possible multipliers, depending on the option selected by the designers.

Cost = 2 for one and a half times the range
4 for twice the range
8 for three times the range

◆ Geological Sensor AUX

The vehicle's sensors are specially designed to perform geological surveys, such as analysing ground chemicals or performing magnetic analysis. This has no tactical application, but it is useful in roleplaying scenarios. Geological sensors are common features on many of the vehicles used in the Badlands.

Cost = 4

◆ Glider

Aircraft with this Perk possess the abilities of a thermal glider and only lose one altitude level or MP of speed when gliding. In addition, the pilot can ride hot air currents to actually *gain* altitude levels, by making a Piloting roll versus a Threshold of 5. Each point of Margin of Success allows the craft to gain one altitude level, without losing speed.

This Perk can only be taken by Flying vehicles.

Cost = 2

◆ Grapple Launchers AUX R

A compressed-gas or small gun unit mounted on the vehicle's hull can fire a special grapple attached to an ultra-resistant cable. The cable is attached to a winch which can be used to drag the vehicle forward or, if the target is lighter than the vehicle, drag it toward the winch.

Grapple launchers can be designed to send their projectile up to 250 m away. It is also possible to buy a simple winch with cable, without the launcher — the range is then considered to be 1 hex for calculation purposes, although the cable can be much longer than this (up to 250 meters long — designer's choice).

Cables (and by extension, the whole system) are rated according to the maximum Size capacity they can handle. For example, a Rating 3 cable can support a weight of 1.1 ton (the maximum mass of the Size 3 category). Several cables can be used together by adding the maximum weight they can support (e.g. two Rating 3 cables could drag up to 2.2 tons together).

Grapple launchers have an Accuracy of -2 and a Damage Multiplier of x2 if used as a weapon. If the Margin of Success of the attack is equal to or higher than 3, the grapple is now attached to the target in addition to any damage it might have caused. It can be detached and reeled in at the cost of one action.

The cable itself can take up to its Rating in damage points before being severed. Ranged weapons, however, have a -3 penalty to hit because the cable is so small. Point-blank melee weapons have no such penalty.

Cost = 0.2 x (range in 50 m hex) x (Rating)

◆ Gun Ports

The vehicle is equipped with gun ports from which the crew and passengers can fire small arms while retaining the protection of the vehicle's armor. The ports are often equipped with special "sealant" opening to preserve the atmosphere within the vehicle and prevent contamination.

Only small arms may be fired from gun ports, not heavy weapons. Because of the design of the gun ports, the weapon is restricted to a "Fixed" firing arc and has a -1 modifier to hit in addition to the vehicular movement modifiers.

Cost = 1 (gun ports for one-third of the crew and passengers)
2 (gun ports for half the crew and passengers)

◆ Haywire Resistant

The vehicle is specially designed to shrug off massive electrical charges through isolated circuitry and grounded structure. EMP sponges take care of the rest of the charge, sparing delicate systems from haywire damage.

This Perk allows the vehicle to reduce the effects of weapons with the "Haywire" effect (i.e. particle beams and haywire grenades). On Light Damage results, ignore the second damage roll produced by the haywire effect. On Heavy Damage results, the second damage roll is treated as a Light Damage roll.

Cost = 10

◆ Heat Resistant Armor R

Although all armored vehicles have some degree of heat resistance built directly into their armor plating, many front-line combat vehicles have an extra layer of ceramite/ablative plate on top of their basic armor to help them fend off Monroe-effect warheads and energy weapon beams.

Since the weapon of choice to hunt Gears is the autocannon, Gears do not normally sport this extra armor coat. Larger vehicles, like tanks, are usually better candidates for this Perk since they are often the target of energy-based weapons like bazooka shells, missile warheads or lasers.

The vehicle's armor is designed to deflect and dissipate the intense energy delivered by weapons like shaped-charge warheads or lasers. Select a Rating of Heat Resistance. The maximum Rating is equal to half of the vehicle's base Armor Rating (rounded down). This Rating is added to the vehicle's base Armor Rating when the vehicle is attacked by Heat-based weapons. This Perk has no effect versus weapons that are not heat-based.

◆ Heat Effect

Heat-based	Not Heat-based
Bazookas	Cannon
Mortars	Railgun
Rockets/Grenades	Rifles (infantry)
Missiles	Punch
Laser	Kick
Particle Beam	Ramming
Torpedo	Melee Weapons

Cost = Rating

◆ High Capacity Computer

The vehicle's computer system has additional processing power that is not consumed by its normal operations. In the tactical game, this has no noticeable effect.

In the roleplaying game, the computer can be used to run various programs that are unrelated to the vehicle's normal function. For instance, a high capacity computer might keep a series of code breaking programs or maybe the financial records of a company or a laboratory.

Cost = 0.5

◆ High Towing Capacity

The vehicle is equipped with a high torque, heavy duty powerplant and transmission. Its towing capacity is doubled or tripled. If the vehicle has the "Walker" movement type, this Perk provides heavier actuators and power systems to give more power to the lower limbs. This yields higher damage in combat from kicks and stomps — add one to the kicking Damage Multiplier for double towing capacity, and two for triple towing capacity.

Cost = 5 (double) or
15 (triple)

◆ Hostile Environment Protection

The vehicle is specially designed for prolonged exposure to some hostile environmental conditions. This Perk is noted "HEP: <chosen environment>" on the vehicle sheet. The following options are available.

The desert version of this Perk is a must for any vehicle that is expected to serve in the Badlands and as such is extremely common on Terra Nova. The other types of Hostile Environment Protection are very specialized and should only be added if the vehicle is expected to encounter such hazards.

• Desert

The vehicle can withstand extended exposure to desert conditions without needing special maintenance to avoid sand build-up. This Perk includes air filters, modified heat exchangers and cloth coverings on delicate mechanisms.

Cost = 1

• Extreme Heat

The vehicle is designed to withstand exposure to scorching temperatures, often well into the hundreds of degrees Celsius, without taking severe damage. If combined with the Fire Resistance Perk, the vehicle is effectively immune to incendiary attack.

Cost = 4

• Extreme Cold

The vehicle is designed to endure freezing cold temperatures, such as those found in Earth's Arctic and Antarctic regions, without freezing up or otherwise breaking down. Heaters, special lubricants and other modifications are part of this Perk.

Cost = 1

• High Pressure

The vehicle is designed to endure the great pressures of locations like ocean depths and the upper layers of gas giants. A variant of this Perk (Extreme Pressure) allows the vehicle to endure even the most extreme pressures, such as those found in the deepest of ocean depths or within the atmosphere of gas giants.

Cost = 4 (High Pressure)
10 (Extreme Pressure)

• Underwater

The vehicle can withstand full submersion in water and other fluids, up to a depth equal to five times the vehicle's Armor Rating in meters (multiplied by five when combined with High Pressure, multiplied by twenty with Extreme Pressure). Vehicles capable of Submarine movement automatically possess this Perk at no cost.

Cost = 2

• High Gravity

The vehicle is designed to withstand very high gravity environments (3 g+) for extended periods. This does not, however, guarantee that the crew can do the same.

Cost = 1

• Vacuum

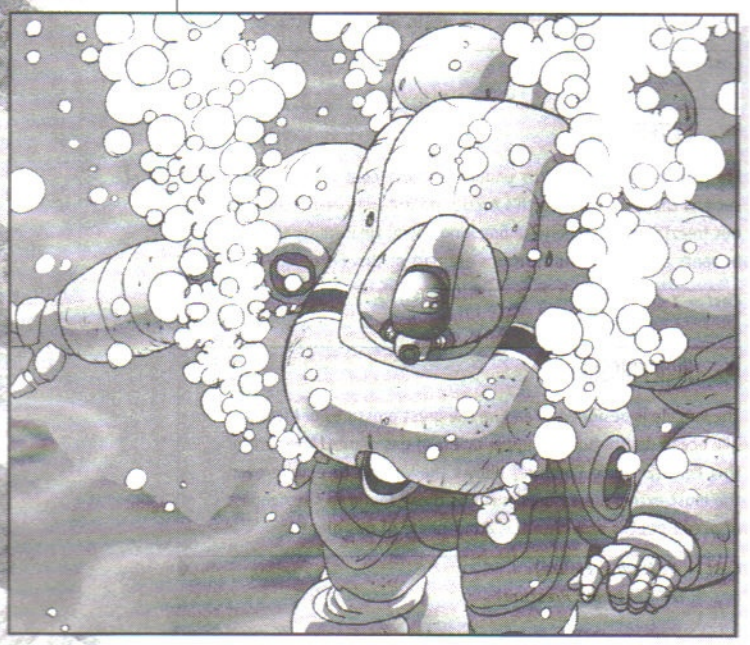
The vehicle is designed to withstand the lack of pressure found in vacuum environments. This means airlock hatches, pressurized hull, and so on (a life support system must still be bought separately). This Perk does not, however, grant a vehicle the ability to perform atmospheric re-entry.

Cost = 1

• Radiation R

The vehicle is designed to withstand high radiation levels. Foamed armor, rad-absorbing gel layers and additional shielding protect the vehicle's sensitive systems (especially the crew). The rad protection level, in rads/hour, is equal to ten to the power of the Rating (e.g., a Rating 3 system would give the equivalent of 10^3 rads/hour of protection).

Cost = Rating



• All

The vehicle is designed to withstand *anything* thrown at it. It is fully sealed and can go over land, underwater, in space, etc. It possesses all the above abilities at no additional point cost, except Radiation and Extreme Pressure protections (which must still be bought separately).

Cost = 12

◆ Improved Off-Road Ability

The vehicle is designed to handle rugged terrain even better than standard military craft. Its movement system is powerfully built with extra actuators and a reinforced structure. This Perk dramatically alter the appearance of any design that uses it.

Ground vehicles with this Perk have massive movement systems like 20th-century dune buggies and monster trucks. Hover vehicles with Improved Off-Road can vary how high they float off the ground, helping them avoid hazardous terrain; they also have improved hazard detection systems to help them avoid pitfalls and rough ground.

Walkers with Improved Off-Road ability have powerful legs and wide, high traction feet that allow them to run efficiently even when trudging over shifting sand or through swamps. Gears with this Perk normally do not have secondary movement systems like wheels and rely solely on their Walker movement mode.

In tactical game terms, the vehicle pays one less MP for any terrain type that requires more than one MP. For instance, a Ground vehicle with Improved Off-Road Ability would pay 3 MP instead of 4 MP when crossing Swamp hexes, but would still pay 1 MP per Clear or Sand hex. The Perk must be bought separately for each movement type.

Cost = 6

◆ Improved Rear Defense

The vehicle has a well-defended rear arc, either through a superior armor design or additional sensor systems. In game terms, this reduces the defense roll penalties from Rear and Rear Flank attack by 1. In other words, the Rear Flank arc of defense penalty is 0 and the Rear arc of defense penalty is -1.

It is normal for combat vehicles to have thick front plates and weaker rear plates, since most attacks come from the front (assuming that you are attacking the enemy and not being caught in an ambush...). Vehicles with this Perk get an equal distribution of their armor or sport additional plates to help protect their vulnerable rear arc. They also have additional sensors and automated monitors in the rear arc.

This Perk is best used on vehicles that are most likely to suffer rear attacks. For example, scouts must often expose their backs to return from a mission. Some fire support models have Improved Rear Defense to help them deal with swift, light vehicles that can overrun them and then circle around to get to their weak back or sides.

Cost = 10

◆ Jump Jets AUX R

The vehicle is equipped with short-burn jump rockets, often liquid-fuel thrusters or solid cartridge boosters bolted to its hull. These jets allow the vehicle to "leap" over a short distance, but they do not allow true flight.

The maximum distance of the jump must be specified. Jumping vehicles may clear obstacles whose elevation does not surpass one-half its jumping distance. For example, a jump-capable Gear with a jumping distance of 300 meters (6 hexes) may clear obstacles of elevation 3 or less.

Jumping requires one action but can be used in addition to the vehicle's normal movement, either at the beginning or the end of the normal move (note that this takes precedence over previous descriptions of the Perk). A vehicle may jump only in a straight line. Jumping occurs during the vehicle's movement phase, despite requiring an action.

Jump Jets are a somewhat bizarre Perk. They are bulky and expensive. Yet, this special ability is useful in three particular circumstances: city fighting, clearing obstacles and the Death From Above tactic. Jump Jets allow vehicles to launch uncanny surprise attacks in urban areas by hopping over obstructing terrain. Jump Jets are also useful for their ability to clear obstacles like walls, ravines, cliffs, and minefields.

Death From Above is a ramming technique which is only available to vehicle with Jump Jets. By leaping towards an enemy unit, a pilot can effectively execute a flying ram. Impact Speed is calculated as normal (see rulebook, page 140), with the ramming direction the same as it would have been for a ground-based ramming attack. Both attacker and defender are damaged by this maneuver. The attacking Gear's Size is multiplied by two for *this action only*.

Cost = maximum jumping distance in hexes x final Size

◆ Laboratories R

Some vehicles are equipped with "laboratories," systems that help the crew in specialized tasks. Each laboratory is dedicated towards one particular Skill or Skill specialization, with the exception of direct combat Skills (all Piloting/Driving, all Gunnery, Combat Sense). Laboratories are rated upon their quality (minimum of 0). This quality Rating is added as a modifier to any test performed using the laboratory's Skill.

Laboratories eliminate any penalty due to missing tools and proper equipment. They can be used to represent specialized rooms such as tactical command centers (Leadership), galleys (Cooking) or even theaters (Theatrics).

Cost = 10 + 10 x Rating (per lab)

◆ Large Doors

The vehicle's crew and passenger compartments are equipped with oversized doors that allow rapid egress and ingress. For each action spent, two crew members can exit the vehicle. A number of passengers equal to twice the Size of the vehicle may enter or exit each turn at no action cost.

Cost = 1

◆ Life Support AUX

Life support systems provide the vehicle's crew with a sealed and controlled milieu, protecting them from hostile environments such as vacuum, underwater, and poisonous atmosphere. If this system is destroyed while the vehicle is in a hostile environment, the entire crew immediately become casualties, eliminating the vehicle from combat.

The limited form of life support includes contingencies for breathing and limited nutritional and excretory needs and provides support for up to a week. The full version of life support includes complete air recycling, proper waste disposal, hygienic and nutritional facilities.

This Perk is best used on vehicles that are expected to travel in space, underwater or work in highly hazardous environmental conditions. Limited Life Support should be used on most of these vehicles. Full Life Support should be reserved for huge vessels like large spaceships and submarines, which require it for extended periods of time.

Cost = 2 (limited) or
5 (full)

◆ Lighter-Than-Air

Aircraft with this Perk use lighter-than-air gases to stay aloft. As this uses no Movement Points, Lighter-than-air craft do not fall when their movement systems are disabled or destroyed, though their horizontal movement will be determined by wind alone (see *Wind*, page 20 of **Tactical Air Support**). Lighter-than-air craft can gain or lose one level of altitude per round without using MPs (further altitude changes require MPs, however).

Light damage to the Structure will cause a lighter-than-air craft to lose one level of altitude per round, without the possibility to gain them back. Heavy Structural damage will cause a two-level drop per round. The envelope can be designed to be self-sealing; when taking Structural damage, airships with this option will suffer the loss of altitude effect only once instead of every round.

A lighter-than-air craft occupies three times as much space as its Size (for example, a Size 10 lighter-than-air will completely fill a tactical hex). Craft with this Perk are considered VTOL craft for determining admissible Perks and Flaws.

Only Flying vehicles can take this Perk.

Cost = 2 (standard envelope)
4 (self-sealing envelope)

◆ Low Profile

The vehicle has a very low profile which makes it easier to hide and conceal. Vehicles with this Perk tend to have sloped and compact hulls — for obvious reasons, bipedal walkers generally cannot be designed this way.

The vehicle gets +1 to Concealment while in cover (hexes with Obscurement of 2 or more). If the Hull-Down rules are used, it derives an extra 5 points of protection from its position.

Cost = 2

◆ Loudspeakers AUX

The vehicle is equipped with powerful external loudspeakers. These can be used for sirens, audio systems, communication gear, or other audio equipment. If turned on a night, they will allow the vehicle to be heard five times further away than usual (ten times for powerful loudspeakers!); see the rules for night-fighting on page 159 of the basic rulebook. This has little use but can be used to establish scenarios.

Loudspeakers are only really useful in the roleplaying game.

Cost = 1 for standard loudspeakers or
2 for really powerful speakers

◆ Manipulator Arm R

The vehicle has an arm-like structure that can pick up and manipulate objects. Manipulator Arms are part of the basic layout of many walker vehicles, but are truly common only on Gears. Smaller Manipulator Arms (Size 1-2) can be installed on virtually any vehicle to represent "micro-manipulators" used for delicate maneuvers or work outside the vehicle without having to expose the crew to danger.

A Manipulator Arm can lift an object whose Size is equal to or lower than its Rating. No matter the Rating of a Manipulator Arm, a vehicle cannot lift an item whose Size is greater than twice its own Size. Half the capacity of all weaker arms are added to the full capacity of the strongest arm to determine the lifting strength of multiple arms.

Optionally, Manipulator Arms can be reinforced to punch or crush opponents. These attacks have a Damage Multiplier equal to the Rating of the arm. This option adds nothing to the Perk's cost, but modifies the Offensive Score (see page 132). For roleplaying purposes, manipulators can apply pressure equal to half their Size Rating, rounded up. The highest weight value for that result on the Size to Mass chart is the pressure applied in tons per square meter.

Manipulator Arms can be used for fine manipulations and tasks which require dexterity. A standard Piloting Skill test is required, the Threshold varying according to the task. In addition, a negative modifier equal to half the difference between the object's Size and the hand's Rating (rounded toward zero) is applied to the roll. The Size to Mass table helps to evaluate the Size of the object being manipulated.

For example, a Gear with a Rating 6 Manipulator Arm is trying to pick up an egg (most definitely a Size 1 object). The pilot has to take a Piloting test with a modifier of (1-6, divided by half and rounded) -2 to make sure he does not break it.

Cost = 0.5 x Rating for each arm

◆ Micro-Labs

Microlabs are elaborate workbenches equipped with devices and sensors that are specialized for one task, such as toxin detection or electronic repairs. Microlabs have no tactical application, but they can be invaluable in RPGs.

Cost = 5 per micro-lab

◆ Mine Detectors AUX

Mine detectors are a set of highly specialized sensors designed to look for the telltale signs of the presence of minefields. These are very similar to the sensors supplied by the Geological Sensor Perk, but are specially calibrated to detect the mass and faint emissions of buried land mines.

Mine detectors allows the vehicle to detect mines in the same way as an infantry unit with the Mine Sensor equipment (see page 48 of **Tactical Field Support**): the vehicle's Sensor Rating is added to its Electronic Warfare roll.

Cost = 4

◆ Minelaying Equipment

The Minelaying Equipment Perk is a set of special machinery designed to dig a small trench or a series of holes along the path of the vehicle. The machinery then plants one or more land mines and buries them. The system can also "spray" the smaller anti-personnel mines behind the path of the moving unit for fast deployment (see the advanced mine field rules on page XX of **Tactical Field Support**).

The whole system is very efficient and can lay up to five points worth of mines every two minutes (four tactical rounds or twenty Skirmish rounds). The minefield becomes active one minute after the minelaying vehicle has left the hex, though this delay can be increased if desired. Minelaying Equipment may not be used to place Jumping Mines (see **Tactical Field Support**).

The mines are not included in the Perk's cost and must be bought separately at the normal cost. The equipment can place any type of mines, except Jumping mines.

Cost = 3 + 1 per ten TV points of mines (rounded up)

◆ Minesweeping Equipment R

Any vehicles can be equipped with mine-clearing devices, but these will work only in the primary environment for which the vehicle has been designed. For example, the mine plow of an engineering tank will be useless against naval mines, even if the vehicle has the Amphibious Perk. See page 31 of **Tactical Field Support** for more on minesweeping.

The exact nature of the minesweeping equipment depends on the designer, but most often consists of a mine plow or det-cord launcher on ground vehicles. A small distributor dropping chemiluminescent sticks to mark the cleared path is included at no point cost.

Minesweeping equipment may not be used to attack another unit, unless it has been specifically designed to do so. Attack-capable minesweeping systems, such as a det-cord launcher, must have their cost included in the Offensive Score. They have a Range of one hex, an Accuracy of -2, a Damage Multiplier of x15 and a TV cost of 10 points per shot.

Cost = 5 per Rating point

◆ Mining Equipment AUX

The vehicle is adapted to perform mining functions. Mining equipment must be specified as either light or heavy duty. Mining Equipment is a rather specialized Perk: in most cases, it is often cheaper to buy a simple tool arm equipped with an earth-moving scoop than buy this.

Light duty mining equipment generally consists of one or two sampler arms, a small earth-moving blade (or a more conventional bulldozer blade) and a simple winch with a cable strong enough to move the vehicle (not to be confused with the Grapple Launchers Perk, page 118). Heavy duty equipment is intended for commercial mining operations: in addition to the aforementioned equipment, it includes a large rock grinder, a shovel arm, one or two trenchers and a drill. Ore conveyors are also a fairly common addition to the package.

The mining equipment can be designed to attack opponents in melee combat. The Damage Multiplier equals half the cost of the mining equipment, rounded up. Light duty equipment has poor (-1) Accuracy and heavy duty equipment has very poor (-2) Accuracy. If selected, this ability modifies the Offensive Score of the vehicle like an arm.

Cost = 5 (light duty) or
20 (heavy duty)

◆ NOE Flyer

Aircraft with this Perk are equipped with very advanced radar-controlled flight systems, which allow the aircraft to effectively fly at altitude level zero ("Nap-of-Earth" flying). This enables the aircraft to avoid most long- and medium-range radars.

In game terms, the NOE flight system gives a -2 modifier to any roll on the Aircraft Control Loss Table (see page 10 of **Tactical Air Support**) if the aircraft is at altitude level zero. When flying at altitude zero, the vehicle benefits from the Obscurement of ground hexes against ground-based attacks (see page 21 of **TAS**). Only Flying vehicles can take this Perk.

Cost = 7

◆ No Fuel Required

The vehicle's main powerplant does not require regular fill-ups with fuel or reaction mass. It draws its energy from the environment around it (a solar-powered or sail vehicle, for example). The vehicle still has to undergo basic maintenance from time to time, though. This is what the Deployment Range Rating represents in this case.

Solar sail and magsail vehicles use this system. The sail itself is so thin (or insubstantial, in the case of the magsail) that it causes no damage to anything that comes into contact with it. Solar sails are damaged as normal during collisions. Sails damaged by any means will reduce the vehicle's thrust by 0.01 MP for each ten points of damage suffered. If the thrust falls under half its normal value, the sail collapses and is unusable. For game purposes, solar and magsails have a diameter equal to half the Size of the vehicle, in kilometers.

Cost = 10 (permanent power)
6 (if the power can be cut off)

◆ Passenger Accommodations

The vehicle is equipped to carry people for extended periods, with proper sleeping quarters for its crew and passengers. Military grade accommodations (intended for marines and other ship troops) are spartan in design and provide little privacy or comfort. Luxury accommodations include private sleeping quarters, a small lounge and personal hygienic facilities. A vehicle with numerous passenger accommodations of either type also includes a few common rooms. Luxury commons are obviously much more numerous and are often very posh.

This Perk can come in handy, if used properly. It is a necessity for long range vehicles that the crew remain fresh and alert. Passenger Accommodations are usually expensive because they take up a lot of room, but civilian vehicles can have military-grade accommodations to cut costs. A good example of this is the sleeping cab found just behind the driver on many long-haul trucks.

The Passenger Accommodations can also serve as a makeshift cargo bay. Military grade accommodations for one person are between two and six cubic meters in size (depending on the vehicle), while civilian accommodations can be as big as a thousand cubic meters on very large vehicles.

Cost = 10 + number of passengers (military) or
30 + number of passengers x 3 (luxury)

◆ Passenger Seating

The vehicle has extra seats for passengers. It is important to note that passengers, whether in seats or in accommodations, are not crewmen. The passengers do not confer any extra actions to the vehicle, nor can they control it. Passengers cannot use the vehicle crew's ejection system (if any); they must buy their own, as if they were normal crew.

Passengers do, however, count as crew for damage purposes, that is, they are hit on "Crew" results. Any damage taken should be randomized between crew and passengers using the usual method of damage resolution (page 146 of the rulebook).

Cost = 3 + number of passengers

◆ Pintle Mount

An infantry weapon installed on a swivel mount just outside a hatch is said to be pintle-mounted and must be operated by one of the vehicle's crewmen. That crewman can do nothing else and is exposed to enemy fire (count as Partially Exposed Crew, unless the vehicle is already open-topped). Pintle Mounts have a 180 degrees arc of fire, chosen at the time of design. The weapon is not protected by the vehicle's armor and counts as an Auxiliary system. Fire Control hits neither affect pintle mounted weapons nor does the Fire Control bonus apply to them. Firing penalties are equal to -1 for more than half and up to Combat Speed, and -2 for Top Speed, in addition to any other modifiers.

Pintle mounts are quite simple and add little to the cost of the vehicle. Any infantry weapon can be mounted on them. The cost of the weapon is equal to its DM plus its ROF in vehicle scale, and is added directly to the vehicle's final Offensive Score.

Cost = free (cost of weapon is added to OS)

Ram Plate

Part of the chassis of the vehicle has been specially reinforced to withstand a high speed impact. Each ram plate must be assigned to a ramming arc (see page 140 of the rulebook). The vehicle takes only half the normal damage in a collision, provided the impact is in the same arc as the Ram Plate.

Cost = 4

Reactive Armor AUX R

Reactive Armor is an advanced development of a millennia old concept. It is not composed of actual armor plates, but rather is a set of directional fragmentation mines mounted on the hull of the vehicle. A series of small dedicated sensor detonates one or more charges in the direction of an incoming attack, hopefully redirecting it or at least reducing its efficiency. The explosion counteracts HEAT-effect charges and sprays anti-laser aerosol to diffuse and refract laser beams.

Reactive Armor is always active. Because of balance problems, vehicles using the Walker movement system cannot have Reactive Armor at a Rating higher than 1. Each defense arc must be individually protected.

Reactive Armor reduces the Margin of Success of a HEAT attack by an amount equal to its Rating. If the Margin of Success of the attack drops below 1, no damage is done. If other units (friends or foes) are present in the hex when the reactive armor is activated, they automatically take a number of damage points equal to the Rating of the system times the Size of the vehicle, times the result of die.

Because the actual number of charges used to repel each assault is highly variable, Reactive Armor does not use ammunition but rolls against an Ammo Threshold. Every time the system is used, roll two dice: if the total is higher than the Ammo Threshold, the system has run out of charges. If the roll is equal or lower, the system works — lower the MoS and increase the Ammo Threshold by one. Fumbles are disregarded and count as a roll of one.

The Threshold starts at 0, so there is enough ammunition for at least two interceptions (Thresholds 0 and 1). Firing Reactive Armor charges does not use up actions and works until the system runs out of charges (the roll is above the Ammunition Threshold) or is destroyed in combat.

Reactive Armor is an AUX system, but damage is applied differently. On a Light damage result, add one to the Ammo Threshold. On a Heavy damage result, all charges on the facing hit are detonated and lost, effectively taking the system out of the fight. All charges must be replaced after a battle.

Cost = (half the Size of the vehicle x Rating)per facing

Reduced G-effect

Aircraft with this Perk have been modified to reduce the strain of pulled Gs (acceleration) on its crew, either through special cockpits, seats or flight suits. The pilot has a +1 bonus whenever he has to make a FIT roll due to sharp turns or other quick accelerations.

Cost = 4

Refueling Equipment

This Perk allows a vehicle to be refueled on the move. The refueling boom consists of enough equipment to refuel one vehicle at a time. The fuel is usually carried within a cargo bay, but the refueler can use its own Deployment Range or Reaction Mass instead.

Both pilots must roll their Piloting Skills vs. 4; if either fails, the refueled vehicle takes on only 1d6 x 10% of the intended load. A fumble means a collision occurred, and the refueling equipment on both vehicles is out of service.

A refueling attempt may be made every three minutes (6 rounds). Suggested time for total refueling is one round per point of Size of the target (plus the three minutes for hook-up).

Cost = 2 per refueling boom
1 for intake and receiving equipment

Reinforced Armor R

The vehicle has one or more facings (arcs of attack) with better armor than the rest of the vehicle. When the vehicle is hit in an arc that is reinforced, add the Rating of this Perk to the base Armor Rating of the vehicle.

Four possible arcs can be reinforced: Front, Rear, Right Rear Flank and Left Rear Flank. Up to three of these arcs can be reinforced on a single vehicle.

Cost = Rating (per arc of attack)

Reinforced Chassis

The frame of the vehicle is designed to absorb considerable punishment. The vehicle may ignore the first Structure hit on the Systems Damage Table, but then loses this Perk. The Perk's effect can be restored by a normal repair if a technician works on the vehicle after combat.

Cost = 6

Reinforced Crew Compartment

The crew compartment is layered with additional armor and fitted with crash-absorbing material. The vehicle may ignore the first Crew hit on the Systems Damage Table, but then loses this Perk. The Perk's effect can be restored by a normal repair if a technician works on the vehicle after combat.

Cost = 4

Reinforced Location Armor R

One of the vehicle's locations has better armor than the rest of the vehicle (by location, refer to the five entries on the System Damage table). When the vehicle is hit in a reinforced location, add the Rating of this Perk to the base Armor Rating of the vehicle before determining damage. This Perk cannot be taken more than twice per vehicle.

Cost = 0.5 x Rating, rounded up (per location)

◆ Rugged Movement Systems

The vehicle may ignore the first Movement hit on the Systems Damage Table, but then loses this Perk. This protection is due to the inherent strength of the drive system's design, or a built-in redundancy. This Perk's effect can be restored by a normal repair if a technician works on the vehicle after combat.

Cost = 5

◆ Satellite Uplink AUX

The vehicle has a specialized add-on to its communication system that greatly boosts its range. This allows it to patch into man-made satellites when the vehicle is on a planet, or transmit messages over great distances in space. The direct Communication range of a vehicle equipped with a Satellite Uplink is multiplied by one thousand (flight or space range factors still apply). The Satellite Uplink includes tracking and motion-correction equipment so the system can be used at up to half-Combat speed (or half-Thrust).

A vehicle with a Satellite Uplink is considered to have an unlimited communication range as long as there is a satellite or other relay in position (this will depend on the scenario being played). Another use for Satellite Uplinks is calling down orbital strikes (if available). While these are rarely used during peacetime, they are the most powerful form of wartime artillery available.

If the vehicle needs to stay in contact with distant groups on a regular basis, it needs a Satellite Uplink or, at least, to be partnered with a vehicle that has one. The best candidates for this Perk are command vehicles (to maintain communications with headquarters), communication vehicles (to allow them to serve as relays), and long-range scouts (to allow them to transmit reports).

Cost = 10

◆ Scoring Sensors AUX

Professional sport duelists often utilize a complex system of weapon simulations rather than actual arms (see Sporting Weapons). While these virtual arms can be used alone, they are more effective when opposing Gears are equipped with a special sensor net designed for this purpose. These sensors detect the emissions of sporting weapons and keep track of the amount of virtual damage received by the Gear.

Several settings are possible for the sensors (which are set before a match begins). In scoring mode, the sensor net divides the Gear into a series of locations, assigning points based on the precision and intensity of a hit. In shut-down mode, the net keeps track of virtual damage and shuts down the Gear when it is "destroyed." In virtual mode, the sensor relays information from each hit to various systems of the Gear, shutting them down based on calculated damage. In the latter mode, combat becomes frighteningly real as weapons "explode" and pilot compartments are "compromised."

When used in battle against Gears with Sporting Weapons, keep track of damage normally but only apply effects in virtual mode. Scoring Sensors add 5000 marks/dinars to the vehicle's price.

Cost = 0

◆ Searchlight AUX

The vehicle has a powerful front-mounted lighting system. At night, treat the vehicle's Fixed Forward firing arc as if it were in daylight. Some searchlights are mounted on a swivel plate: at night, the vehicle's Front (or Right, Left, or Rear, as selected) firing arc is treated as if it were in daylight. Any fire directed at the vehicle is also treated as if the vehicle were in daylight, regardless of the arc.

Cost = 1 per 50 m range (fixed)
2 per 50 m range (swivel)

◆ Shield R

Some vehicles, usually those with manipulator arms such as Heavy Gears, can carry a large piece of reinforced armor plating and use it as a shield. This shield can be moved in front (F defense arc) or to one side (L or Rt defense arc, chosen at the moment of design) of the vehicle to stop incoming attacks. A vehicle with a shield may expend one action to block an attack; the vehicle's pilot can then reroll his defense roll. If this second roll is successful, the vehicle is still hit, but the shield adds its Rating to the vehicle's base armor for damage purposes.

Vehicles may not carry shields whose Rating is greater than their base Armor Rating or their Size, whichever is smaller. The vehicle requires an arm of some type (Manipulator, Tool or Battle Arm) whose Rating is equal or higher than the shield's. When not actively blocking, the shield adds half its Rating (rounded down) to the vehicle's base Armor, either to the front or side defense arc (pilot's choice).

If a vehicle suffers Light Damage after having successfully blocked using its shield, the shield's Rating is automatically halved (rounded down). If a vehicle suffers Heavy Damage after having successfully blocked using its shield, the shield is automatically destroyed. In both cases, no further damage is applied to the vehicle or its Armor.

Cost = shield Rating x 3

◆ Shielded Weapons

The vehicle's weaponry is sheathed in plates of armor. The vehicle may ignore the first "-1 to a Single Weapon", *or* "-2 to a Single Weapon", *or* "-1 to All Weapons", *or* "Single Weapon Destroyed" result on the Fire Control Damage Table. The Perk is then destroyed. Its effect can be restored by a normal repair if a technician works on the vehicle after combat.

Cost = 5

◆ Sick Bay R

Some large vehicles, like landships, have an infirmary or sick bay. These facilities have no value in the tactical game but, in the roleplaying game, they are considered to be constant medical aide for healing purposes. Sick bays are rated by their maximum number of patients.

Cost = maximum number of patients x 2

◆ Smoke Launchers AUX

Smoke Launchers are small tubes fixed to the hull of the vehicle. Each tube contains a small smoke grenade which is launched using compressed gas to a position within 20 to 75 meters of the vehicle. The shell contains a volatile gas mixture which vaporizes into thick smoke of whatever color was chosen (usually black or gray, though practically any color can be ordered). Smoke Launcher charges are too slow and don't burn hot enough to be used as an offensive weapon. They never cause damage.

Smoke Launchers have a maximum range of one hex and can be fired at any time during the vehicle's Movement Phase at no action cost. The smoke covers the whole hex where the grenade lands. The dense smoke cloud has an Obscurement of 2 and will last until the end of the turn. Firing multiple charges in one hex will not add more Obscurement, nor will it increases the duration of the cloud cover.

The hull-mounted position of the smoke launchers makes them very vulnerable to damage. The launchers count as auxiliary systems, but damage is applied differently for them. On Light damage result, two dice's worth of charges are destroyed. On Heavy damage result, all charges are detonated and lost. It is not possible to armor or otherwise protect the launchers.

Cost = 0.1 per shot

◆ Sniper Systems

Sniper systems are additional targeting systems, such as long-range telesensors or dedicated millimeter-wave radars, that allow the weapons to which they are linked to have better accuracy at long range.

In game terms, sniper systems add a +1 modifier to the attack roll at Long and Extreme ranges, but only for the weapons that have been linked to the system.

Cost = 5 per weapon linked to the system

◆ Sporting Weapons

Usually paired with Scoring Sensors (see above), the Sporting Weapons Perk transforms a Gear's actual weapons into harmless virtual arms. This type of equipment is used for arena combat and for training purposes.

Rounds are replaced with blanks (to maintain recoil and ammunition) while arms are loaded with harmless laser pointers. Complex pointer rockets, grenades and mortar shells are created by combining a smoke round with a very mild haywire round. Vibro-weapons can be converted by stopping the vibration and putting a targeting charge along the blade. A similar charge can be applied to Gear fists and ram plates, but in these cases true damage is not negated.

If used against Gears equipped with Scoring Sensors, combat functions as described in that Perk (see the previous page for the full rules).

Sporting Weapons add 100 marks/dinars per weapon modified to the price of the vehicle.

Cost = 0

◆ Stabilizer Mount

Stabilizer Mounts are special systems designed to handle the recoil generated by a large weapon, allowing even a light vehicle to use one. Stabilizer weapon mounts can take on a variety of forms, from giant rifle bipods (for Gears, obviously) to recoil compensators and hydraulic blades, but they almost always anchor the vehicle to the ground in some way.

The Stabilizer Mount Perk allows the vehicle to add +2 to its Size for weapon and ammunition purposes. Therefore, a Size 6 vehicle equipped with this system may carry weapons and ammunition as a Size 8 vehicle. Larger vehicles such as striders must often get into a "firing position" to use heavy weapons and this is also represented by the Stabilizer Mount Perk.

The Perk must be bought for each and every oversized weapon carried by the vehicle. Before firing that particular weapon, the vehicle must spend one action preparing its position (dropping down to the ground, activating the hydraulic jacks, etc.).

When preparing the firing position or using the weapon, the vehicle cannot move. As soon as it moves, the vehicle is not able to fire its oversized weapon(s) anymore and must spend another action regaining its firing posture.

Cost = 2 per oversized weapon

◆ Stealth AUX R

Stealth systems are features that make a vehicle difficult to detect with sensors: heat baffles, radar-absorbing skin, silent running systems, etc.

In tactical game terms, Stealth adds its Rating to the vehicle's Concealment value when opponents use Sensors to detect it (see page 136 of the rulebook for the full Stealth rules). Stealth systems have no effect upon visual detection.

Cost = Rating x 3

◆ Stratospheric Flight

An aircraft with this Perk can climb past the habitual ceiling of 12 km (altitude level 48 in Air War scale), in effect going into the stratosphere, up to an altitude of 50 km (altitude level 200 in Air War scale). It requires the Space movement mode and sufficient reaction mass in order for the vehicle to move into orbit, however. Flying vehicles in the stratosphere double their Flight MP at no cost because of the rarefied atmosphere.

Only Flying vehicles can take this Perk.

Cost = 8

◆ Streamlining

The vehicle is shaped to present minimal resistance to the medium through which it moves. It gets +1 MP when moving at Top Speed. Aircraft are already considered to be streamlined, but taking this option makes them even more so. Streamlining has no effect on space movement.

Cost = 2

◆ Target Designator AUX

Target designators are used to lock-on guided weapons (see *Guided Weapons*, page 199 of the rulebook). To lock on a designator, the vehicle simply "attacks" the target, using the designator as the weapon. Its Base Range is equal to its Rating; it has +0 Accuracy and does no damage. Any successful attack "paints" the target for incoming guided munitions. The target remains designated until the end of the round. Designators have a Forward arc and may not be used with a Sniper System.

Target Designators tend to raise a vehicle's cost quite dramatically and so are best kept for specialized vehicles. Scout and command vehicles are ideal choices for Target Designators since they frequently serve as artillery spotters. Occasionally, it will be more convenient to put the designator on the vehicle that carries the guided munitions. This is often the case with aircraft.

Cost = 5 + base range in hexes

◆ Tool Arm R

Tool Arms are, by far, the most diverse of the three Arm types. Tool Arms can represent forklift-like cargo loaders, a tow truck's winch arm, a crane's boom, an extendible blowtorch or any other useful tool that can be imagined. The only restrictions are that the Arm cannot handle objects with the finesse of a manipulator and may not serve as a weapon, unless otherwise specified. Its function should be clearly defined at the outset.

Tool arms can lift objects whose Size is equal to or lower than their Rating, provided it has been attached to or is contained by the arm. No matter what the Rating of a Tool Arm, a vehicle cannot lift an item whose Size is greater than twice its own Size. Half the capacity of weaker arms are added to the full capacity of the strongest arm to determine the lifting strength of multiple arms.

Optionally, Tool Arms can be reinforced to punch or crush opponents. These attacks have a Damage Multiplier equal to the lifting capacity of the arm. This option adds nothing to the Perk's cost but modifies the Offensive Score (see page 132).

Pincers, hands and other types of manipulators can apply pressure equal to half their Size Rating, rounded up. Look up the highest weight value for that result on the Size to Mass table: this is the pressure applied in metric tons per square meter. The manipulator can also be "locked" in position, in which case a pressure equal to its Size will be required to force them open. Arms forced open in that way are disabled as pressure lines rupture from the strain and joints pop open.

Cost = 0.3 x Rating for each arm

◆ Urban Friendly

This Perk is primarily a roleplaying convenience since it has little to no effect on tactical combat. Vehicles equipped with the Urban Friendly Perk have head lamps, brake lights and navigation lights. Their engine(s) are either non-polluting (hydrogen cells or electrical) or have emission-control systems and catalytic converters. Heavy military vehicles have rubber soles on the feet and/or treads to avoid damaging public roads.

Cost = 0.5

◆ Trideo Link-up AUX

All military sensor and communications systems can be used to relay simple video images to a remote location, but few Gears have the special equipment required for a full trideo feed. First developed for vehicles used by news reporters, the trideo link involves mounting twin stereoscopic cameras on the machine. The feed from these cameras is relayed through the vehicle's communications system (which is also slightly modified) enabling distant spectators to watch a duel or other encounter as if they were there. The trideo feed also includes a back-up recorder , allowing the storing of an hour of images in the vehicle proper.

On Gears, trideo cameras are usually mounted in special armored shoulder assemblies or on either side of the head. The cameras can also be mounted on thin tool arms, hence allowing greater visibility, but this exposes the sensitive equipment to a degree that makes such a mounting impractical in combat models.

A Trideo Link-up adds 15,000 marks/dinars to the vehicle's price, but otherwise has no effect on its Threat Value.

Cost = 0

◆ Vehicle Bay

The vehicle has a vehicle bay for storing another, smaller vehicle. There are also facilities to maintain and refuel such vehicles (the main difference between a cargo bay and a vehicle bay). Vehicles with vehicle bays are usually called carriers. Vehicle bays need not be for very large vehicles, as even Gears can transport small drones. Vehicle bays on a carrier may be purchased separately to reflect multiple storage areas. Carried vehicles spend one entire round disembarking from the carrier, during which time they may fire but not move.

Vehicle bays are rated in terms of the type of vehicle carried and the maximum weight they can hold. Each vehicle is considered as massing the maximum weight of its Size category. For example, a Size 10 bay holds up to 30 tons of vehicles: that can be 375 Size 1 vehicles, three Size 7 vehicles or one Size 9 and one Size 6 vehicles, and so on. The type of vehicle must be specified during construction, i.e. a bay designed to house assault boats cannot house tanks or jet fighters. Vehicle bays, however, can usually house different models of the same type (within size constraints).

Cost = (maximum carried weight in Size points)

◆ Weapon Link

A Weapon Link allows multiple weapons to be linked to a single fire control mechanism. One action is required to fire the weapon link. The link's Accuracy and Range are equal to the worst Ratings among the link's weapons. Each weapon attacks and is rolled for separately. As soon as one weapon misses, all the other weapons not yet fired automatically miss (but still use ammunition). When a link is fired, *all* of the weapons in the link fire. However, the individual weapons that make up the link may be fired individually. Weapons may be part of more than one link.

Cost = 1 per weapon in the link (per link)

Flaws

Annoyance

Any vehicle can have something infuriatingly annoying about it. The nature of this Annoyance depends heavily upon the type of vehicle. Small vehicles are typically cramped and uncomfortable, even putting limits on the crewmen's Build Attribute. Vehicles packed with electronics often have some minor subsystem on the blink now and then. Vehicles with powerful engines can have significant noise problems.

These type of Flaw are too insignificant to have an effect on the tactical game, but are interesting for roleplaying. Annoyances also serve to individualize the various designs, and they add significant "character" to vehicles. Each Annoyance must be clearly identified and described, and this Flaw cannot be taken more than five times (one or two is more likely). The gravity of the Annoyance is left entirely to the designer of the vehicle.

Cost = -0.2 per Annoyance

Sample Annoyances

Name	Game Effect
Cramped Crew Compartment	Limit on crew's BLD
False Alarm System	Gives false warning to crew
Instruments are hard to read	Crew has to concentrate harder
Loud Engine Noises	Engine makes worrisome noises
Small entry hatches	Takes one more turn to enter/exit
Stale Smell	Ventilation system creates strange odors
Uncomfortable Seats	Reduce crew Skills after X hours

Brittle Armor

The vehicle's armor and superstructure are either of poor quality of just badly attached/fitted. The vehicle loses twice the usual Armor points loss from damage, that is, two points at Light Damage and four at Heavy.

Cost = -10

Cannot Glide

The aircraft has little or no wing span, and cannot gain lift without thrust. Should the engines fail, or be cut off for any reason, the aircraft will automatically enter an uncontrollable fall (see page 157 of the rulebook). Only vehicles with the Flying movement can take this Flaw.

Cost = -4

Decreased Maneuverability R

When using one type of movement, the vehicle loses some of its natural agility. This Flaw only applies to vehicles with two or more Movement Types and must be linked with one Movement Type in particular. When this Movement Type is used, the Rating of this Flaw is applied to the vehicle's Maneuver value.

Cost = -(Rating x 2)

Defective Active Sensors R

The vehicle's active sensor system has a tendency to go on the blink in a random manner. Defective active sensors are rated from 1 to 5. In combat, roll one die each round just before attempting to obtain an active sensor line-of-sight. If the roll is equal to or less than the defective active sensor Rating, apply the Flaw's Rating as a negative modifier to the sensor test.

Cost = -Rating

Defective Fire Control R

The vehicle's fire control system has a tendency to go on the blink in a random manner. Defective fire controls are rated from 1 to 5. In combat, roll one die each round, just before firing. If the roll is equal to or less than the defective fire control's Rating, then apply the Flaw's Rating as a negative modifier to the attack.

Cost = -Rating x 2

Difficult to Modify

The vehicle's innards are a nightmare of intertwined machinery and cables. Pieces must be specially machined for it, bolts and nuts are not standard, the color coding is wrong, etc. A -1 modifier is applied to all repairs on the vehicle.

Cost = -5

Exposed Auxiliary Systems

If the vehicle has all sorts of external gizmos attached to its hull with little or no protection, then it is likely to have the Exposed Auxiliary Systems Flaw. This Flaw is particularly appropriate for vehicles with large sensors, satellite uplinks, or external ECM pods. Whenever an Auxiliary Systems effect is rolled on the Systems Damage Table, it is treated as if the damage was one stage worse (i.e. Light Damage is treated as Heavy and Heavy Damage as all Auxiliary Systems destroyed).

Cost = -5

Exposed Crew Compartment

This Flaw is used to represent the open tops of jeeps and convertible vehicles. If only part of the crew or passengers are exposed, use the "Partially Exposed Crew" Flaw instead (see page 130). Vehicles with Exposed Crew Compartments should not be front-line combat units under any circumstances. Whenever a Crew effect is rolled on the Systems Damage Table, it is treated as if the damage was one stage worse (i.e. Light Damage is treated as Heavy and Heavy Damage as all crew killed).

This is a particularly nasty Flaw, especially if Player Characters are aboard the vehicle. Vehicles with Exposed Crew Compartments should not be front-line combat units under any circumstances. Any armored vehicle crew knows that the armor has to be around you to afford any protection! This Flaw is used to represent the open tops of jeeps and convertible vehicles. If only part of the crew or passengers are exposed, use the "Partially Exposed Crew" Flaw instead.

Cost = -5

Exposed Fire Control Systems

The vehicle's Fire Control mechanisms are inadequately protected. Firing sensors are exposed, barrel elevation mechanisms are unarmored, and so on. +1 is added to the die when rolling on the Fire Control Damage Table.

Cost = -4

Exposed Movement System

Some movement systems are too large, project too far away from the chassis, or are completely unarmored. If the vehicle is a civilian or non-combat model, odds are that its movement system is poorly protected. Whenever a Movement system's effect is rolled on the Systems Damage Table, it is treated as if the damage was one stage worse (i.e. Light Damage is treated as Heavy and Heavy Damage as all movement systems destroyed).

Cost = -5

External Power AUX

The vehicle does not have a powerplant and does not require regular fill-ups with fuel. It draws its energy from wired or beamed power; the Deployment Range represents the basic maintenance interval. External Power is not strictly a Flaw, but is a liability even though it reduces the vehicle's weight and cost.

External power can be beamed in, a collector receiving the energy and converting it for use by the vehicle's systems. The vehicle must remain in line-of-sight with the power supplier. If the collector is destroyed, the vehicle will suffer total power failure.

The energy may be wire-fed instead, the vehicle trailing a wire for power. A Piloting roll must be made every turn against the highest MP cost for the hexes traveled to avoid snagging the cable. Flying drones must test also and use the overflown ground's MP cost. Space drones are not affected. Failure means the cable is stuck and the drone must halt for the next round to free it. A fumble means the cable is severed. The cable has a Damage Point Capacity equal to the vehicle's Size, per hex.

Cost = -2

Extreme Overheating

The vehicle is prone to overheating in a highly dangerous manner. The vehicle will automatically suffer a Light Damage effect if it does any of the following for two combat rounds in a row: move and fire a weapon, fire three or more weapons, or use jump jets. If it does any of those actions for three combat rounds in a row, the vehicle will suffer a Heavy Damage effect.

Cost = -10

Fragile Chassis

Civilian vehicles and some non-combat vehicles use light, less expensive chassis to help cut costs. These chassis perform just fine under everyday, normal usage, but they are more vulnerable to weapons fire and physical damage. A +1 modifier is added to the die when rolling on the Structural Damage Table.

Cost = -5

Fuel Inefficient R

The vehicle gulps down massive amounts of fuel. Each kilometer traveled adds the Rating of this Flaw for Deployment Range purposes. For example, a vehicle with this Flaw at a Rating of 2 will count each kilometer traveled at Top Speed as six for fuel purposes (1+2, times two for Top Speed consumption).

Cost = -Rating

Hazardous Ammo/Fuel Storage

The vehicle's fuel tanks and/or ammunition bays are poorly designed. They are either placed in a prominent place, lightly armored, or even both.

A +1 modifier is added when rolling Light Damage on the Fire Control Damage Table, +2 when rolling Heavy Damage.

Cost = -5

HEAT Vulnerable R

The armor of the vehicle cannot withstand high energy attacks such as those from lasers or shaped-charge warheads. Subtract the Rating of this Flaw from the Armor Rating of the vehicle when submitted to a HEAT attack.

Cost = -Rating

Highly Flammable

The vehicle is built with flammable materials, or is extremely sensitive to excessive heat. All incendiary attacks have their Intensity doubled before damage is calculated. If the vehicle is destroyed, it will keep burning at Intensity 10 for an additional number of turns equal to its Size.

Cost = -7

Inefficient Combat Computer

The vehicle's fire control computer is easily overtaxed and can only fire one weapon or set of linked weapons per turn without penalty. If more than one weapon or link is fired (or if a weapon is fired again at a different target), apply a -1 modifier to the attack rolls for each weapon or link fired after the first attack.

This Flaw can only be taken by vehicles equipped with two or more weapon systems.

Cost = -3

Inefficient Controls

The vehicle's control mechanisms are poorly organized, causing the crew to waste precious time in high-stress situations as they interfere with one another to access controls. The number of crew actions is reduced by one. Note that this Flaw may only be taken for vehicles with two or more crew members.

Cost = -9

◆ Large Sensor Profile R

A design Flaw has made the vehicle more visible to sensors: a large structure, a high infrared signature, a poorly shielded, overly powerful electronic suite, or a significant radar trace. The Flaw's Rating is subtracted from the vehicle's Concealment value versus sensors (not for Obscurement). While this has a limited effect in tactical combat, a large sensor profile is hazardous when trying to ambush enemies or evade pursuit.

This Flaw is often underrated: while it has a limited effect in tactical combat, a Large Sensor Profile is hazardous when trying to ambush enemies or evade pursuit. If the vehicle is a large Gear, tank or a strider, this Flaw should be seriously considered. A Large Sensor Profile can also be caused by poor quality, overly powerful electronics suites whose emissions are easy to detect, or "hot" or noisy engines.

Cost = -Rating x 2

◆ Maximum Ceiling R

Aircraft with this very common Flaw cannot climb past a certain altitude. The Rating is subtracted, in kilometers, from a height of 12 km to give the aircraft's maximum ceiling. For example, an aircraft with a Maximum Ceiling Rating of 4 cannot climb past (12 - 4 =) 8 kilometers (an altitude level of 32 in Air War scale). Rotary wing craft rarely have ceilings higher than 4 km (Rating 8). Aircraft that can go higher than 12 km cannot take the Maximum Ceiling Flaw.

Only Flying vehicles can take this Flaw.

Cost = Rating x -1.5

◆ Maximum Climbing Angle R

Aircraft with this Flaw must advance a certain number of hexes before they can climb one altitude level; the Rating of the Flaw gives the number of hexes. VTOL craft cannot take this Flaw. Only Flying vehicles can take this Flaw.

Cost = Rating x -3

◆ No Communication

The vehicle is not equipped with any form of communication system. It cannot stay in contact with teammates and cannot act as spotter for indirect fire. It may not benefit from Command Points. Such a vehicle has both Communication Rating and Range equal to zero.

Cost = -5

◆ No Engine

This is not a Flaw *per se*: the vehicle has simply been designed without an engine or power transmission system and must be towed or catapulted. Vehicles with this Flaw usually have compensating Perks like Glider. If flying, the vehicle cannot have a Stall Speed lower than 1, unless it also has the Lighter-than-air Perk. Movement hits are ignored, though Armor is lost as usual.

Cost = -2

◆ No Sensors

The vehicle has no electronic sensors and may only detect opponents visually. The vehicle is likely to have a clear canopy or exposed crew compartment. Such a vehicle has both Sensors Rating and Range equal to zero.

Many small vehicles are guided using unassisted human senses. If the vehicle being designed is one of these, it probably has no sensors. Such a vehicle cannot perform Active Sensor checks and must rely entirely on the Passive Detection Rating of its crew to acquire its targets (see page 135 of the rulebook).

Cost = -6

◆ One Way Communication

The vehicle's communication system can either receive or emit, but not both. The comm system is either an emitter or a receiver. Only receiving Communication systems allow the unit to use Command Points, and only emitting systems allow forward observing.

Cost = -2

◆ Overheating

The vehicle is prone to overheating in a dangerous manner. The vehicle will automatically suffer a Light Damage effect if it does any of the following for three combat rounds in a row: move and fire a weapon, fire three or more weapons, or use jump jets.

Cost = -5

◆ Partially Exposed Crew

Only part of the crew is protected by the vehicle's mass; the rest is exposed to enemy fire. The vehicle is considered to have the "Exposed Crew Compartment" Flaw until all exposed crew members have been eliminated. For example, a vehicle which has three crewmen in an enclosed cockpit and four gunners on open mounts will have the Flaw until the four gunners are casualties. The cost would be (4 ÷ 7 =) 0.571 x -5, rounded off to -3.

Cost = -5 x (Crew Exposed ÷ Total Crew), rounded off

◆ Problem-prone

Tighten one bolt, and two come loose. For some unknown reason, problems seem to crop up everywhere on the new design. One die is added to the Lemon roll, regardless of the chosen production type.

Cost = -1 per additional Lemon die

◆ Poor Off-Road Ability

Since the game system assumes that typical vehicles are rugged military models, all vehicles are given a certain amount of innate off-road ability. Most civilian vehicles and some military transports lack the rugged suspensions and transmissions required for proper all-terrain performance. If the vehicle is one of these, this Flaw should be taken to represent its problems on broken ground.

Whenever entering terrain that costs two or more MP (not including elevation changes), the MP cost of the hex is increased by one. The vehicle may ignore this penalty and move counting the normal MP cost, but the crew must make a Piloting roll for each hex against a Threshold equal to 4 + the hex's MP cost. If failed, the vehicle suffers Light Movement damage or is stuck for 1d6 rounds. If fumbled, Heavy Movement damage or is stuck permanently and must be towed out.

Cost = -1

◆ Poor Towing Capacity

The vehicle's powerplant is too small, or its transmission system is not up to the task and overheats all the time. The vehicle's towing capacity is halved. Except for high performance fighters or civilian vehicles, very few designs have this Flaw.

Cost = -4

◆ Random Shutdown R

Whenever strained (each round of combat or every 15 minutes of moving at top speed), the vehicle must roll two dice to avoid shutting down (no movement or actions) for a number of combat rounds equal to the roll of one die. The Threshold is equal to one plus the Rating of this Flaw.

Cost = -0.5 x Rating

◆ Requires Airstrip

The aircraft cannot land on rough or even smooth non-asphalted ground. An airstrip is required for a safe landing — this is represented by a Road (see page 155 of the rulebook). In any other case, the pilot must make a Piloting Skill roll against a Threshold equal to 3 plus the Ground MP cost of the hex to avoid crashing. Only Flying vehicles can take this Flaw.

Cost = -5

◆ Sensor Dependent

The vehicle's cockpit does not allow the pilot a direct, clear visual image of his vehicle's surroundings. If the sensors are damaged or destroyed, the vehicle is running blind and is next to useless. It cannot attack, nor can it move. Any such attempt is automatically randomized on the board (i.e., direction and target are determined by the dice instead of the controlling player). If the environment permits, crew members may open a hatch, negating the penalty but acquiring the Partially Exposed Crew Flaw.

Cost = -6

◆ Traceable Emissions

The vehicle emits large amount of residual heat, smoke, radiation, etc., and is thus easily tracked down. Sensor rolls to spot the vehicle have a bonus equal to the Rating of this Flaw. Guided weapons automatically lock-on without need for a designator. AIs and computers (such as autopilots) may be instructed to track these emissions.

Cost = -Rating x 3

◆ Unstable

The vehicle is somewhat hard to control at high speed, either because it is badly designed or just top heavy. Apply a -1 modifier to all Piloting Skill rolls at Top Speed or in terrain with a MP cost greater than one. This is a more serious Flaw in an atmospheric flight vehicle, where a sudden turn can result in a lost of lift, intake, or any of a dozen other serious problems. A flying vehicle suffers a -1 to Maneuver any time it travels at a speed higher than Combat Speed.

Cost = -2, -5 for vehicles with Flight

◆ Vulnerable to Haywire Effects

The vehicle is vulnerable to electrical attacks. Fragile circuitry and ungrounded systems are prone to excessive damage. Haywire weapons get three damage rolls instead of their normal two.

If the vehicle has lots of nifty electronics packages, it is a great candidate for this Flaw. Vulnerable to Haywire Effects gives back lots of points and is rarely applied. Unfortunately, the vehicle is dead meat if it encounters enemies using particle beam guns and other electricity-based weapons.

Cost = -9

◆ Weak Facing

The vehicle has a weak facing (arc of defense). This may be due to incomplete armor coverage, shoddy design, or just plain bad material. When the vehicle is attacked on that side, halve its effective armor. This Flaw cannot be taken more than twice.

This Flaw is useful in order to help offset the cost of expensive Perks. However, both Weak Facings and Weak Points are very hazardous if the enemy knows of their existence. This is especially true of Weak Points, which are only hit on called shots. The vehicle should either rarely expose its weak area or have some means to defend it (a shield, for example). Note that even a side with some kind of specialized armor may have a Weak Point.

Cost = -(0.25 x base armor Rating) (per defensive arc)

◆ Weak Point R

The vehicle has a weak point in the armor covering one of its locations. This may be due to incomplete armor coverage, shoddy design, or plain bad material. When a specific system/location is targeted and successfully hit, reduce the base armor by the Rating of this Flaw before applying damage. This Flaw cannot be taken more than twice per vehicle.

Cost = 0.5 x Rating, rounded down

◆ Weak Underbelly

The underside of the vehicle is either unarmored or otherwise poorly protected. The vehicle's effective Armor is halved against all attacks coming in directly from below, such as minefields.

Cost = -0.2 x base Armor Rating

6.1.12 - Threat Value

The Threat Value and cost of a vehicle do not necessarily have to be figured out in order to use it in a given roleplaying campaign. Just plugging in the stats and playing is a perfectly valid option if a Gamemaster is present to balance the forces in presence. The Threat Value is useful only when hard numbers are required — for example, to help balance a one-shot tactical scenario, or to assign a price to a vehicle.

Threat Values enable the players to establish campaigns without the help of a Gamemaster. A single number is not the ultimate, perfect representation of a vehicle's worth, however. This is why a vehicle's Threat Value is further broken down into Offensive, Defensive and Miscellaneous Scores. These three "sub-values" point out the strengths and weaknesses of each vehicle design, making it much easier to balance out scenarios according to the mission at hand.

Calculating the Threat Value of a vehicle is a logical process involving separate, sequential steps. First, the Offensive Score, Defensive Score, and Miscellaneous Score values of the vehicle must be figured out. These three scores are then averaged together to determine the vehicle's total Threat Value, rounding up to the nearest whole number. This allows the player to change some equipment or values without having to recalculate the cost of the whole vehicle, only the affected sub-score.

THREAT VALUE FORMULA:

Threat Value =
(Offensive Score + Defensive Score + Misc Score)/3

◆ The Offensive Score

Vehicles with high Offensive Scores are especially good at dishing out damage. On open terrain and in face-to-face confrontations, they are very likely to come out on top. The base Offensive Score is based on the total of the Ratings of all the vehicle's weapons and their required ammunition.

If a weapon has either a Fixed Forward (FF) arc or is turret-mounted, its weapon Rating is altered. Weapons with "FF" arcs have a x0.6 multiplier applied to their Weapon Rating while weapons with "T" arcs have a x1.8 multiplier applied to their Rating (this includes the cost of the turret). The turret may be deemed "slow" (ST): the player must choose a 180 degrees fire arc for it each turn; the cost multiplier is x1.5 instead.

Only Weapon Cost, not ammo cost, is multiplied for these special arcs; ammunition is ammunition, regardless of the mounting of the weapon firing it.

Punching ability for all types of arms is entirely optional and must be paid for by squaring one-half of the punch's Damage Multiplier to calculate the weapon Rating of each punching arm. Note that it is possible to have a lower punch Damage Multiplier than the Rating of the arm — it just leads to more bookkeeping as a separate Rating must be recorded. Arms cannot cause more damage than their Size: if a higher DM is desired, a melee weapon should be bought.

Do not round numbers until the end of the OTV calculation; then round up to the nearest whole number.

◆ Calculating the Offensive Score

Weapon Arcs and Special Systems

Weapons with FF arc =	Weapon Threat Rating x 0.6
Weapons with T arc =	Weapon Threat Rating x 1.8
Weapons with ST arc =	Weapon Threat Rating x 1.5
Punch Rating =	(Damage Multiplier of arm x 0.5) squared

OFFENSIVE MULTIPLIER = the sum of the following:

Costs for all Weapons (modified for Fire Arcs)
Ammunition costs for all weapons
Punch Rating for each arm (if applicable)
Offensive Score = Targeting System Multiplier* x Offensive Multiplier

* Do NOT use the Fire Control Rating. Instead, look up the Rating on the *Targeting System Multiplier* table and use the multiplier given by the table.

Targeting System Multiplier

Fire Control	Multiplier	Fire Control	Multiplier
+5	700	-1	0.5
+4	120	-2	0.333
+3	24	-3	0.25
+2	6	-4	0.2
+1	2	-5	0.167
0	1		

◆ The Defensive Score

Vehicles with high Defensive Scores are especially good at avoiding or surviving damage. Their strong point is defending objectives and escaping enemy forces. The Armor Rating and all movement modes are included in the calculation. The second and subsequent slowest movement speeds are added together. For example, if a vehicle had the Flight (fastest), Ground and Naval movement types, the latter two would be added together for calculation purposes.

Ground and Rail vehicles with no other movement modes use a slightly modified Defense Score formula to reflect their simpler drive mechanisms. Their speed should be divided by 40 (for Ground only) or 60 (for Rail only) instead of the usual factor of 25 (see the formula on the next page).

The following formula produces the vehicle's Defense Score. Threat Values are calculated the same for flight-capable vehicles as for any other vehicle, with one little exception: a modified formula for the Defense Multiplier must be used. It takes into account the higher speeds of aircraft and also includes the Stall Speed of an aircraft, as this can have a significant effect in tactical games. Make sure to use the proper formula.

Do not round numbers until the end of the DTV calculation; then round up to the nearest whole number.

Calculating the Defensive Score

The Defense Multiplier is equal to the sum of the following:

(Armor Rating) squared
(fastest movement speed in kph ÷ 25†) cubed
(sum of speeds of all other movement types in kph ÷ 6) squared
(Space acceleration, in MP) squared

†Ground movement-only divide the speed by 40. Rail movement-only divide the speed by 60.

If the vehicle has the **Flight** *movement system, the Defense Multiplier is equal to the sum of the following:*

(Armor Rating) squared
((Flight Speed - Stall Speed) in kph ÷ 125) cubed
(sum of speeds of all other movement types in kph ÷ 6) squared
(Space acceleration, in MP) squared
Defensive Score = Maneuver Multiplier* x Defense Multiplier

* Do NOT use the actual Maneuver Rating. Instead, look up the Rating on the *Maneuver Multiplier* table and use the multiplier given by the table.

Maneuver Multiplier

Maneuver Score	Multiplier	Maneuver Score	Multiplier
+3	9	-4	0.333
+2	3	-5	0.286
+1	1.5	-6	0.25
0	1	-7	0.222
-1	0.667	-8	0.2
-2	0.5	-9	0.182
-3	0.4	-10	0.167

The Miscellaneous Score

Specialist vehicles such as scout exo-suits, communication AFVs and the like typically have high Miscellaneous Scores to reflect their unusual abilities. Depending on the scenario played, this can be useful or detrimental.

The following formula produces the vehicle's Miscellaneous Score. The vehicle's total actions are used in the formula, not just the bonus actions. The Communication, Sensor and Deployment Ranges should be divided by the correct factors before squaring or cubing them. If there are no Sensor or Comm system, use zero for both the Rating and Range; the proper Flaw (No Sensor, No Comm) should be added.

If the sum of the Sensor and Communication Ratings is negative, the square value will also become negative (for example, a total of -3 would be squared to 9, which would then become -9). The Perk/Flaw Point Totals referred to in the formula are the total cost points for all of the vehicle's Perks and Flaws, respectively; the costs are listed on pages 112 to 131.

Do not round numbers until the end of the MTV calculation; then round up to the nearest whole number.

Calculating the Miscellaneous Score

The Miscellaneous Score is equal to the sum of the following:*

(Total Actions) cubed
(Communication Range in km ÷ 10) cubed
(Sensor Range in km ÷ 2) cubed
(Deployment Range in km ÷ 50) squared
(Burn Points ÷ 100) squared
(Sensor Rating + Communication Rating) squared**
(Perk Point Total) squared - (Flaw Point Total) squared

*The Miscellaneous score has a minimum value of zero;

**If both values are negative, the resulting square becomes a negative value.

Design Example

Kurt pulls out his trusty calculator and starts to work out his Gear's Offensive Score. He adds the weapon Ratings of each of his Gear's weapons, carefully checking them in the weapon listing: 108 (for the Light Autocannon) + 226 (for the LRP/24) + (29 x 0.6) (for the fixed AP Grenade Launcher) + vibroknife (16 points) = 367.4.

He decides to add the punching option to both arms, at a cost of $(6 \times 0.5)^2 = 9$ points; one never knows when it might come in handy. He also buys ammunition for his various weapons: 60 shots for the autocannon (16.8 points), 24 rockets (13.9), 6 shots for the APGL (0.6 points), and 3 grenades (11 points each), bringing his Offensive score to 449.7. Since his Targeting System Multiplier is 1, his final Offensive score is 449.7 (which will later be rounded to 450 for simplicity).

He moves on to his Gear's Defensive Score. He enters his Gear's numbers in the Defense Multiplier formula: Armor 15, fastest speed 72 kph, and sum of all other speeds, 42 kph. His Defensive Score calculations look like this: $15^2 + (72/25)^3 + (42/6)^2 = 297.9$. Since his Maneuver Multiplier is 1 (because of his Maneuver 0), his final Defensive Score is 297.9 (which will later be rounded to 298 for simplicity).

Kurt now starts calculating his Miscellaneous Score. He's got just one guy supplying one Action, standard Sensors and Comm Ranges and Ratings, and a 500 km Deployment Range. He continues by calculating his total Perk/Flaw cost. He adds 3 + 3 (both arms) + 1 (HEP: Desert) + 10 (Easy to Modify) = 17. There are no Flaws. Kurt then uses this number to help him calculate his Miscellaneous Score as follows: $1^3 + (10/10)^3 + (2/2)^3 + (500/50)^2 + (0+0)^2+17^2 = 392$.

To find his vehicle's final Threat Value, he takes the average of the three numbers. His calculations look like this: (449.7+297.9+392)/3 = 379.86. Once rounded up to a whole number, the Threat Value of his Gear is 380.

6.1.13 - Default Size and Cost

The Default Size score of a vehicle is calculated using the following formula by using the Threat Value. Round the Default Size to the nearest whole number.

DEFAULT SIZE:

Default Size = Cube Root (Final Threat Value)
Default Cost = (Final Threat Value) x 1000

The Armor Rating of a vehicle places certain constraints upon its minimum Default Size. If the Default Size of the vehicle is calculated at less than one-fifth of the Armor Rating, raise the Default Size to one-fifth (round up) of the Armor Rating.

If the Default Size of the vehicle is more than ten times its Armor Rating, the designer has grossly underestimated the toughness of his vehicle and its structure is too flimsy to stay together. In this situation, return to Step Four, increase the vehicle's Armor Rating, and recalculate the vehicle's Threat Value and Size (Steps Eleven and Twelve).

The Default Cost in Mark/Dinar is equal to the final Threat Value times 1000. The final cost will be adjusted later to whatever monetary unit is appropriate to the place where the vehicle is assembled.

Design Example

The Default Size of Kurt's vehicle is equal to the cube root of 380, or 7.24, rounded down to Size 7. This is well above his minimum of (Armor 15/5) = 3 (one-fifth of his base Armor Rating).

The Default Cost of his Gear is (380 x 1000 =) 380,000 Marks/Dinars.

6.1.14 - Actual Size and Pre-Prod. Cost

The vehicle does not have to be the Size generated by these calculations. It may be as large as twice the Default Size score or as small as one-fifth the Default Size score. There is no cost involved in changing Sizes within these limits, because the advantages and disadvantages tend to cancel out. For example, a smaller vehicle will be easier to carry around, but a larger one will be cheaper to design (more room to work with!) and cause more damage in physical attacks.

If the Size of the vehicle is greater than twice its Armor Rating, the designer must reduce the vehicle's Size so that it is no greater than twice the vehicle's Armor Rating.

A vehicle must have at least one crew member per ten Size points or fraction thereof. The Automation and Artificial Intelligence Perks can be used to substitute for living crew members.

Most Gears are Size 6 or 7, although they could probably go as low as Size 5.

The pre-production cost of a vehicle is calculated using the following formula. It should not be rounded until the Final Cost stage, later on.

PRE-PRODUCTION:

Cost = Default Cost x (Default Size ÷ Actual Size)

Size To Mass Chart

Size	Mass in Tons	Size	Mass in Tons	Size	Mass in Tons
1	0-0.08	34	1001-1100	67	7901-8300
2	0.09-0.3	35	1101-1210	68	8301-8700
3	0.4-1.1	36	1201-1300	69	8701-9100
4	1.2-2.4	37	1301-1400	70	9101-9500
5	2.5-4.4	38	1401-1500	71	9501-9900
6	4.5-7.3	39	1501-1700	72	9901-10300
7	7.4-10	40	1701-1800	73	10301-10700
8	11-16	41	1801-1900	74	10701-11200
9	17-22	42	1901-2100	75	11201-11600
10	23-30	43	2101-2200	76	11601-12100
11	31-40	44	2201-2400	77	12101-12600
12	41-52	45	2401-2500	78	12601-13100
13	53-65	46	2501-2700	79	13101-13600
14	66-81	47	2701-2900	80	13601-14100
15	82-100	48	2901-3100	81	14101-14600
16	101-120	49	3101-3300	82	14601-15200
17	121-145	50	3301-3500	83	15201-15700
18	146-170	51	3501-3700	84	15701-16300
19	171-200	52	3701-3900	85	16301-16900
20	201-230	53	3901-4100	86	16901-17500
21	231-270	54	4101-4400	87	17501-18100
22	271-310	55	4401-4600	88	18101-18700
23	311-350	56	4601-4900	89	18701-19400
24	351-400	57	4901-5100	90	19401-20000
25	401-450	58	5101-5400	91	20001-20700
26	451-500	59	5401-5700	92	20701-21400
27	501-560	60	5701-6000	93	21401-22100
28	561-630	61	6001-6300	94	22101-22800
29	631-690	62	6301-6600	95	22801-23500
30	691-770	63	6601-6900	96	23501-24100
31	771-840	64	6901-7200	97	24101-25000
32	841-930	65	7201-7600	98	25001-25800
33	931-1000	66	7601-7900	99	25801-26600

Design Example

According to the calculations, the basic, unmodified design of the vehicle will be Size 7. Kurt looks up Size 7 on the Size to Mass Table and find that this represents between 7.4 and 10 tons.

He imagines his Gear being a little smaller and lighter than that (if only to stuff more of them in the cargo holds of his transports), so he decides to spend some additional cash on miniaturisation and make it a Size 6 vehicle.

Since his Actual Size is lower than his Default Size, his Pre-Production Cost will be greater than his Default Cost. He multiplies his Default Cost (380,000) by 7 (Default Size) and divides this by 6 (Actual Size), arriving at a PreProduction Cost of 443,333. Miniaturization does tend to raise the cost a little.

6.1.15 - Production Type and Lemons

Select the stage of production the vehicle is in. Prototypes are hand-crafted and often one-of-a-kind, making them outrageously expensive. Early production runs often still have a bug or two left in them that has yet to be worked out. Mass production runs produce cheap, reliable machines. Limited production runs improve product quality and increase cost. Scratchbuild designs are lovingly hand-crafted with little or no planning. The production type will also define how much care is put into each unit built and how many will be built on average (the "#" column).

Along with production type comes Lemon Rolls, the only random part of vehicle design (this is what the "Dice" entries in the table are for). Lemon Rolls are fully explained further. If the Gamemaster is designing a vehicle for use in a campaign, he should feel free to ignore Lemon Rolls or add Defects that he finds appropriate. If designing a vehicle that the Player Characters are building, the Lemon Rolls should be made and enforced.

Note that this table is designed for vehicles of Size 1 to about 15. Larger vehicles, such as the monstrous Landships, rarely go past what could be considered the Early Production stage because of their extremely large and complex construction. The same phenomenon applies to spacecraft as well.

Production Types

Model Type	Definition	#	M. Dice	Ind. Dice
Testbed Prototype	New Tech	1-3	12	2
Early Prototype	New Model	1-5	8	1
Late Prototype	New Model	1-10	4	1
Early Production	New Release	5-100	3	3
Limited Production	High End Model	5-500	1	2
Mass Production	Common Model	100+	2	3
Scratchbuild	Patchwork Mess	1	N/A	10

Lemon Rolls

Not every vehicle is made the same, even if they are the same make, model, and variant. Every once in a while, someone screws up and a lemon is produced. Just how many mistakes get made depends on what kind of model the vehicle is.

In addition to the base Model Lemon dice (see the table), one die is added for every full five Perks assigned to the vehicle (0-4, no extra dice, 5-9, one extra dice, and so on). The dice are rolled against a Threshold of 5: for each point above it, a Defect occurs. Fumbles are disregarded in this case. Due to the meticulous design and construction of Flight and Space vehicles, they tend to have fewer defects: one die is added for every ten (10) Perks the vehicle has, instead of the usual five.

When a new model is produced, its Model Dice are rolled and the Defects common to all vehicles of this model are determined. In addition, each individual vehicle gets a set number of Lemon Dice. Whenever a vehicle of this type is introduced into a game or campaign, its Individual Lemon Dice should be rolled to know what "quirks" it has.

Roll once on the Lemon Defect table per Defect. If multiple options are available, only one should be selected.

Lemon Defect Table

Die Roll	Defect
1	Structural Weakness (-1 Maneuver *or* -10% to Armor, rounding up)
2	Elec. Glitch (-1 Fire Control *or* -1 Sensors *or* -1 Communications)
3	Mov. Sys. Defect (-1 Maneuver *or* -10% Top Speed (min. 1 MP))
4	Vehicle has one Annoyance Flaw
5	Vehicle has additional Flaws totaling -2 or less
6	Vehicle has additional Flaws totaling between -2 and -4

Getting Rid of Defects

The Model Defects are basically errors that were made in either the conception or construction of the vehicle, and as such cannot be eliminated unless the unit is totally redesigned back at the factory. This often leads to the well-known parade of variants that merely correct the previous implementation's defects — sometimes adding new ones in the process.

Individual Defects are not so bad, however; they simply represent errors made on the assembly line. Unfortunately, repairing these Defects amounts to taking the vehicle apart and putting it back together — correctly, this time.

They are repaired like normal battle damage (see *Repairs*, page 154), but the repair time is doubled for each Defect repaired (fixing two defects will take four times as long as a normal repair), and the difficulty is also doubled. A failed repair roll means the vehicle is stuck with the Defect. A Fumbled roll means an automatic additional Defect!

The Curse Option

Optionally, if the Annoyance Flaw is rolled, it can be refused in favor of choosing to have a Curse. Effectively, the vehicle proves Murphy's Law whenever it is convenient to the Gamemaster. This can be used only in a roleplaying or integrated game, since it would be hard to apply the Curse evenly in a tactical game.

Here are a few examples of possible Curse effects: a certain tank model that gets struck by lightning ten times more often than other tank designs. A stealth submarine whose hull, for some unknown reason, picks up and resonates radio stations when near the shore. A destroyer which is just plain jinxed ("it's haunted... Yeah, that's it!").

Design Example

Kurt had already decided that his Gear is a mass production model. Consulting the Production Type table, he notes that he has to roll two dice for a new Mass Produced vehicle. His design has less than five Perks, so he does not have to add any more dice.

Kurt rolls his two Model dice, and obtains a result of 4. This is below the Threshold of five, and thus no Defect occur. All vehicles of this model will have to roll three dice for possible Individual Defects, but the base design is sound and has no defects. Kurt sighs with relief.

6.1.16 - Final Cost

The Pre-Production Cost of the vehicle is multiplied by the Production Cost Multiplier to obtain the Final Cost of the vehicle. It should be rounded up to the nearest whole number.

Vehicle Final Cost

Model Type	Prod. Cost Mult.
Testbed Prototype	x100
Limited Production	x2
Early Prototype	x20
Mass Production	x0.5
Late Prototype	x5
Scratch-Build	x0.2
Early Production	x1

Design Example

Since Kurt's Gear is a United Mercantile Federation mass production model, its final cost is 0.5 of the Pre-Production Cost. Half of 443,333 is 221,667, so the final cost of each Gear of this model is 221,667 Marks. Cheap!

6.1.17 Name the Design

Fill out a vehicle record sheet for the new creation. Christen it with a good sounding name or identification code and, optionally, write down its history and description. The new vehicle is ready to be taken out to battle.

Design Example

Kurt now has to name his new Gear. After pondering the name "Ranger," he decides to call it the "Hunter."

6.2 - Special Cases

The Mechanical Design System is very complete: it allows the creation of any type of vehicle or object, from a bicycle to a gun emplacement to a huge spaceship. However, since the scale of the system has to be somewhat large to accommodate all those vehicles' different sizes, the smaller ones tend to suffer from a certain lack of detail. Other more specialized items require additional explanations and special case rules. This section explain how to design small and oversized vehicles, and emplacements.

6.2.1 - Small Vehicles

Small scale vehicles (Size 5 and smaller) are easy to define using the normal rules. All that is required is a bit of ingenuity and a change of perspective. The Silhouette vehicle design system uses a set of mathematical formulas to compute the Size, cost and effectiveness of a given vehicle based on its chosen capabilities. By adding decimals to the statistics and using them in the design formulas, an accurate and more detailed pattern will emerge just like the other, larger, vehicle types.

Size

The main adjustment for small vehicles lies in the Final Size decided upon. Since the normal Size values cover quite a broad range of weights to choose from, they have been subdivided into smaller ranges for convenience. The Size value provided by that table is used in the Threat Value (TV) calculations as usual, complete with the decimals.

Small Scale Size-to-Mass Chart

Size	Mass in Kg	Size	Mass in Kg	Size	Mass in Kg
0.1	0-8	0.2	9-16	0.3	17-24
0.4	25-32	0.5	33-40	0.6	41-48
0.7	49-56	0.8	57-64	0.9	65-72
1.0	73-80	1.1	81-102	1.2	103-124
1.3	125-146	1.4	147-168	1.5	169-190
1.6	191-212	1.7	213-234	1.8	235-256
1.9	257-278	2.0	279-300	2.1	301-380
2.2	381-460	2.3	461-540	2.4	541-620
2.5	621-700	2.6	701-780	2.7	781-860
2.8	861-940	2.9	941-1020	3.0	1021-1100
3.1	1101-1230	3.2	1231-1360	3.3	1361-1490
3.4	1491-1620	3.5	1621-1750	3.6	1751-1880
3.7	1881-2010	3.8	2011-2140	3.9	2141-2270
4.0	2271-2400	4.1	2401-2600	4.2	2601-2800
4.3	2801-3000	4.4	3001-3200	4.5	3201-3400
4.6	3401-3600	4.7	3601-3800	4.8	3801-4000
4.9	4001-4200	5.0	4201-4400		

Movement and Maneuver

Small vehicles use the standard movement types with no modification to cost or capabilities. Speed is expressed in kilometers per hour, just like all other vehicles. To get the speed in meters per roleplaying turn (6 seconds), the speed in kilometers per hour is multiplied by 1.65, rounding to the nearest whole number.

Small vehicles are generally more nimble than larger ones and their Maneuver Attribute should reflect this. Generally, small vehicles will not have a Maneuver of less than -3.

Electronics

Small vehicles use the same Sensor, Communication and Fire Control Attributes as their larger brethren. Because of the limited internal space available, however, less equipment is generally carried. Sensor and Communication scores tend to be a bit lower (-1 or -2), but do not have to be.

Armor

Small vehicles may have Armor Ratings based on the Personal scale rather than the Vehicle scale. The Personal-scale Armor Rating is divided by ten for Threat Value (TV) calculation. In tactical battles, it is also divided by ten, but is rounded to the nearest whole number. For example, a truck could have an Armor Rating of 45 on the Personal scale. This would translate to an Armor Rating of 4.5 for TV purposes, and 5 for tactical battles.

◆ Weapons

Either the standard vehicular or infantry weapons can be used. Infantry weapons will need to be mounted on a Pintle Mount, or be carried with a human-sized Manipulator Arm (Size 1 or 2). Vehicular weaponry causes ten points of Personal-scale damage per point of Vehicle scale damage.

6.2.2 - Large Vehicles

Just like small vehicles, large vehicles can be built with specialized rules to better represent their capabilities and peculiarities. This section explains how to design large or oversized vehicles (anything above Size 30).

Large vehicles can be built as one large structure, but they are most often broken down into smaller parts to facilitate construction, reduce costs and increase their survivability. In Silhouette terms, this means that the vehicle is composed of a main hull, which may have the primary movement system(s), plus a number of superstructures and components that perform certain function and are "towed" by the main hull. Examples of this include weapon turrets, communication towers, drive units, etc. For the sake of simplicity, these are referred to as "sections" in the text.

◆ Size

The main adjustment for large vehicles lies in the Final Size. Movement systems are generally designed into the main hull, which is then used to "tow" the rest of the vehicle. The true Size of the overall vehicle (for collisions, physical attacks and transport) is thus the total of the mass of the main hull *plus* the mass of the sections added to it. This must be remembered if the vehicle is to tow or carry anything.

◆ Crew

Each section requires at least one crewmember, human or computer. Actions are determined separately for each part of the vehicle, including the main hull. Crew casualties are likewise applied to each separate section as damage is received.

Crew may be reassigned to other sections. A number of crewmembers equal to the Size of the smallest section involved in the exchange may be transferred each turn. Transferred crewmembers do not count for action purposes in the round during which they are transferring.

◆ Maneuver

Large vehicles are generally slower and more cumbersome than small ones, and their Maneuver Rating should reflect this. Generally, large vehicles will not have a Maneuver of more than -3. All sections must have the same Maneuver Rating as the main hull. They use the same movement modifiers in combat (e.g. if the main hull is moving at Combat speed, each section will be treated as moving at Combat speed).

Sections ignore any Maneuver-related damage result, but still lose Armor points as usual (1 for Light damage, 2 for Heavy damage). They are affected by any Maneuver damage suffered by the main hull.

◆ Movement

Only the main hull (and additional motive sections, if any are present) needs movement system(s). Other sections do not need movement systems but still have connections to the main hull to benefit from its movement — because of this, they may not take the "No Engine" Flaw or any other movement-related Perk or Flaw. Sections ignore any Movement-related damage result, but lose Armor points as usual.

The exception to this is additional motive sections. These contribute motive power by adding their total mass to define a common "towing capacity." This is then used to tow the rest of the vehicle (the main hull simply adds its own MPs, if applicable). Obviously, all motive sections must use the same movement type. If a motive section is Overkilled or can no longer supply *any* motive power, the speed drops; the new speed provided by the remaining motive sections is rechecked according to the towing rules. It is generally better to figure out these speed decreases as the vehicle is designed to save game time.

◆ Electronics

The electronic systems (Sensor, Communication, Fire Control) are distinct for each part of the vehicle. Thus, if the hull carries no weapons it can have a Fire Control Rating of -5, while the turrets have a standard Fire Control of 0. A communication tower could have a very high Communication Rating but not much else.

Some sections can dispense with Sensor, but they all need a Communication system to connect with the rest of the vehicle. Should it be destroyed, that section is cut off and may not receive orders from (or supply them to) the rest of the vehicle. It cannot benefit from Command points or transfer crew unless a messenger physically fetches them (that crewmember does not count for any actions while he is away from his post).

◆ Armor

Armor is placed as normal on the main hull and components. Each section has its own Armor Rating and takes damage separately. Should a section be Overkilled, any remaining damage is applied to the Armor of the main hull to see if additional damage is suffered. If the main hull is Overkilled, each section still has power for a number of turns equal to its Size, after which they lose all power and become inactive.

For example, a turret section with an Overkill value of 72 takes a glancing blow from a powerful laser beam and suffers 120 points of damage as a result. The Overkill result automatically destroys the entire turret, while the remaining 48 points of damage are applied to the main hull.

◆ Weapons

The weapon and ammunition carrying capacity of each section depends on its Size, as normal. Extra ammunition may be stored in other sections, but must be physically transferred. A section is considered fixed in place. If the design calls for a turret, the weapon(s) should be bought with the Turret fire arc as normal. Fixed arcs are also possible.

6.2.3 - Emplacements

Buildings and general structures such as roads and bridges are assigned Damage Point Capacities rather than an Armor Rating (see *Urban Terrain*, page 156 of the rulebook). These structures take damage by ablation rather than by Light or Heavy damage effects. It is possible to mount systems and weapons on these basic structures to give them additional capabilities: these are referred to as emplacements.

Emplacements are designed using the same system as vehicles, with a few limitations. They have a maximum Size Rating of 15 (25 when added to Dense Urban structures). Their movement is always equal to zero, and their Maneuver value is equal to -10 for calculation purposes. Their defense roll will always be equal to zero — a gun emplacement does not dodge. Emplacements always benefit from the Stationary attack modifier (+2). Gun emplacements ignore any Movement or Maneuver-related damage result, but still lose Armor points as usual (1 for Light Damage, 2 for Heavy Damage).

Emplacements don't have to make room for things such as an engine, transmission or control components, so they have more internal space to devote to weaponry and ammunition. They count as being five Size points larger than their actual Size for weapon and ammunition Size requirements. The Deployment Range shows how many hours of power is stored in their internal reserves.

◆ Anti-Aircraft Laser Platforms

Some defensive gun emplacements use megawatt lasers instead of ammunition-based weapons. AA Laser Platforms are built with the same rules as other gun emplacements, but are immobile. Because they are connected to a power grid, they never expend ammunition points. They can fire in burst or saturation mode if the chosen lasers have a ROF of one or more. Each weapon costs five times its normal value when figuring out the Offensive Score of the platform (for example, an emplaced, turreted Heavy Laser Cannon would cost 623 x 5 x 1.8 = 5607 points).

Because of their large power supply, laser turrets can be used for limited anti-missile fire. In game terms, firing in anti-missile mode costs one action per attempt and allows a single attack with a -6 modifier. One interception attempt may be made per Range band. Lasers with rapid-fire capacity can use ROF points on a one-for-one basis to reduce this penalty (for example, a Gatling Laser would suffer a penalty of only -5). Each functional anti-aircraft laser platform may roll versus every incoming missile or missile cluster (burst attacks), provided the crew (or the computer controlling it, if applicable) can spend the actions.

The anti-aircraft laser platform can attack any type of mortar shell, rocket, missile, or bazooka projectile. If the result of the anti-missile roll is greater than the attacker's roll, the system shoots down the missile. The laser completely destroys the missile when successfully used versus a single shot attack. When used to defend versus a missile cluster (ROF attack), each point of the MoS reduces the incoming cluster's ROF bonus by one. If the ROF bonus drops to zero, all of the incoming missile flight has been effectively destroyed.

6.3 - Weapon System Customization

There is an old military saying that goes "Remember, your weapon was made by the lowest bidder." While a soldier would never willingly fight with a barely functional weapon, sometimes they must make do with the quirks and limitations of the ones they are issued. From time to time, a few units will get lucky and get their hands on superior weapons.

The following rules explain how to customize the various weapon types that exists in the Heavy Gear universe to make them more individualized. Note that these rules require just a tad more bookkeeping than usual, and their use is entirely optional. Each option may be taken once; indicate which option was taken by placing an asterisk beside the modified weapon statistic. Only one option can be taken by weapon system.

Do not round numbers until the end of the calculations; then round up to the nearest whole number.

6.3.1 - Accuracy

Not all weapons shoot equally well. A short or warped barrel, a low quality guidance system or a poorly prepared charge can cause a shot to go wide of its intended mark. On the other hand, some weapons are more accurate than usual — needless to say, these are highly prized by soldiers.

If this option is chosen, add or remove one from the Accuracy Attribute. For example, a poorly made light autocannon will have an Accuracy of -1 instead of the usual 0. A great LAC, with a long barrel or gyro-stabilized mount, will have a +1 Accuracy.

ACCURATE WEAPON (+1 ACCURACY):
multiply weapon's Rating by 1.5

INNACURATE WEAPON (-1 ACCURACY):
multiply weapon's Rating by 0.6

6.3.2 - Damage

Some weapons are better designed and can cause more damage than other weapons of a similar type. This might be due to a more powerful charge, higher energy conversion ratio, larger warheads, etc. Underpowered weapons also exist, to the dismay of the soldiers using them.

If this option is chosen, add or remove one from the weapon's Damage Multiplier. For example, a poorly made light autocannon will have a Damage Multiplier of 7 instead of the usual (x8). A great LACwill have a x9 multiplier, almost as good as a standard Medium Autocannon!

POWERFUL WEAPON (+1 DAMAGE MULTIPLIER):
multiply weapon's Rating by 1.25

UNDERPOWERED WEAPON (-1 DAMAGE MULTIPLIER):
multiply weapon's Rating by 0.85

6.3.3 - Range

By putting more care into the crafting of the weapon, designers can sometimes manage to squeeze out a little more range than planned. Conversely, some weapons cannot match the range expected of a weapon of their type.

If this option is chosen, add or remove one from all Range bands. For example, a poorly made light autocannon will have Range bands equal to (1/3/7/15) instead of the usual (2/4/8/16). A great LAC will have (3/5/9/17).

LONG-RANGE WEAPON (+1 HEX):
multiply weapon's Rating by 1.1

SHORT-RANGE WEAPON (-1 HEX):
multiply weapon's Rating by 0.9

6.3.4 - Rate of Fire

By improving the cooling system and adding a faster auto-loader, some weapons can be designed with an improved rate of fire. However, the reverse is also possible: a badly-designed automatic weapon will jam if it is forced to fire too quickly!

This option can only be taken by weapons that already feature a ROF factor of one or more. For improved weapons, add one to the weapon's ROF. For badly designed weapons, the ROF remains as is, but count all Fumbles on shots using at least one point of ROF as a permanent weapon jam (weapon is out of action and must be repaired).

For example, a multi-barreled light autocannon could have a ROF of +3 instead of just +2. A shoddy LAC will jam on all Fumbled rolls.

HIGH ROF WEAPON (+1 ROF):
multiply weapon's Rating by 1.1

POOR ROF WEAPON (JAMS ON FUMBLES):
multiply weapon's Rating by 0.9

6.3.5 - Poor Workmanship

Some weapons are badly designed or built with low quality materials; others are experimental and not quite ready for field service. They overheat, jam, or otherwise fail, often with deadly consequences. Note that any type of weapon can suffer from this problem: for lasers, simply read "overheating safety override" instead of "jam."

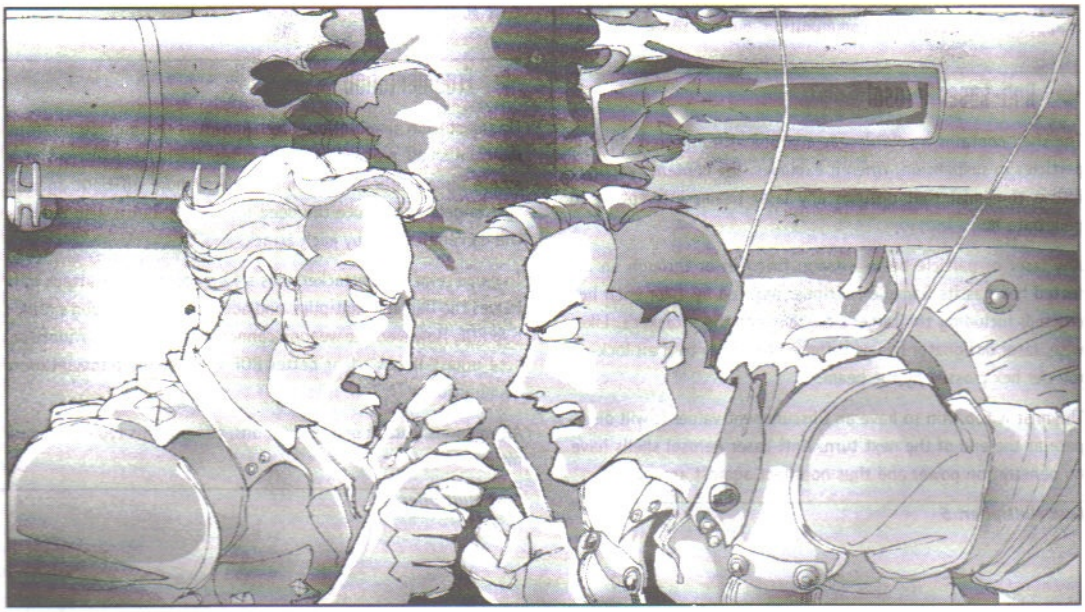
Whenever the weapon is fired, the user must beat the weapon's Threshold with two dice to avoid weapon trouble. For example, a weapon with a Threshold of 3 will require a roll of 4 or more to avoid a problem. If a problem does occur, check the Margin of Failure on the Weapon Trouble table below.

An overheated weapon can be fired while overheated, but immediately roll against its Threshold with a -2 modifier. If the weapon jams, it cannot be fired until cleared. Clearing the weapon requires one action and another roll; if the new roll fails, the weapon remains jammed. A Fumble results in a permanently jammed weapon (a technician will be able to clear it after the battle, though). Obviously, a weapon that explodes is useless as well.

POOR WORKMANSHIP:
multiply weapon's Rating by 1 - (0.1 x Threshold)

Weapon Trouble

Margin of Failure	Problem
0	Weapon overheats for one Turn
1	Weapon overheats for two Turns
2	Weapon jams
3	Weapon jams
4	Weapon jams; lose 1d6 shots of ammunition in clearing it
5	Weapon damaged; -1 Accuracy OR add one to the Threshold
6 +	Weapon explodes; apply damage equal to weapon's DM times (MoF-5) vs. half the vehicle's Armor (rounded down)



6.4 - Ammunition Types

The usual warheads and shells used by the vehicles described in **Heavy Gear** are standard high explosive or armor-piercing rounds. However, many weapons can fire special ammunition types that are not in standard, everyday use. The list below offers over twenty ammunition types and their game effects, along with the names of the weapons that can fire them (note that lasers and particle cannons cannot use these new ammunition types, for obvious reasons).

Up to three ammunition types can be mixed in a single warhead, but the price gets atrociously high very fast. For example, ammunition designed for Boosted Range Area Effect (BRAE) will have a cost multiplier of (15 x 15 =) 225, making it extremely expensive per shot. Ammunition costs should keep up to two decimals after the point.

Some of the ammunition types cause no damage. This is obviously negated if another characteristic is taken that cancels this effect. For example, an Aerosol shell alone will cause no damage, but an Armor-Piercing Aerosol shell (while strange) certainly will. Weapons cannot use ammunition that duplicates their existing function(s). Likewise, effects are not cumulative — applying the same cost multiplier several times does not improve the ammunition more than once.

The following text replaces and expands the notes on page 133 of the **Heavy Gear Second Edition** rulebook.

6.4.1 - Common Ammunition

Many types of ammunition can be designed to fit a variety of operational roles, making weapons more flexible on the field. The types listed in this category are relatively easy to manufacture and do not require any change in the weapon or its targeting software. Ammunition designed for one weapon class will not fit another. A smoke round for a medium autocannon cannot be fired by a light autocannon or a field gun, for example.

A cost multiplier is listed under each ammunition type. This cost is applied to the cost of the ammunition, but not to the weapon.

◆ Anti-Laser Aerosol

The shell contains a volatile gas mixture with mirrored metallic particles in suspension. When it explodes, the contents vaporize into a thin mist that diffuses any laser beams attempting to penetrate it.

Any laser or particle beam weapon firing in or through an affected hex has its Damage Multiplier reduced by 1 for each hex crossed, including the target's hex but not the attacker's. Likewise, laser designator beams suffer a -1 penalty to their lock-on roll per hex crossed by the beam.

The mist is too thin to have an Obscurement value. It will dissipate at the end of the next turn. Anti-Laser Aerosol shells have no penetration power and thus no effect against armor.

Cost Multiplier: 5

◆ Anti-Structure

The warhead has been specially designed to damage buildings, roads, airstrips, bridges and bunkers. Whenever this type of ammunition is used against something with Structural Damage Points instead of Armor, the damage inflicted is doubled. If used as direct-fire ammunition, Anti-Structure ammo places a -1 modifier on the attack roll.

Anti-Structure ammunition is only manufactured for mortars, rockets, missiles and bombs.

Cost Multiplier: 15

◆ Area Effect

This type of ammo delivers a high concussion blast and/or scatters shrapnel around when it detonates. It gives the weapon an AE of 0 (if the weapon already has an Area Effect, add one to its radius). The damage in this additional zone is half the weapon's normal damage. All normal area effect rules otherwise apply.

Warheads can be designed for field guns, artillery weapons, mortars, grenade launchers, bazookas, rockets/missiles, torpedoes and bombs.

Cost Multiplier: 15

◆ Fire-Fighting Foam

The shells/warheads are filled with a stable polymer compound that expands into a fire-fighting foam once exposed to the atmosphere. The foam cancels one die worth's of Fire Intensity points per ten points (or part thereof) of "damage."

Foam shells have no penetration power and thus no effect against armor. The foam is non-toxic, harmless to people and property and dissolves in water.

Fire-fighting ammunition can be designed for flamers, field guns, mortars, grenade launchers, bazookas, medium and heavy rocket packs and hand grenades.

Cost Multiplier: 1

◆ Fragmentation

Fragmentation ammunition, often known as shotgun rounds, fires multiple small projectiles (most often flechettes) instead of a single large warhead. This makes them more efficient against soft targets and reduce the need for aiming, but it also reduces the damage caused by each attack.

In game terms, the attacker adds a +1 modifier to his attack roll, halves the Damage Multiplier, and adds +2 to the weapon's effective ROF. However, the weapon cannot walk its fire or saturate an area unless it has +1 or better ROF without the fragmentation ammunition.

All weapons, except energy weapons, can use this type of ammunition.

Cost Multiplier: 15

Illumination

The warhead contains a powerful flare and a parachute to keep it aloft while burning. The flare will illuminate an area equal to the weapon's Area Effect plus two (so a weapon with no AE would have an AE of 2, an AE of 2 would become 4, and so on). The flare will last one turn per ten points of the weapon's Damage Multiplier, rounded up. The illuminated area is counted as being in daylight.

Illumination ammunition can be manufactured for field guns, mortars, grenade launchers, bazookas, medium and heavy rocket packs and hand grenades.

Cost Multiplier: 1

Non-Lethal

Non-lethal ammunition is used for crowd-control or police operations, when it is important or desirable to keep the casualties to a minimum. Shells are built around either rubber bullets or low-velocity plastic projectiles that deploy "arms" to distribute the impact across a larger surface. Rockets, grenades, mortars and missiles can also be non-lethal, carrying a payload of choke or irritant gas. Non-lethal ammo has no penetration power and thus no effect against armor of any kind.

If non-lethal ammo is used in a roleplaying context, use the weapon's Damage Multiplier (vehicle scale) plus the MoS of the attack as a Threshold for a Health roll against unconsciousness. If it fails, the target is automatically unconscious for a number of rounds equal to the MoF of the Health test. In addition, if the roll fails by between 4 and 6, the subject gains a flesh wound; if by between 7 and 9, a deep wound. If the Build roll is failed by 10 or more, the target is dead. Once this period has passed, another Health test must be made every turn to regain consciousness. The Threshold is the same as before, but goes down by one after each failure to regain consciousness.

In the tactical game, non-lethal weapons have no penetration power and no effect of any kind against armored units. Only infantry squads (no matter the type of armor) and vehicles with the "Exposed Crew Compartment" Flaw are affected by this type of ammunition. The weapon's basic Damage Multiplier is halved, but the damage is otherwise applied as normal. Vehicles with exposed crew are only affected on "Crew" hits and disregard any other damage result (non-lethal gas attacks affect them automatically, however).

After the battle, casualties are dead on a roll of 6 instead of 4-6. On a roll of 1 or 2, the casualties are not harmed and are available for the next battle.

Only machineguns, light rifles, very light and light autocannons can fire non-lethal ammo; other direct-fire weapons are just too powerful. Pack guns can be manufactured with non-lethal ammunition, but they cannot fire anything else.

Rockets, grenades, mortars and missiles carry a payload of choke or irritant gas. The weapon's Damage Multiplier is halved, rounded down. The gas cloud's radius is assumed to cover only the target hex, unless the weapon or ammunition also has an Area Effect (in that case, one is added to the AE).

Cost Multiplier: 1

Paint

The weapon's shells are hollow and filled with a brightly colored paint (practically any color can be ordered, though day-glo tones are preferred). Paint shells cause no damage to vehicles and are used for training — although some have found some more ingenious combat uses for it. The paint is generally water-soluble.

Observers have a visual spotting bonus equal to the MoS of the painting attack when trying to visually spot a vehicle that has been hit by paint ammunition. Only the highest MoS is ever used — multiple hits are not cumulative.

Cost Multiplier: 2

Smoke

The shell contains a volatile gas mixture. When it explodes, the contents vaporize into thick smoke of whatever color was chosen (usually black or light gray). The smoke covers one hex both horizontally and vertically (unless the chosen ammunition also has an area effect, in which case add one to the weapon's normal AE) and has an Obscurement of 2. The mist will dissipate at the end of the next turn.

Smoke shells have no penetration power and thus no effect against armor. Only visual detection is affected by the Obscurement modifier. Active sensor sweeps are not affected at all.

Cost Multiplier: 1

Smoke (Artillery)

This heavier version of the standard smoke round can only be fired by Artillery-class weapons (see Tactical Field Support). The shell contains a volatile gas mixture, but also chaff, flares and electronic dummies ("noisemakers"). When the shell explodes, the contents covers one hex both horizontally and vertically (if an area effect already exist, add one to the weapon's normal AE), creating a zone with an Obscurement of 2. The effect will dissipate at the end of the turn after the next.

Artillery Smoke shells have no penetration power and thus no effect against armor. All types of detection are affected by the Obscurement modifier, even active sensor sweeps.

Cost Multiplier: 5

Tracer

Tracer shells have a tiny back-mounted flare that allows the gunner to follow them in flight to improve his aim. They are mostly used in automatic weapons to "lead" the burst to the target. Some flare types only show up on sensors, reducing the odds of detection by enemy infantry lurking nearby. Generally, about one in ten shells is a flare.

In game terms, the cost and aiming improvement are negligible — it is assumed that most automatic weapons use some form of tracer rounds already. When used at night, tracer ammunition gives a +1 bonus to both Walking Fire and Saturation Fire attempts. This, however, makes the firing unit plainly visible to all within LoS (-1 to all defense rolls, cannot hide).

Cost Multiplier: 1

6.4.2 - Uncommon Ammunition

Uncommon ammunition is a lot more specialized. In tactical games, the player may roll one die to determine if his vehicle was assigned its special ammunition. On a roll of 1 to 4, the special ammunition is not available and standard shells/warheads must be used. On a roll of 5 or 6, the vehicle may load the special ammunition if desired. In roleplaying or integrated games, the Gamemaster decides what ammunition loads are available to the Player Characters.

A cost multiplier is listed under each ammunition type. This cost is applied to the cost of the ammunition.

◆ Adhesive

Adhesive ammunition is designed to stick to the target before detonating. It places a -1 modifier on the attack roll, but, if successful, the warhead becomes attached to the target. It can be detonated later, counting as a MoS 1 attack at Point Blank Range. If desired, it can be detached at any time by the attacker at the cost of one action.

To detach an adhesive warhead, a Piloting Skill roll is made versus the attack's Margin of Success plus the DM of the weapon. If the defending vehicle has Manipulator Arms, a bonus equal to half the Rating of the largest arm (rounded up) is applied to the Piloting roll.

Adhesive ammunition is only manufactured for field guns, mortars, grenade launchers and missiles.

Ammo Cost Multiplier: 5

◆ Airborne Torpedo

Airborne torpedoes are actually a form of missile that is used to attack underwater targets like submarines. These missiles skim the surface of the water until the last possible moment when they suddenly dive in, striking the submerged target in the same manner as a torpedo. Airborne torpedoes allow missile launchers above water to attack underwater targets without penalty.

Airborne Torpedoes are only manufactured for mortars, rockets, missiles and bombs.

Cost Multiplier: 15

◆ Armor-piercing

The weapon is highly efficient when penetrating armor, concentrating all its energy on a single point to enhance its force. The vehicle's base Armor Rating is halved to determine damage. If the attack is successful, the target does not lose any Armor points (the entry hole is too small to affect the Armor Rating), but takes system damage as usual. Targets may not be Overkilled by Armor-Piercing weapons — any extra damage passes right through the target, possibly affecting something beyond.

Armor-piercing ammunition is available only for railguns and massdrivers.

Cost Multiplier: 5

◆ Biological

The weapon's shells are hollow and filled with a short-lived biological warfare agent. The most common payload is an airborne virus that has a very short incubation period. Whether or not the agent is lethal should be decided during design.

Lethal agent victims will die immediately after the battle, while semi-lethal agent victims can survive if provided with medical attention. The disease's infection sphere is assumed to cover only the target hex, unless the weapon or ammunition also has an Area Effect (in that case, add one to the AE).

Infantry units and vehicles with the "Exposed Crew Compartment" Flaw are affected if they are hit (although the vehicle itself suffers no damage, obviously). For every ten points of damage, a penalty of -1 will be applied to all actions attempted by the target. This represents the fact that the enemy unit is not feeling well — not feeling well at all... If the penalty goes down to -5 or worse, the affected unit becomes a casualty.

Biological shells have no penetration power and thus no effect against armor. Enclosed vehicles and infantry in sealed suits (Encumbrance -1, no cost) are not affected by bio rounds.

Bio ammunition can be manufactured for most weapons.

Cost Multiplier: 15 (semi-lethal) or 20 (lethal)

◆ Boosted Damage

Many weapons can fire ammunition that carry enhanced warheads for increased damage. These are generally more complex and costly and use technologies such as self-forging penetrators (for hyper-velocity missiles and rockets) or customized armor-defeating shells (for artillery or autocannons).

Such munitions are often small missile-like projectiles with terminal trajectory boosting. Many Boosted Damage weapons are semi-guided, attacking the target from above and targeting the thinner roof armor instead of carrying a larger warhead.

When used, these ammunitions add 2 to the base Damage Multiplier of the weapon. They do not otherwise increase or modify the Range, accuracy or rate of fire of the weapon.

Boosted Damage ammo is manufactured for all types of weapons.

Cost Multiplier: 15

◆ Boosted Range

The weapon can fire enhanced ammunition such as continuous acceleration rounds or multi-stage propulsion units. Such munitions are often small, self-guided missiles. These munitions increase the weapon's base Range by 50% (round down). Medium, Long and Extreme Ranges are equal to 2, 4 and 8 times the new base Range.

Boosted Range ammo is manufactured for all types of weapons.

Cost Multiplier: 15

Chemical

The weapon's shells are hollow and filled with a chemical agent such as combat gas. The most common payload is a deadly nerve gas. Halve the weapon's Damage Multiplier, rounded down. The gas cloud's radius is assumed to cover only the target hex, unless the weapon or ammunition also has an Area Effect (in that case, add one to the AE). Infantry units that are hit are considered to be casualties (cross out any remaining damage points). Vehicles with the "Exposed Crew Compartment" Flaw are also considered casualties if they are hit (although the vehicle itself suffers no damage).

Chemical shells have no penetration power and thus no effect against armor. Enclosed vehicles and infantry in sealed suits (Encumbrance -1, no cost) are not affected by chem rounds.

Cost Multiplier: 15

Haywire

The haywire warhead is a strange weapon designed to immobilize enemy vehicles without destroying them. Upon impact, a large rapid-discharge capacitor releases all its stored energy in one intense burst that fries circuitry, damages sensitive systems and shocks crewmembers into unconsciousness or death.

The weapon's Damage Multiplier is halved, but it gets two rolls on the Systems Damage Table when it scores Light or Heavy Damage on an opponent. In roleplaying terms (for example, if "Crew" is hit), treat the weapon's damage results as an electrical attack with an intensity equal to its Damage Multiplier plus its margin of success.

Haywire ammunition can be designed for field guns, mortars, grenade launchers, bazookas, chassis reinforcements, melee weapons, torpedoes and bombs.

Cost Multiplier: 15

Incendiary

The shells are filled with an incendiary compound such as napalm or white phosphorus. Halve the weapon's Damage Multiplier; the weapon gains the "Fast Burn" characteristic.

Incendiary ammunition can be designed for all weapons.

Cost Multiplier: 12

Minelayer

Formally known as FASCAM and other acronyms, Minelayer ammunition saturates an area with small multi-purpose land mines.

If used as direct-fire, normal munition, Minelayer ammunition places a -1 modifier on the gunner's attack roll. If used in saturation fire, it attacks normally. In addition, the attack's saturation effects remain in that hex until the end of the battle or until the hex is cleared (as per regular minefields).

Minelayer ammunition can be designed for field guns, mortars, grenade launchers, bazookas, heavy rocket packs, torpedoes and bombs.

Cost Multiplier: 15

Mass Destruction

Mass destruction ammunition includes special warheads like nuclear, thermonuclear, neutron and anti-matter. The Damage Multiplier of these devastating warheads is ten times normal. They have huge area effects, giving them an AE score equal to their Damage Multiplier plus one. In addition to their basic damage, these doomsday weapons automatically do their Damage Multiplier in damage points to anything within their blast radius, regardless of whether or not they "hit" their target.

Mass Destruction ammunition can be designed for heavy and very heavy field guns and all artillery weapons. It can also be used to represent space-based weapons: in that case, it can be used for any weapon type, even energy weapons.

This ammo type, because of its huge power, has a special cost. When using Threat Values to "purchase" vehicles for a tactical game, vehicles equipped with mass destruction ammunition are worth fifty times their normal Threat Value.

Cost Multiplier: special TV multiplier

Seeking

The weapon can try to hit a moving target more than once: the missile turn and twist to try and collide with an enemy vehicle. If the attack fails, the attacker may reroll it. If the target has already spent action(s) to either shoot down, parry, block or dodge the attack, it can defend itself again with the same method at no additional action cost (but normal ammo expenditure).

Seeking ammunition is only available for missiles (except rockets) and torpedoes.

Cost Multiplier: (10 + 20 per additional attack roll)

Sensor-Homing

The weapon uses the target's electronic emissions to lock-on and destroy it. It is most often used for missiles, but special computer/sensor systems can be adapted for shells. If the target made an Active Sensor roll, used Communication or has any kind of ECM or ECCM active during the combat round where the Energy-homing attack takes place, the weapon gains a +2 to hit.

Sensor-homing ammunition can be designed for heavy and very heavy field guns, mortars, all missiles (except rockets), torpedoes and all artillery weapons.

Cost Multiplier: 30

Subroc

Subrocs are missiles that have been specially modified to allow them to be launched from underwater firing platforms like submarines. They rapidly rise to the surface of the water and once airborne speed towards their targets. Submarine missiles allow submerged vehicles to attack surface, land, or aerial targets without surfacing. They cannot be used against submerged targets.

Subroc ammunition can be designed for all bazookas, rocket packs and missile types.

Cost Multiplier: 15

◆ Underwater

More than just an ammunition type, Underwater allows the weapon and its ammunition to be used in an aquatic environment. The weapon can be fired from an underwater vehicle at other underwater vehicles or at vessels floating on the surface. In general, Underwater is built into the weapon when it is designed and is very hard to retrofit unto existing weapon systems (Mechanics vs Threshold 8). Underwater can be applied to lasers, but not particle beam weapons.

Some underwater weapons, such as torpedoes (rockets and missiles with the Underwater ammo), can only be used underwater. These weapons are less costly to produce than weapons that can fire both above and underwater, which are both more complex and more expensive.

Cost Multiplier: 10 (underwater only) or 20 (both above and under)

◆ Ammunition Reference Table

Common Ammunition

Name	Cost Multiplier	Weapon Types
Anti-Laser Aerosol	1	all
Anti-structure	15	MOR, RP, MIS, B
Area Effect	15	FG, ART, MOR, GL, BZK, RP, MIS, TORP, B
Fire-Fighting Foam	1	all
Fragmentation	15	all
Illumination	1	all
Non-Lethal	1	all
Paint	2	all
Smoke	1	all
Smoke (Artillery)	5	all
Tracer	none	all

Uncommon Ammunition

Name	Cost Multiplier	Weapon Types
Adhesive	10	FG, MOR, GL, BZK, HRP, TORP, B
Airborne Torpedo	15	all
Biological	15 (semi-lethal) or 20 (lethal)	all
Boosted Damage	15	all
Boosted Range	15	all
Chemical	15	all
Haywire	15	FG, MOR, GL, BZK, CR/Melee, TORP, B
Incendiary	12	all
Minelayer	15	FG, MOR, GL, BZK, HRP, TORP, B
Mass Destruction	none, but vehicle's TV x 50	HFG, VHFG, ART
Sensor-homing	30	ART, FG, MOR, MIS, TORP
Subroc	15	BZK, RP, MIS
Underwater	10 (underwater) or 20 (both)	all

Abbreviations: chassis reinforcement (CR), pack guns (DPG), field guns (VHFG, HFG, FG), artillery weapons (ART), mortars (MOR), grenade launchers (GL), bazookas (BZK), rocket packs (HRP, RP), missiles (MIS), torpedoes (TORP), bombs (B).

6.4.3 Ammunition Feed

Weapons with ammunition can be fed in one of two ways: either through "clips" (actual ammo clips, removable battery packs, etc.) or by an ammunition "bay" (through internal belt-feeding, autoloader, etc.).

Each method has its own advantages and disadvantages. All weapons are considered "bay-fed" unless stated otherwise.

◆ Clip

The ammunition rounds stored in a clips, being external to the weapon, do not increase the Minimum Size required to mount it on a vehicle. Rather, the ammunition clips are stored on the exterior hull of the vehicle, generally on easy to access hardpoints (often located on the back for obvious reasons).

This, however, also makes clips very vulnerable to damage. Each additional clip counts as an AUX system — Light damage destroys one clip, Heavy damage destroys one die's worth. Destroyed clips explode, causing a number of damage points equal to the Damage Multiplier of the ammunition directly to the hull. It is possible to protect the clips, however, with the Ammo Storage perk (see below).

Clips can also be damaged while in the weapon. When rolling a Fire Control damage result (sub-table A), it is possible to read "Clip Destroyed" instead of the first two results of the table. Apply the usual damage resolution procedure (see 5.10.1 in the Heavy Gear rulebook) to decide which option is applied.

Changing clips requires one action and the presence of either a Manipulator Arm or a Tool Arm designed for ammo-loading. The number of shots stored in each clip is left entirely to the designer's discretion — large clips last longer, but more ammunition is lost if they are destroyed during battle.

Any type of ammunition can be stored within a single clip. If there are more than one type of ammunition rounds in a clip, the order in which the ammo types are loaded must be noted and then followed. For example, if ten Area Effect shots are followed by two fragmentation shots, the first ten AE rounds must be fired before the frags.

Some vehicles are equipped to store part or all of their spare ammunition clips in an armored compartment to protect them against damage. This is the Perk: Ammo Storage, which is explained at length on page 113.

◆ Internal magazine

An internal magazine is the default ammunition storage. Though it takes up internal space on the vehicle, the ammunition is protected from enemy fire without having to buy additional reinforced storage space.

Ammunition stored in bays is entirely internal to the vehicle and is fed to the weapon through the inside. Because of this, extra ammunition will increase the required Minimum Size of the weapon, as usual. Multiple ammunition types can be stored, but switching between types requires one action.

6.4.4 - Ammunition Prices and Availabilities

Ammunition is very expensive, often costing nearly as much as the weapon itself in the long run. Officially, ammunition is sold only to registered armed forces representatives, although several companies have proven themselves willing to deal with anyone coming up with the money.

Ammunition costs vary wildly depending on the type of weapon it is manufactured for. Ammunition for weapons with Damage Multiplier of 10 or less costs ten times its point cost (for example, APGL grenades are 10 x 0.1 = 1 marks/dinars each).

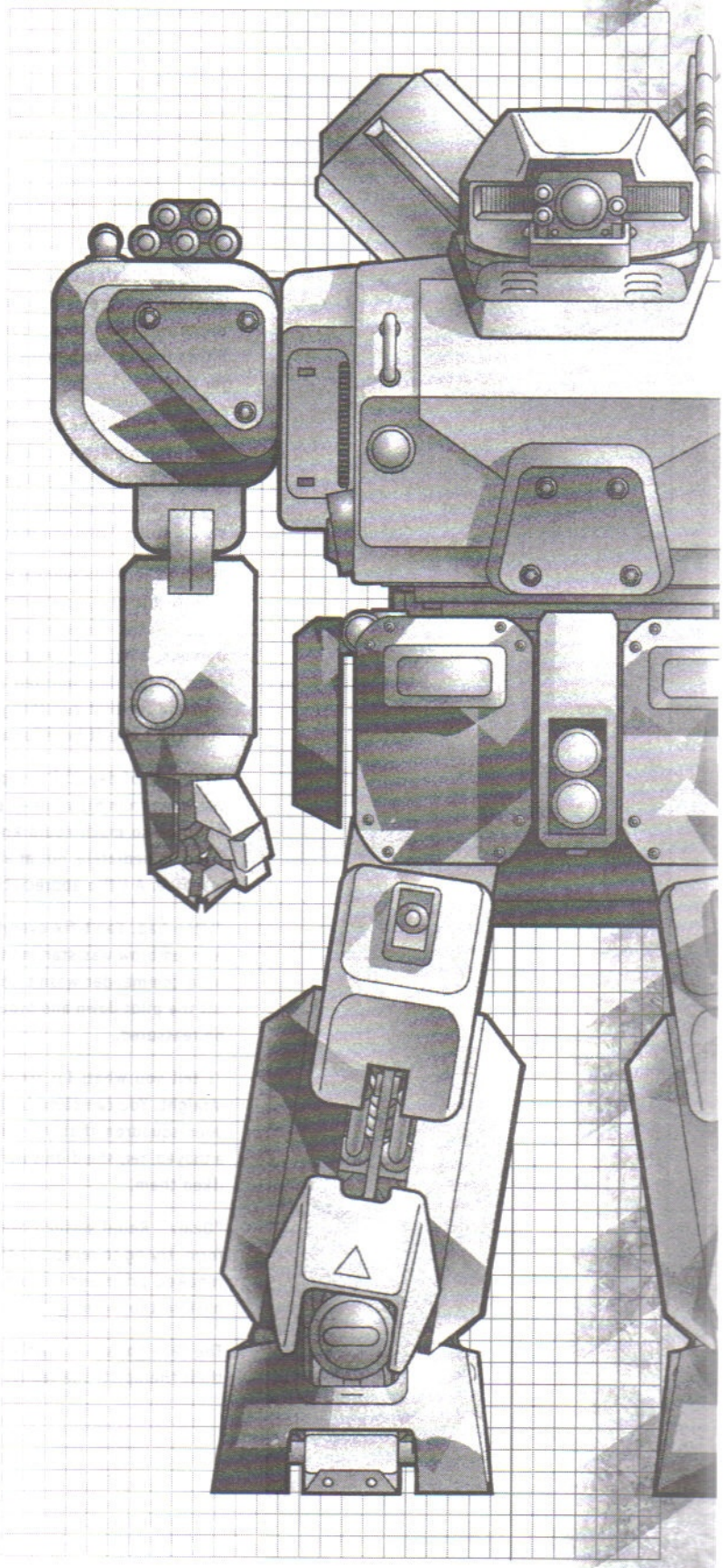
Ammunition for weapons with Damage Multiplier between 11 and 30 costs a hundred times its point cost (for example, HAC shells are 100 x 0.68 = 68 marks/dinars each).

Ammunition for weapons with Damage Multiplier above 31 costs a thousand times its point cost. Special type multipliers (see table above) are also applied to this price, though the multipliers must be divided by ten first (for example, Boosted Damage would multiply costs by 1.5) .

◆ Ammunition Availability

The simplest types, such as Non-Lethal or Foam, are available almost anywhere. These are often sold to fire and police departments and crowd control units for use in water or foam cannons (modified flamers).

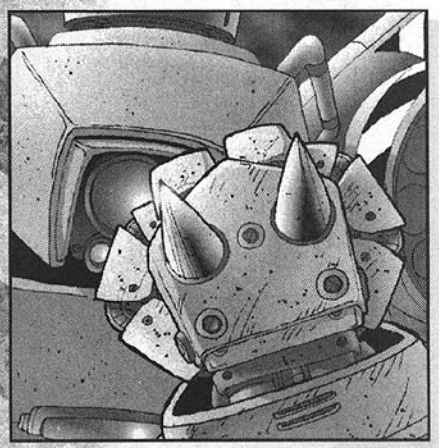
Any other type is restricted to military use and can only be only found on the black market, at a cost 2 to 5 times higher than the listed price. The source can be a corrupt quartermaster, a band of rovers, or even a greedy company official, but regardless of the provenance, all governments consider the possession of military weapons and ammunition to be a grave offense.



7.1 - THE BASICS

The Silhouette tactical combat simulator is best played with miniatures that represent combat units and a three-dimensional terrain (or a hex-based map that represents the battlefield). If no Heavy Gear miniatures are available in your area, you can always fall back on the cardboard counters produced by Dream Pod 9, or, if all else fails, simply make your own unit markers. Record sheets track damage and six-sided dice determine success or failure.

7.1.1 - Combat Units



The standard **combat unit**, represented on the mapboard by a miniature or a counter, is either a single vehicle or a ten-person infantry squad. Vehicles are generally organized into groups of two or more vehicles; Gears are grouped into squadrons of five (5) vehicles. Infantry is divided into platoons of four (4) squads. The group's name and number of units can change according to its origin; to keep things simple, groups of fighting units are referred to as **combat groups** for game purposes. Most battles should involve one to three combat groups per side.

Miniature models are the best. Though they require a larger base investment and a bit more work to prepare for the game, they are visually very appealing. Space considerations preclude an in-depth examination of modeling techniques, but there are plenty of documentation already on the market. Most hobby stores will have at least one painter or modeler on staff that will gladly help out any newcomer. A full line of Heavy Gear miniatures is available through hobby and game retail stores.

Counters can also be made very cheaply by using a small piece of paper with the name of the vehicle on it along with an arrow to show facing. A better counter can be made by photocopying the illustrations found in the Vehicle Compendiums, reducing them to about 25% of the present size. A number written down in a corner will help differentiate units of the same type. Dedicated Players can even color their machines to their own specifications.

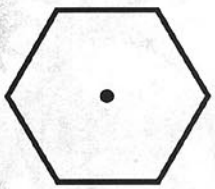
7.1.2 - Mapboards

The battlefield is represented by a hex-based map for ease of play. Each battlefield hex represents a 50-meter wide area of terrain. For game purposes, the terrain of the entire hex is considered to be the terrain type which surrounds the dot in the center of the hex. Each increase in elevation levels represents a 50-meter increase in height (smaller altitude variations are not significant enough to be represented at this scale).

For a more realistic appearance, one can also use a hexless map where only the center points are printed. In such a case, the dots (sometimes represented by six-branched stars) are used to determine movement and facing.

Mapboards Terrain Icons

HEX WITH CENTRAL DOT



STAR-TYPE HEXLESS MAP



TERRAIN ICONS	
CLEAR	
ROUGH	
SAND	
WOODLAND	
JUNGLE	
SWAMP	
WATER	
ELEVATION INCREASE	
ELEVATION DECREASE	

VEHICLE RECORD SHEET - 7.2

Each vehicle has an appropriate record sheet that details the necessary statistics for game play. These sheets allow clear tally of damage and other important information. The information is broken down into five parts: vehicle Attributes, crew Skills, weapons, Perks and Flaws and battle damage. The infantry record sheet is discussed in the infantry section, page 148.

Vehicle Attributes - 7.2.1

Vehicle Attributes are values that define a vehicle. The numbers are used as indicators to show the strength and prowess of each machine. Variations in the numbers between vehicles indicate various design objectives. For example, light scout vehicles are fast, big artillery vehicles are armored and slow, and so on.

Threat Value ◆

Threat values are a good measure of a vehicle's strength. Every combat unit, including infantry, is rated according to a Threat Value. This value reflects the vehicle's offensive, defensive and miscellaneous abilities. The higher the number, the more powerful the unit is in that particular field. The basic Silhouette system provides Threat Values for stock units and the ability to upgrade them with various weapons and systems. Games can be easily balanced by allocating an equal amount of points to each side. These amounts are then used to purchase vehicles according to their Threat Values.

Size ◆

Every vehicle is assigned a Size value based upon its mass. Size values are primarily used to determine the outcome of physical attacks like ramming attempts. The following table lists the mass range that each Size value roughly represents. Notice that the table is not linear; that is, a Size 10 vehicle is not just twice as big as a Size 5 vehicle, but eight times as big.

Size to Mass Chart

Size	Mass in Tons	Size	Mass in Tons	Size	Mass in Tons	Size	Mass in Tons
1	0-0.08	26	451-500	51	3501-3700	76	11601-12100
2	0.09-0.3	27	501-560	52	3701-3900	77	12101-12600
3	0.4-1.1	28	561-630	53	3901-4100	78	12601-13100
4	1.2-2.4	29	631-690	54	4101-4400	79	13101-13600
5	2.5-4.4	30	691-770	55	4401-4600	80	13601-14100
6	4.5-7.3	31	771-840	56	4601-4900	81	14101-14600
7	7.4-10	32	841-930	57	4901-5100	82	14601-15200
8	11-16	33	931-1000	58	5101-5400	83	15201-15700
9	17-22	34	1001-1100	59	5401-5700	84	15701-16300
10	23-30	35	1101-1210	60	5701-6000	85	16301-16900
11	31-40	36	1201-1300	61	6001-6300	86	16901-17500
12	41-52	37	1301-1400	62	6301-6600	87	17501-18100
13	53-65	38	1401-1500	63	6601-6900	88	18101-18700
14	66-81	39	1501-1700	64	6901-7200	89	18701-19400
15	82-100	40	1701-1800	65	7201-7600	90	19401-20000
16	101-120	41	1801-1900	66	7601-7900	91	20001-20700
17	121-145	42	1901-2100	67	7901-8300	92	20701-21400
18	146-170	43	2101-2200	68	8301-8700	93	21401-22100
19	171-200	44	2201-2400	69	8701-9100	94	22101-22800
20	201-230	45	2401-2500	70	9101-9500	95	22801-23500
21	231-270	46	2501-2700	71	9501-9900	96	23501-24100
22	271-310	47	2701-2900	72	9901-10300	97	24101-25000
23	311-350	48	2901-3100	73	10301-10700	98	25001-25800
24	351-400	49	3101-3300	74	10701-11200	99	25801-26600
25	401-450	50	3301-3500	75	11201-11600	100	26601-27400

For the number-crunchers out there, the formula used is ((Size + 0.5) x3) cubed. This gives the maximum mass (in kilograms) for a given Size. Some rounding has been done to the numbers to make the table more regular.

◆ Crew

Combat vehicles always carry a crew. In high-tech vehicles, robotic systems replace live crew members. Additional personnel increases the number of actions a vehicle can perform. Big vehicles generally need many crewmen to function at all.

◆ Speed

A vehicle's speed is translated directly into movement points (MP). Entering a map area denoted by a hex, costs a certain number of movement points. Each vehicle can move at two different rates, or "speeds." Combat Speed is the highest speed a vehicle can achieve and still participate efficiently in combat. Top Speed is twice as fast as Combat Speed, but the vehicle's finesse in combat is strongly impaired and it is limited in its maneuvering.

◆ Maneuver

Maneuver indicates a vehicle's ease of control and its responsiveness to sudden changes of direction. The value is a zero-average value and is used as a modifier to all Piloting Skill rolls.

◆ Sensors

Sensors is a generalized rating of the quality and sophistication of a vehicle's detection systems. This number covers the various sensor systems installed in the vehicle, regardless of their actual nature.

◆ Fire Control

Fire Control is a catch-all category for targeting devices and weaponry. These can vary between expensive combat computers to primitive mechanical sights. The value is used as a modifier to all attack rolls.

◆ Armor

Armor represents the toughness of the vehicle's protective hide and general structure. Three values are listed: Light damage, Heavy damage, and Overkill. They are equal to one, two, and three times the base armor value, respectively. When a vehicle is hit, the attacker's damage is compared to each of the vehicle's Armor values in turn. The attack's effect is the last armor stage it has exceeded (see *Damage*, page 145).

7.2.2 - Crew Skills

Skills indicate the quality of a vehicle's crew. Skills are rated by experience: higher Skill indicates greater ability. See Silhouette Introduction for a list of Skill equivalents (Skills are the same in both RPG and tactical combat systems). In the tactical game, anyone who has a Skill at level 0 cannot perform any task which requires this Skill.

◆ Leadership

The commanding officer's Skill at leading troops and planning tactics. Leadership Skill is used to check for combat initiative.

◆ Piloting

The Skill of piloting and maneuvering a walker vehicle. Piloting is required to evade attacks, initiate physical attacks and perform difficult maneuvers. Driving and Naval Piloting are used for ground and naval vehicles respectively, but they serve the same purpose.

◆ Gunnery

The Skill of aiming vehicle-mounted weapons or using fire control mechanisms. Gunnery is crucial to all ranged attacks.

◆ Electronic Warfare (EW)

The Skill of using sensors, jamming equipment and other electronic packages in combat vehicles. This Skill is used when calculating a vehicle's Detection value (see *Detection*, next page, and *Line of Sight*, page 134) and for checking the position of an object using the vehicle's sensor systems. In a tactical environment, it should be one level less than the Gunnery Skill (optionally, the levels for Gunnery and Electronic Warfare could be swapped).

Detection

The Detection scores are measures of the unit's ability to passively detect opponents who are far away or well hidden, that is, without using Active Sensor. Detection scores and the Active Sensor procedure are discussed more fully in the *Line of Sight* section, page 134.

Standard Crew

Provided below is a selection of sample Heavy Gear pilots which you can use in tactical scenarios, should you wish to use this game for non-roleplaying purposes. They are listed with a corresponding Threat Value modifier, which you should multiply by the Threat Value of the Gear to give the final pilot/Gear team Threat Value. By default, most tactical games should be played with Qualified pilots.

Type	Piloting (Lvl/Attr.)	Gunnery (Lvl/Attr.)	TV Multiplier
Rookie	1/0	1/+1	x0.25
Qualified	2/0	2/+1	x1
Veteran	3/+1	3/+1	x2.25
Elite	4/+1	4/+2	x4

Weapons - 7.2.3

Most military vehicles carry weapons of some kind. Regardless of their performance, these weapons all share similar characteristic, such as Accuracy, Damage Multiplier, Range, Rate of Fire and Ammunition. This section describes these abilities. Full explanations for using the various characteristics of the weapons are given in the *Vehicular Weapons* section, p. 198.

Accuracy

In addition to the effects of the vehicle's main fire control systems (the Fire Control rating), the Accuracy (Acc) of each individual weapon affects the odds of successfully damaging opponents. It is applied as a modifier to each attack roll made with the weapon. Accuracy can drop because of damage (see *System Damage*, page 145).

Damage Multiplier

The Damage Multiplier (DM) of a weapon is a rating of how devastating and destructive the weapon's attack is. The Damage Multipliers work on an exponential scale, not a linear one. A Damage Multiplier of x10 is more than twice as effective as a Damage Multiplier of x5: in fact, it is four times as effective.

Base Range

The Base Range (BR) of each weapon is listed on the sheet. The Base Range is equal to the Short Range of the weapon; the Medium, Long and Extreme ranges are equal to twice, four times and eight times the Base Range, respectively. All vehicular weapon ranges are listed in hexes.

Modern weapons are extremely powerful. They have theoretical ranges that often extend to many kilometers. Life, however, is not a firing range. Obscurement, the movements of both attacker and defender along with the limitations of targeting system all reduce the effective range of weapons. The Range Bands given represents the effective combat range.

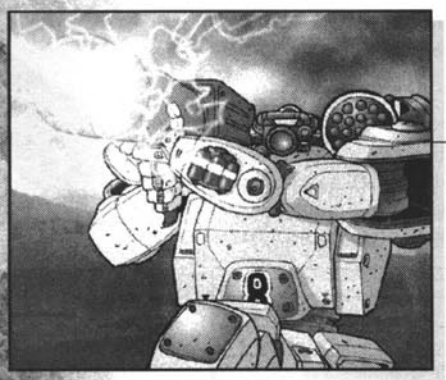
Rate of Fire

The Rate Of Fire (ROF) of a weapon is listed in its own column. A weapon with an ROF of 0 fires a single shot and is then reloaded; it expends one round of ammunition per attack. Weapons with ROF of 1 or more are rapid-loading and can fire many more shots during the same interval of time. They can lay down a hail of fire to saturate an area with firepower or hit more than one target at once, but expend considerable amounts of ammunition while doing so. Rapid-fire rules, along with various attack options, can be found on page 143.

Ammunition

The amount of ammunition loaded into a weapon is listed here. If a weapon's ammunition drops to zero, it is out of ammo and can no longer fire. A weapon with a high rate of fire will often be equipped with extra ammunition (and sometimes additional ammunition clips) to compensate for the quick expenditure of ammo in combat — but not always. Players should be careful of how much ammunition they spend in combat. It may be nice and efficient to walk your fire on several opponents at once, but it is also extremely costly in ammunition. Some attack types, such as physical attacks, do not expend ammunition.

Arc of Fire



Firing arcs determine whether or not a given weapon can be aimed at a target. The six standard arcs are listed in the table. The abbreviations in the table are the standard ones used to denote the various fire arcs on the vehicle sheets and throughout the rules. For a visual representation of the fire arcs, turn to page 136.

Abbreviations for Fire Arcs

F	forward (180 degrees)
Rt	right (180 degrees)
L	left (180 degrees)
Rr	rear (180 degrees)
FF	fixed forward (120 degrees, begin arc one hex ahead of vehicle)
T	turreted (360 degrees)

7.3 - THE COMBAT ROUND

A tactical game is subdivided into combat rounds that simulate approximately 30 seconds of real life events. Players get one (or more) action(s) during that round, which can be used to shoot, communicate important information or scan the area. While the fact that shooting once every thirty seconds may appear unrealistic to some Players, we must point out that Player Characters involved in tactical combat are only shooting when they get an opportunity. This is the same assumption which is made for personal combat (with its 6-second rounds). In a computer simulation, everything can be adjusted every thousandth of a second, so simultaneous combat and repetitive shooting are a possibility. For a pen-and-paper-and-miniatures-and-hex maps simulation, combat has to be broken down into "chunks" of time and distances in order to be manageable.

If Players truly want to have the opportunity to make several attacks during the round, they can still do so, but at a cost in acuracy since the crew will be trying to get more things done in the same amount of time and will thus be less careful. It is possible to declare several actions instead of just one for the round, but this will cause a penalty to each action.

During each combat round, the following four steps occur in order, except Step Zero, which only occurs at the beginning of the game.

Step Zero: Set-up Phase



A battle always begins with the Set-up Phase, which occurs only once. An overall commander must be chosen for each side, with a second in command. Their identities can remain secret, but must be noted down for future reference. If the commander becomes a casualty, he or she is replaced by the second in command. If both are put out of action, all future Leadership Skills are rolled at the Skill level of the next highest ranking soldier present (by default, at level 1), except during integrated roleplaying/tactical games. The Player Character with the highest Leadership Skill may choose to replace the commander if the latter becomes a casualty.

A Tactics Skill test is made by each side based upon the Skill level of the commander. Fumbles count as a die result of one. Reroll ties. The winner chooses which Player will begin placing his or her combat groups upon the map. Players should alternate, each placing one combat group at a time on the mapboard. After placing a unit, the Player must declare what speed (stationary, Combat, or Top Speed) it is moving at. Pre-designed scenarios should have clearly defined set-up locations for each faction. When not using pre-designed scenarios, the Players should agree on which mapboards to use and set up on the first three rows of hexes on opposite sides.

If, during the first round, a unit is attacked before it has been moved, it is treated as if it were moving at the maximum number of hexes possible for its speed, for the purpose of defense rolls.

The die result of the Tactics roll should be recorded by each Player. Each point represents one Tactical Command point that can be played at any time during the game. Command points represent an action reserve for unexpected situations; they are fully explained further on.

Step One: Declaration Phase

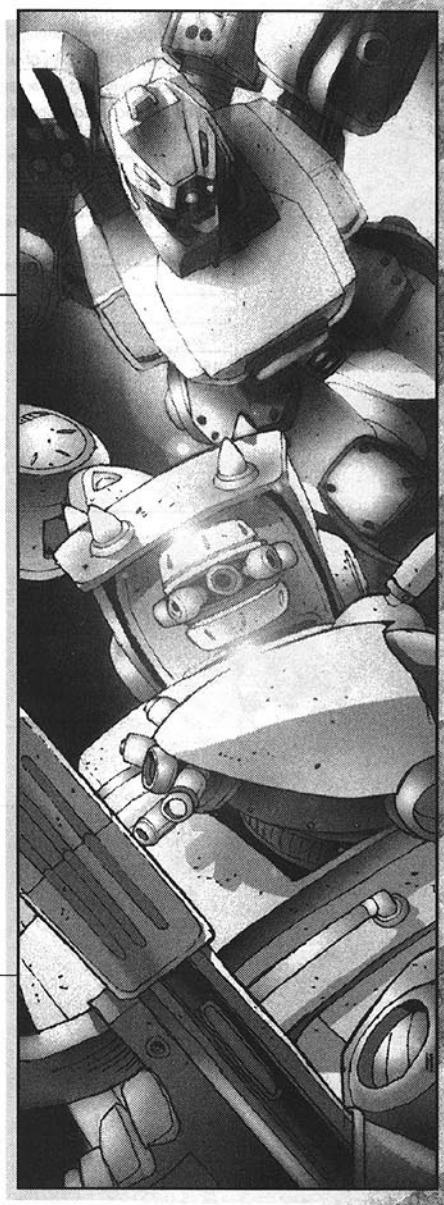
Both sides declare any extra actions and individual evasive maneuvers for the round. Use a counter or token to mark the unit(s) with extra actions, avoiding confusion during game play. This token can be placed either near the playing piece or on the record sheet, whichever the Player finds more suitable.

Step Two: Initiative Phase ◆

Initiative determines which side has the advantage during the present round of combat. Each side rolls an action test based on their commander's Leadership Skill. If only two machines are facing each other, the Piloting Skill is used instead of the Leadership Skill. The highest result wins. Draws are rerolled.

Record the MoS of the Initiative roll. The Winner receives a number of Initiative Command points equal to that MoS. The Loser receives no Initiative Command points this combat round, but may use Tactical Command points.

The side with the least number of combat groups decides which side will play first. If both sides have the same number of combat groups, the winner of the Leadership roll makes the decision.



◆ Step Three: Activation Phase

The side whose turn it is to play may move any or all units in one of their combat groups. Units that shift speeds (Combat to Top and vice-versa) must declare so immediately after movement. Actions, such as firing or activating a system, may be resolved at any time before, during or after the movement. Attack penalties are based on the unit's total movement; for example, if Half-Combat Speed is announced, the unit cannot spend more than half its Combat MPs.

Each unit moves and takes its actions before another unit is activated. If a unit does not move or act when its combat group is activated, it cannot do so at a later point in the round.

At any time during the activated unit's movement, any enemy unit may use one (or more) of its actions to fire or perform a task against the moving unit (and only against the moving unit). Attacks may be directed at any point along the moving unit's path, but the unit's full movement counts towards the Defense roll. The total MP allocation of the target is used to determine the defense speed modifier, even though the actual displacement may be shorter, because this is a hurried reaction for the attacker. The defender must spend at least one MP or end its movement before each of the attacker's actions if more than one action is used. Forward observers must always act before the firing unit(s).

Once every unit in the combat group has moved and acted (or forfeited its chance to do either), the other side activates one of his or her own combat groups, which may move and take action. This exchange goes back and forth until all groups have moved and acted.

A combat group may only move once per combat round. If one Player no longer has any combat groups left to use, the opponents activates their remaining combat groups one by one until they all have been moved.

◆ Step Four: Miscellaneous Events Phase

During this phase, any unusual events, such as long-range artillery and bombing attacks, are resolved. Basic rules are described for these are described in Chapter 8 (more detailed rules are described in the **Tactical Field Support** and **Tactical Air Support** sourcebooks). Initiative Command points go back to zero. Any action not spent at this point is lost.

Repeat steps 1 to 4 until the battle is resolved or pre-planned objectives are met. A combat group may only move once per combat round.

Command Points - 7.3.1

Command points represent the commander reacting to or anticipating the enemy's actions. There are two types of Command points. Tactical Command points are available throughout the game, but cannot be regained once spent. Initiative Command points are valid for one turn only, but are refreshed during each new Initiative roll. Other than this, there is no difference between the two. Two dice of different colors can be used to keep track of Command point totals.

Command points may be used by any unit with a functional Communication system. They can be used as an additional regular action, incurring no die penalty. One Command Point can be used to buy a +2 modifier to a single Defense roll (representing a warning shout). A Command Point can be used to activate a unit out of sequence — to get out of harm's way, for example. In the latter case, the unit must not have been activated (i.e., moved) previously, and it cannot be moved again when its combat group is activated (though it may act if it has any actions left). Finally, a Command Point may be used to turn a unit around by up to 180 degrees, even if it has been activated before (and thus has no MP left).

7.4 - NUMBER OF ACTIONS

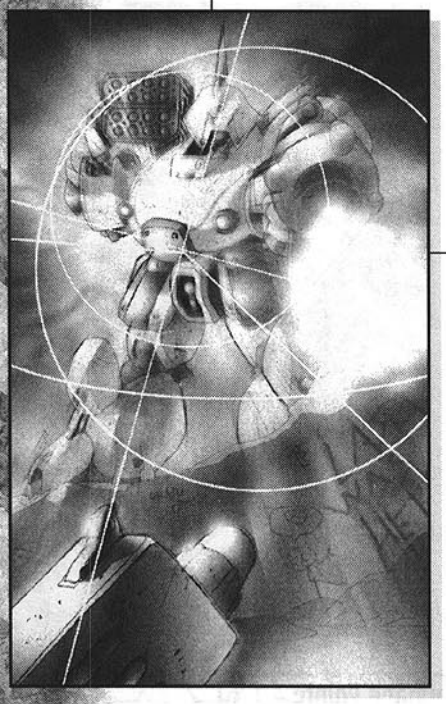
A vehicle's actions are limited by the total number of crewmen. All vehicles automatically get one action. Vehicles with two or more crewmen get additional actions at no cost. Some or all of these additional actions can be lost when crew casualties occur. The table below lists the lowest crew requirements required to obtain additional actions; the minimum crew requirement to gain more actions is doubled for each additional action.

Crew and Actions

Min. Crew Size	Additional Actions	Total Actions	Min. Crew Size	Additional Actions	Total Actions
1	0	1	32	5	6
2	1	2	64	6	7
4	2	3	128	7	8
8	3	4	256	8	9
16	4	5	512	9	10

A vehicle's crew can get more actions by penalizing all their action test rolls by one (1) for each additional action taken. For example, a single crewman could fire twice, with a -1 on both attacks, or three times with a -2 on all attacks. These additional actions must be declared at the beginning of a round, in Step One.

Action Examples



	Among possible combat actions
-	fire one weapon once
-	fire one set of linked weapons once
-	perform a single physical attack (ramming, kicking, punching, etc.)
-	activate an auxiliary system (ECM, active sensors, communication, etc.)
-	embark/disembark one crewman
-	embark/disembark a number of passengers equal to the Size of the vehicle

Number of Actions Examples

Example 1:	***A Hunter Gear has a crew of one person. This vehicle gets its one automatic action and no free additional actions. If the Hunter needed to perform three actions in a single turn (2 more than its normal allocation), it would receive a -2 penalty on all three actions.***
Example 2:	***A tank has a crew of four people. This vehicle gets its one automatic and two additional actions due to its crew complement, for a total of three actions per turn (without penalty). If the tank needed to perform more than three actions, it would suffer a -1 penalty on all actions per action beyond three. No benefit is gained from performing less than three actions.***
Example 3:	***If the tank's crew were injured and one crewmember was incapacitated, the vehicle would have an effective crew of 3, giving it only one additional action (instead of 2). The short-handed tank would now be able to perform up to 2 actions without penalty.***

7.5 - MOVEMENT AND TERRAIN

A vehicle can cross a certain number of areas based on its movement points (MPs). The vehicle record sheet contains the values for Combat Speed and Top Speed. Combat Speed allows a vehicle to engage in offensive actions unhindered. Top Speed is twice as fast as Combat Speed, but severely impairs offensive actions.

Speeds are listed in MPs and in kilometers per hour (kph). One MP equals movement across one clear mapboard hex or about 6 kph across clear terrain. Thus a vehicle with a Combat Speed of 70 kph has 12 MPs. At its Top Speed of 140 kph, it has 23 MPs.

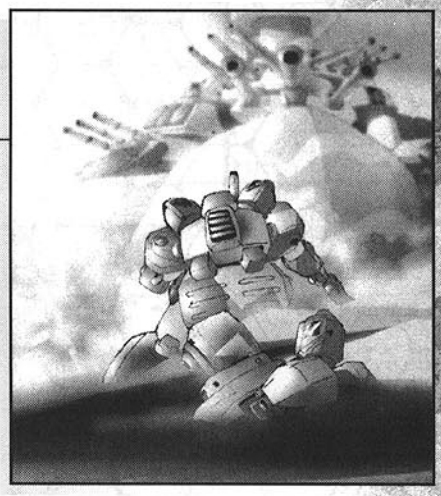
Every turn, each vehicle receives as many points as its current speed (Combat or Top).

Combat Speed - 7.5.1

A vehicle normally receives a number of movement points equal to its Combat Speed value. If the vehicle expends none of these movement points to move, it is considered stationary. Otherwise, the vehicle is said to be traveling at Combat Speed. Attacks can be made normally at this rate of movement. Vehicles moving at half their Combat Speed or less gain an additional +1 to their attack rolls due to the additional stability provided by lower speeds (see *Movement Modifiers*, page 138).

Reverse Movement ◆

A vehicle moving at up to half Combat Speed can opt to move backward instead of forward. Reverse movement is not possible at higher speeds. Half the Combat Speed means an extra +1 modifier to the attack roll for extra stability. This is particularly efficient when using several vehicles in a combat group that is retreating from the field: enemy units will think twice before attacking them.



◨ Speed Example

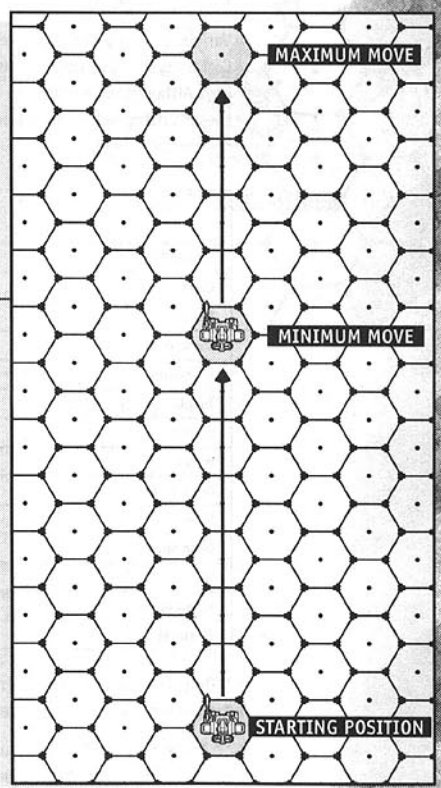
Example 1:	***A Hunter walking at Combat Speed receives four Movement Points, which may be spent for moving, turning or any combination thereof. If the pilot chooses not to spend any MPs, the Gear is considered to be stationary. It can still dodge attacks and adjust its facing by one hex side (see* Turning*, page 133) — but as long as no MPs are spent, it is stationary for game purposes.***
Example 2:	***The same Hunter is again moving at Combat Speed, this time with its Secondary Movement System (the wheels in its feet). The pilot receives 6 MPs, but needs only three to reach his desired firing position. Since he spent only half of his Combat Speed's Movement Point allocation, the Player can claim the +1 bonus to attack.***

Top Speed - 7.5.2

A vehicle that expends its full Combat Speed MPs can shift to Top Speed in the next round. This shift must be declared by the Player immediately after moving the unit. The vehicle is considered to be at Top Speed for attack and defense purposes for the rest of the combat round.

In subsequent combat rounds, the vehicle receives movement points equal to its Top Speed value. The vehicle must expend a number of movement points greater than its Combat Speed while moving at Top Speed. A vehicle may return to Combat Speed after any number of rounds of Top Speed movement. The Player declares the return to Combat Speed immediately after moving the unit.

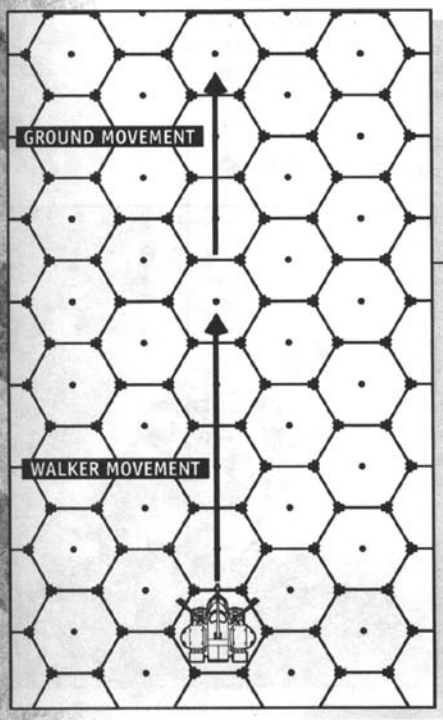
Players are advised to put chits or markers of some sort on the vehicles moving at Top Speed. This helps to prevent disputes over the speed at which a vehicle is moving.



◨ Speed Examples

Example 1:	***A Hunter Gear is rolling at Combat Speed (6 MPs). It may spend anywhere between 0 and 6 MPs. If it spends zero, it is considered to have stopped moving and is immobile. If it spends the full 6 MPs, it has the option to shift to Top Speed. The Hunter's Player opts to do this and declares the speed shift immediately after moving the Hunter. To making record keeping easy, the Player puts down a "Top Speed" marker beside his or her unit counter on the mapboard (a penny could be used).***
Example 2:	***On the next turn, the Player has the Hunter's full Top Speed movement points available to him (12 MPs). He must spend at least 7 MPs (one greater than his Combat Speed). After a few turns of zipping about, the Player realizes that it is very difficult to shoot accurately from a Hunter at Top Speed and decides to shift back down to Combat Speed. After moving the Hunter, he declares that he is returning to Combat Speed on the next turn and removes the "Top Speed" counter (or penny or whatnot).***

7.5.3 - Multiple Movement Systems



Vehicles with multiple movement systems, such as walking and rolling, are able to switch modes during combat. A vehicle may only switch modes while at Combat Speed, not at Top Speed. During the switching round, the initial movement mode is used to determine the available MPs. The vehicle expends MPs as its original movement mode until the switch is declared. The remaining MPs are expended at the terrain cost of the new movement mode. If the vehicle has already spent more MPs in movement than it would have in the system it switches to, then it stops moving after the switch.

A vehicle with multiple movement systems may only switch modes once per round. This option must be announced during the movement phase.

Movement System Examples

Example 1:	*The pilot of a walking Naga strider wishes to switch to SMS (roller wheels). The strider has 7 (Walking) movement points at Combat Speed. The Player expends 4 MPs on walking and then declares that the strider is switching to SMS. 3 MPs remain to be used for wheeled Ground movement.*
Example 2:	*An Iguana pilot is currently moving at Combat Speed with his Ground Secondary Movement System (7 MPs). After moving 6 hexes, he decides to switch to Walker mode. His Walker Combat Speed is 5 MPs. With no MPs left, his movement ends.*
Example 3:	*An amphibious jeep nearby attempts to cross a 100-meter wide river which is two Rough hex away. The jeep has a Combat Speed of 8 Ground MPs and 6 Naval MPs. It uses 4 MPs to get to the river, then switches to water movement. It can then only use 4 MPs of Naval movement (8 - 4 = 4), crossing half the river. The remaining MPs are lost.*

7.5.4 - Terrain Effects

Various terrain types negatively affect locomotion methods. The following chart lists the MP cost to traverse different types of terrain. Certain types of terrain also reduce visibility. This is represented by the Obscurement of the terrain (Obscurement will be explained later on). Although no vehicles in this rulebook have a hover mode, they do exist in the universe of **Heavy Gear** and the terrain costs for these is listed below. They tend to be rare, however, and maintenance intensive (compared to Gears and tanks), so they aren't common on the battlefield.

Terrain Costs

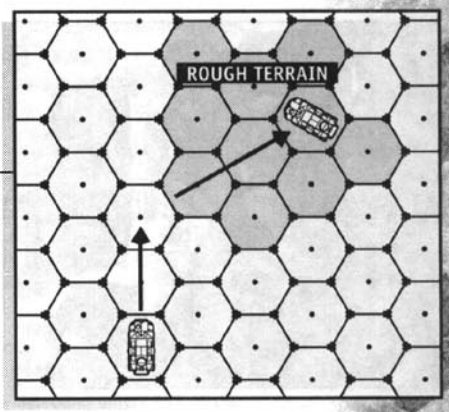
Terrain Type	Walker	Ground	Hover	Obscurement
Clear	1	1	1	-
Rough	1	2	1	-
Sand, Dust	2	2	1	-
Woodland	1	2	2	1
Jungle	2	3	n/a	2
Swamp	3	4	1	1
Water	2*	3*	1	**
Deep Water	2*	3*	1	**
Snow	2	2	1	-
Deep Snow	3	4	1	1
Ice	2	3	1	-
+1 elevation	add 2	add 2	add 4	-
-1 elevation	add 1	-	-	-

* Only Amphibious vehicles may enter these hexes. Other vehicles will flood and automatically be put out of action. In addition, Amphibious vehicles cannot enter or exit this type of hex while moving at Top Speed.

** These only produces Obscurement if the defender is in the hex and is not a Hover vehicle. In this case, Water produces 2 points of Obscurement, Deep Water 4 points.

Dots and Hexes

The dot in the center of each hex on the mapboards is there to help you determine what the terrain type of the hex is. The terrain of the hex is whatever mapboard feature the dot is on top of. So, if a little bit of the drawing representing broken terrain spills over into a primarily clear hex, the dot will be on clear terrain, indicating that the terrain type is clear. If one or more terrain elevation contour lines cross through a hex, the elevation level of the hex is the elevation level the dot resides in.



Movement & Terrain Example

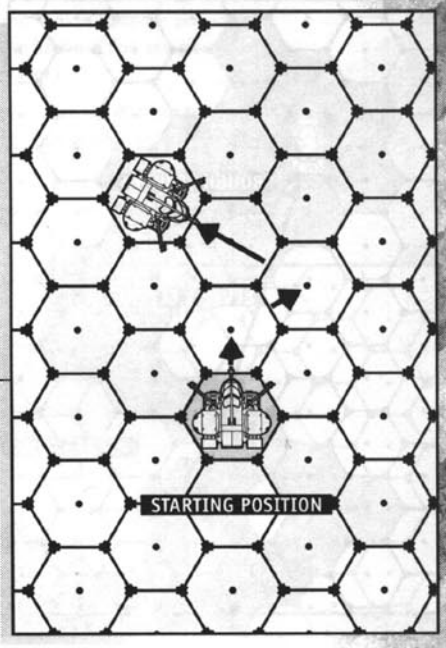
Example:	***An APC (ground vehicle) is moving at Combat Speed (10 MPs). It begins in a Clear hex. It travels forward two hexes across Clear terrain (expending 2 MPs) and then turns one hex-facing clockwise (expending 0 MPs). The APC then moves forward 3 hexes across Rough terrain (expending 6 MPs), turns two hex facings counterclockwise (expending 1 MP), and ends its movement. The remaining 1 MP is wasted and does not carry over to the next round.***

Turning - 7.5.5

A vehicle spends zero movement points to turn a single hex facing (60 degrees). Turning two or more hex facings (120 degrees) costs one movement point. Thus, single hex turn is free, while anything up to 360 degrees (full spin) is 1 point.

Any vehicle that turns more than two hex facings (180+ degrees) while moving at Top Speed requires a Piloting Skill roll versus a Threshold of 3 plus the terrain MP cost (this does not count as an action). If the roll succeeds or is a draw, the turn occurs without complications. If the roll fails, the vehicle skids forward 1 hex before taking the turn (if something is already in the hex, consider it a ramming attempt). If the roll Fumbles, the vehicle crashes. This ends the vehicle's movement, even if it has MPs left to spend. If a vehicle crashes, roll one die and assign either a Light (1 to 3) or Heavy (4 to 6) damage effect, depending upon the number rolled (see *Damage*, page 145).

Multiple turns can be performed along a vehicle's movement. Each turn must be followed by at least one hex of forward movement before another turn can be performed.



Turning Example

Example:	***A running Naga at Top Speed has 7 MPs and is moving on Clear ground. It expends 1 MP to move forward 1 hex. It turns one hex facing to the right at no MP cost. Next, it spends 1 MP to move forward another hex, then turns two hex facings to the left at a cost of 1 MP. It then move forward by 2 hexes for 2 MPs. It then attempts to turn 180 degrees. The driver has a Piloting Skill of 2. The Threshold is (3 + 1 =) 4. He rolls a 5 (7 modified by the Naga's -2 Maneuver) and can now spend the last Movement Point.***

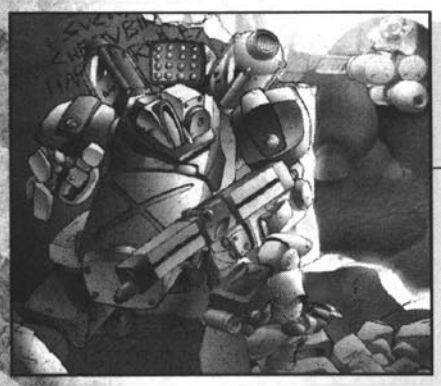
Stacking - 7.5.6

The term "stacking" refers to how many units can reside in a single mapboard hex. While the standard hexes are 50 meters wide, a certain security margin must be observed during the chaos of combat less accidents happen. For this reason, the number of units allowed in a single hex is limited by stacking.

Each 50-meter hex can take up to a total of 30 Size points worth of vehicle and other units. The Size of each vehicle is always noted in its description. Five or less infantrymen count as the equivalent of a Size 3 vehicle for stacking purposes (an entire squad of ten would thus take up six points). Range is measured from the attacker's closest target's hex: if combat occurs between units in the same hex, the range is considered to be Point Blank (0).

If a vehicle is bigger than Size 30, it will occupy more than one hex; for example, a Size 61 vehicle will occupy three hexes (61 ÷ 30 = 2.034, rounded up to 3). The number of Size points assigned to each hex is decided at the time of construction. For example, the USS Nimitz, a 20th century aircraft carrier, weighs 91,400 tons (Size 150) and is 332 meters long by 40 meters large. It would thus occupy 7 hexes, or around 22 Size points per hex.

7.6 - LINE OF SIGHT & OBSCUREMENT

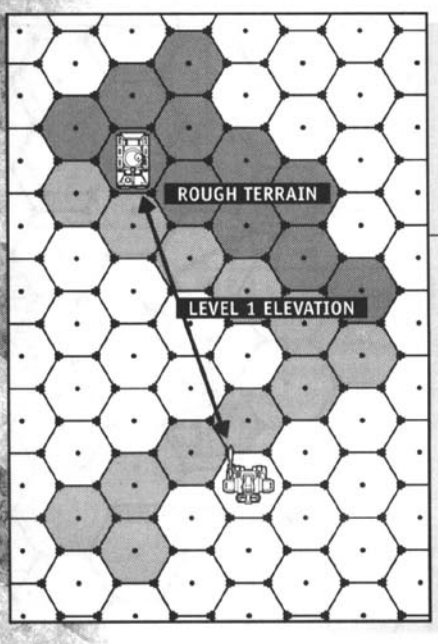


It is a requirement for a unit to "see" its target to fire. The ability to detect and target an opposing unit is called, for simplicity, having a Line of Sight (LOS). This does not necessarily implies that the target is within human visual sight, merely that it can be acquired and locked on by the sensors and fire control computers available to the detecting unit. Units are considered to have a LOS to their target unless one of the following conditions exist.

Blocked Line of Sight

•	The target is beyond the detecting unit's Sensor range.
•	Any terrain between the two units is one or more elevation levels higher than both the units.
•	Either unit is within the dead zone of an intervening elevation level. A unit is within a dead zone if it is adjacent to an interceding elevation increase.
•	The Concealment value between the vehicle and the target is greater than the vehicle's Detection rating (see page 135).

7.6.1 - Concealment

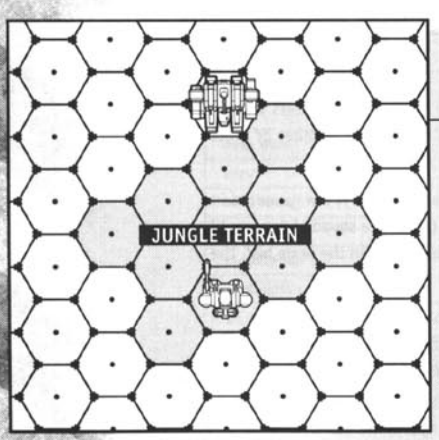


The Concealment value is equal to the Obscurement score of all terrain directly between the two units plus the Obscurement score of the terrain the defender is in. If one of the two vehicles is on a higher elevation level than the other, only the terrain at the higher elevation level and the terrain of the defender's hex are counted for concealment purposes.

The Terrain Effect table below indicates the Obscurement values for each type of terrain. In addition to making a target more difficult to detect, Obscurement cause penalties that are applied to the attacker's roll in combat.

Terrain Effect

Terrain Type	Obscurement
Clear	-
Rough	-
Sand, Dust	-
Woodland	1
Jungle	2
Swamp	1
Water	*
Deep Water	*
Snow	-
Deep Snow	1
Ice	-
Elevation	-



* These hexes only produces Obscurement if the defender is in the hex and is not a Hover, Naval or Amphibious vehicle. In this case, they produce 2 points of Obscurement, 4 for Deep Hexes.

Line of Sight Examples

Example 1:	*If either unit is in a dead zone, line of sight is obscured. Gear Beta is within range of an enemy APC (6 hexes) but both units are just behind ridges. The APC is hidden and cannot be fired upon.*
Example 2:	*A target can also be concealed through terrain Obscurement. Gear Alpha is faced with a Mammoth strider and has taken shelter in jungle vegetation. Two Jungle hexes (Obscurement of 2 each) intervene in addition to the Jungle hex the Jäger is in, for a total Concealment value of 6. This is greater than the Mammoth's Detection score of 4, so Alpha remains hidden.*

Detection Rating - 7.6.2

Sensors and crewmen are always on the lookout for enemy units. Every vehicle has a passive Detection Rating: this value is used to calculate whether a unit can gain line of sight to its target. All units, including infantry, get a Base Detection rating of 4 in daylight (2 at night) from unassisted vision. The vehicle's Sensor rating is added to its crew's Electronic Warfare Skill level to produce the vehicle's passive sensor value. The highest value between this and the Base Detection is the vehicle's final Detection rating. Unassisted vision has a range of 1 kilometer; if sensors are available, their range is used instead.

Active Sensor LOS - 7.6.3

Most of the 62nd century combat vehicles carry sophisticated sensor suites to locate enemy units lurking nearby: radar, motion detectors, IR and UV cameras, etc. By performing an active sensor sweep, these systems can be used to obtain a combat lock-on on an enemy unit even when visual or passive sensor LOS is blocked.

An Electronic Warfare Skill test is rolled, modified by the vehicle's Sensor rating. The Threshold number is equal to the target's Concealment value, minus the defender movement's penalty (see table) and minus one for every weapon the defender fired. The rating of any stealth systems possessed by the defender is added to the target number. A success gives the detecting unit a LOS to the defender. A draw, failure, of fumble does not grant LOS. Vehicles with no sensors cannot perform an Active Sensor detection. Active Sensor sweeps, unlike passive or visual detection, require a full action to complete.

The range of the sensor and communication system can be augmented by increasing power. This gives a much larger sensor signature and greatly increase the chances of detection, however. The listed range is the base range in which the vehicle's passive sensors operates. Using active sensors in that range gives no penalty. Each doubling of the range requires an Active Sensor action and gives a -1 modifier to the sensor roll, in addition to making the vehicle easier to detect (+2 per doubling of the range).

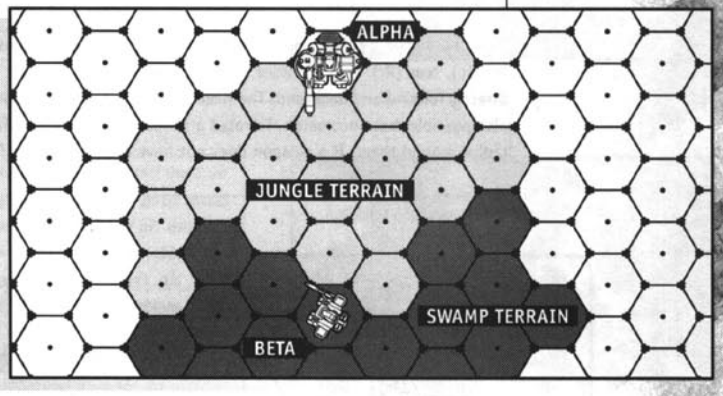
On a planetary surface, unless using a relay station or friendly vehicle as a spotter, the maximum range is equal to the distance to the horizon. This distance will increase if the unit is placed on a high vantage point, such as a mountain or other high ground, and decrease if the vehicle is on low ground (valley, canyon).

Detection Threshold Modifiers

APPLIED TO ATTACKER'S ROLL	
Sensor Bonus	variable, by default 0
Range Modifier	-1 per extra range band
Target Sensor Profile	variable, by default 0
Target Sensor Signature*	+2 per extra range band used by target
APPLIED TO DEFENDER'S CONCEALMENT THRESHOLD	
Stealth Bonus	variable, by default 0
Ground Movement Penalty	-1 per hex moved by target
Air Movement Penalty	-1 per five Air War hexes** moved by target
Combat Penalty	-1 per weapon fired by target

*Applicable only if target used Active Sensors this combat round.

**See Tactical Air Support sourcebook for aircraft rules.



Active Sensor Example

Example 1:	*Gear Alpha cannot normally detect Gear Beta, since the total Obscurement value of the hexes between the two machines is greater than the Detection Rating of Alpha (which is 4). Three Jungle hexes intervene between the two and Beta is in a Swamp hex. This produces a Concealment value of (2+2+2+1=) 7. Alpha's unit leader, however, is expecting trouble and orders the Gear to do an active sensor sweep to try to lock-on to the faint readings from Beta's direction. The Concealment value of 7 is the base Threshold for Alpha's sensor Skill test.*
Example 2:	*Beta last moved two hexes. This reduces the Threshold by 2 points, down to 5. Beta did not fire any weapons this round. To add to Alpha's difficulties, Gear Beta is an experimental combat model with the Stealth Perk at a rating of 3. This is added to the Threshold, producing a final Threshold of 8.*
Example 3:	*Alpha's Sensors are rated at +1. Alpha's pilot spends an action and rolls his EW Skill test, obtaining a 6. He adds his Sensor rating (+1) to the roll and obtains a final score of 7. This is not enough to detect Beta — Alpha needed to get a higher score (9 or better) than the Threshold of 8 to detect the enemy Gear.*

7.6.4 - ECM and ECCM effects

Electronic Countermeasures and Electronic Counter Countermeasures (see page 191) are used to affect communication and sensor transmissions. ECM and ECCM Thresholds (Electronic Warfare Skill + rating) are rolled immediately after the action is spent to activate these systems, but their effect is not felt until the beginning of the next round.

If ECM is active and functional during the initiative phase, all Sensor and Communication rolls for the round are affected and must beat the ECM Threshold. The unit which is using either of these systems is the one testing, not the receiver. Transferring Command points requires a Communication test from the commanding unit (if an infantry squad, use Infantry Skill with Comm 0). ECM affects all enemy units within the emitter's Sensor range.

If ECCM is active during the initiative phase of the turn, all active ECM systems within the Sensor range of the ECCM unit must compare their own Threshold to the ECCM's Threshold (or Thresholds, if there are more than one ECCM system active). If the ECCM Threshold is equal or higher than the ECM's Threshold, the ECM has no effect that turn.

The ECM unit may spend an action during the turn to try and increase its own Threshold in order to beat the ECCM in the next round. Likewise, the ECCM unit may spend an action to try to raise its own Threshold for the next round. The new result stands, even if it is lower than the previous one. Friendly ECM units are not affected by their side's ECCM.

7.6.5 - Stealth Effects

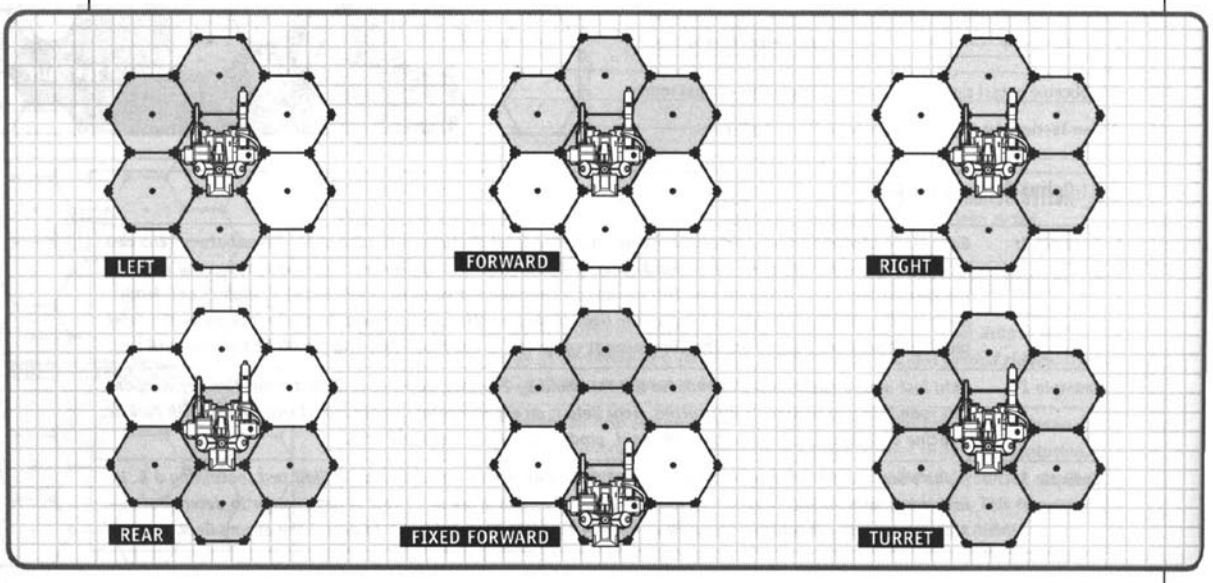
During daytime, the rating of a Stealth system is added to the Concealment total only when there is Obscurement between the attacker and the defender — Stealth does not confer invisibility. Stealth systems are always added to the defender's Concealment at night, since most stealth vehicles are painted in dark shades and feature silent running drive trains, making it hard to locate them with human senses and sensors alike.

Stealth aircraft are designed to escape long range sensors. In addition, they don't cause as much of a visual disturbance as a ground stealth unit would cause on the ground (no bushes to push around, for example). Flying Stealth units apply a -1 modifier for every five (5) Air War hexes traveled instead of the usual movement modifier.

7.6.6 - Firing Arcs

Vehicles may only target opponents that are within their weapons' firing arcs. There are six common firing arcs: forward (F), right (Rt), left (L), rear (Rr), fixed forward (FF) and turreted (T). The first four are 180-degree arcs on their respective sides. Side arcs include directly forward and backward. The fixed forward arc is a 120-degree arc on a vehicle's front facing. Note that side or rear fixed arcs are also possible, but uncommon. Turreted arcs span 360 degrees. Infantry do not have firing arcs and may attack anything in a 360-degree radius around them. If a weapon does not have a clearly stated firing arc, the default arc is the forward arc.

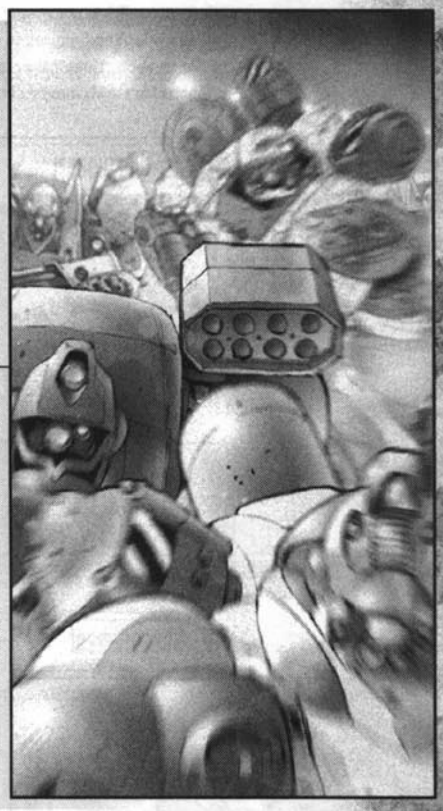
Firing Arcs Diagrams



ATTACKS - 7.7

If a unit has a LOS to a target within its weapon's firing arc and range, it can attack that unit. When an attack occurs, an opposed Skill test is required to determine the success of the attack. The attacker uses his unit's Gunnery Skill and the defender uses his unit's Piloting Skill to make the roll. If the attacker wins the Skill test, the attack succeeds. If the defender wins or if a draw occurs, the attack misses. The following table contains a list of the modifiers to both rolls; they are explained further in the text.

Unless the gunner is a remarkable marksman or the range is fairly close, many attacks should miss. This is quite normal — most of the firepower expended is aimed at forcing the enemy to keep his head down and go in the direction required by the attacker's battleplan. Indeed, since even the most unprobable shot has a chance of succeeding (through a fumble of the target), the enemy must minimize exposure to all attacks whenever possible. There are often ways of winning the battle other than the complete destruction of the opponent.

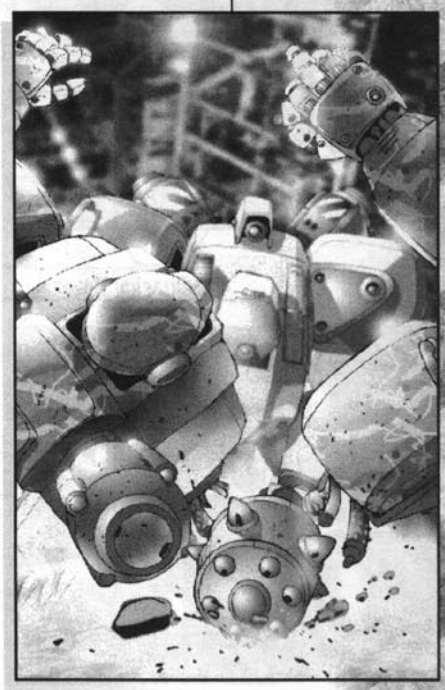


Attack And Defense Modifiers

Attack Roll Modifiers:	
-	Targeting System Rating
-	Weapon Accuracy Rating
-	Range Modifier
-	Attacker "Speed" Modifier
-	Obscurement Penalty
Defense Roll Modifiers:	
-	Maneuver Rating
-	Defender Movement Modifier
-	Arc of Attack Modifier
Possible Outcomes:	
If Attackers total is above Defender's	HIT
If Attacker's total is equal to or below Defender's	MISS

Attack Example

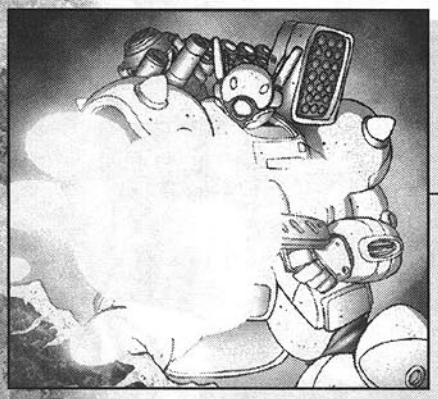
Example 1:	***Gear Alpha shoots at Gear Beta. Alpha moved at Combat Speed and used up all his MPs (+0). His targeting system and weapon accuracy are both rated at +0. He is attacking within the "short" range band (2 hexes) of his weapon (+0). There is no obscuring terrain. Alpha's pilot rolls his Gunnery Skill roll and obtains a total of 6. Since Alpha's modifiers total up to +0, his final attack roll is 6. Beta must now play his defense roll. On his last move, Beta traveled 7 hexes (+1). Beta's Maneuver rating is +1. Alpha's attack occurs in Beta's forward defense arc (+0). Beta's pilot rolls his Piloting Skill test and obtains a score of 5. This is modified by the situation bonuses to yield a final total of 7. Since 7 is definitely greater than or equal to 6, Beta avoids Alpha's attack.***
Example 2:	***Later, Gear Alpha is again shooting at Gear Beta. Alpha moved at Top Speed (-3). His targeting system was damaged during the battle and Alpha now receives a -1 to all attacks. He is 5 hexes away from Beta, and is therefore at Long range with his weapon (-2). In addition, two hexes of Woodlands terrain (Obscurement 1 each) lay between the two (-2). Alpha rolls his Gunnery Skill test and obtains the remarkable roll of 10. Unfortunately, after the total -8 penalty is applied, the final total is only 2. Beta attempts to avoid this attack. On his last move, Beta only traveled 2 hexes (-2). In addition, Alpha now lies in Beta's rear defense arc (-2). Fortunately, Beta still has his good Maneuver (+1). Beta rolls his Piloting Skill test and obtain a lowly 3. After the situation modifiers are applied, this is reduced to a final total of 0. Since Alpha's total of 2 is greater than Beta's total of 0, Alpha has successfully attacked Beta with a Margin of Success of 2.***



7.7.1 - Attacker Modifiers

Life is not a firing range, and combat is always harder under certain conditions, easier under others. Modifiers resolve this by introducing penalties and bonuses to each and every combat roll. Apart from the quality of the vehicle's Fire Control computer and the accuracy of the weapon, three other factors apply: the range to the target, the obscurement (or cover) between the attacker and defender and the attacker's own movement.

◆ Range

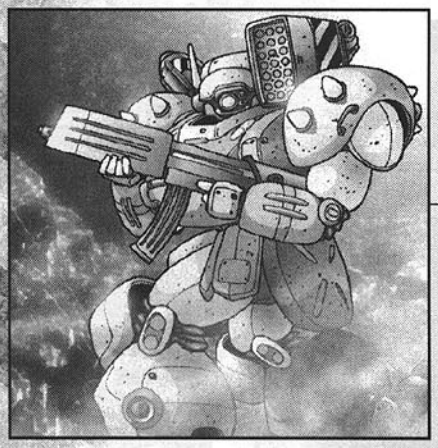


Every ranged weapon is rated by a value known as its Base Range. The Base Range is further expanded into four Range Bands, each one doubling the maximum distance of the preceding band. The further away the target, the harder it is to hit and damage it. Although there is no theoretical limit on certain weapons' ranges, such as lasers and particle accelerators, the ranges given are practical combat ranges that take into account both the increased difficulty of aiming and the loss of energy caused by distance. Point Blank is the range band for attacks that occur within the same map hex.

Range Modifiers

Point Blank	Special range (same hex)	+1
Short	(from 1 hex to base range)	0
Medium	(from previous to two (2) times base range)	-1
Long	(from previous to four (4) times base range)	-2
Extreme	(from previous to eight (8) times base range)	-3

◆ Obscurement



Various terrain types, such as swamped and wooded areas, obscure a target and make it difficult to hit. The Concealment value of the defender (see *Line of Sight*, page 134) is subtracted from the attacker's roll to represent both the lack of accuracy and the damage absorption caused by the intervening cover.

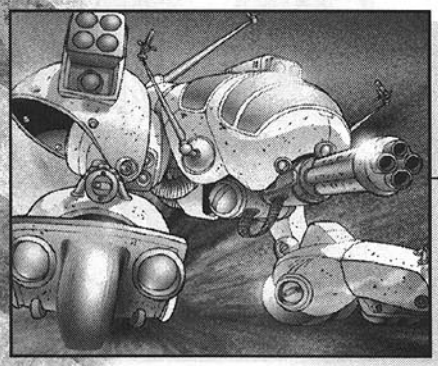
Indirect fire is an exception to this. Since the attack is arcing through the air above the intervening terrain, some of the Obscurement may be ignored (see *Indirect Fire*, page 142).

Obscurement Modifiers

Swamp	1
Woodlands	1
Jungle	2
Water	2*

* Only produces Obscurement in the defender's hex and only if defender is not a Hover, Naval or Amphibious vehicle.

◆ Attacker Movement



A moving gun platform has a higher chance of missing than a stationary one. Conversely, a unit that is moving slowly generally have less trouble keeping their weapons trained on a target. Stationary attackers (i.e., that have spent no MP) are the best firing platform.

Since the penalty for moving slowly are higher than the attack benefits gained, Players must be careful to place their slow-moving units in a position where return fire is least likely.

Movement Modifiers

Stationary	+2
Half Combat Speed or less	+1
Combat Speed	+0
Top Speed	-3

Defender Modifiers - 7.7.2

Targets rely on the following modifiers to help them avoid shots. In general, the only defense of large and ungainly vehicles is their speed, as their poor Maneuver rating will often severely hamper their defense. Attacks coming from the rear are also much more dangerous than attacks from the front, both because the armor is thinner there and because the crew's attention is much more focused on the front arc.

Maneuver Value ◆

Each vehicle has a set maneuver value by design. Negative maneuver values are for slow ponderous vehicles like battleships and large tanks. Positive maneuver values are for fast and agile vehicles like motorcycles, combat helicopters and Gears.

Target Speed ◆

An enemy platform's speed affects how easy it is to hit. Speed modifiers are determined according to the following ever-increasing scale. If the target has yet to move in the round, its last recorded movement is used to determine its modifier. On the first round of combat, assume that the vehicle has moved the maximum number of hexes for its current speed in its current terrain.

Target Speed Modifiers

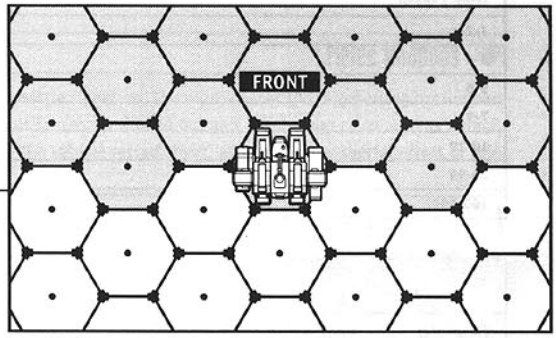
Hexes Moved	Defense Modifier
0	-3
1-2	-2
3-4	-1
5-6	+0
7-9	+1
10-19	+2
20-99	+3
100-999	+4

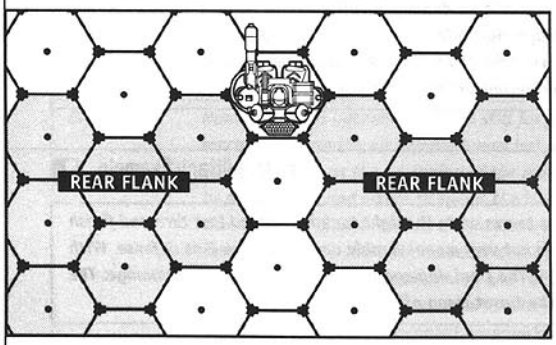
Defense Arc ◆

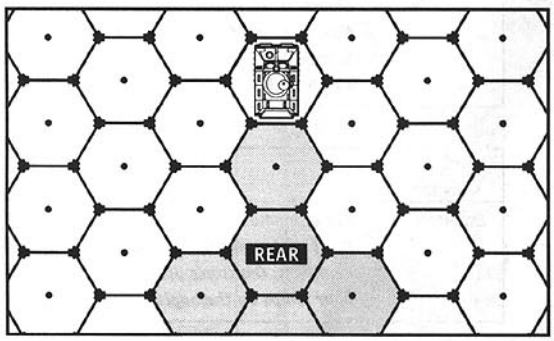
The defender's orientation, when attacked, can reduce his chances of successfully escaping the attack, either because of inattention or thinner armor. Most combat vehicles carry less armor on their back than on the front, due to unavoidable engineering concerns. More importantly, however, pilots cannot dodge attacks they cannot see coming.

Defense Arc Modifiers

If attack is in the defender's Front	0
If attack is from defender's Rear Flank	-1
If attack is from defender's Rear	-2







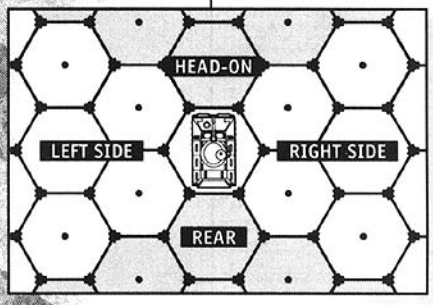
7.7.3 - Physical Attacks

There are few vehicles that can make effective physical attacks. Ground vehicles are capable of ramming, but few commanders exercise the option. With humanoid Heavy Gears, the old-fashioned close-in attacks have become common. Ramming, punching, kicking, stomping and all manner of melee weapons are being used on the battlefield when ammo runs out. All physical attacks use the attacker's Piloting Skill instead of his or her Gunnery Skill, except when a melee weapon is used.

◆ Ramming

Impact at high speeds can be devastating. Frontal collisions are almost always deadly, while impacts from either side or from the rear are slightly less dangerous. Ramming is a standard Opposed Skill roll. Unlike other attack forms, ramming inflicts damage on both the attacker and the defender.

When checking for ramming damage, impact speed is first determined based upon the direction of the incoming ram. Head on collisions add the speeds of the attacker and defender. Side impacts take the attacker's speed, and rear collisions take the difference between the two speeds.



Ramming

Ramming Direction	Impact Speed
Head On	Attacker Speed + Defender Speed
Side	Attacker Speed
Rear	Attacker Speed - Defender Speed

Once the impact speed has been established, a damage modifier is determined using the Impact Speed Table (below). This damage modifier is added to the Size of each vehicle involved in the collision to determine its actual Damage Multiplier. Each vehicle will take an amount of damage equal to the Margin of Success of the Attack multiplied by its opponent's Impact Damage Multiplier (see *Damage*, page 145). The larger the unit, the more damage it will inflict on the other unit involved in the collision.

Impact Speed Modifiers

Impact Speed	Damage Modifier
1-2	-2
3-4	-1
5-6	+0
7-9	+1
10-19	+2
20-99	+3
100-999	+4

Ramming Example

Example: *Gear Alpha (Size 6) rams tank Beta (Size 12) in the side. Alpha traveled 8 hexes that round. Beta had last moved 7 hexes. Since this is a side impact, the impact speed is equal to the attacker's movement, or 8. A quick glance at the Impact Speed Table shows this to produce a +1 damage modifier. Thus, Alpha's impact Damage Multiplier is (6 +1 =) 7 and Beta's impact Damage Multiplier is (12 +1 =) 13. If Alpha has a Margin of Success of 2 for the ramming attack, then Alpha will take (13 x 2 =) 26 in damage and Beta will take (7 x 2 =) 14 in damage. Maybe Gear Alpha's pilot should reconsider this course of action!*

Physical Attack Example

Example: *Out of ammunition, Gear Omicron (Size 6) decides to run up to the light tank it disabled last turn and finish it off with a well-placed kick. The damaged tank is not very maneuverable and rolls a low 2 as defense. With modifiers, Omicron's pilot rolls a 6, for a MoS of 4. The final damage is (4 x 6 =) 24 points of damage. The Gear jumps on the hapless tank's hull and kicks the turret clean off.*

Punching

An arm or an equivalent appendage is required to punch. The Gears are the most common punching vehicles, but construction machines equipped with hydraulic arms can achieve a similar effect if the latter are sturdy enough to withstand the impact (this is noted in the Perk's description on the vehicle sheet). Punch attacks require a Gunnery Skill roll (modified by the Fire Control rating) versus the defender's own Piloting (or Infantry Skill, if attacking infantry units).The Damage Multiplier of a vehicle's punch is normally equal to the rating of the punching arm, but the pilot may elect to "pull" the punch to lower the DM and thus reduce the damage.

Kicking and Stomping

Kicking other vehicles and stomping infantry squads are both valid attacks for a Walker vehicle. Kick attacks require a Piloting Skill roll (modified by the Maneuver rating) versus the defender's own Piloting (or Infantry Skill, if attacking infantry units). If successful, the Margin of Success is worked out and the damage calculated as normal. The Damage Multiplier of a kick is equal to the Size of the vehicle. If the vehicle is capable of putting its full weight upon the target, the damage is doubled.

Throwing

Throwing is the attack used to hurl items, such as rocks or grenades. At least one arm is required for throwing. Battle and Tool Arms may not be used to throw objects, unless they have been specifically designed to do so. They may not be used for another function, and the Battle Arm cannot pick up the projectile by itself.

The base throwing range (in meters) of the arm is equal to twice its rating. This total is reduced by the Size of the object being thrown, which is subtracted from the throwing arm's rating before doubling it. If the object being thrown is larger than half the Size of the throwing vehicle, half the rating of another arm can be added to the effort. Weapons' Sizes are equal to their Minimum Size requirement minus one.

The base range calculated above is doubled for each additional range band, as for any other weapon. When playing on a hex board, both the attacker and defender are considered to be in the middle of their respective hexes when determining the range.

When an object is thrown, a Gunnery Skill roll, modified as normal for range and movement, is made. If the modified die roll is equal or higher than the defense roll, the object thrown lands right on target. If the dice roll is failed, the shot will deviate from its intended destination by a number of meters equal to twice the Margin of Failure. One die is rolled for the direction of the deviation. When using hexes, the deviated projectile is placed in the nearest possible hex, considering the target point as the center of the target hex.

If the attack roll was Fumbled, the shot deviates as normal, but toward the throwing unit. Sometimes, a Fumble will land a projectile right on top of another unit anyway. The attack is resolved as normal if the defense roll of the new target is failed.

Melee Weapons

Much like punching, attacking with various handheld weapons is a Gear battle signature. The pilot attacks the target using his Gunnery Skill, applying the Fire Control as a modifier. If successful, the Margin of Success is worked out and the damage calculated as normal. A melee weapon's Damage Multiplier is listed in the Weapon section of the vehicle record sheet, along with any special effect or rule.

Evasive Maneuvers - 7.7.4

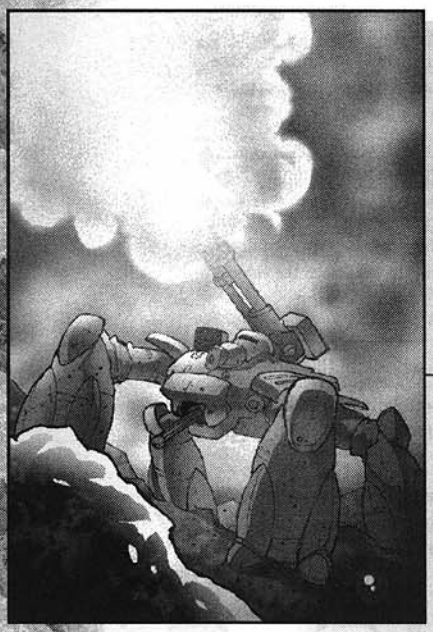
Evasive maneuvers allow the pilot to avoid incoming attacks. An evasive maneuver counts as an action and MUST be declared at the beginning of the combat round (units may not "abort" to evasive maneuvers later in the round). Performing evasive actions adds a +3 bonus to all defense rolls for the combat round, but forbids the vehicle from attacking or performing ANY other action that round. Multiple "evasive actions" cannot be performed to accumulate defensive bonuses.



Evasive Maneuvers Example

Example: ***Hunter Alpha is outnumbered and still far from safety. The pilot would very much like to use the +3 defense bonus but cannot, since he has not declared evasive actions at the beginning of the round. In the next round, he decides to play it safe and elects to spend the round dodging madly: the pilot declares evasive maneuvers. As the Hunter weaves around, enemy attacks miss repeatedly until the pilot fumbles one of his defense rolls, negating his bonus. He still manages to survive and reach some woods, where he spots a juicy target for the artillery. Unfortunately, the poor pilot is so busy throwing his machine about he cannot communicate the information back to base!***

7.7.5 - Called Shots



A gunner may elect to perform a called shot versus a specific component of a vehicle. Possible targets are Fire Control, Structure, Crew Compartments, Movement Systems, and Auxiliary Systems. These locations are represented by 1 to 5 on the Systems Damage Table (see *Damage*, page 145). Called shots take a -1 modifier on their attack. If the called shot hits, the odds of hitting the specific component are increased (see *Damage*, page 145).

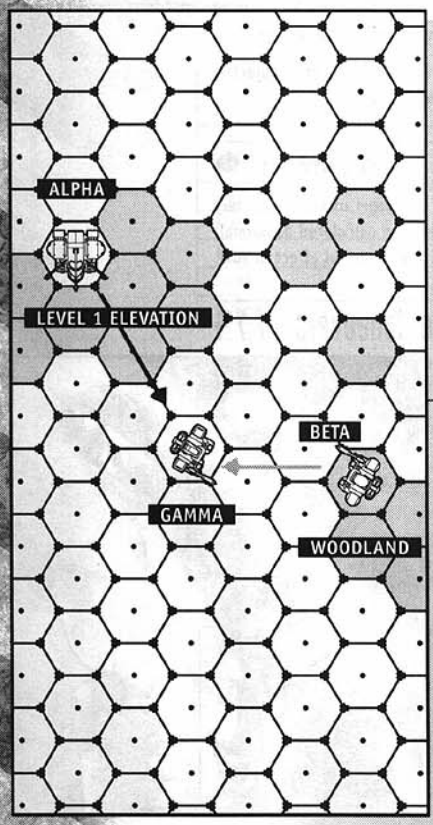
High precision shots versus tiny targets (headlights, for example) are possible. The shot must be aimed and a Margin of Success of at least 3 is required to hit. If the MoS is lower then 3 but above 0, the attack hits the targeted location but not the tiny target.

Called shots, being less likely to hit than other attacks, are usually best used for specific objectives. For example, destroying a vehicle's movement system helps to capture it, while specifically targeting the fragile antennae array of the Gear providing ECM cover to the opponent is more likely to silence it than a random hit to the structure.

Called Shot Example

Example:	***Gear Alpha's pilot holds a grudge against Gear Beta's pilot and performs an aimed shot towards Beta's crew compartment. Alpha takes a -1 on his attack roll, but if he hits Beta, his odds of hitting the crew compartment are slightly increased. When Alpha's Player rolls on the Systems Damage Table, either a "3" or a "6" result will hit the crew compartment. Normally, only the "3" is a crew compartment hit — a "6" usually results in a "Roll twice on this table" result.***

7.7.6 - Indirect Fire



Indirect fire is used by artillery batteries and other vehicles that have weapons capable of indirect fire. Indirect fire is primarily used for long range fire support, though it is also useful to attack targets that are out of visual line of sight. Only weapons that are specifically designated as indirect firing weapons may use this form of attack.

To fire indirectly, an allied unit must be designated as the forward observer. The forward observer must have a valid LOS to the target. Being a forward observer takes up one action (and possibly a Communication roll to beat ECM, if any is present). However, a single forward observer can relay firing coordinates to multiple indirect fire units.

Indirect attacks can be performed over obstacles, including interfering elevation levels, because the attacks are angled over the obstructions. The attack receives the forward observer's Obscurement modifier to attack instead of his own. If the attack is successful, however, only the target hex's Obscurement counts, thus increasing the MoS. If the attack fails, the shot scatters in a random direction by a number of hexes equal to the MoF.

Indirect Fire Example

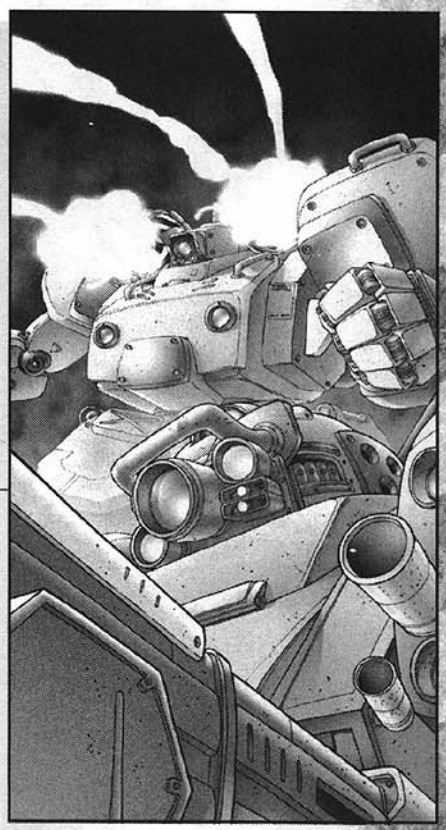
Example 1:	***Vehicles Alpha and Beta are allies. Vehicle Gamma is their enemy. Alpha and Gamma cannot see each other due to an obstructing hill. However, Alpha has an indirect fire weapon. Beta has a line-of-sight with Gamma and can serve as a forward observer for Alpha. If Beta expends one action to serve as a forward observer, Alpha may fire indirectly at Gamma using the Obscurement between Beta and Gamma as his own Obscurement modifier.***
Example 2:	***The total Obscurement between Beta and Gamma is 0, because only Beta's own hex has any Obscurement. Beta can then transfer the information (at the cost of one action) to Alpha, who fires with Beta's Obscurement penalty, but its own range and Accuracy modifiers. If it hits, the MoS is increased by removing all Obscurement except Gamma's own hex. If it misses, the shot scatters randomly by a distance equal to the MoF.***

Burst Fire - 7.7.7

Any weapon with a Rate of Fire (ROF) rating of 1 or greater is capable of burst fire. The Rate of Fire is added to the weapon's Damage Multiplier when the weapon is used against vehicles and other hard targets such as buildings and other structures. This represents the increased damage effect caused by the pounding of many projectiles upon the target's armor (remember, Silhouette's Damage Multipliers increase exponentially, not linearly). A successful burst fire attack versus infantry and other soft targets, on the other hand, adds the ROF bonus to the Margin of Success instead of the Damage Multiplier to represent the devastating effect of the multiple rounds on the unprotected target(s).

10 rounds of ammunition are expended (not entirely realistic, but much simpler game-wise) for every point of Rate of Fire bonus used in the attack. Burst fire has the effect of lowering the weapon's total effective damage for the ammo fired because many rounds will simply not connect with the target. To conserve ammunition, the attacker may elect not to use the weapon's entire ROF rating. If the ROF rating is equal to zero (by choice or by design), only one round of ammunition is expended per firing of the weapon.

Burst fire is a typical example of the effect-based rule design philosophy that permeates the Silhouette system. Rather than worry about each and every bullet or rocket sent toward the enemy, they are generalized and abstracted into a form that is easier (and faster) to use during the game.



Burst Fire Example

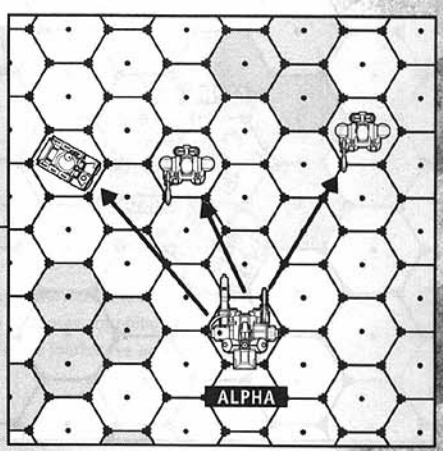
Example:	***Smitty fires his 20mm autocannon at the enemy. His gun has a ROF bonus of 2. He elects to fire with the full ROF bonus, expending 20 rounds of ammunition. He hits with a Margin of Success of 2. His gun's normal Damage Multiplier is x8; since his ROF is 2, this now becomes (8 + 2 =) 10. The total is now 20 points of damage. Had he elected to use an ROF bonus of 1 his total damage would have been ((8 + 1) x 2 =) 18. He would, however, have saved himself 10 shots. Had he used his full ROF bonus of 2 against infantry, the bonus would have been applied directly to his Margin of Success. This raises his Margin of Success to 4, thereby causing (8 x 4 =) 32 points of damage to the hapless infantry unit.***

Missile ROF

Unlike other weapons, rocket and missile launch systems do not expend 10 rounds of ammunition per point of ROF bonus used in the attack. Instead, the number of rockets or missiles used doubles for every point of ROF that is applied to an attack. Thus, an attack with ROF +1 requires 2 missiles, ROF +2 requires 4 missiles, ROF +3 requires 8 missiles, ROF +4 requires 16 missiles, and so on, doubling every time. This reduction in ammunition cost both represents the increased effectiveness of rockets and acts as a counterpoint to their vulnerability to anti-missile devices.

Walking Fire

Weapons capable of burst fire can be used to attack multiple targets in a single action by walking the burst across the targets. A Player must declare that he is walking fire before any attacks are made. The Player then chooses the targets of his attack. A number of targets equal to the weapon's ROF plus one may be attacked. For each extra target, the weapon's ROF is reduced by one for damage purposes (but not for ammo expenditure). All targets must be within the weapon's firing arc. Each separate attack is rolled separately. Each individual target may not be attacked more than once per round by the same weapon (no extra attacks against one target).



Walking Fire Example

Example:	***Gear Alpha sprays rocket fire across three targets. Since the rocket pod has a Rate of Fire of +4, he could chose to attack up to five targets in a single attack (basic target plus four others). Since he is attacking two extra target, his effective Rate of Fire for each individual attack is +2, two points of ROF having been expended to switch target. Alpha still expends 16 rockets.***

Saturation Fire



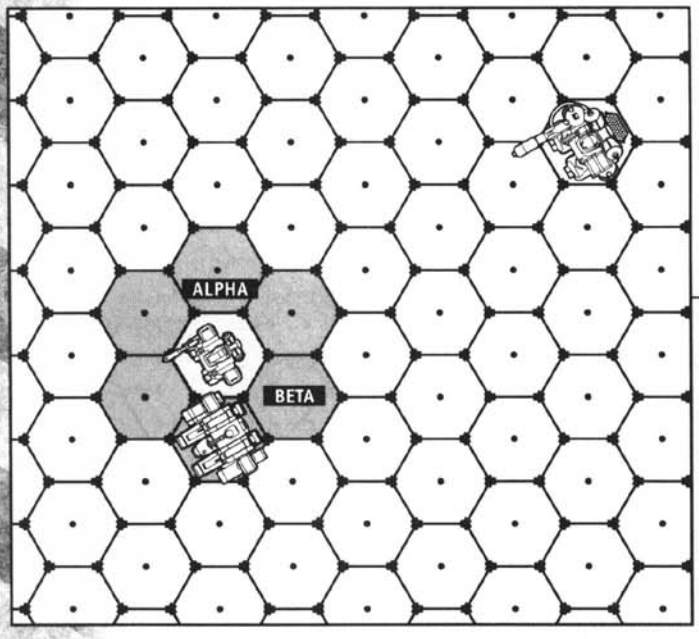
A burst fire weapon (ROF equal to or greater than +1) can be used to saturate a mapboard hex and automatically attack anyoneentering it. The weapon is put on full automatic fire and ammunition is emptied liberally in the target zone, filling the air with a virtual wall of projectiles. Every unit that is in the target hex or enters the hex later in the combat round suffers an attack automatically, regardless of speed, maneuver or allegiance.

To perform saturation fire, the attacker chooses a hex. He then rolls his attack normally except that half the weapon's ROF (rounded down) is added to his total. The ROF is not used to increase the Damage Multiplier or Margin of Success of the attack. After rolling, the attacker records the total attack roll. Any unit in the hex, or that enters the hex later in the combat round, must surpass this number or be damaged by the saturation fire. The Margin of Failure of the defender is treated as the Margin of Success in a normal attack (i.e. total damage = Margin of Failure x Damage Multiplier of weapon). There are two limitations to this type of fire: the saturation zone cannot be further than the Medium range of the weapon, and the weapon uses 30 shots of ammunition (or 8 rockets) per ROF point used in the attack. If the weapon does not have this much ammo left, the result still stands (although the ammo magazine is emptied). A least 10 rounds of ammunition (or 4 rockets) are required to saturate a hex.

Saturation Fire Example

Example: ***Smitty, our ever vigilant autocannon fiend, decides to saturate a certain hex using all of his autocannon's ROF of +2. Smitty empties his massive clip into the tiny 50-meter hex. His attack roll turns up a 7. Smitty adds 1 (half his ROF bonus) to the total, bringing it to 8. Any unit presently in that hex, or that enters that hex later in the round, must immediately roll a normal defensive roll versus a Threshold of 8 (Smitty's attack roll). If one of these defenders failed the roll, he would be treated as if he had received a successful attack from Smitty's autocannon. The poor schmoe's Margin of Failure would be multiplied by the autocannon's Damage Multiplier of 8. It is a pity that Smitty is now out of ammo, but then again, his opponents are likely to get shredded to itty, bitty pieces.***

7.7.8 - Area Effect Weapons



Area effect weapons damage everything in their radius, irrespective of friend or foe. These weapons are rated in Area Effect (AE), followed by the radius (in hexes) of their blast area. An AE of radius 0 means that only the target hex is affected (anything present in the target hex must defend against the attack). A single attack roll is made, while each and every vehicle and squad (allies included) in the affected area roll their defense against this value separately. Even if the blast is completely defended against (e. g. Margin of Success equal to 0), any unit in the blast zone still takes half the explosion's Damage Multiplier in concussion damage.

Area Effect Example

Example: ***An area effect weapon (AE1, DM x30) is fired at Gear Alpha (Armor 15/30/45). Both Alpha and strider Beta nearby are affected since the blast is AE1. The attack roll is low — a mere 3. The Gear rolls a 6 and the strider a 3 (after modifiers). Still, both take 15 points of damage (half the weapon's Damage Multiplier). The strider shrugs off the damage, but the Gear suffers a Light Damage.***

DAMAGE - 7.8

The Armor rating of a vehicle represents the toughness of its best armored location. Aiming for the weaker points of the structure thus increase the chances of damaging the unit. A weapon's damage increases with the Margin of Success of its attack, since weapon damage is rated as a multiplier to the Margin of Success. Thus the better the marksman, the greater the damage.

- **Total Damage = Margin of Success x Damage Multiplier**

This final damage is compared to the Base Armor of the target platform. The following table lists the possible outcomes. Only the most severe effect applies. For example, if a vehicle suffers Heavy Damage because it took damage exceeding twice its Base Armor value, it does not suffer Light Damage even though it obviously took damage in excess of its Base Armor rating.

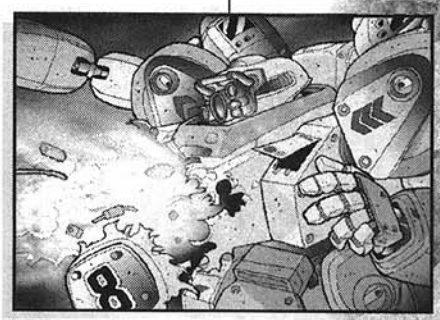
Damage versus Armor

Damage versus Armor	Outcome	What to Do
Damage smaller than Armor	No Effect	Nothing; Damage bounces off
Damage greater or equal to Armor but lower than 2 x Armor	Light Damage	-1 to Armor Rating; roll on Systems Damage Table, Light
Damage greater or equal to 2 x Armor but lower than 3 x Armor	Heavy Damage	-2 to Armor Rating; roll on Systems Damage Table, Heavy
Damage greater or equal to 3 x Armor	Overkill	Vehicle Destroyed; remove counter

Armor = Vehicle Base Armor

Vehicle Damage Example

Example: ***Gear Alpha fires his bazooka at tank Beta. Alpha's modified attack roll is 7. Beta's modified defense roll is 4. Alpha hits with a Margin of Success of 3. If Gear Alpha's bazooka has a Damage Multiplier of x20, his total damage is (3 x 20 =) 60. Tank Beta has a Base Armor value of 25. Since 60 is over double that value but not triple it, the tank takes Heavy Damage. A roll on the Systems Damage table produces a 2: Structural Damage. This requires a roll on the Structural Damage Subtable B, and this die roll is a 4. One is added to the result, as directed in the previous table. This brings the total to 5: Power Transfer Failure/No Movement. The tank can no longer move, probably because of extensive damage to its treads or gearboxes. It also loses two points of Armor.***



Systems Damage - 7.8.1

The attacker rolls 1d6 to find the location of the hit. When multiple possibilities exist for exactly which vehicle component is damaged, such as when a weapon is damaged, a single die is rolled. If the result is an odd number, the defender chooses which system is damaged. If the result is an even number, the attacker chooses which system is damaged. For example, a defender might receive a "-1 to Single Weapon" damage effect. If this defender has more than one weapon, a die is rolled. If the number is odd, the defender will probably choose to penalize his most feeble weapon ("we lose more vibroknives that way"). If the number is even, the attacker will most likely opt to damage the defender's main weapon.

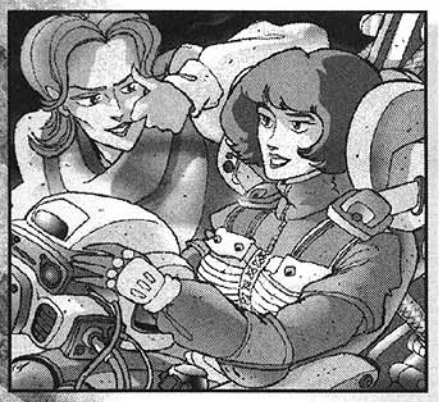
If the damage table indicates damage to a system that is not present on the vehicle (or that has already been totaled), the vehicle takes no further damage beyond the loss of Armor points. A vehicle is not destroyed until it is either down to zero Armor point or the damage table result indicates that it is destroyed.

Structure ◆

Structure hits damage the vehicle's frame and structural integrity. The hull and other components are twisted out of shape or ripped apart, causing further damage to the mechanisms within. Most Structure hits are fairly straightforward: loss of Movement Points are applied to one Movement Type, while Maneuver losses affect the vehicle as a whole.

Power Transfer Failure hits destroy the vehicle's transmission, effectively putting all movement systems out of service. It is still possible to fire weaponry, though. Catastrophic Crew Compartment Failure is just that: the vehicle's structure collapses, trapping the crew between the very armor plates that were supposed to protect them. The Reinforced Crew Compartment Perk is ineffective against this, but the Reinforced Structure Perk will absorb the hit as normal.

Crew



"Crew Stunned" results means one action is lost. If the actions were already taken that round, the crew must buy off the loss on the following or subsequent turns, until all the action losses are canceled by normal or extra declared actions. Command points may be used to pay the action debt. A chit can be placed on the game sheet as a reminder of action owed.

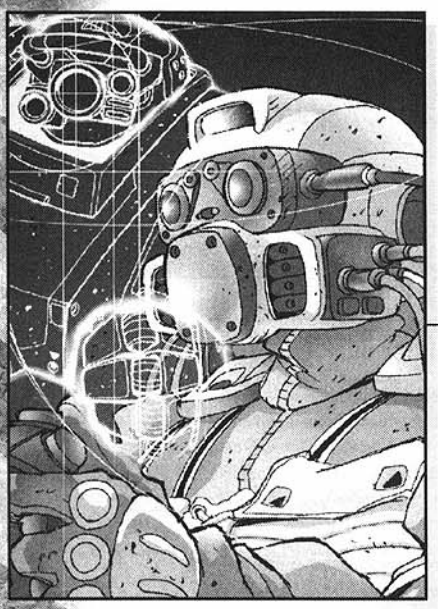
Crewmen who become casualties are automatically useless for the remainder of the combat. They are not necessarily dead, but they are unconscious, pinned, wounded or otherwise unable to fight. After the combat, roll one die for each casualty. If the result is 3 or less, the crewman is dead. If the result is 4 or more, the crewman was only wounded and may be used in later scenarios of a campaign. For vehicles with large crews (e. g. warships), simply assume that half of the casualties were fatalities and that half were wounded. See also the notes on page 118 for PCs as vehicle crewmen.

The Crew result on the System Damage Table is also used to determine damage among the vehicle's passengers, if any are aboard. One die is rolled to determine whether the crew or the passengers take the hit. Damage is then applied as normal. Passengers cannot normally replace lost crew, though allowances can be made for this in a scenario.

Movement

Any penalty to the speed of the vehicle is applied to Top Speed first; the Combat Speed is then recalculated as needed. If the Movement Systems are totalled, either through successive minuses or heavy damage, the vehicle's defense rolls are equal to zero from now on.

Auxiliary Systems



Auxiliary systems include Sensors, Communications and any Perks which are labeled as auxiliary systems (e. g. life support, ejection seats). If any turret is present, it is counted as an Auxiliary system and may be disabled like the rest (turrets are not affected by "-1" results). A disabled turret is frozen in place and any weapon mounted in it becomes fixed in the arc where it was last fired.

If a vehicle's sensors or fire control are utterly destroyed, the vehicle may still perform actions that require these systems, but it suffers a -5 modifier. If a vehicle's communications system is destroyed, the vehicle may not be used as a forward observer for indirect fire and may not talk to other units.

Damaged AUX Perks have a -1 to any roll involving those particular systems (for example, -1 on any Sensor roll with Aquatic Sensors), or a 20% loss in efficiency (on systems like mining equipment). Any system that reaches -5 (100% efficiency loss) is considered destroyed.

System Damage Example

Example: ***In the middle of a furious firefight, Gear Theta is hit by a light autocannon. The MoS is equal to 4. The 32 points of the attack cause a Heavy Damage result. Rolling one die, we get a 1 (Fire Control). Rolling on Subtable A, we get a 3, plus 1 for Heavy Damage. The result is "Single Weapon Destroyed. " Gear Theta's Player must now roll 1d6 to determine which weapon is destroyed. The result (a "5") indicates that he can choose which one he loses, probably the smaller one. Had the number been even, his opponent would have made that choice for him.***

Systems Damage Table

Die Roll	Damaged System	Light Damage	Heavy Damage
1	Fire Control	Roll on Subtable A	Roll on Subtable A and add +1
2	Structure	Roll on Subtable B	Roll on Subtable B and add +1
3	Crew	Crew stunned (-1 action for 1 round)	10% casualties, min. 1
4	Movement	-1 MP	1/2 remaining MP (round down) & -2 Maneuver
5	Auxiliary Systems	-1 to 1d6 Auxiliary Systems	1d6 Auxiliary System destroyed
6	Roll Twice on this table*	-	-

* If the attack was a called shot, the attacker hits his target location (as effects 1 to 5 on table, depending on target).

Subtable A: Fire Control Damage

Die Roll	Effect
1	-1 to a single Weapon
2	-2 to a single Weapon
3	-1 to all Weapons
4	Single Weapon destroyed
5	Fire Control system destroyed (-5 to attacks)
6	Roll Twice on this table
7	Ammunition/Fuel Hit (roll 1d6)
1-3	Ammo Storage and Fuel Tank Ruptured (vehicle cannot move or fire weapons)
4-6	Chain Reaction! Ammo and Fuel Explodes! (Vehicle Destroyed and Crew Killed)

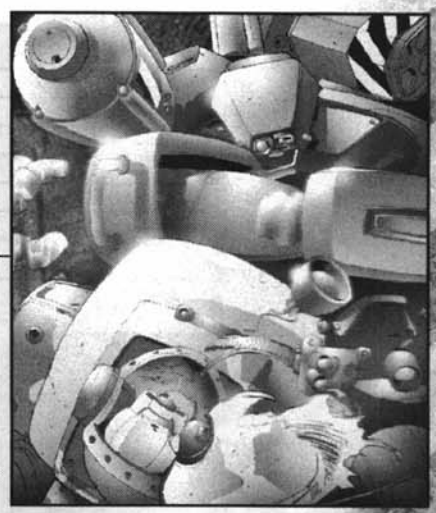
Subtable B: Structural Damage

Die Roll	Effect
1	-1 MP
2	1/2 remaining MPs (round down)
3	-1 to Maneuver
4	-2 to Maneuver
5	Power Transfer Failure; no movement
6	Catastrophic crew compartment failure, 75% casualties, min. 1
7	Complete structural failure; vehicle is destroyed; crew survives.

Damage to Armor - 7.8.2

Armor loses its effectiveness when damaged due to cracking and structural fatigue. When a vehicle receives Light Damage, it loses 1 point of Base Armor permanently in addition to the normal effect. Heavy Damage causes a vehicle to lose 2 points of Base Armor permanently, in addition to the normal effect. Each point of Base Armor that is lost reduces the amount needed to inflict Heavy Damage by 2 and the amount need to produce Overkill by 3.

Even if the vehicle has specialized armor-related Perks, damage is always taken off the base Armor rating. This is mostly done to simplify bookkeeping and keep the game moving along, though Players are certainly welcome to remove points on the Perks if they prefer.



Armor Loss

Example: ***Gear Alpha has 15 points of Base Armor (15/30/45). It receives 24 points of damage in one attack, enough to cause Light Damage. The armor thus drops by one point and becomes (14/28/42). It then receives 28 points of damage. Normally, this would cause Light Damage, but because of the previous hit lowering the armor, it now causes Heavy Damage. The armor drops by two points, becoming (12/24/36). Any future hit of 36 points or more will kill the Gear.***

Damage to Arms - 7.8.3

Arms (whether Battle, Tool or Manipulator) are normally part of the vehicle's basic chassis but may be considered weapons for damage purposes. If no other weapon systems is carried by the machine, the arm are automatically affected on "Weapon" hits. If other weapon systems are present, the damage is randomized following the usual procedure. Any damage to the arm is also applied to the weapon being carried in that arm. Handheld weapons are usually specified in the design; if not, the weapons are not affected.

Penalties caused by damage are applied equally to all functions of the arm: hand-held weapon fire, punching, manipulation, etc. If an arm's cumulative penalties ever reach a total of -5, the arm is put out of commission and cannot be used anymore. If the penalties drop to -6 or lower, the arm is completely destroyed and blown off the hull.

7.8.4 - Ejection and Evacuation

When a platform suffers an Overkill result, there is a slim chance that the crewman will escape unharmed (roll 6 on one die). The chance of escape improves on vehicle designs that have an ejection mechanism built into the cockpit.

The crew rolls a single die. On a result of 1 or 2, the ejection system does not respond in time and he dies. On a 3 or more, he ejects, landing in the same map area. In a roleplaying environment, the Gamemaster may opt to disregard this rule for PCs, letting them eject successfully at all times. A Player can also voluntarily eject a crewmember from a vehicle equipped with an ejection system. This requires one action.

7.9 - INFANTRY RULES

Machines are expensive and require maintenance, but humans need only food and motivation to participate in a battle. Consequently, foot soldiers still form a large percentage of the fighting forces in the 62nd century.

7.9.1 - Infantry Record Sheet

Each infantry squad has an appropriate record sheet that details the necessary statistics for game play. These sheets are used to tally the damage and record other important information.

The name of the infantry squad should be entered here. Naming a squad can be as elaborate as listing the unit's regiment, battalion, company, platoon and squad designation or as simple as a number (i. e. squad #1).

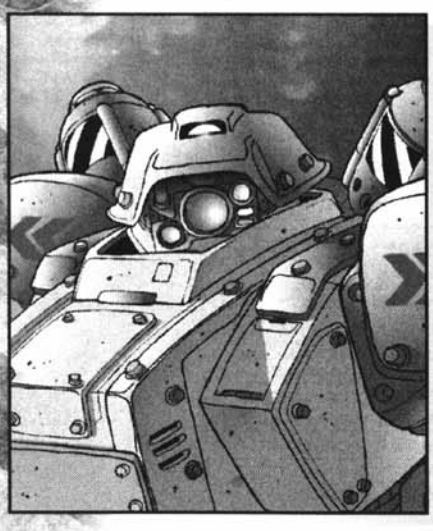
◆ Quality

There are five levels of infantry quality. The level of quality determines the stamina and Skill of the squad's members. Stamina is a measure of how much physical punishment each trooper can endure. Unlike vehicle crews, infantry are assigned one generic Skill to keep the game simple. This Skill serves for attack, defense and other action tests.

Infantry Quality

Quality Level	Stamina	Skill
Rookie	3	1
Qualified	3	2
Veteran	4	3
Elite	4	4
Legendary	5	5

◆ Armor



Many infantry squads wear some type of body armor for protection against light weapon fire and shrapnel. There are three primary forms of body armor available to infantry: light flak, heavy flak and "turtleshell," each offering an increasing amount of protection. Tougher armor, however, is restrictive and heavier, slowing down the trooper wearing it; this is simulated by Encumbrance points. Each point of Encumbrance results in a -1 modifier on all rolls made by the squad. Only one type of armor may be worn by a trooper at any one time. Infantry Armor values are not comparable to vehicle Armor values.

Light flak consists of thin bulletproof clothing resembling normal combat fatigues with padding. It provides 2 points of armor and does not cause encumbrance. This is the favorite choice of untrained civilians who wish to have a minimum of protection without hampering their movements.

Heavy flak is a bulky suit of flexible body armor worn over normal fatigues. It provides 4 points of armor and produces one point of Encumbrance when worn by Rookie or Qualified troops. Troops of Veteran or better quality do not suffer encumbrance effects while wearing heavy flak.

"Turtleshell" is the nickname for full suits of antiballistic polymer plates. It provides 6 points of armor and produces two points of encumbrance when worn by Rookie or Qualified troops, or one point of encumbrance when worn by Veteran troops. Elite and Legendary troops do not suffer encumbrance effects while wearing turtleshell.

Weapons

Infantry units carry two types of weapons: standard weapons and heavy weapons. Standard weapons are usually some form of rifle. A few troopers (usually 2) in a squad carry a heavy weapon to deal with tougher opponents. Refer to the Infantry Weapons Table to obtain the statistics of particular weapons. Note that the infantry squad record sheet has no place to record ammunition. This is intentional. Infantry squads are assumed to carry enough ammunition to last them through a battle. While this is not always true in real life, it does dramatically reduce the paperwork for Players with infantry units.

Infantry Weapon

Weapons	Accuracy	Damage	Range	ROF
7mm Rifle	0	x2	1/2/4/8	0
7mm Assault Rifle	0	x2	1/2/4/8	1
9mm Heavy Rifle	0	x3	1/2/4/8	0
15mm Sniper Rifle	+1	x4	2/4/8/16	0
Heavy Weapons	**Accuracy**	**Damage**	**Range**	**ROF**
9mm Lt. Machine gun	0	x3	2/4/8/16	2
9mm Chaingun	0	x3	1/2/4/8	4
24mm Anti-HG Rifle	+1	x7	3/6/12/24	0
37mm Grenade Rifle	0	x8	1/2/4/8	0
50mm Rocket Launcher	0	x14	1/2/4/8	0
62mm Light Mortar	-1	x12	3*/ 6/12/24	0
Sniper Laser Rifle	+1	x4	4/8/16/32	0

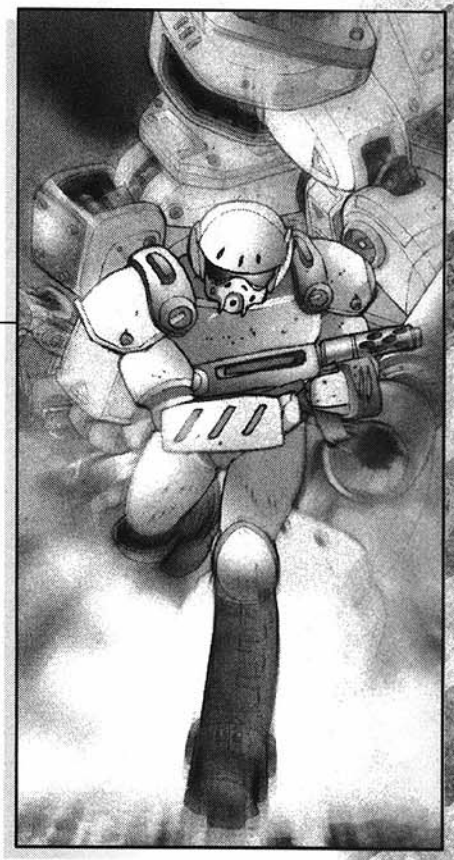
* Cannot fire at range 2 or less.

Squad Damage Track

The infantry sheet is composed of three columns which represent the ten squad members. The first column (#) lists the members numerically. Circle one of these ten numbers to indicate your squad leader. If he is killed, the squad's leadership Skill rating drops to 1 (all other Skill rolls are unchanged). It is these trooper numbers that the Infantry Hit Location table (see page 151) refers to.

The Weapon column reads "Std/Hvy. " This refers to standard weapons (Std) and heavy weapons (Hvy). Circle the type of weapon each particular trooper carries.

The third column is composed of eleven boxes. Each box represents one damage point. Each trooper can take a number of damage points equal to his stamina plus his armor rating. Cross out the extra boxes for each trooper. When the infantry squad takes damage, cross out one of these boxes for each point of damage the unit takes.



Infantry Squad Examples

Example 1:	***Infantry squad Alpha is a Veteran squad (Stamina 4) wearing heavy flak armor (Armor 4). Two of the squad members are heavy weapons troopers. The Player chooses trooper number 4 as his leader and circles his number in the first column. He chooses troopers 2 and 8 as his heavy weapons specialists and circles the "Hvy" in their second column. The other eight squadmembers, including the leader, have "Std" circled. Lastly, the Player crosses out the last three boxes of each trooper, leaving 8 damage points for each member of the squad.***
Example 2:	***Infantry Squad Beta is composed of green recruits, who, because of an administrative mishap, have been outfitted with the finest equipment. The troopers have a stamina of 3 and are wearing turtleshells (armor 6). There are only eight men in the unit, but three of them are heavy weapon soldiers (#1, 3, 7 have "Hvy" circled on the sheet). The leader will be #4 (his number is circled). Two damage boxes are crossed out for each trooper, leaving 9 points for each of them. Unfortunately, the heavy armor will cause a penalty of -2 on all attack rolls made by the inexperienced squad.***

7.9.2 - Movement

Infantry squads on foot receive 2 Movement Points per round. Infantry units do not have Top Speeds, and always move at Combat Speed. They use the Walker terrain movement costs, but it never costs infantry more than 2 MPs to travel through one hex (in short, they can always move at least one hex per round). There is one exception to this, however: elevation changes. While the squads are assumed to be equipped with all the latest climbing gear, they can only go down the cliffs, not up — climbing is too time-consuming for a combat environment. Furthermore, it would make infantry prone and helpless, something nobody wants during combat. No more than two elevation changes are possible per hex traveled.

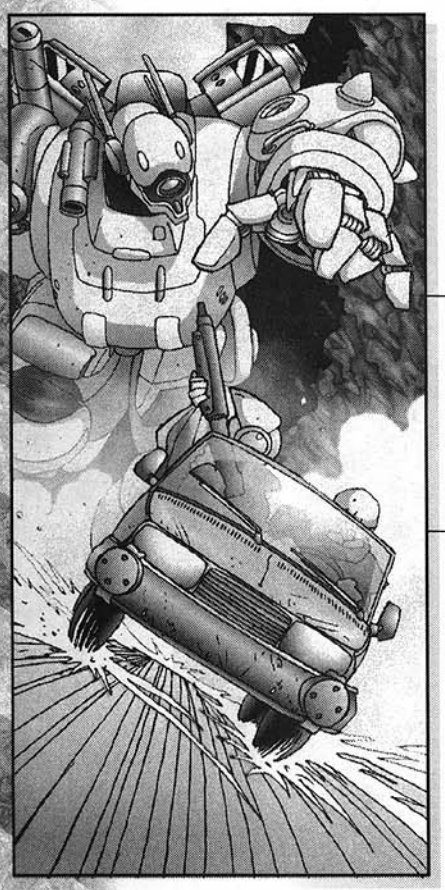
◆ Optional Movement Options

Some specialized infantry squads have modes of transportation other than walking. Some rapid deployment teams are equipped with jetpacks or tiny unarmed all-terrain vehicles (dirt bikes and the like). Jetpack units have 6 MPs and use the same movement costs as Hover vehicles. Squads with light ATVs have 8 MPs and use the same movement costs as Ground vehicles.

7.9.3 - Sensors

Most infantry squads are not equipped with special sensors. They have a camera and communication suite mounted within their helmet to relay information to other members of the combat group. When used with the goggles' Head-Up Display, these can be used to receive limited sensor information. Infantry have Detection values of 4 during the day and 2 at night, with a range of 1 km. Infantry can be equipped with night vision equipment, giving them a Detection value of 4 at night. They are assumed to have small personal communicators that are sufficient to allow them to coordinate their actions with the rest of their teammates. If tested, these communicators are assumed to have a range of ten kilometers and a Communication rating of -2.

7.9.4 - Infantry Actions



Infantry units have one action per squad, which is normally used to attack. When an infantry unit goes on the offensive, it gets one attack per gun type at the cost of a single action. All attacks use the unit's Infantry Skill (with modifiers). Weapons of the same type must attack the same target.

Massed attacks of infantry squads also have a special ROF bonus. If two or more troopers are using a certain weapon, the value listed in the table below is added to the weapon's Rate of Fire. Infantry weapon ROF otherwise works as for vehicles (see *Burst Fire*, page 143), with the same options.

Even if the entire squad is equipped with disparate weaponry (more than two types of weapons), the squad can attack two different targets at the most. Infantry units can use their weapons' ROF for burst fire, walking fire or even saturation fire.

Infantry ROF Bonus

Min. Number of Troopers w/Weapon	ROF bonus
1	0
2	+1
4	+2
8	+3

Infantry Attack Examples

Example 1:	***Infantry squad Alpha has 9 members, 5 of which are armed with 9 mm machineguns (MGs) while the remaining 4 carry 37 mm grenade rifles. One attack will be made with the MGs (ROF 2), and another with the grenade rifles (ROF 0). If the MGs succeed, they cause a x7 attack (x3, +2 ROF, +2 number of troopers bonus), while the grenade rifles are at x10 (x8 +2).***
Example 2:	***The same squad has taken some casualties. Only two troopers with MGs remain. They attack, gaining a measly +1 bonus because there are only two of them firing. The elect to put two points of ROF into boosting the damage and one point to allow them to walk their fire across a second target. The result is two x5 attacks aimed at two different targets.***

Attacks versus Infantry - 7.9.5

Due to their small sizes, dispersed formation and uncanny ability to take advantage of any available cover, infantry do not suffer any defense modifiers for their slow movement: their movement modifier is always 0. In addition, a -2 modifier is applied to any unit other than other infantry squads attempting to target them. Some vehicles are equipped with specialized anti-infantry weapons which ignore the -2 modifier due to their special targeting systems or method of attack.

If an infantry squad is hit, the total damage points are calculated normally. The exceptions to this rule are burst fire weapons, which add their ROF bonus to their Margin of Success instead of to the Damage Multiplier (see page 143). The damage, however, is applied somewhat differently.

Infantry units do not suffer damage like vehicles. Instead, each point of damage is removed from the squad on a one-to-one basis. When the squad takes damage, the attacker rolls one die using the Infantry Hit Location Table below to see where in the unit his attack hit. The table indicates which trooper is the first one to take damage. If the trooper runs out of damage points, he is considered a casualty and the remaining damage points are applied to the next trooper either up or down the list (depending on the die result), and so on. If damage remains to be allotted up past trooper #1 or down past trooper #10, the damage loops around to the other end of the damage track (i. e. to #10 or #1, respectively).

A trooper is not considered to be a casualty until his entire damage track is crossed out. The debilitating effects of injuries are ignored for convenience — the troopers are equipped with emergency first aid packs with stimulants. As for casualties in vehicle crew, a trooper with zero points remaining is not necessarily dead — but he is unconscious, wounded or otherwise unable to keep on fighting. The ROF bonuses from mass attacks with infantry weapons is reduced if casualties drop the number of squad members with a particular weapon below the 2, 4, or 8-member levels (see table on the previous page).



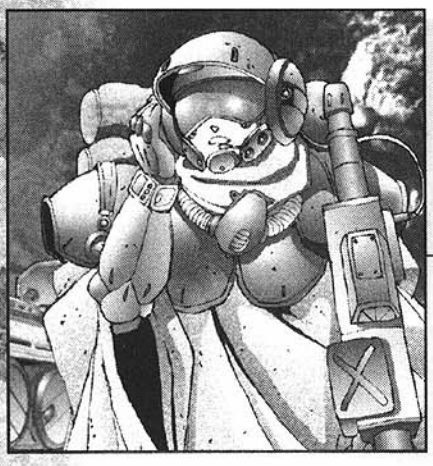
Infantry Damage Examples

Example 1:	***Infantry squad Bravo has 2 heavy weapons troopers, #3 and #8. The leader is #9. Each trooper has 6 damage points. An autocannon burst chews into squad Bravo for 32 points of damage. A roll on the Infantry Hit Location table turns up a 3. #5 is the first in line for damage and the damage will work its way down the damage track. The first 6 points drop #5. The next 6 points drop #6. The 6 points after that make #7 a casualty. The fourth 6-point group eliminates #8, the heavy gunner. The fifth 6-point group drops #9, the squad leader. #10 takes 2 points of damage but is still up and functional. The unit is now down to one heavy gunner (massed attack ROF bonus drops from +1 to 0) and 4 standard weapon troopers (massed attack ROF bonus drops from +3 to +2). In addition, the unit is now leaderless (Leadership Skill of unit drops to 1).***
Example 2:	***A second attack, doing 20 points of damage hits the unit. The Infantry Hit Location roll is a 6 (start at #10 and work up). #10 loses his remaining 4 points. Since #9 through #5 are down, #4 is the next to absorb damage. #4 and #3 both take 6 points of damage and are eliminated. #2 takes 4 points but is still active. Bravo squad is in sorry shape with only two standard weapon troopers (#1 and 2), no heavy weapons specialists and no leader.***

Infantry Hit Location

Die Roll	Start at Trooper #	Direction
1	1	down
2	3	down
3	5	down
4	6	up
5	8	up
6	10	up

Area Effect Weapons versus Infantry



Infantry units are very vulnerable to area effect weapons designed to be used against them. These weapons typically bounce right up before exploding and showering the landscape under them with thousands of sharp fragments moving extremely fast. This negates most of the cover that is available to infantry units and cause devastating injuries. The anti-personnel grenade launchers that are mounted on Gears and tanks work on the above principle, releasing dozens of micro-bomblets above their targets.

When a weapon with both the Anti-Infantry and an Area Effect hits an hex that contains an infantry unit, the damage is inflicted upon each trooper instead of working its way through the squad.

Area Effect Versus Infantry Example

Example:	***Each trooper in infantry squad Bravo has 7 damage points. An anti-personnel area effect attack hits their hex, doing 6 points of damage. All the troopers lose 6 points from their damage track, leaving each one with a single damage point left. If the area attack had done 7 or more points, the entire squad would have been wiped out.***

7.9.6 - Infantry Threat Value



Infantry squads are easy to generate. Choose the Skill rating, armor, equipment and weapons, then calculate the Threat rating according to the following formula.

Individual Infantryman Threat = square root ((infantryman's Damage Points)^2 x Weapon Damage)

The individual Threat Rating of all infantrymen is added up, then modified according to their Skill level (see the table below). Infantry has a single generic Skill, which is equal to the rating listed in the parentheses. Infantry squads equipped with either jetpacks or All-Terrain Vehicles double their final Threat Value.

Infantry Multiplier To Threat Value

Skill Level	Threat Multiplier (Skill)
Rookie (1)	0. 25
Qualified (2)	1
Veteran (3)	2. 25
Elite (4)	4
Legendary (5)	6. 25
Legendary (6)	9
Legendary (7)	12. 25
Legendary (8)	16

A Note on Infantry Equipment and Cost

All modern infantry squads are equipped with a minimum of equipment in order to do their job. For example, they all wear protective polarized goggles as standard — with the number of targeting lasers out there, there is little choice if you want to avoid ending up blind. Night vision equipment is only issued if night combat is expected. Infantry personnel also have personal communicators to stay in touch with one another. The relatively low cost of this equipment, when compared to the cost of a vehicle, does not justify their inclusion in the Threat Value formula above.

Jetpacks and ATVs are definitely worth something, however. Inquisitive minds will have noted that the jetpack is not included in the equipment list — this was done on purpose. It is a heavy and cumbersome piece of equipment which requires constant maintenance and complex Skills to use, making it a restricted specialist item only.

The ATVs are Size 1 ground vehicles. A complete design is not supplied in order to reduce the bookkeeping of a typical game (do you really want to keep track of ten bikes per hex?) A typical infantry ATV is Size 1 or 2, has a Top Speed of 16 Ground MP, an Armor of 2 or 3, can carry one man, has a Maneuver of +1 and a Deployment Range of 200 km. It has no radio, no mounted sensor and no provision for mounted weaponry. The **Tactical Field Support** sourcebook contains a few examples of light infantry vehicles.

Threat Values and Their Use - 7.10

The hardest part in establishing a tactical scenario is making sure that the two sides are more or less equal. Of course, in real life, combat is rarely fair, but Heavy Gear is a game — unfair combat would rapidly become very frustrating for the Players. Threat values are a numeric measure of a combat unit's various abilities and can be used to make sure the forces are well matched.

What is the Threat Value? - 7.10.1

Threat values are a measure of a vehicle's strengths and weaknesses. All combat units, including infantry and defensive installations, are rated according to a Threat Value (TV). The higher the number, the more powerful/costly the unit is. Scenarios can be balanced easily by allocating an equal amount of points to each force, points which are then used to purchase vehicles by their Threat Value. The Threat Value can be found on every vehicle data sheet.

A vehicle's Threat Value is broken down into three separate sub-categories: Offensive, Defensive and Miscellaneous Scores. The Offensive Score represents the unit's weapons and general ability to inflict damage. The Defensive Score covers anything that can help a unit survive in combat: speed, maneuverability and armor. Finally, the Miscellaneous Score covers any special abilities the vehicle might have: electronic countermeasures, troop transport capacity and so on. Infantry units are the exception to the rule and do not break down their TV into three Scores like vehicles do.

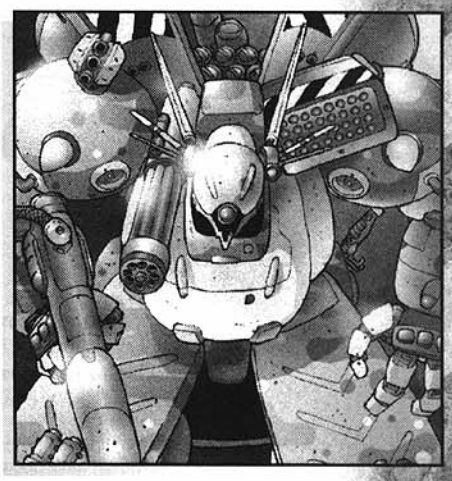
Threat Values and Miniatures ◆

The official Heavy Gear miniatures represent official vehicles found in the game. The rules for converting the tactical rules to tabletop combat are found on page 160, but the miniatures can also be used to represent units on a standard hex map sheet since their bases are hexagonal and fit most available hex maps.

Miniatures are also available in ready-made, pre-calculated, boxed squads, typical of the force the squad is supposed to come from. These squads come complete with organization charts, suggested paint schemes, insignias and unit histories. Weapons and equipment packages are in the planning stage and will include spare parts to customize the miniatures and create new variants to better suit the Players' needs and tastes.

Balancing One-on-One Combat - 7.10.2

One-on-one combat is the simplest in terms of raw play balance. The two units should have roughly equivalent Threat ratings in both Offensive and Defensive scores. It is evident that an armed-to-the-teeth Grizzly with an Offensive Score of 2174.8 will make (very) short work of a small Iguana (Defensive Score: 472.4) in straight, head-to-head combat. On the other hand, a Jaguar and a Black Mamba have roughly equivalent Offensive and Defensive Scores and make good opponents. As a rule of thumb, the difference between the respective TVs of the two units should not exceed 10% if combat is to occur on open ground with little terrain features and no mission objective or victory conditions (see the scenario generator in Chapter 8). The Iguana pilot in the example above has to be an ace or pretty sneaky to get through the fight on top!



The Miscellaneous Score generally interferes very little in one-on-one fights (or duels, as the Terranovans prefer to call them), since the special abilities covered by this sub-category are rarely used in this kind of battle. After all, ECM systems and target designators are somewhat useless if there is no allied units around. Terrain and victory conditions can influence combat, making this score more important when using cluttered terrain. In the above example, the Iguana will stand a much better chance of survival (and perhaps even winning) if it uses its ECM system to camouflage itself in forests or swamps, so that it can snipe away at the heavier machine pursuing it. In general, the more complex the scenario and the terrain, the more accurate the Threat Value becomes.

Balancing Mass Combat - 7.10.3

Mass combat allows each unit to use its natural abilities to the maximum — troop carriers can ferry infantry, target designators can call in support fire, and so on. Because of this, a vehicle's Threat Value is a valid representation of the general combat efficiency of the vehicle. In fact, the more units on the table and the more complex the scenario, the more accurate the Threat Values become.

Each side should agree on a point total and buy their forces with it. The table on page 169 shows a few suggested point totals according to the type of battle you wish to fight. It is also a lot more interesting to develop a scenario for the battle, rather than just bash each other's forces into spare parts. Chapter 8 contains plenty of hints and tips to do just that, including a series of table that can generate the skeleton of a scenario, from the basic objectives to the secondary plot points.

7.11 - OPTIONAL TACTICAL RULES

The following are optional rules designed to provide additional environments and tactics for the Tactical System. They are a little more complex than the basic game but not overly so, and generally consist only of an additional die roll or some extra bookkeeping. The additional tactical rules include material such as naval movement/combat and urban environments, which were placed here because they are not required to fight most battles on Terra Nova. The rest covers some uncommon situations that may be happen in the course of a given scenario. These optional rules may be used if (and only if) all of the Players agree to use them before the game. Aerial tactical rules are not included because they would require too much space. They are available in the **Tactical Air Support**, however.

7.11.1 - Aquatic Movement

Naval vessels, submarines and amphibious vehicles (ground vehicles and walkers) are able to travel in water hexes. Naval vessels and submarines must expend 1 MP per water hex. Amphibious vehicles pay the water hex MP cost for their movement type (2 for walkers, 3 for ground vehicles).

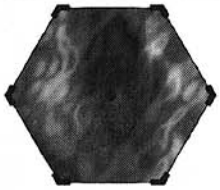
Aquatic movement normally occurs on the surface of the water. Certain unusual walkers or ground vehicles are sealed against underwater environments (i.e. the Hostile Environment Protection: Underwater Perk), but lack the ability to float (i.e. the Amphibious perk). These "bottom-crawlers" pay the normal Water hex movement costs and must pay for any elevation changes if they enter Deep Water hexes (see below). Only "bottom-crawlers" gain the Obscurement effects of Water hexes.

◆ Sinking

Any aquatic vehicle that suffers a Heavy Damage result must roll one die. On a roll of 2 or less, the vehicle begins to sink. It immediately suffers a -1 maneuverability result and will flood and sink (i.e. be destroyed) in a number of rounds equal to the roll of one die. Even "bottom-crawlers" must test for sinking. They would not actually sink, but would instead flood. A vehicle which suffers an Overkill result will automatically flood.

◆ Deep Water and Submarines

An optional terrain type called Deep Water exists. This terrain type is used to describe water with a depth of approximately 10 meters or more. Deep water may have elevation changes to indicate the depth of the river/lake. Vehicles with the Submarine movement mode may rise or descend elevation levels in Deep Water at a cost of 2 MPs per level of elevation change.



Deep Water Terrain

MP costs:	as Water
Obscurement:	4*

*Only affects normal sensors. Vehicles with the Aquatic Sensors Perk do not suffer any Obscurement effects from Water or Deep Water terrain.

◆ Underwater Combat

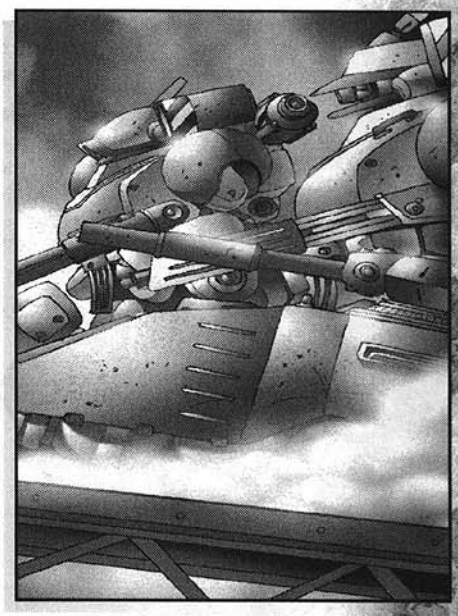
Only torpedoes and bombs (usually called depth charges when used underwater) are effective underwater weapons. Projectile weapons jam due to water resistance. As projectiles attempt to leave the barrel, missiles, rockes and bazookas cannot ignite their propellants. The concentrated blasts of energy weapons diffuse quickly in water, turning it into rapidly expanding steam and most often harming the attacker far more than the intended target.

Any non-submarine (i.e. vehicles without the Submarine movement type) that engages in underwater activity automatically suffers a -2 to its Maneuver while submerged. The lack of proper control surfaces and water streamlining adversely affect the movement and reaction time of the vehicle, hence the Maneuver penalty.

7.11.2 - Bridges, Roads and Urban Terrain

Many man-made objects can often be found on or near battlefields. When setting up the terrain for the scenario, the Players should agree on what kind of structures are on the mapboard, if any. The presence of structures will often depends heavily on the scenario's objective(s) or where the battle is set. Man-made objects can be destroyed in the course of combat. Each structure has a Damage Point Capacity; if it takes more damage points than this Capacity, the structure is destroyed and reduced to a pile of rubble (count as Rough Ground). Man-made structures take damage in a manner similar to infantry (i.e. they accumulate damage points instead of Light/Heavy Damage effects). Burst fire weapons affect structures in the same manner as they do infantry.

Bridges



Bridges span bodies of water such as rivers and straits, or chasms, including canyons and gullies. The bridges presented here are the large ironworks found over prominent terrain features, not the small ten or twenty-meter bridges found in the city or on campaign roads (those are considered as part of the road itself for the sake of simplicity).

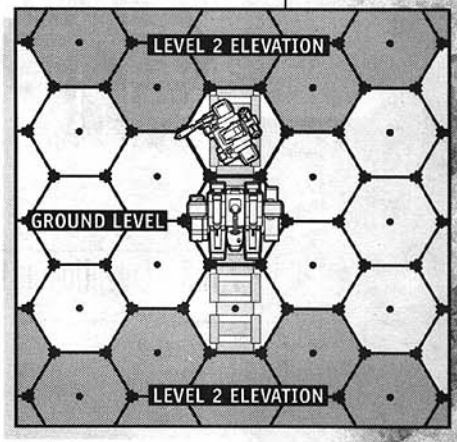
Movement across bridges has the same MP cost as clear terrain, unless a road has been built on the bridge (see Roads). Each bridge hex is rated by three attributes: Damage Point Capacity, Elevation Level and Size Capacity. The middle part of some of the biggest bridges can be one or more elevation level higher than the land it connects to.

The Size Capacity of a bridge hex is the maximum Size of vehicle that this bridge section can safely support. If a larger vehicle attempts to cross the bridge hex, roll one die. If the die roll is equal to or less than the difference between the vehicle's Size and the bridge's Size Capacity, the bridge loses one tenth of its original damage point capacity per point in Size difference (see example below). Repeat the die roll until the bridge section either does not take damage (at which point, stop rolling for bridge collapse) or breaks under the strain and collapses. If a vehicle is six or more Size points greater than the bridge's capacity, the bridge hex will automatically and immediately collapse.

If a bridge hex collapses, sections in the adjoining hexes have a 50% chance of collapsing as well. Roll one die for each adjacent hex: if the result is 3 or less, the adjoining bridge hex collapses. All vehicles on a collapsing bridge take normal falling damage based on the number of elevation levels they fall. The bridge hex is transformed into a Rough hex afterward, unless it is a Water hex — it then becomes a Swamp hex (this only represents the presence of debris in the shallow water, not a sudden growth of vegetation!). A bridge collapsing above a Deep Water hex (see page 154) leaves no debris.

Bridge Example

Example: ***Each hex of a three-hex long (150 m) bridge has a Damage Capacity of 100 and a Size Capacity of 7. The middle hex is elevated one level higher than the other two hexes and the surrounding terrain. The bridge spans a chasm that is two elevation levels lower than the surrounding terrain. If a Size 9 vehicle attempts to cross the bridge, it must pay the normal MP cost for Clear terrain to travel across. Since the vehicle is too heavy for this bridge, it must test for bridge collapse. Upon entering the first bridge hex, the vehicle rolls one die. On a result of 2 or less (Size 9 - Size Capacity 7), the bridge loses 20 damage points (one-tenth of its original Damage Point Capacity, times the Size difference). If the bridge is damaged, the roll is repeated until the roll is greater than 2 (at which point the bridge stabilizes) or until that section of the bridge collapses. If the bridge collapses, the vehicle will suffer a two elevation level fall. If the middle part of the bridge collapses, any vehicle on it will suffer a three elevation level fall since it is one elevation level higher than the surrounding terrain.***



Roads

Roads are designed to make travel easier for ground vehicles by providing them with an ideal travel surface. Any Ground vehicle traveling on a road gains an additional number of Movement Points equal to half of its current speed (Combat or Top) rounded down to the nearest whole number. These free MPs must be expended on movement along the road or they are lost. Additionally, if a vehicle (of any type) travels on the road, it pays the MP cost of Clear terrain instead of whatever terrain the road happens to lay on in the hex.

Roads are tough, and without specialized cratering charges are hard to put out of commission. They have a 100 Damage Point Capacity per hex. Roads over bridges use the bridge's Damage Point Capacity but still confer the above movement bonus to Ground vehicles. They have no appreciable effect for other types of units.

Urban terrain hexes have small streets, but they do not normally receive the road movement bonus due to the large number of minor obstructions in urban settings (speed bumps, pedestrians, parked vehicles. etc.). All major streets or highways should be represented by Roads through Urban terrain.

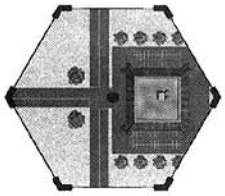
Roads are tactically important as they allow forces to move and maneuver much faster. Controlling them is often vital, both for the benefits they confer and to deny them to the enemy. A road crossing the board diagonally or even meandering through the various terrain obstruction is a great scenario element.

◆ Urban Terrain

Towns, villages and other urban environments sometimes find themselves the center of unwanted attention. The narrow streets and close confines of the clusters of buildings greatly restrict line of sights, making urban combat a deadly and brutish short range slugfest. Fortunately for soldiers, the same buildings offer excellent protection and hiding places against enemy fire.

Since a tactical hex is 50 meters across, it can easily hold several buildings. Any hex containing from one to six buildings is considered to be Urban terrain. Any hex containing seven or more buildings is considered to be Dense Urban terrain. Both types of Urban terrain naturally favor Ground vehicles and offer poor traction for Walkers and poor maneuvering space for Hover vehicles. These optional terrain types have the following attributes.

Urban Terrain

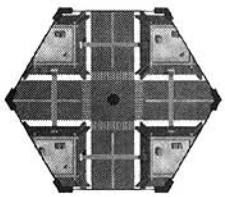


Walker MP cost	2
Ground MP cost	1
Hover MP cost	2
Obscurement	1*
Damage Point Capacity	80 per building**

* Produces a -1 modifier on attacks per hex of intervening urban terrain.

** Assumes generic buildings. Reinforced buildings or fragile buildings would vary accordingly. The values of Urban hexes must be decided before the game and made available to all.

Dense Urban Terrain

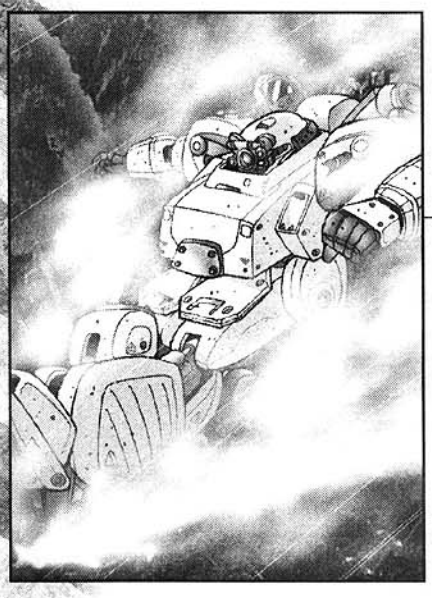


Walker MP cost	3
Ground MP cost	2
Hover MP cost	3
Obscurement	2*
Damage Point Capacity	100 per building**

* Produces a -2 modifier on attacks per hex of intervening urban terrain.

** Assumes generic buildings. Reinforced or fragile buildings would vary accordingly. The values of Dense Urban hexes must be decided before the game and made available to all.

7.11.3 - Elevation as Range



If the elevation level difference between an attacker and his selected target is greater than the (horizontal) range between the two, substitute the difference in elevation for the range. This approximation, while grossly inexact, speeds up game play greatly; people who desire a greater reality factor may want to calculate the exact distance using the Pythagorean Theorem. Using the latter, the range is equal to the square root of the sum of the squares of the vertical distance and the horizontal distance. This will rarely give a whole number, so the range should be rounded to the nearest whole number for simplicity.

Elevation Range Example

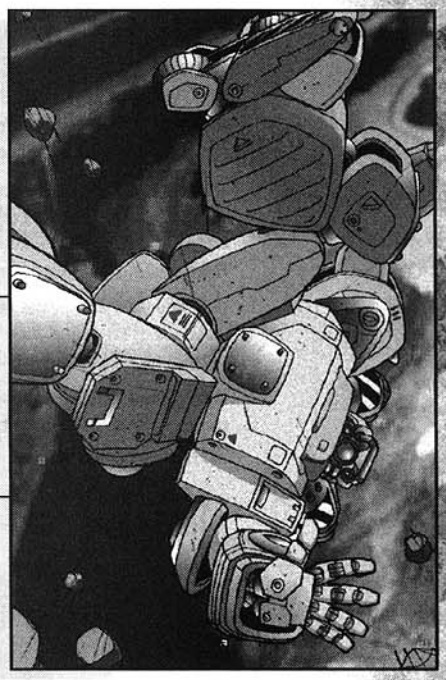
Example 1:	***Gear Alpha is standing on the edge of a cliff. APC Beta is two hexes beside him at the bottom of the cliff (4 elevation levels below). Since the difference in elevation levels (4) is greater than the horizontal range between the two (2), the difference in elevation levels is treated as the range (i.e. range equals 4 hexes).***
Example 2:	***Later, Gear Alpha is standing on the edge of another cliff. Gear Gamma is four hexes beside him at the bottom of the cliff, three elevation levels below. Using the Pythagorean Theorem, we draw an imaginary triangle between them and calculate the true range: the result of ($4^2 + 3^2$) is 25, from which we take the square root. The range is five hexes.***

Cliffs - 7.11.4

Any hex with an elevation change of two or more levels is considered to be a cliff. Vehicles may not normally ascend or descend cliffs. Walkers with arms are the only exception. Infantry may descend cliffs at normal costs for elevation changes.

If a walker has arms that can lift a vehicle of its own Size, it can climb up or down a cliff face. The walker must pass a Piloting Skill test with a Threshold of 5. The walker ascends or descends the cliff face at a rate of 1 elevation level per combat round. If the walker fails or fumbles the piloting test, it falls the remaining elevation levels. Climbing consumes a vehicle's entire MP allotment and is considered to be equal to expending the vehicle's entire combat speed MPs.

Climbing walkers and infantry are in poor defensive positions and suffer -2 on all defense rolls.



◆ Falling

If a vehicle falls an elevation level or more, it takes a number of damage points equal to a standard two-die test roll times the vehicle's Size times the number of elevation levels fallen. Fumbles result in an automatic kill.

- Falling Damage = Two Dice x Vehicle Size x Elevation Fallen

◨ Falling Example

Example:	***A Size 6 Gear with a Base Armor of 15 falls off a 3 level tall cliff (150 meters tall). Two dice are rolled for damage, resulting in a 3 and a 5. The Gear takes 5 (die roll) x 6 (vehicle Size) x 3 (elevation fallen) = 90 points of damage and is smashed to pieces (Overkill result).***

Incendiary Effects - 7.11.5

Incendiary weapons can decimate enemy troops. When an incendiary weapon hits a vehicle, the damage is equal to the weapon's damage "multiplier" (called its intensity score) plus the Margin of Success. While this may seem like less damage than most weapons, many incendiary weapons are labeled as "slow-burn" weapons. Slow-burn weapons cause the same amount of damage for a number of rounds equal to the Margin of Success. Consequently, if a slow-burn weapon with an intensity score of 12 hits a target with a Margin of Success of 3, it would do 15 points of damage to the target for three rounds.

Incendiary weapons are most effective versus infantry. Against infantry, add the Margin of Success to the intensity and multiply this value by the Margin of Success to obtain their damage. Slow-burn weapons apply their later rounds of damage to the unit only if it remains in the same hex.



◨ Incendiary Examples

Example 1:	***Vehicle Alpha attacks vehicle Beta with a slow burn incendiary weapon. The attack succeeds with a Margin of Success of 3. The weapon has an intensity rating of 15 (the substitute for the damage multiplier). This attack will do 18 points of damage to Beta for three rounds. The first round's damage is allocated immediately. In later rounds, the damage is allocated during the miscellaneous events phase.***
Example 2:	***Vehicle Alpha attacks infantry squad Gamma with the same slow-burn incendiary weapon (15 intensity). The attack succeeds with a Margin of Success of 2. This attack will inflict (15 + 2) x 2 = 34 damage to the infantry squad per round for two rounds.***
Example 3:	***Vehicle Alpha attempts to ignite a woodlands hex using the same weapon. Alpha must attack the hex at least four times (15 x 2 x 4 = 120) to amass the 100 points of intensity required to ignite a hex.***

Starting Fires

Incendiary weapons can be used to start fires. To ignite a hex, a total of 100 points of intensity must be fired into it. No attack roll is necessary. Slow-burn incendiaries have their intensity doubled. Once the hex is ignited, it is considered to be a fire of intensity 10. At the end of every combat round thereafter, its flame intensity is increased by one until it reaches 20. Once it reaches 20, every adjoining hex ignites as an intensity 10 fire.

Unless the battle drags on for hours, wind will have little effect on the spread of the fire. If such an effect is desired nonetheless, randomly determine the direction of wind before the game, then spread fire only to the hexes that are downwind.

Vehicles crossing a burning hex must pass a Piloting Skill test versus a Threshold equal to one-half of the hex's fire intensity to pass safely. If the vehicle fails the roll, treat the result as a successful incendiary attack on the vehicle with a Margin of Success equal to the Margin of Failure of the Piloting Skill test. Treat Fumbles as if the incendiary attack's Margin of Success were equal to the test Threshold. Infantry units that enter a burning hex are automatically destroyed.

Only Woodland and Jungle hexes can be ignited. Alternatively, the Players may agree that the Rough and Clear hexes on the map are grassland or scrub and allow them to be ignited. Sand, Swamp and Water hexes cannot ignite for obvious reasons. A scenario might cover them with oil or a similar flammable substance and thus allow these hexes to be ignited, but they normally cannot burn.

Burning hexes produce smoke in an irregular fashion. Roll one die per hex to know how much Obscurement the smoke from that hex causes: 1-2, no Obscurement; 3-4, Obscurement 1; 5-6, Obscurement 2. The smoke causes Obscurement in the two levels above the ignited hex as well.

7.11.6 - Minefields



Any hex may be designated as a minefield. These are generally laid down well before the battle and are generally used by the defending side of a given scenario. The type of mine used to lay the minefield determines the minefield's Threshold and Damage Multiplier.

Minefields are treated as areas that have a continuous saturation attack in effect (see *Saturation Fire*, page 144). Some mines have different Thresholds versus different units (some are more effective versus infantry). More detailed mine rules can be found in the **Tactical Field Support** sourcebook.

Minefield Example

Example:	***Gear Zeta wanders into a heavy anti-armor minefield hex (x25 damage, Thresholds = 8 vs. vehicles, 3 vs. infantry). Zeta must now roll a piloting Skill test to avoid the mines. He rolls a 6. The Margin of Failure is 2, yielding 50 damage points against Zeta. Since Zeta is a standard Hunter (Overkill = 45 damage points), Zeta is blown to smithereens.***

Sample Minefields

Mine Type	Damage Multiplier	vs. Vehicles	vs. Infantry	Threat Value per Hex
Anti-Personnel	x5	4	7	2
Improved Anti-Personnel	x7	4	8	3
General Purpose	x10	6	6	5
Heavy General Purpose	x15	6	6	7
Anti-Armor	x15	7	4	8
Heavy Anti-Armor	x25	8	3	10

7.11.7 - Multiple Attacker Penalty

Combat is an extremely confusing environment. Despite the help given by the computers that are built into all combat vehicles, the crew can easily be overwhelmed by all the information and lose track of an adversary. And no computer in the world will allow a vehicle to dodge an incoming wall of lead and rockets!

If more than one attacker fires on a single unit during a round, the defender will take a -1 penalty on his defense roll for the second attacker, -2 for the third, and -3 for all subsequent attacks. The penalty is applied per attacker, not per attack: if a unit fires three weapons at the defender, no penalty apply until a second combat unit fires at the defender. Regardless of accumulated penalties, the defense roll cannot go below 0 as usual.

Towing Capacity - 7.11.8

All types of vehicles are assumed to be capable of towing objects. A vehicle's maximum towing capacity (in kilograms) is equal to the vehicle's mass. This assumes that the towed item is designed to be towed (e.g. a trailer, another ground or naval vehicle). Items which were not designed to be towed, such as disabled Heavy Gears, are considered to have double their normal mass for towing purposes. Vehicles can tow up to half their maximum towing weight without a reduction in speed. Vehicles towing between half and three-fourths of their capacity are limited to Combat Speed; loads from three-fourths to full towing capacity reduce the speed to half Combat Speed until the charge is dropped.

Walkers Falling - 7.11.9

Whenever a vehicle using Walker movement mode takes large amounts of damage, it may fall down from the force of the impact. If the total damage received in one attack is equal to or higher than twice the Size of the vehicle, the pilot must pass a Piloting Skill test against a Threshold equal to one plus the Margin of Success of the attack that hit it. If the walker fails the test, it falls down, suffering Light Damage. If the walker fumbles the test, it falls down, taking Heavy Damage. Walkers must spend one MP to stand before they can spend MPs on movement.

Weather Conditions - 7.11.10

Certain weather conditions complicate tactical combat. Players who want to add a little extra realism to their game may want to use some or all of the optional rules below. The rules give the simplified game effects of common (and uncommon) weather phenomena, such as wind, storms and rain. The following are just a few.

Extreme Temperatures ◆

Extreme cold (-40°C or lower) or extreme heat (+50°C or higher) is very detrimental to the functioning of vehicles. Any vehicle that lacks the appropriate Hostile Environment Protection perk automatically suffers Light Damage whenever pushed to Top Speed. In addition, such vehicles must roll one die at the beginning of each combat round. On a roll of one, the vehicle breaks down for a number of rounds equal to the roll of one die. Infantry cannot function in extreme temperatures unless it has special gear to protect it (coolant/thermal suits). Unless so noted, infantry is automatically equipped at no cost in a special environment scenario.

Night ◆

Nighttime combat functions as daytime combat except that the Night Detection score of a vehicle is used instead of its daytime Detection score. Infantry without nightvision equipment and vehicles without functional sensors will move only at half speed and have a -1 modifier applied to all attacks.

Some units are equipped with powerful searchlights (see Perks, page 193). Searchlights can be turned on or off at the beginning of each round. Using searchlights obviously make the vehicle easier to spot, however. Any sensor inquiry or weapon fire directed at the vehicle is also treated as if it were in daylight, regardless of the arc of the searchlight. Enemy fire can target the searchlight(s) by performing an aimed shot. If successful, the searchlight is automatically taken out.

Vehicles can be heard up to two kilometers away at night, infantry only 300 meters. Naval units will be detected up to one kilometer away, unless they keep their speed below two MPs. Stealth vehicles are detected at a distance equal to the above, divided by their Rating. For example, a stealth tank with a Rating of 4 will be heard at a distance of (2000 m ÷ 4) 500 meters away.

Rain ◆

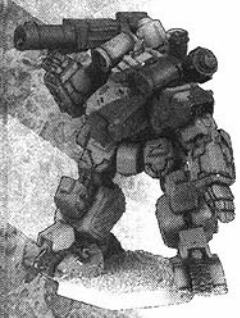
Rain mainly causes visual Obscurement. Light rain does not affect visual detection within 20 ground hexes; beyond that, it has an Obscurement value of 1. Heavy rain has an Obscurement value of 2. For Active scanning, the value decreases by 1.

Blizzards, Sandstorms and Terranovan Tempests ◆

Sandstorms are common in the middle latitudes of Terra Nova. These turbulent dust clouds obscure both visibility and sensors alike. If both players agree that a sandstorm is occurring during their combat, add +1 to the Obscurement value of every hex of terrain. This translates to a -1 modifier per hex of intervening terrain on all attacks. Blizzards have the same penalties as sandstorms. In addition, vehicles that lack the Hostile Environment Protection: Extreme Cold perk must spend one additional MP per hex of terrain moved.

Terra Nova is also subject to massive sandstorms known as tempests. Tempests add +2 to the Obscurement value of every hex and add a -2 modifier per hex of intervening terrain to all attacks.

7.12 - SILHOUETTE 3D MINIATURES RULES

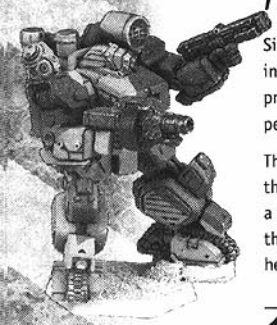


Players wishing for a more visually exciting game may opt to play on a fully decorated miniature battlefield instead of the traditional hex or dot map. Hobby stores can provide excellent terrain features which are made to HO scale (model train scale) and are compatible with the scale used for Heavy Gear miniatures. You can create more realisic terrain this way and have battles that are visually more appealing. This requires some simple adaptations for movement and combat, but basically uses the exact same rules as the map-based tactical system outlined on page 124 and onward.

Silhouette 3D is played in much the same way as the standard Silhouette rule system, except that the rules rely on an imaginary hex map on top of a real miniature landscape instead of the reverse (an imaginary landscape and a real hex map). The troopers, vehicles and land features are represented by small models and miniatures that are painted up to represent the units and terrain features required by the scenario. Movement and ranged combat are controlled with tape rulers, while turning, fire arcs and defense arcs are handled through the use of a single template (see page 161).

To avoid repeating information, the following text covers only the changes required to adapt the map-bound tactical rules to a miniature environment and its peculiarities. Unless otherwise mentioned, all tactical rules apply normally.

7.12.1 - Measures and Scale



Since the 3D-based game does not have hexes to regulate movement or measure the range of the weapons, a tape ruler (or other similar instrument of measure) must be used instead. The following rules assume that the metric scale will be used, but there is nothing preventing the players from using the Imperial/US system if they feel more comfortable with it. It all comes down to a matter of personal preference.

The official Heavy Gear miniatures are in 1/87 (HO) scale — that is, they are almost a hundred times smaller than the "real" thing. At this scale, the 50 meters tactical hexes would measure just a little over 50 centimeters across, making them somewhat unwieldy (unless a fairly large playing surface, such as a gymnasium, is available). For large games, the scale of most battlefields will have to differ from the scale of the model. Smaller skirmishes, however, may be played in the correct scale. The peculiarities of both are explained under the headings below.

◆ Tactical

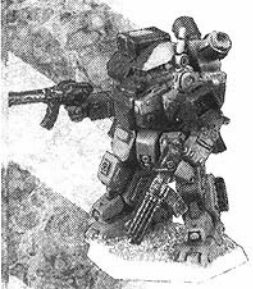


In tactical combat, the scale of the battlefield differs from the scale of the models that fight on it. It is as if the players were officers looking into the command post's holotank, with the computer enlarging individual units so that they are visible on the landscape. This method is best used for large battles in the open countryside.

The tactical scale uses a ground scale of 1/1000, which means that the corresponding hex map would sport hexes that are 5 centimeters across (50 meters divided by a thousand). Ground features, such as buildings and vegetation, are simplified representations of the "real" items, enlarged by the holotank for clarity.

The actual position of the vehicle is considered to be the exact center of the miniature representing it. All measurements are thus taken from this center point (it is often helpful to paint some kind of marker to avoid measuring disputes). The height of the base of the miniature is used to calculate line of sight and cover. When no base is available (for a tank, for example), use a height of 0.5 centimeter. Although it is an approximation, this method is good enough for game purposes.

◆ Skirmish



A true scale battlefield is often best used for urban combat and other restrictive environments (jungle, rocky terrain). In skirmish combat, the time frame is decreased proportionally with the increase in scale, so that the action can fit on a reasonably sized table. Instead of 50-meter hexes and 30-second rounds, skirmish uses 10-meter hexes and 6-second rounds just like the Personal Scale. In 1/100 scale (close enough to HO and easier to use), the hexes are thus 10 centimeters wide.

The shortened timeframe must affect the way actions are used, obviously. The players have the choice between two methods, both equally valid. One must be chosen by mutual consent before the start of the game. The first method restricts the players to their existing base actions, plus no more than one extra (a standard Gear would thus have one action, with the possibility to gain a second one for an overall -1 modifier). The weapon ranges are counted using the regular 50 meters hexes: a weapon with 1/2/4/8 range bands would thus have range bands equal to 50/100/200/400, in centimeters. With this method, most of the fighting will take place at Point Blank or Short range, making the game extremely deadly unless plenty of cover is available.

The second method is to allow as many extra actions as the player wants, as usual, but keep weapon range bands proportional to the smaller hexes. The above weapon would thus have range bands equal to 10/20/40/80 centimeters. Snap firing at multiple targets is imprecise, hence the shortened range. This simulates the frantic pace of skirmish combat as well as keeping the game manageable on a reasonably sized table.

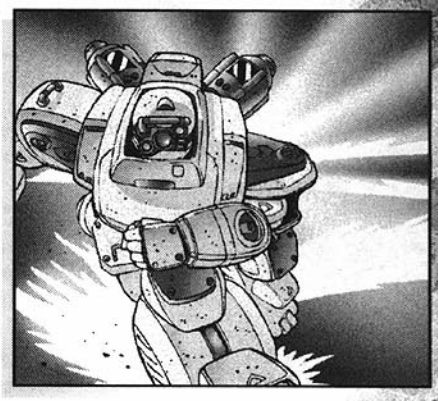
Movement - 7.12.2

The rules for movement, terrain effects and turning do not change from those given in the tactical battle chapter, page 124. They are merely used in a slightly different way, adapted for use on a map or miniature scenery without guiding hexes. Throughout the following text, "hex equivalent" refers to the distance that would equal one hex in the chosen scale. The hex equivalent in 1/1000 tactical scale is 5 centimeters (50 meters divided by one thousand). The hex equivalent in skirmish is 10 cm (10 meters divided by 100).

Each Movement Point (MP) buys one hex equivalent of distance in Clear ground (the actual distance will vary according to the scale chosen for the playing surface). Moving on difficult ground will cost more depending on the type of terrain: the distance is multiplied by the normal MP cost for that type of terrain. For example, moving through 1 cm of Rough ground (MP cost of 2) will cost the same as moving through 2 cm of Clear ground (MP cost of 1). The unit is considered to be in the terrain type that its base covers the most.

The Battle Templates

The attack and defense arcs of the vehicle do not change. Since there are no hexes to determine them, a template is used. The first side of the template serves to determine attack arcs while the second shows the defense arcs. The two patterns below should be reproduced on paper (a 200% enlargement using a photocopier gives them a more practical size) and glued to a piece of stiff cardboard. This will help the template survive the rough and frequent handling it will receive during the game. Since they are the same size, the two templates can be glued back to back to reduce the number of components.



The templates are similar to a phantom hex which travels with the model — all the normal rules are used for turning, attacking and defending, just as if the hex were part of an hexagonal map (see next page for the Ranged Combat and Close Combat rules modifications). The template's arrow must be lined up with the exact front of the miniatures.

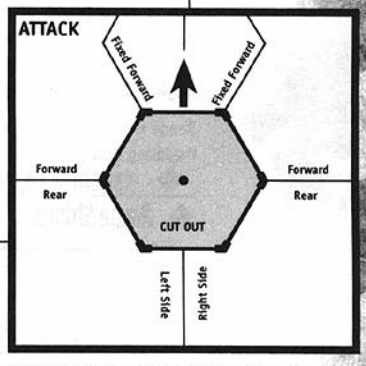
Either template can be used to determine the MP cost of any given turn. One of the templates is superimposed above the model: the resulting "phantom hex" determines whether the turn exceeded 120 or 180 degrees. The MP cost is then applied accordingly.

Movement Example

Example 1: *A Hunter is moving at Top Walking Speed. In the skirmish game, the scale of the terrain is 1/100, making one "hex" 10 cm across. The Hunter receives (7 MP x 10 cm =) 70 cm for movement purposes. Presently, the Gear is running through a thick jungle. Jungle hexes normally cost 2 Movement Points per hex to go through. Thus, for each centimeter moved, the actual cost is (1 cm x Jungle Cost 2 =) 2 cm. Each centimeter of Jungle terrain will cost the Hunter 2 cm, so it can move only up to 35 cm through jungle terrain.*

Attack Arc Template

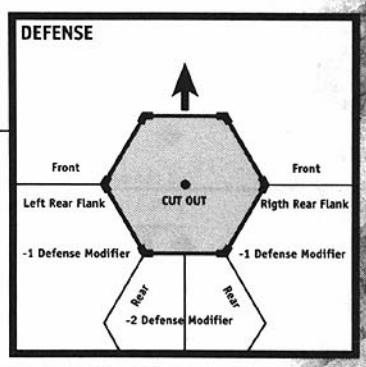
Template 1: *This is the template used when attacking. All of the possible attack arcs are listed on the template itself. There is some overlap, obviously — the side arcs (such as the left and right arcs) overlap both the front and the rear arcs. The Fixed Front (FF) arc lies between the two lines at the front(top) of the template — the imaginary extensions of these two lines define the fire arc itself. This attack template can also be used to define whether or not a turn costs some MPs.*



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Defense Arc Template

Template 2: *This is the Defense Arc Template. Just like the other template, it can be used to help determine movement cost. Its primary purpose, however, is to define the defensive arcs of the vehicle. All four arcs are represented on the template itself, along with the arcs' modifiers to the Defense Roll. Just superimpose the template over the miniature with the arrow centered on the front of the model and check to see where the attack comes from.*

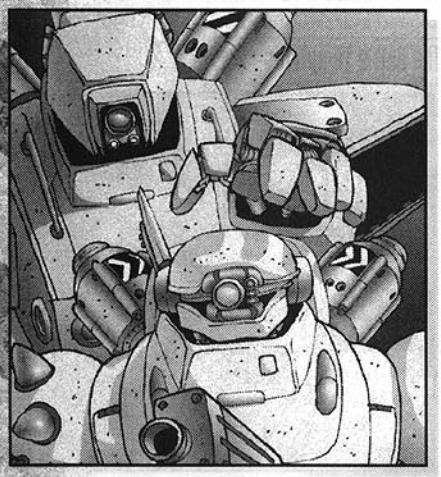


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7.12.3 - Ranged combat

Ranged combat is conducted in the same way as the normal map-bound games (see the Tactical Rules on page 124). There are only a few adaptations required to take into account the peculiarities of the miniature tabletop. These include methods to determine line of sight and range as well as area effects. Range strings are one such method, a useful tool that remove all range calculations and measures. A range string is a pre-measured piece of string that has markers along its length to indicate the various range bands for a given Base Range value. They do require a bit of extra work before the game, but are well worth it (see below).

◆ Line of Sight



There are several simple ways to check line of sight. The string is a common and easy-to-use method. An ordinary string or thread is placed from the sensors of the firing unit to the visible portion of the defender (or the center points of both, if playing the tactical scale). If the string is not hindered in any way, the LOS is clear. If it is, the model is in partial cover, or, if the string is blocked completely, in full cover. Other methods include direct visual sighting (impractical on large playing surfaces) and, for the well equipped, laser pointer sighting.

Concealment and Obscurement is counted as normal, applying the modifier only when a full hex equivalent of obstruction lies between the two units (5 cm in tactical scale and 10 cm in skirmish). If more than half the miniature is not visible, the vehicle is assumed to be in cover. When it receives a hit, a die is rolled: on a result of 1 to 3, the shot hits the cover instead. For the purists, more detailed rules about cover and hull down positions can be found in the **Tactical Field Support** sourcebook and directly transposed to the miniature game.

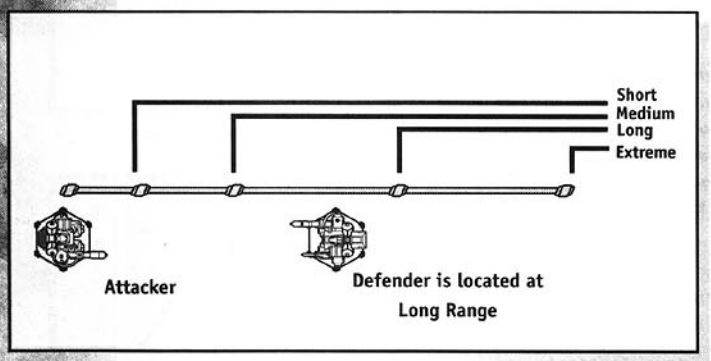
Line of sight and cover may be the source of the great majority of rule-related arguments among the wargaming public. It is thus better to try and prevent as many disagreements as possible before the battle starts. The best solution is to use an impartial umpire who will arbitrate any rule-related dispute). Other solutions include creating a battlefield with as few terrain ambiguities as possible and clearly defined terrain edges. Otherwise, when in doubt simply roll a die to decide.

◆ Range

Range is counted as normal, except that the distance in hexes is multiplied by the hex equivalent to allow proper measurement. For example, a gun with a Base Range of 2 can fire up to 80 centimeters away in tactical scale (Extreme range 16 x 5 cm/hex). Its range bands will be 10/20/40/80, always in centimeters. The range bands in the skirmish scale will depends on what action methods the players have chosen (see Skirmish Scale, page 160).

Range is measured from the center of the base to the center of the target's base. This prevents problem with long gun barrels and other modeling features.

◆ Range Strings



Range strings are a useful tool that remove all range calculations and measures, but they require a bit of extra work before the game. Each base range should have its own string (i.e. BR1, BR2, BR3, etc.). Use a good string, about a millimeter in diameter. With a tape ruler, the proper distances between each range band are measured and paper markers are attached on the string. Four markers are needed: Short, Medium, Long and Extreme. Wood sticks could also be used, though they are more cumbersome.

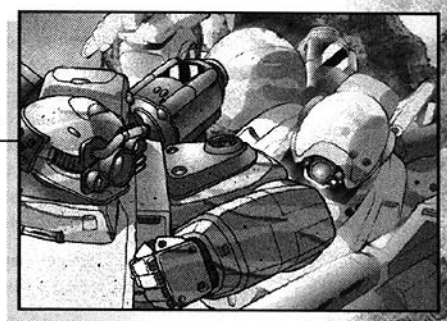
To use the range strings, the one corresponding to the Base Range of the weapon used is placed on the playing field from the attacker's mid-point to the defender's mid-point. The position of the target in relation to the string will clearly identify the range band in which it lies.

◆ Rate of Fire and Area Effect

The ROF and area effect rules are used as normal, remembering that hexes are replaced by equivalent distances. For example, in a tactical scale game, an AE1 weapon would have a radius of (1 x 5 cm =) 5 cm. AE0 weapons use half a hex; in the tactical scale, that would be (1/2 x 5 cm =) 2.5 cm radius.

Physical Combat - 7.12.4

The physical combat rules do not change (see page 140). The miniatures need not touch, but they must not be more than half a hex equivalent away from one another. For example, two units fighting on a tactical scale terrain must not be further away from one another than 2.5 cm (5 cm divided by 2). It is assumed that the attacking unit can charge the rest of the way into close combat.



Close Combat Example

Example: ***Gear Alpha wishes to engage Gear Beta in a fist fight. Alpha is currently 15 cm away from Beta, on a skirmish scale battlefield (10 cm per hex). Alpha spends one MP, crossing 10 cm of Clear terrain toward Beta. It is now 5 cm away, just close enough to engage in physical attack.***

Miniatures - 7.12.5

A full line of official Heavy Gear miniatures is already available, and more are in the works. The Gears themselves are between 4 and 5 centimeters high, or around 1/87 (HO) scale, and all other upcoming equipment will be 1/87 scale as well. A wide range of HO scale buildings and accessories are available from the model railroading industry — 1/87 scale is probably the most common scale for miniature trains. With a bit of time and a well-stocked spare parts box, these kits can be made into superb scenery for any scenario.

At this scale, even individuals can be represented, although infantry squads will definitely be cumbersome if the players wish to represent every single trooper — about one in five will do fine (two trooper figures per base). Human miniatures in 1/87 or smaller scale are available from several sources: modelers are advised to check out the railroad models section of the hobby shop or other games' miniature lines.

Players can use models of W.W.II or modern tanks and infantry units: the armor section of the local hobby shop will yield many kits suitable for conversion. Although expensive, the Rocco® line of HO scale (1/87) military vehicles comes preassembled and decorated. Inexpensive vinyl toys could also be used.

The Playing Field - 7.12.6

The playing field can be very detailed or very simple. The choice depends on the preferences and resources of the players. There are three general categories of terrain: simple, moderate and full-blown. Which one is used has no effect on the game mechanics themselves as long as the terrain types (Clear, Rough, Woodland, etc.) are clearly identified and their boundaries delimited.

The Simple Battlefield ◆

This is the bare floor or table top, with maybe a few pieces of furniture or some boxes to represent elevations, cover or obstacles. Each box can have a Damage Point Capacity like a building or it can be considered indestructible. This type of background is well suited for "arena" games or scenarios taking place in the deep deserts of the Badlands.

The Moderate Battlefield ◆

This background is made with a big piece of canvas or a sheet covering books piled to form the elevations, with some simple cardboard cut-outs to represent the buildings and features of the environment. Empty tin cans make wonderful factories and storage tanks.

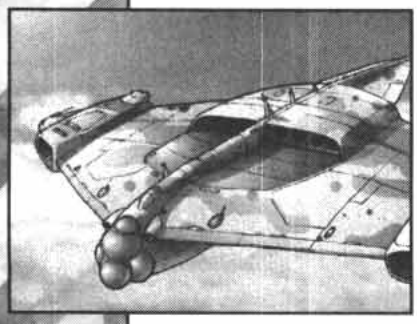
This type of terrain can also profit from the use of commercially available modular terrain. Many model terrains even have hexes printed on them, allowing the use of the usual rules without any modification.

The Full-Blown Battlefield ◆

This is the summum bonum: a complete miniature map with scale buildings, ruins, vegetation and so on. Water can be represented by plastic sheets or bits of mirror or glass (although players are strongly advised to leave the house's mirrors and windows alone). A wide selection of commercial models are available in many styles, shapes and materials. Many manufacturers make buildings customized for science fiction gaming.

A convenient way to build miniature scenery is the "tile" method: sections of terrain are built on square tiles made of strong cardboard or wood. These tiles are easy to store and can be assembled to form a variety of different playing surfaces. The only limitation is that roads and rivers must be either straight or curved or they will not line up when the tiles are put together.

AIR WAR TACTICAL RULES



With the exception of the change in Movement Point values and the addition of altitude, aerial combat is played out in the same manner as ground-level tactical combat. Note that the following rules can also be used for space combat if the style of the campaign is more cinematic than realistic.

There are two scales of aerial combat: Air War scale and Dogfighting scale. Air War scale is ideal for representing large numbers of aircraft or to simulate ground support missions. Dogfighting scale, on the other hand, is more detailed and fast paced: it is best used for a small number of aircraft, or for aircraft performing specific fire-support missions. This chapter describes the rules of Air War combat.

2.1 CHANGE OF SCALE

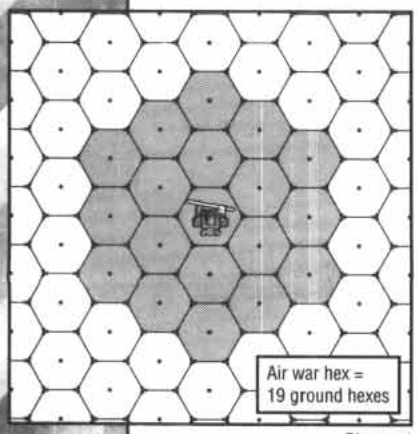


Diagram 1

Air War scale hexes are 250 meters across, five times the standard tactical hex. Air War scale combat rounds, however, represent 30 seconds of real time, just like the normal tactical combat rounds. Because of this, Air War MP scores are not the same as tactical MP scores: one Air War MP represents a speed of approximately 30 kph.

For hybrid games that combine Air War with ground tactical combat, a good solution is to use two maps: one for ground forces and one for aircraft (include a miniature version of the ground map within the air map). In effect, the two maps represent roughly the same battlefield (though the Air War map will cover a larger area). To account for the difference in scale, number the hexes individually on the Air War map and correspondingly number the ground hexes in groups of nineteen, as shown here.

It is possible to combine both aircraft and ground units on the same map, but this requires an unusually large playing surface, which is bound to be impractical. Multiply an aircraft's Combat and Top speed values, as well as its Turn Radius (see page 9), by a factor of five (x5) to get the corresponding values in tactical hexes.

2.2 MOVEMENT AND AIR EFFECTS

Movement in the Air War Tactical Rules follows exactly the same procedures and rules as ground movement, with a couple of exceptions to represent the peculiarities of atmospheric flight. Unless otherwise mentioned, assume that all tactical rules from Chapter 4 of the rulebook are valid when applied to aircraft.

2.2.1 ALTITUDE

Pilots must keep track of their altitude level. One altitude level is equal to one level of elevation (250 m). Climbing one altitude level costs 3 MP and dropping one altitude level costs 1 MP. Aircraft must stay one altitude level above the ground or crash (see *2.2.5 Crash Landing*, page 8).

One exception to this rule is landing. When an aircraft lands, it must end its movement at Stall speed, on terrain with a Ground MP cost of no more than 1 (rougher terrain will result in a crash landing). Aircraft with the Improved Off-road Ability can land on Rough ground. On the following round, the aircraft switches to its Ground movement mode (Top speed), if any.

Always record an aircraft's altitude every round after moving it. Its current altitude level can either be written down on a piece of scrap paper, or one or more 10 or 20-sided dice can be placed next to the unit on the map board, the correct number facing up.

Some aircraft have the Maximum Angle of Attack flaw, which forces them to move a certain number of hexes before climbing one hex. Aircraft without this flaw can climb almost straight up if they want, spending up to half their MPs in a single hex.

NOTE

Since most aircraft fly at considerable altitudes, the terrain effects of the hexes below them become irrelevant — all hexes cost one MP to move through. Likewise, the terrain obscurement effects are ignored when dealing with aircraft, unless the aircraft is attacking a ground target. If the target is within a hex with Obscurement, the Obscurement value of that hex counts. Aircraft with the NOE ability may hide behind (but not in) hexes with terrain that cause Obscurement — for example, helicopters will often hide behind woods before executing a "pop-up" attack. High ground, such as mountains and tall hills, can also block the line of sight between two aircraft.

2.2.2 STALLING

Most aircraft are given a Stall Speed attribute. This attribute indicates the *minimum* speed at which an aircraft must fly to avoid stalling, i.e. losing altitude due to reduced lift. If the aircraft is moving below this safety limit at the end of any movement, the plane begins to stall. VTOLs (Stall Speed of zero) can hover at no MP cost and are considered stationary for die modifier purposes.

A stall is like a fall, except that it is possible to regain control. In a fall, an aircraft — including a VTOL — is reduced to zero MP ***due to Structure hits*** (no movement possible) and plummets to the ground. Every round the craft stalls or falls, it loses an increasing number of altitude levels, as indicated on the table below.

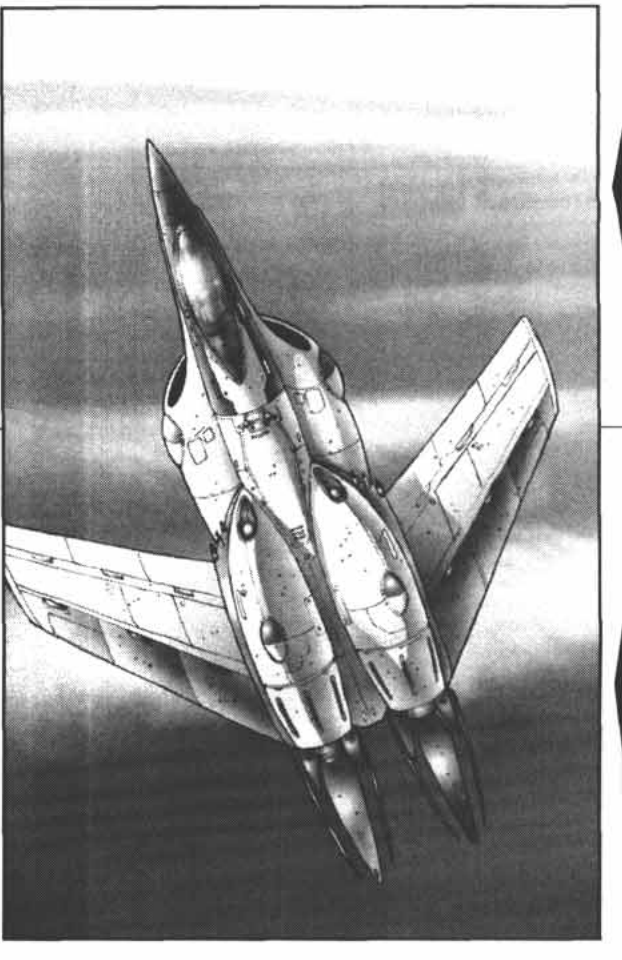
To pull out of a stall, a pilot must first wait until the number of altitude levels lost per round is equal to or higher than his aircraft's Stall Speed, then make a Piloting roll against a threshold of 6. If the pilot's Margin of Success is 2 or higher, he can select his craft's heading when he pulls out of the stall; otherwise, determine it randomly with a roll of the die. If the die roll does not succeed, the pilot can make another attempt once he has again lost a number of altitude levels equal to or higher than his aircraft's Stall speed. This will continue until the aircraft has lost the maximum number of altitude levels for that turn (see Altitude Loss table below). Note that a more detailed version of this table is used for Dogfighting combat (see next chapter).

ALTITUDE LOSS TABLE

# of Rounds	Drop
1	18
2	32
3	36
4+	36

# of Rounds *is the number of rounds the aircraft has remained stalled.*

Drop *is the maximum possible number of 250m altitude levels lost during the round. The maximum total altitude loss is 36 levels per round.*



STALL SPEED EXAMPLE

Aircraft Alpha is flying at an altitude of 28 (6751-7000 meters). It has a Stall Speed of 9, but only moved 8 hexes in the last round. The plane stalls and begins to lose altitude. The pilot attempts to regain control, but the plane first loses 9 altitude levels. Using his Piloting skill, the pilot rolls a 4, which is not enough against the threshold of 6. The plane sinks even further, another 9 altitude levels. The pilot makes another attempt, which fails again. The total altitude loss for the round is 18, which is equal to the maximum possible number of altitude levels lost during the first round, so the plane's stall will continue only in the next round.

The next round, the plane sinks another 9 altitude levels, for a total altitude loss of 27 hexes. The pilot prays and make another attempt, rolling a 7. The Margin of Success of one brings the plane out of the stall in a random direction, a mere (28 - 27 = 1 hex =) 250 meters above the ground. The plane can start moving normally in the next round.

2.2.3 GLIDING

It is possible for a fixed-wing aircraft to keep on flying even if its engines no longer exert any thrust: otherwise known as gliding. This can occur when all Movement Points are lost *due to Movement hits*, in which case the initial gliding speed is the speed from the last round. Each round a plane glides, it must lose any combination of 2 points of either speed (in MPs) or altitude. Should the aircraft's speed fall below its Stall Speed, it will immediately stall and lose altitude levels accordingly. Gliding aircraft can use the diving maneuver to gain speed (see *2.2.4 Diving*, below).

Planes that can reach supersonic speeds (i.e. with Top speeds of 40 or more) are not very good at gliding. Each round they spend gliding they must lose any combination of 3 points of speed or altitude, with a minimum altitude level loss of one. Planes with the Glider perk, on the other hand, only lose one altitude level or MP of speed per combat round.

2.2.4 DIVING

A good way to rapidly lose altitude, a full dive is nonetheless a dangerous maneuver, as there is always the risk of being unable to pull out. Understandably, dives are best handled at high altitudes.

To dive, the aircraft must spend a number of MPs equal to at least its Combat speed. The plane loses altitude levels equal to its MPs, *plus* a number of altitude levels equal to half the MPs spent. At the beginning of the following round, the pilot may attempt to pull out of the dive. Pulling out requires a Piloting roll, modified by the aircraft's Maneuver bonus, versus a threshold of 4.

A failed Piloting test means that the aircraft cannot pull out this round and begins to fall as if it were stalling. The aircraft will first lose a number of altitude levels equal to half the MPs it originally spent in beginning the dive, plus those normally lost due to stalling, until the pilot can pull out of this uncontrolled fall (Piloting vs. 6). If the aircraft's altitude drops below ground level in that hex, the plane crashes and is completely destroyed.

A fumble on the pull-out roll requires another roll, this time on the Aircraft Control Loss Table; apply the indicated effects in addition to the normal effects of a failed Piloting roll, unless they're redundant or contradictory.

The pilot of an aircraft pulling out of a dive can choose any facing he wants; see *2.2.2 Stalling* to determine the aircraft's heading if it has stalled during the maneuver. The speed of an aircraft pulling out of a dive is equal to the amount of altitude levels dropped in the last round of the dive.

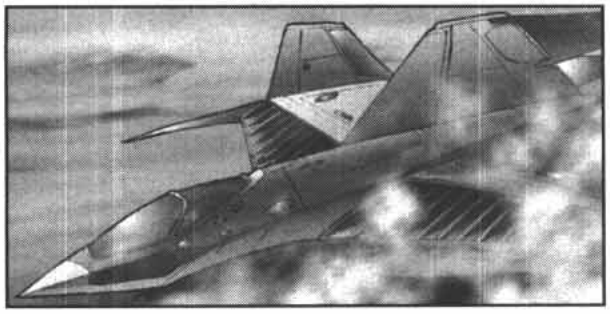
2.2.5 FALLING

Generally, anything falling out of the sky will be destroyed on impact. If a specific amount of damage is required, use the ground tactical combat rules (**Heavy Gear** rulebook, *6.2.2 Falling*, p. 106), with the following modifications: any fall from one Air War elevation level (250m) or less counts as a fall from five (5) ground tactical elevation levels for the purpose of calculating damage.

• Crash Landing

Whenever an aircraft is forced to land on Rough terrain (or worse), or no longer has landing gear (Ground movement system destroyed), it is said to be crash landing. Treat a crash landing as a fall, replacing the number of elevation levels fallen by half the landing speed of the aircraft (in MPs — usually the Stall speed) rounded up.

Some (or all) of the damage can be avoided by the pilot. A Piloting roll (with any applicable modifier) must be made against a threshold equal to the cost in Ground MPs of the surface he is landing on. The Margin of Success of that roll is subtracted from the die roll used to determine crash landing damage. If the total is equal to zero or less, the damage is equal to the aircraft's size.



CRASH LANDING EXAMPLE

Aircraft Alpha (Armor 13, Size 9, Stall Speed 8) is about to crash land on Rough terrain (Ground MP cost of 2). The pilot attempts a smooth belly landing. Using his Piloting skill, he rolls a 7, for a MoS of 5. The Gamemaster rolls two dice for the crash-landing damage and obtains a total of 6, subtracts the pilot's MoS of 5, for a final result of 1. This is multiplied by the aircraft's Size (9) and half the aircraft's speed in MPs, rounded up (4), for a total of 36 damage points. Fortunately, the plane's Overkill score is 39 and the pilot gets to walk away from this one... shaken, but alive.

2.2.6 TURNING

Aircraft in the Air War scale use the normal tactical rules for turning, with one exception: only an aircraft with VTOL capabiliity can change its facing by more than one hexside per hex moved. Non-VTOL aircraft with negative maneuver bonuses must travel straight ahead one more hex per negative maneuver point before turning one hexside. The forward movement (in hexes) required before turning is called the "turn radius."

DIAGRAM 2: TURNING

Aircraft A has a Maneuver rating of 0: it can change its facing by one (and only one) hexside for every hex moved (a turn radius of 1). Aircraft B has a Maneuver rating of -1: it must travel two hexes before changing its facing by one hexside (a turn radius of 2). Aircraft C has a Maneuver rating of -2: it must travel three hexes before changing its facing by one hexside (a turn radius of 3).

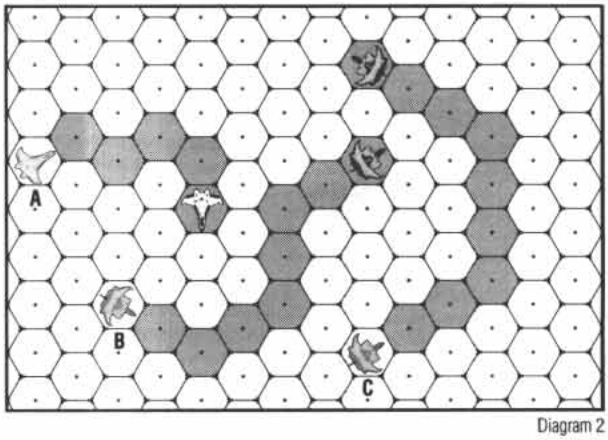


Diagram 2

NOTE

Aircraft moving at speeds below 6 have their turn radius reduced by 1 (if the turn radius is equal to 0, treat the aircraft as VTOL for maneuvering purposes). Aircraft moving at speeds greater than 20 have their turn radius increased by 1.

- **Tight Turns**

Aircraft can try to make turns tighter than their Turn Radius will allow, but in doing so they automatically have to roll on the Aircraft Control Loss Table (see p.10), adding one for every point the actual Turn Radius is tighter than the aircraft's normal Turn Radius.

Aircraft can also use the sideslip maneuver, in which the plane moves to a hex situated forward and 60° to the right or left, without changing headings. See diagram 3 for an example.

DIAGRAM 3: SIDESLIP

The aircraft in this diagram executes a sideslip to the right. The plane moves to a hex situated forward and 60° to the right or left of the original hex, without changing heading or overall speed. This simulates the fact that the aircraft is "sliding" on the air pressure under its wings (or under the fuselage for a helicopter, hover vehicle or floater). The aircraft may lose a bit of altitude, but what are a few meters when compared to the 250-meter altitude level? Therefore, it is assumed that an aircraft sideslipping does not lose any altitude.

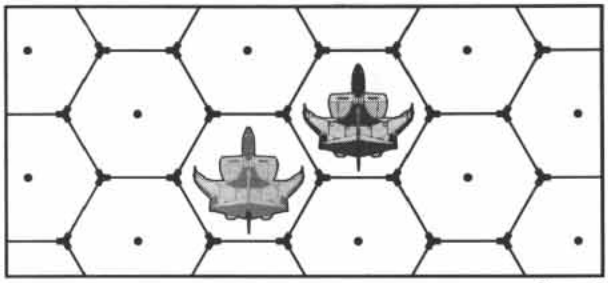


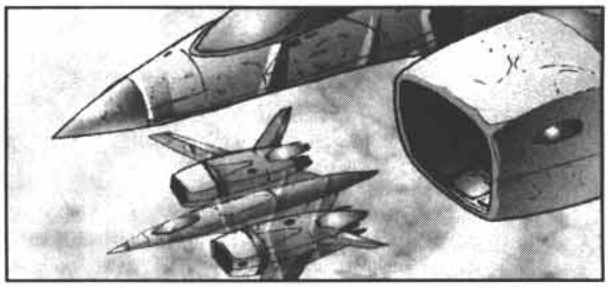
Diagram 3

2.2.7 STACKING

Since aerial combat hexes are in three dimensions instead of two, they have a lot more room than ground hexes, so stacking becomes less of an issue — in Air War scale, up to 150 Size points may be stacked in one hex.

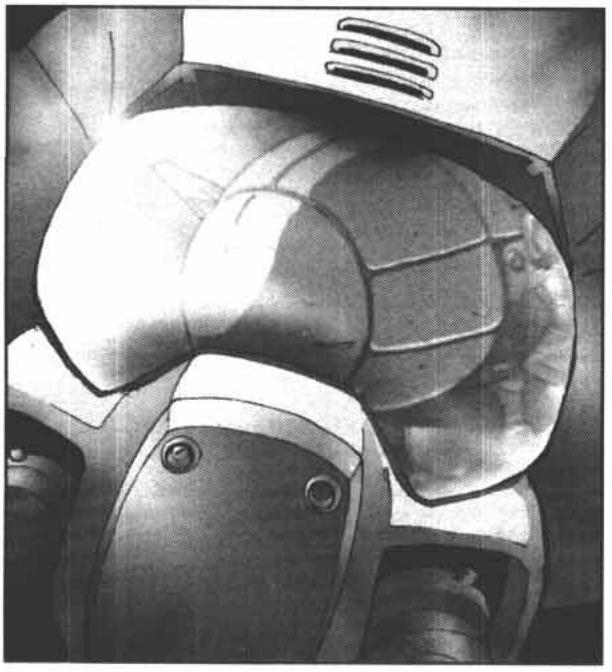
STACKING EXAMPLE

The picture at left shows two Southern *Quetzal* fighter-bombers flying in close formation. Since *Quetzals* are Size 10 vehicles, a single 250-meter hex can be occupied by fifteen such aircraft, although it could conceivably hold many more. After all, a *Quetzal* is not that big, volume-wise. However, one must keep in mind that some maneuvering room is required to execute even the simplest turns, if only for safety reasons. Not all pilots, military or civilian, are trained in close formation aerobatic flying.



2.3 LOSS OF CONTROL

Loss of control is a more dangerous situation than one would expect. While it is true that there is not much up there to collide with, a pilot who loses control of his aircraft can find himself in a dire situation nonetheless. There are many causes of control loss, from bad weather (see *Optional Rules*, p.20) to bad piloting, and the aircraft could suffer structural damage, or even worse, spin out of control in a deadly fall. Whenever a pilot fails during a delicate maneuver (as indicated in the maneuver's text), or *fumbles any Piloting roll*, he must roll one die and check the result on the following Aircraft Control Loss Table. Specific maneuvers will, and rules may, modify the roll, otherwise the result is taken straight.



AIRCRAFT CONTROL LOSS TABLE

Die roll	Effect
1	Nothing more than a good scare. (Pilot loses 1 action.)
2	Aircraft Sideslips, as per maneuver. Roll randomly for left or right.
3	Aircraft Skids (turns one hexside, but keeps going in the same direction) for a number of hexes equal to the roll of one die. Roll randomly for left or right if necessary. If the aircraft runs out of MPs during the skid, it must make them up by beginning the next movement phase with the remainder of the skid.
4	Aircraft suffers Light Structural Damage.
5	Aircraft loses a number of altitude levels equal to the roll of one die.
6-7	Aircraft Stalls.
8-9	Aircraft suffers Light Structural Damage and Stalls.
10	Aircraft suffers Heavy Structural Damage.
11	Aircraft Suffers Heavy Structural Damage and Stalls.
12+	Aircraft falls into an uncontrollable spin. It suffers Heavy Structural Damage and will plummet to the ground and crash unless the pilot makes a Piloting roll vs. a threshold of 10.

2.4 AERIAL ATTACKS

Aerial combat is similar to ground combat and uses the same general rules and modifiers. There are, however, a few adjustments to be made to take into account the differences in scale and medium (Air War hexes are 250 meters wide and combat occurs in three dimensions with little cover and fast-reacting vehicles).

In addition to the usual direct fire engagements, air combat makes a new attack form possible: bombing. While bombing can be inaccurate, modern ordinance is equipped with guidance systems that make lock-on bombs as precise as any other weapon. This section explains the various modifications to the rules for dealing with aerial combat and ground attacks.

2.4.1 MODIFIERS: RANGE

All modifiers remain the same as in the ground tactical scale (**Heavy Gear** rulebook, p.93), but the effect of the range modifiers changes due to the switch from tactical scale (50-meter hexes) to Air War scale (250-meter hexes).

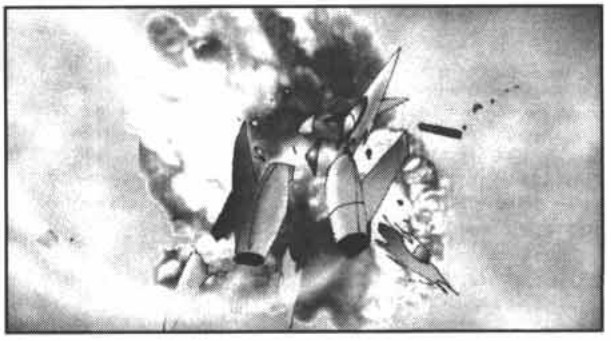
Aircraft have a clearer field of fire than their ground-pounding cousins — there is nothing to hide behind in the sky. As a result, although they carry comparable weapons, aircraft can use their full potential and hit a target much further away. In Air War scale, all weapon ranges are multiplied by five when dealing with other flying vehicles. Thus, a Light Autocannon (Base Range 2, listed range 800 m, p. 134 rulebook) can hit targets up to 4000 meters away without penalty when used in aerial combat, though its range stats remain the same for game purposes, i.e. 2/4/8/16.

2.4.2 PHYSICAL ATTACKS: RAMMING

Physical combat between aircraft is extremely rare. The only form of physical attack available is Ramming. Substitute the following table for the normal impact speed modifier table to compensate for the change in scale. The impact speed is determined using the usual table (see rulebook, p. 95). Note that ramming another aircraft requires that both aircraft be in the same hex and *at the same altitude level* (see 2.2.1 *Altitude*, p.6); in addition, the defending pilot automatically gets a +1 on his defense roll (it's easier to dodge in three dimensions).

AIR WAR IMPACT SPEED MODIFIERS

Impact Speed	Damage Modifier
0	-2
1	0
2	+1
3	+2
4-19	+3
20-199	+4
200+	+5



2.4.3 WEAPON FIRE

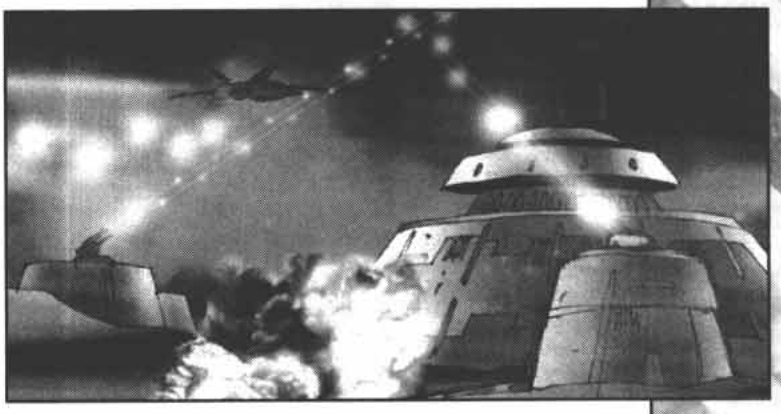
All Air War offensive maneuvers are ranged attacks, since close combat in the air is somewhat impractical (ramming excepted, but it is not a recommended attack procedure). Air War weapon fire is worked out exactly according to the standard tactical rules, with the following modifications.

• Area Effect Weapons

In Air War scale, all area effect diameters are divided by five (rounded off, with a minimum of 0), i.e. a weapon with a tactical AE of 2 would have an Air War scale AE of 0. Weapons with a tactical area effect of 0 lose that effect when used in Air War combat, since the explosion can be easily avoided in the large hex. Area effects are used as normal when playing a game using the Dogfighting Scale (see page 14).

• Saturation Fire

Saturation fire affects one Air War scale hex for every five tactical scale hexes that would normally be affected. More than one unit can contribute to this effect (i.e., several ground vehicles could throw up a wall of flak to hit an aircraft). All other saturation fire rules apply normally. Note that saturation fire effects are applied as normal when playing a game using the Dogfighting Scale (see page 14).

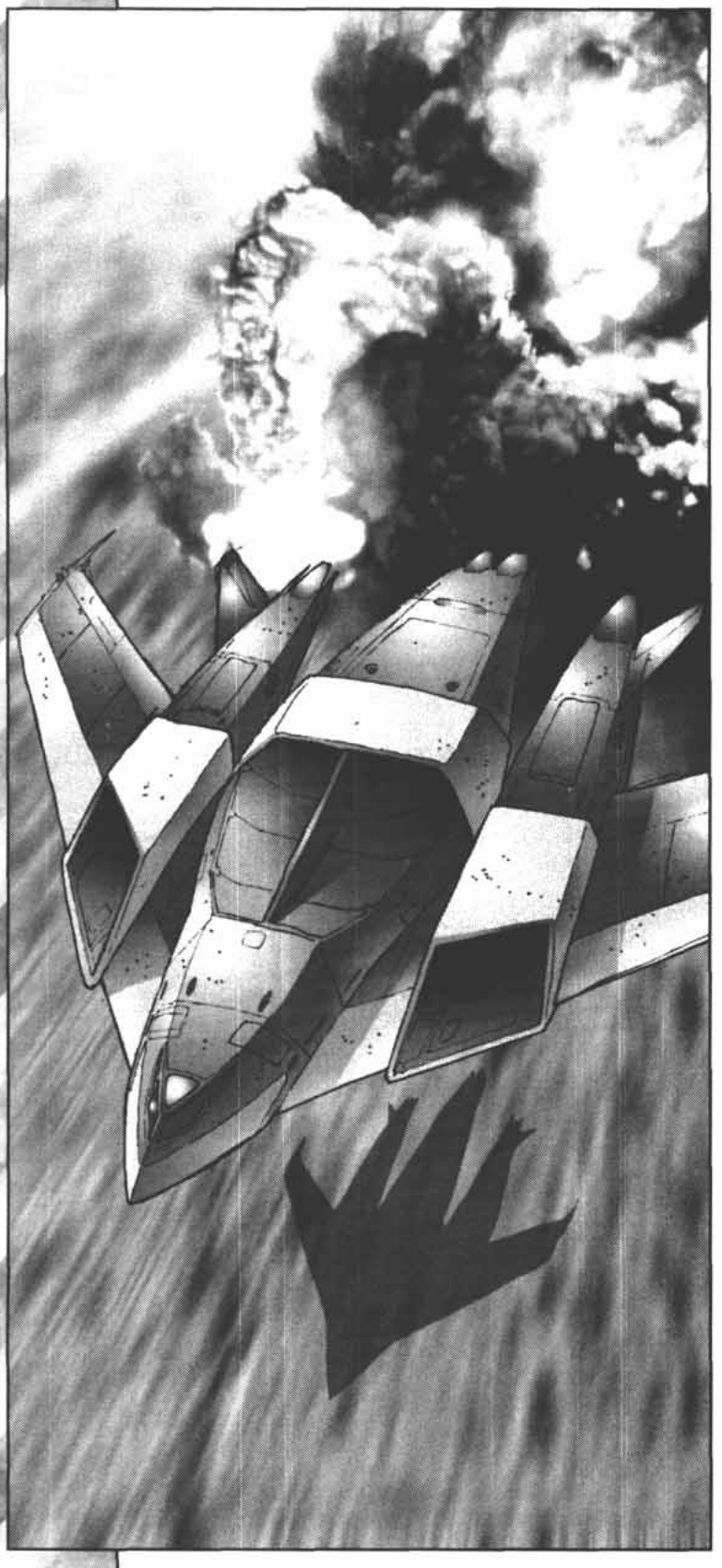


2.4.4 BOMBING

One of the main strengths of air power is the ability to bomb ground targets. Bombs fall into two broad categories: air-to-ground missiles and ordinary bombs. Air-to-ground missiles follow the same rules as normal guided weapons.

Ordinary bombs are simply dropped from an aircraft, and where they fall depends on the aircraft's velocity, altitude and the method of bombing. There are three such methods: normal bombing, carpet-bombing and dive-bombing. Bomb attacks must be declared and calculated during the bombing unit's *movement* phase, but are resolved during the *action* phase. The bomb *drops* when the plane moves, and *hits* after it has finished moving.

A Gunnery roll is still required to see if the target was hit. If the roll fails, the bomb falls one hex away from the target for every *two* points of MoF, either short or long (even MoF = long, odd MoF = short). If a fumble is rolled, the bomb did not explode or it hit way off-target (because of high winds, bent fins, collision with a flying critter, etc.)



• Normal Bombing

In normal bombing, the target hex is determined by the speed and altitude of the aircraft *when it dropped* the bomb, as well as its direction. For speed, use the number of hexes moved during the preceding round. Bombs follow the same direction vector as the plane that dropped them. To find out how far the target hex is from the dropping hex, consult the Bombing Distance Table on the next page. The pilot must thus choose the trajectory, speed and release time that will take the bomb to the desired target hex.

Note that guided bombs, whether or not they are directed by an allied target designator, can modify their target hex by one in any direction. Depending on the aircraft's altitude, the bomb may or may not hit in the same round it was dropped on; roll for the attack in the action phase of the combat round indicated by the Bombing Distance Table. A bomb gets to attack even if the airplane was destroyed after releasing it (though if the target designator was aboard the plane, the bomb loses the benefit of guidance, obviously).

• Carpet-Bombing

A tactic used for the mass destruction of urban and rural regions, carpet-bombing consists of dropping very large quantities of bombs over a given area. To carpet-bomb a target, a plane must have a bomb rack with a ROF greater than zero. Determining the target hex is done the same way as for normal bombing, except that the bombs cannot be guided (this rarely matters as accuracy is not the issue in carpet-bombing). The bombardier can choose to either saturate hexes (using the normal saturation rules) or spread out the attack over the largest possible area. Bombs are considered as rockets for ammunition expenditure purposes, i.e. 8 bombs per point of ROF used, with a minimum of 4 bombs to saturate an hex. See *Saturation Fire* on page 97 of the rulebook.

If spreading the attack over multiple hexes, the different hexes targeted are determined in the same way as for individual bombs, using the Bombing Distance Table and aircraft direction for every hex the aircraft moves and drops bombs at the same time (up to a maximum number of bombs equal to the bomb rack's ROF per bombing action spent by the crew).

• Dive-Bombing

Dive-bombing uses a different principle than other types of bombing. The aircraft actually plunges towards the target to drop the bomb, pulling up at the last moment. The target hex can thus be chosen more easily: the bombing aircraft can pick either the hex in which he's diving, or the one right in front of it (front being the direction of pull out). The procedure, however, is not without risk.

First, the aircraft must fall into a dive and spend at least one round diving. On any subsequent round of diving, the aircraft declares its attack and target hex at the beginning of its movement phase. It then tries to pull out of the dive, as per the normal Diving rules (see *2.2.4 Diving*, p.8). The attack, as usual, is resolved during the player's action phase. Bombs dropped during a dive gain a +1 accuracy per round spent diving as they are easier to place on target. The bombs can also be guided by a target designator as usual.

Dive-bombing can also reduce the attack delay for the bomb, as it starts with a higher vertical velocity than if it were simply dropped. Subtract one altitude level at the time of the release of the bomb for each altitude level descended in the diving round(s) prior to the drop, then consult the Delay row on the Bombing Distance Table: if the total is 0 or less, the bomb impacts immediately.

BOMBING DISTANCE TABLE

Speed / Alt.	1	2	3	4	5	6-7	8-10	11-15	16-20	21-30	31+
1	0	0	0	0	1	1	1	1	1	1	1
2	0	1	1	1	1	1	2	2	2	3	3
3	1	1	1	1	2	2	2	3	3	4	4
4	1	1	2	2	2	2	3	4	4	5	6
5	1	2	2	2	3	3	4	4	5	6	7
6-7	2	2	3	3	3	4	5	6	7	8	9
8-10	2	3	4	4	5	5	6	8	9	11	13
11-15	3	4	5	6	7	8	9	11	13	15	18
16-20	4	6	7	8	9	11	13	15	18	21	25
21-30	6	8	10	12	13	15	18	21	25	29	35
31+	8	12	14	16	18	21	25	30	35	41	49
Delay	0	0	0	0	0	0	0	0	1	1	2

Speed *is equal to the number of (horizontal) hexes the aircraft moved in the preceding round.*

Alt. *is the aircraft's altitude level (in 250 m hexes).*

Delay *is the delay in combat rounds before the attack is actually resolved.*



DIAGRAMS 4 & 5: BOMB ATTACK

In a combined Air War/ground battle scenario, Bomber Alpha plans to bomb Command and Control center Beta (and Heavy Gear Gamma at the same time) this round. The pilot has carefully placed his aircraft at a good altitude (level 8, somewhere between 1751-2000 meters) with the correct velocity (the aircraft moved 10 hexes in the preceding round). The two sides roll for initiative. C&C center Beta and Heavy Gear Gamma win, and choose to let Bomber Alpha move first.

After moving two hexes (to point 1), the player controlling Bomber Alpha announces that it is dropping a single Heavy Bomb (DM x20). Looking at the Bombing Distance table with the speed and altitude of the bomber gives an impact point located 6 hexes in front of the current position of the bomber, a mere one hex away from the target. Since this is a guided bomb, Alpha can move the impact point by one hex and directly target the C&C center's hex (see diagram 4 at right).

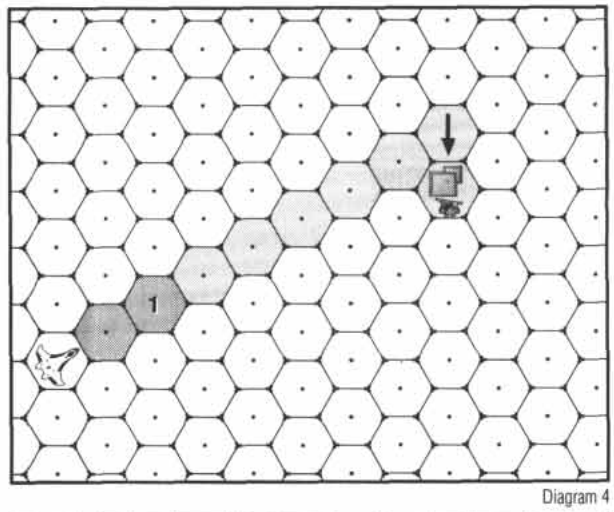


Diagram 4

Bomber Alpha then finishes its move, veering towards another target. The player controlling Heavy Gear Gamma sees the danger coming and moves to get out of the target hex (remember, each Air War hex is equal to five tactical hexes). During the Action phase, Heavy Gear Gamma can attempt to retaliate against the bomber, provided it has the means to do so. The bombardier in Bomber Alpha spends an action dropping the bomb in the Movement phase. The bombardier then spends another action and uses the plane's onboard target designator to illuminate the impact point. Since there is no attack delay at an altitude of 8, he immediately rolls his Gunnery skill to see how close he got to the main target: he gets a 6, all modifiers included. Note that even if the plane was destroyed by Gamma, the bombardier would still have rolled to hit, since the bomb was released before Gamma's strike.

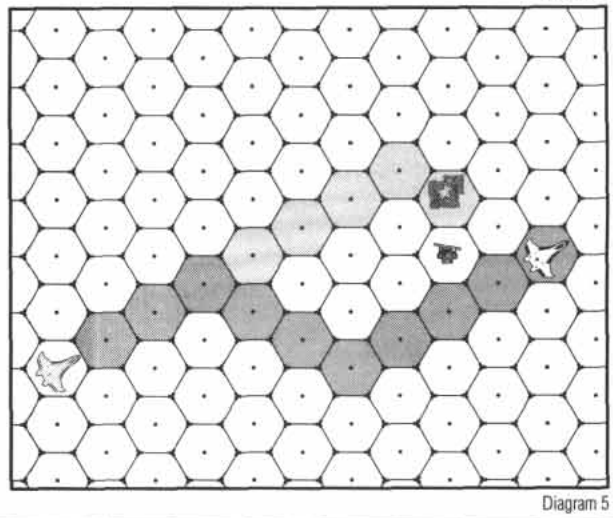
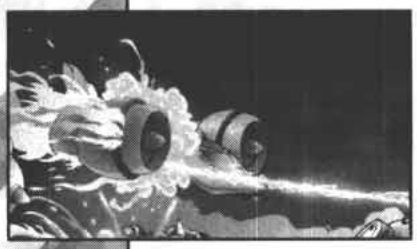


Diagram 5

Buildings do not dodge attacks and as such get no defense rolls (count as zero). The Margin of Success is thus 6 and the total damage is (6x20) =120 points of damage. Its damage point total exceeded, the Command and Control center bursts into a giant, glowing ball of orange flame (see diagram 5).

DOGFIGHTING RULES



For fast and furious action involving small numbers of aircraft, players may opt to use the Dogfighting rules instead of the "regular" Air War combat rules. The Dogfighting Scale uses a compressed time frame of six seconds per turn (equal to the ground-based Skirmish Scale and the Roleplaying Scale). To keep aircraft speeds constant, the hexes are reduced to fifty meters. This section details the rule changes for this more precise scale of combat. Unless otherwise noted, the rules remain the same as in Air War or ground-level Tactical combat.

3.1 CHANGE OF SCALE

Dogfighting-scale hexes are 50 m across (standard tactical scale hexes); similarly, Dogfighting altitude levels are 50 m high. Dogfighting-scale combat rounds represent 6 seconds of real time. Dogfighting MP scores are identical to Air War scale MP scores, i.e. one Dogfighting MP represents a speed of approximately 30 kph.

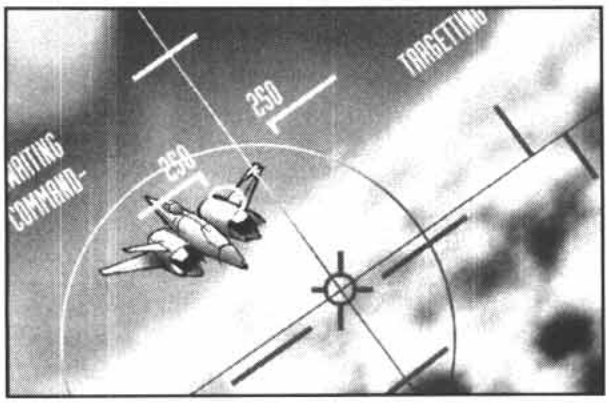
3.2 THE COMBAT ROUND

All combat procedures in the Dogfighting scale are the same as those in the ground tactical scale save for the Initiative Phase. Aircraft are usually grouped in combat groups of two vehicles (leader and wingman).

3.2.1 INITIATIVE

Initiative proceeds as usual, except when there are a total of four or less aircraft in the fight. In this case, it is assumed that the aircraft are independent as opposed to being part of a coordinated formation. Therefore, instead of rolling initiative for each side, players roll initiative for each aircraft separately. Any ties are rerolled. These individual initiative rolls are Piloting skill rolls, not Leadership skill rolls. Both Maneuver rating and speed modifiers for Combat and Top Speed apply to the Piloting skill roll.

Multiple initiative is treated in a particular way: during the movement phase, the person with the highest initiative roll (Player A) can decide to move first, or after any other unit has moved. Same goes for attacks or other actions. This is called "Opportunity Initiative." The second highest initiative (Player B) can also move or act at any time *except* before or after Player A if the latter decides to go first or last, respectively. Same goes for Player C (the third highest initiative): he can move or act at any time *except* before or after Player A or B if they want to move before or after him. In any case, where two players want to go at the same time, the one with the highest initiative roll has priority. The player with the lowest initiative doesn't get much choice: he moves and acts when the others allow him to.



OPPORTUNITY INITIATIVE EXAMPLE

Four units (A, B, C, and D, respectively) are rolling for initiative, and win in that order. During the movement phase, player A has the option to go first if he wants, but elects to wait, and so does B. C decides to move right away. D, who has no option but to wait for his turn, asks A or B if they want to move before him. Neither does, so D has to move now. It is then B's turn to move, *unless* A wants to cut in before him. He doesn't, and moves after B.

During the action phase, things go a little differently. A, who is the first to speak, decides to postpone his action. B goes right ahead and acts, followed immediately by A, who cuts in before the other players. C decides to delay his action, forcing D to act before him. Finally, C is the last to act.

3.3 NUMBER OF ACTIONS

In Dogfighting-scale combat, players still have the same number of actions per round as in tactical combat. They are permitted **one** additional action with a -1 modifier on all their rolls. Because of the short time span involved, it is impossible to get more.

For the same reason, the scope of what an action includes has been reduced. For example, in the Air War/tactical scale, maneuvering an aircraft costs zero actions and firing a weapon costs one action. In the Dogfighting scale, some aircraft maneuvers require one action, and aiming and firing a weapon require an action each (see further).

As a general rule, most complete acts in the Dogfighting scale require two actions. The first action spent represents the preparations made (e.g. acquiring a target, programming active sensors). The second action represents the actual completion of the act (e.g. firing the weapon at a target, performing the sensor scan). Usually, the second action can be performed many times in a row without requiring the first act to be repeated. For example, once an aircraft has acquired a target, it can fire upon it repeatedly until it either loses sight of it or switches to another (see *Target Acquisition*).

The following are common actions in Dogfighting-scale combat.

• Maneuvering

Aircraft can use a wide variety of special maneuvers and piloting tricks to either attack or defend. Most if not all of these require a lot more attention from the pilot than regular flying. See the section on Movement, on the next page, for the action costs of specific maneuvers.

• Shifting into Top Speed

Instead of simply declaring a change from Combat Speed to Top Speed or vice versa after a completed movement, in Dogfighting-scale combat this change requires the expenditure of an action (the change still takes place after the movement).

• Target Acquisition

Before attacking an opponent, an aircraft can use one action to acquire it as a target (also see *Panic Attack* below). A unit may only acquire a limited number of targets. The maximum number of targets that can be acquired simultaneously is equal to the unit's total number of actions per round.

It is also possible to acquire a target by "tailing" it over several rounds. To tail an opponent, one must end the round in the target's rear defense arc. If the attacker is still tailing the defender in the next round, an opposed Piloting check is made between the two pilots. If the tailing unit succeeds, the target is acquired. For each subsequent round where the target is tailed but not acquired, add +1 to the attacker's roll to acquire the target.

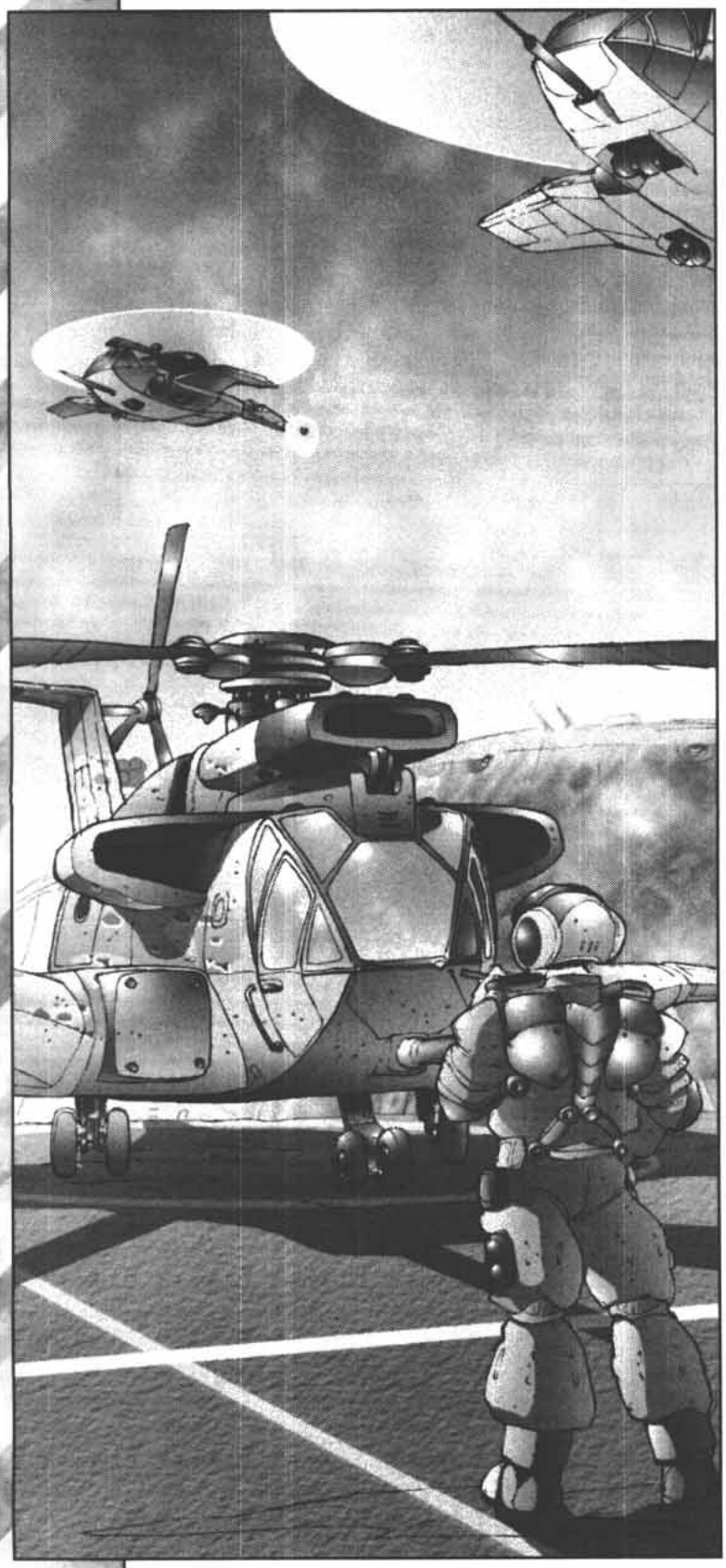
• Standard Attack

After performing target acquisition, an aircraft may attack the target with one weapon or set of linked weapons, as usual. Damage is applied immediately as each weapon hits.

• Panic Attack

A panic attack consists of an attack performed without first acquiring the target. Panic attacks suffer a -2 penalty on their attack rolls. If a unit performs three panic attacks (successful or not) against a target without ever losing line of sight, the target is automatically acquired.





• Activating Auxiliary System

Before using any auxiliary system, such as ECM or active sensors, an aircraft crew must spend one action preparing the system for use. No rolls are made during this action; it succeeds automatically. A system need only be prepared once for all future use, provided it is used in consecutive rounds. If the system is not used for a complete round, it must be prepared again at the cost of another action.

• Using Auxiliary System

Once an auxiliary system has been prepared, an aircraft's crew must expend one action to use it. If the system requires a roll of some sort, it is performed when the action is expended. An auxiliary system may be used multiple combat rounds in a row. If a round goes by without the system being used, the crew must expend one action to prepare it again the next time.

• Preparing to Embark/Disembark

One action is required for a vehicle crew outside their aircraft to prepare to embark (if at all possible) or for a vehicle crew inside their vehicle to prepare to disembark. This action covers the various ingress preparations such as lining up for entry, opening hatches and access doors, etc. Crew preparing to leave the vehicle must likewise release their security harnesses and move into position by the doors. This action is most often used prior to dropping paratroopers.

• Embarking/Disembarking

Once a vehicle's crew has prepared to embark or disembark, up to ten crew members or passengers may enter or exit the vehicle per action expended, provided the situation allows it. This action covers various activities such as entering the crew compartment or cockpit, settling down, reaching for straps and belts, etc. The action also covers the release of paratroopers and airdropped equipment (one action is required per 6 Size points dropped).

• Warm-Up/Shutdown

Since Dogfighting scale turns are so short, the actual act of starting up an aircraft's engine, or shutting it down, requires a full action. In most combat situations, all aircraft will already be flying with their engines started, but in some scenarios, an aircraft's crew could begin on the ground, inside or outside their aircraft.

In such cases, treat the crew as an infantry squad one level lower than their crew level (e.g. Veteran crew becomes Qualified infantry), often with fewer members than usual (break down the crew in units of ten). They are armed with pistols (Accuracy 0, ROF 0, Damage 1, Range 1 hex). In the case of a large crew, one in five crewmen is equipped with a rifle or a shotgun (treat as a standard infantry rifle).

• Landing and Take-Off

Landing and take-off are treated the same way as they are in the Air War game scale, with one exception: both landing and taking off require two actions: one to prepare for the maneuver and another action to actually land/takeoff. All other rules remain unchanged, though purists may want to follow the plane through all the phases of switching movement modes and the acceleration and deceleration related to taking off and landing.

3.4 MOVEMENT AND AIR EFFECTS

Aircraft move in the same manner as they do in a normal Air War/tactical game, with one major exception: they move individually, not as part of a combat group. Maneuvers are treated differently from those in the Air War scale, as detailed below.

3.4.1 STALLING

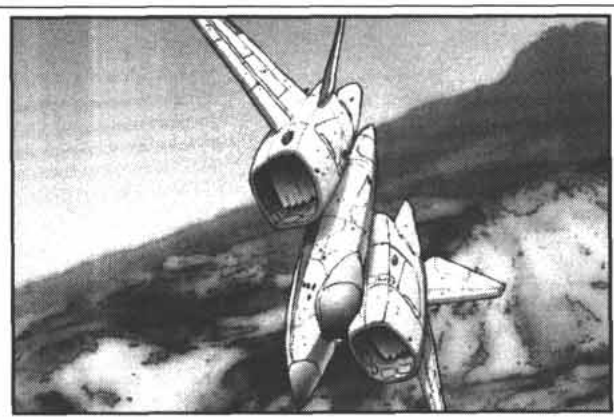
Keep the same rules for stalling in Dogfighting combat as in the Air War scale, using the alternate table below for altitude loss.

ALTITUDE LOSS TABLE

# of Rounds	Drop
1	4
2	10
3	18
4	24
5	32
6+	36

***# of Rounds** is the # of rounds the aircraft has stalled.*

***Drop** is the number of 50 m altitude levels lost during the turn. Maximum number of altitude levels lost in one turn is 36.*



3.4.2 DIVING

As in the Air War scale, you can use the Diving maneuver (see *Diving*, p.8) to rapidly lose altitude. Use the Air War rules, though diving requires an action in Dogfighting games.

3.4.3 FALLING

In the Dogfighting scale, treat falls as you normally would in any tactical game [damage received = two dice x aircraft size x elevation levels fallen] up to a maximum elevation level of 6. Use the normal Air War rules for crash landing.

3.4.4 TURNING

In Dogfighting scale, non-VTOL aircraft use different rules for maneuvering: the number of hex facing changes they can make in one round is still restricted by their turn radius, but the turn radius is determined by dividing an aircraft's Combat or Top speed (for combat or Top speed turning radiuses, respectively) by three *plus* the aircraft's maneuver bonus (minimum divisor of one). This value — rounded down — gives the number of hexes an aircraft must move before *safely* turning one hexside.

Aircraft can make tighter turns than their safe turn radius will allow. These tighter Combat and Top Speed Turn Radius are three values which represent 3/4, 2/3 and 1/2 (rounded to the nearest number) of the safe turn radius, respectively. During play, reduce the Combat speed Turn radiuses by two (2) (with a minimum of one) if the plane is moving at half its Combat Speed or less.

Making tighter turns is risky, though: the increased G-forces can force Piloting and FIT tests on the pilot. Use the table on the next page to determine what a pilot must do to keep control of his plane and if the turning maneuver requires an action or not. If two turn radiuses are the same after rounding fractions to the nearest integer, use the higher threshold of the two listed when rolling Piloting or FIT tests. For example, if both the 2/3 and the 1/2 come up the same number, use the thresholds listed for the 1/2 turn radius for both.

A failed Piloting test means that the pilot must roll on the Aircraft Control Loss Table (see p.10), adding one per point of Margin of Failure. A failed FIT test means that the pilot is stunned for 1 round from the black-out. On a fumble, the pilot temporarily loses consciousness and is considered stunned for 1d+1 rounds (in such cases, the aircraft follows its current trajectory). The FIT test is taken only if the Piloting test is passed.

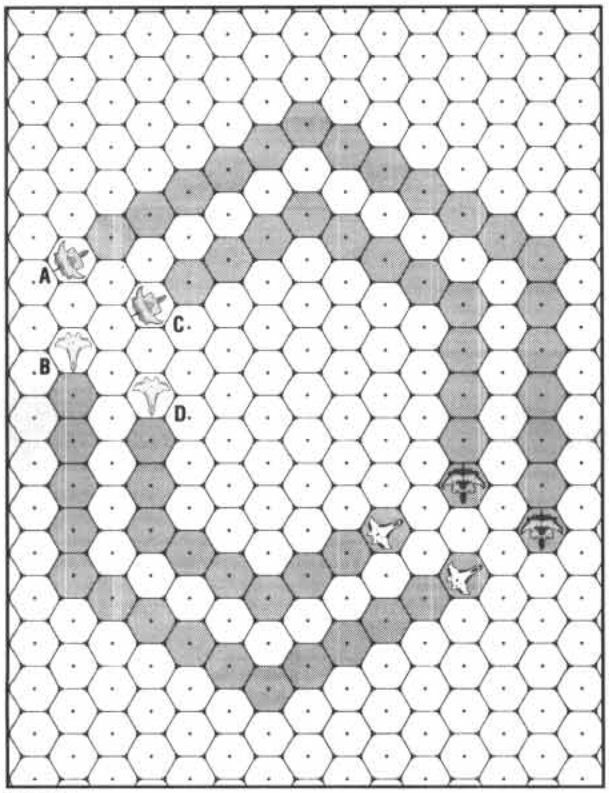


Diagram 6

TURN RADIUS CONTROL TABLE

Turn Radius	Piloting	FIT	Requires Action?
Safe	–	–	No
3/4 of Safe	4	–	No
2/3 of Safe	5	4	Yes
1/2 of Safe	7	6	Yes

*Use the **Turn Radius** row that is equal to or lower than the tightness of the current turn. Use the corresponding values for Combat and Top speed, as explained in the text.*

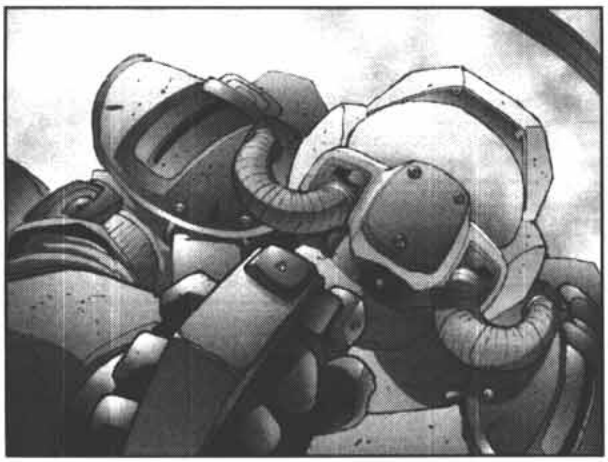
***Piloting** gives the threshold against which the pilot must test his Aircraft Pilot skill.*

***FIT** gives the threshold against which the pilot must make his Fitness roll.*

***Requires Action?** dictates if the maneuver requires an action from the pilot.*

DIAGRAM 6: TURN RADIUS

This shows the different combat turn radiuses for a plane with a Combat speed of 20 and a Maneuver bonus of 0. A is the normal, safe turn radius: MP/(3+bonus) or 6. B is the second safest turn radius, with a value of 5 (3/4 of 6, rounded up). C is more difficult, with a value of 4 (two-thirds the safe turn radius). Finally, the tightest and most difficult turn radius is D, with a value of 3 (half the safe turn radius).



TURN RADIUS EXAMPLE

Wu Jonz, ace aircraft pilot, is testing his new light fighter plane. It has a Combat speed of 16 MPs and a Maneuver bonus of -1. Flying high above the ground, Wu decides to test the plane's turning ability. The normal turn radius for the plane is 16/(3 plus -1), or 8. It is safe to a make a one-hexside facing change for every 8 hexes of straight movement. Of course, safe ain't Wu, so he tries to turn after only 6 hexes, which is 3/4 of the safe turn radius. The table calls for an Aircraft Pilot roll vs. 4. Wu passes the test, but still isn't satisfied with the plane's maneuverability. He decides to push the aircraft to its limits and makes a turn with a radius of 4, the minimum allowed (1/2 the safe turn radius). For this maneuver he must spend one action. The table calls for a Piloting roll vs. 7 and a FIT roll vs. 6. Wu misses the first roll by 3: he turns, but must roll on the Aircraft Control Loss Table. Since he missed the Piloting roll, he doesn't need to make the FIT roll.

• Sideslipping

The Dogfighting Sideslip is identical to the Air War Sideslip: the craft moves to one of the two hexes on either side of the hex directly in front of it, without changing its heading. See Air War section *2.2.6 Turning* (p. 9) for an explanatory diagram. Sideslipping in the Dogfighting scale requires an action.

• Rolling

An aircraft rolls when it rotates around its main axis, keeping a more or less straight heading. Rolling does not affect movement *per se*, as only the aircraft's attitude really changes. It does, however, add a +1 bonus to evading enemy fire and a -1 penalty to any attacks made by the rolling craft. Rolling requires one action with a difficulty threshold of 4 against the Piloting skill. On a failure, roll on the Aircraft Control Loss Table. Only fixed-wing aircraft can execute a roll.

• Looping

There are two kinds of loops: a Full Loop and a Half Loop (also known as an Immelmann). In a Full Loop, the craft more or less ends the maneuver where it started, keeping approximately the same heading. In a Half Loop, the craft keeps on going straight at the top of the loop (or the bottom, for an inverse loop), thus executing a reverse turn. All loops require one (Half Loop), or two (Full Loop) actions.

The tightness of a loop depends on how many MPs the player spends. For a Full Loop, the minimum number is the turn radius x 6; the difficulty threshold is the turn radius +1 (minimum 3; *double* the threshold for rotary-wing aircraft; lighter-than-air craft *cannot* perform loops). The aircraft ends its movement in the same hex it started from, or any of the surrounding hexes and at a) the same altitude level, b) one above, or c) one below.

A Half Loop has the same difficulty threshold, though the minimum number of MPs is less (selected turn radius x 3). As above, the craft ends its movement in either the hex it started from or any surrounding hex, but the heading is changed by 180°, and altitude must be increased (or decreased, for inverse Loops) by an amount equal to *at least* the selected turn radius x 1.5 and up to twice that, as desired.

A pilot who fails his roll during a Loop must roll on the Aircraft Control Loss Table (see p.10) adding 1 for a Half Loop, 2 for a Full Loop and 3 for any kind of Inverse Loop.

3.4.5 STACKING

In Dogfighting games, up to 30 size points can safely occupy the same hex at each altitude level.

3.5 AERIAL ATTACKS

In Dogfighting games, the rules are treated the same way as in normal (i.e. ground-level) tactical combat save for one change and a few additions. Note: weapon ranges remain the same as in the Air War scale.

3.5.1 PHYSICAL ATTACKS: RAMMING

Ramming is the only physical attack available in the Dogfighting scale. As in Air War, both aircraft must be in the same hex and at the same altitude level, although in this case the ground-level scale is used and the defender does not get a bonus.

3.5.2 POP-UP ATTACKS

VTOLs and vehicles with jump capacity can execute a maneuver referred to as a "pop-up attack." These units can use land features on the battlefield to hide behind and shield themselves from enemy fire, "popping up" briefly to spot or attack. This affects the attacker's accuracy, but since it greatly reduces the vehicle's exposure to enemy fire its chances of being hit are minimal.

A pop-up attack is declared during the movement phase. The proper amount of MPs to bring the attacking vehicle out of hiding, to the chosen attack point and back under cover must be spent. It might be helpful to place a counter in the hex where the attack is declared, to serve as a reminder. In the action phase, the attacker rolls as if his vehicle were at the location where it declared the pop-up attack, regardless of its current position. The attack is at -1 to hit because it is a hurried shot.

The target can shoot back at any time in the same round as the pop-up attack, at a penalty of -3, even though the attacker has since disappeared behind cover. This represents the snap-shot of the defender seeing the attacker popping up and reacting to it.

3.5.3 BOMBING

Bombing follows the same rules as in the Air War scale, with one exception: bombing delays due to altitude. Substitute the following for the Delay line in the Bombing Distance Table:

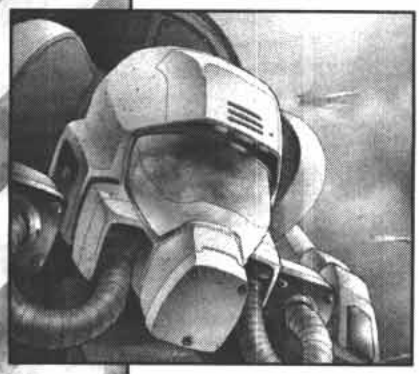
BOMBING DISTANCE TABLE

Altitude	1	2	3	4	5	6-7	8-10	11-15	16-20	21-30	31+
Delay	0	0	0	1	1	1	1	2	2	2	3

***Altitude** is the aircraft's altitude level (in 50m increments).*

***Delay** is the delay in combat rounds before the attack is actually resolved.*

OPTIONAL RULES



These are optional rules that can be used with any game, be it an Air War or Dogfighting combat scenario or a straight roleplaying session. These rules cover special considerations such as weather effects, airdrops — of both man and cargo — and airlifting operations. With these rules, it is now possible to drop troops into a battle during anything from a light drizzle to a torrential downpour, or from a pleasant breeze to the terrible tempests of the Badlands.

Because of the extra complexity brought into play, the optional rules may slow down play a little, but using them can breathe new life into an old scenario. Some or all of the following rules may be used if, and only if, all the players agree to use them *before* the game begins.

4.1 WEATHER

Players who want to add a little extra realism to their game may want to use some or all of the optional rules below. They give the simplified game effects of common weather phenomena, such as wind, clouds and rain.

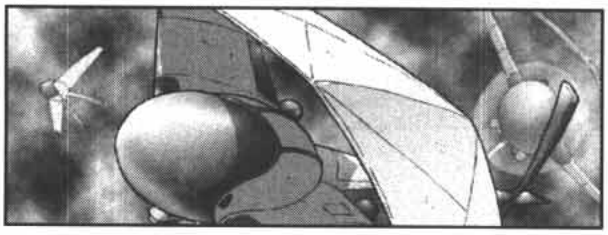
4.1.1 WIND

A strong wind will affect the flight of any given aerial object and make flying harder for small, lightweight aircraft — increasing the chances of a mishap or fumble. Wind is described with two parameters: Force and Direction. Direction is self-explanatory and is represented by a simple vector that is assumed to be consistent throughout the game map. The force of the wind is calculated in 30 kph increments — identical, in essence, to aircraft MPs.

Wind Force one (5 on the Beaufort scale) is equivalent to a good draft: flight with ultra-light craft (size 3 or less) and lighter-than-air craft will be difficult, but not impossible (add 2 to the difficulty of any maneuver).

Wind Force two (7 on the Beaufort scale) indicates a strong wind: flight with ultra-light and lighter-than-air craft will be nearly impossible (add 4 to the difficulty of any maneuver). VTOL aircraft pilots subtract 1 from their skill.

A typical storm has Wind Force 3 (10 on the Beaufort scale): subtract 1 from the Piloting skill for fixed-wing aircraft; for VTOL craft the penalty is 2 levels. Higher WF levels indicate hurricane-force winds: for each WF level above 3, increase the skill penalty by 1, and call for rolls on any maneuver other than moving straight ahead.



RANDOM WIND FORCE TABLE

Die Roll	Wind Force
1-3	No wind
4	Wind Force One
5	Wind Force Two
6	Wind Force Three

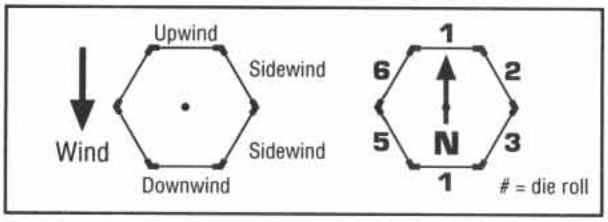


DIAGRAM 7: RANDOM WIND DIRECTION

In addition to making flight more difficult, wind also affects an aircraft's overall movement. At the end of the movement phase of any aircraft, move it downwind an additional number of hexes equal to the Wind Force. Do the same for any normal or carpet-bomb trajectory, counting the appropriate number of hexes for every round the bomb spends falling.

4.1.2 CLOUDS

While clouds have little effect on an aircraft's movement, they do provide an important source of visual obscurement. Depending on the level of detail you wish for, you can determine that the entire map is covered by a thick layer of clouds, or that there are only specific "cloud" areas. In the latter case, cut the shape of the clouds out of paper or cardboard, place them on the map and give them upper and lower limits in elevation levels. Any plane that goes "over" these clouds inside their limits is considered obscured. For added realism, use the wind rules and move the clouds by a corresponding number of hexes in the direction of the wind at the end of each turn.

Different types of clouds have different Obscurement values, from 1 (light clouds) to 3 (heavy storm clouds). This is for passive (visual) detection only; clouds have no effect on Active Sensor detection, or attacks based on such detection.

4.1.3 RAIN

Rain has an effect similar to clouds, and mainly causes visual obscurement. Light rain does not affect visual detection within 4 hexes (Air War scale; Dogfighting: 20 hexes). Beyond that it has an Obscurement value of 1. Medium rain has an Obscurement value of 1 and heavy rain has an Obscurement value of 2. For Active scanning, rain has no effect, except if the rain is actually an electrical thunderstorm; in which case, heavy rain has an Obscurement of 1 for Active Detection. Heavy rain can also affect an aircraft's flight: apply a -1 penalty to all Piloting skill rolls, -2 for lighter-than-air craft.

4.1.4 SANDSTORMS

Most common in the Badlands, sandstorms can be *very* dangerous for flying aircraft as powerful winds send tons of sand twisting into the air. Like windstorms, sandstorms are given a Wind Factor, which affects movement by a certain number of hexes each turn. This "wind," however, is very fickle and constantly changes direction. Roll 1 die to determine the wind direction each turn, *for each aircraft.*

Sandstorms are more devastating than windstorms of equivalent strength: treat a sandstorm as being one (1) Wind Factor higher for determining Piloting roll penalties and effects on small craft. Sandstorms have an obscurement value of 3. Fortunately, sandstorms usually have relatively low ceilings: around 1,500 meters for small storms (elevation levels: 6 for Air War, 30 for Dogfighting) and up to 2,500 meters (10 for Air War, 50 for Dogfighting) for big ones. Larger ones are possible, but uncommon.

The most devastating sandstorms of all are called tempests. Tempests are winds of Force 4 or 5 that can throw hundreds of tons of sand into the air. Ultra-light and lighter-than-air craft are automatically destroyed if caught within such a storm because of their flimsy structure. Tempests are otherwise handled the same way as sandstorms.



4.2 AIRDROPPING

Airdropping is another common military and civilian use for aircraft. Large aircraft can drop paratroopers, Gears, vehicles, food, propaganda, etc., practically anywhere you can see the sky.

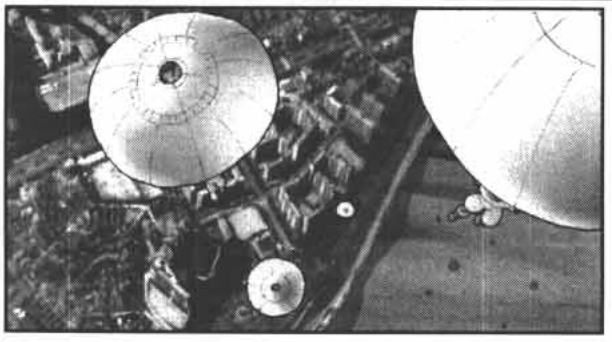
4.2.1 PARATROOPERS

Paratrooper squads are special infantry units trained in the Parachuting skill (see below). Equipped with steerable parachutes (paragliders), paratroopers can drop from any height between 250 to 10,000 meters (altitude levels: Air War 2 to 40, Dogfighting 6 to 200) from aircraft flying at a speed of no greater than 20 MPs.

A paratrooper unit can choose to land anywhere within a landing area whose radius is equal to the aircraft's altitude level. A Parachuting skill roll versus a threshold equal to one-half of the altitude level (round up; maximum 9) is required to land in a precise hex; otherwise, the Margin of Failure indicates how far the trooper(s) landed from their intended target, in hexes (direction is always downwind). Any collision(s) with an obstacle present in the hex is worked out immediately.

The time required for the drop is equal to the sum of the altitude levels dropped and the number of hexes between the drop hex and the landing hex, divided by two, in rounds. It takes one round for a landed paratrooper to get ready for battle, and usually one more to rendezvous with the rest of his squad.

If wind rules are used, there are a few restrictions on parachuting. Parachuting is not possible with a Wind Force greater than 2; even then, a Wind Force of 2 will doom the paratrooper to death if he fumbles his Parachuting skill roll. A Wind Force of 1 or 2 will modify a paratrooper's possible landing area as follows: a Wind Force of 1 will halve the landing radius upwind and double it downwind (effectively changing the normally round landing area into an ellipse). Landing at an angle to the wind (*aligned with an* hex side), either fore or aft, will reduce the landing radius by 1/3 or leave it unchanged, respectively. With a Wind Force of 2, the radius upwind is reduced to zero, downwind it is tripled. The fore radius is reduced by 2/3, while the aft radius is halved.



NEW SKILL: PARACHUTING (AGI)

Complexity:	Simple
Specializations:	High Wind, High Altitude, Night-time
Often Possessed By:	Skydivers, Paratroopers, Pilots

Parachuting allows the character to use and control a parachute or similar device and to correctly absorb the landing impact. The Parachuting skill includes the ability to prepare and pack parachutes and to make minor repairs. The skill also includes how to estimate wind speed and evaluate weather patterns that might affect the drop.

4.2.2 CARGO

In addition to paratroopers, an aircraft equipped with a rear ramp or other special drop bay can drop a variety of cargo. The difference is, cargo is dropped with unsteerable parachutes (see *Vehicle Parachute Kit*, p. 92) that fall straight down (unless there is a wind, see further). Cargo is assumed to have a "Parachuting skill" of 1 for deviation purposes. Maximum speed and height is the same as for troopers, though a minimum height of 750 meters (altitude level: Air War 4, Dogfighting 16) is required for the parachutes to open. After landing, vehicles are operational in a number of Air War or Tactical rounds equal to twice their Size (half the Size for airdroppable walker vehicles).

Using the wind rules will move the landing site of airdropped cargo. For every two levels of altitude dropped, move the landing site one hex for each level of Wind Force, in the windward direction. Thus, cargo dropped from 2,000 meters (altitude level 8) in wind with a force of 1 will land 4 hexes downwind from the drop hex, plus any deviation that might take place.

Cargo can also be dropped using a procedure known as Very Low Altitude Extraction, in which the aircraft flies very close to the ground (altitude level 1) and simply drops the cargo on the ground from its rear ramp. The cargo is yanked away by one or more "drogue" chutes, which slow it down and lessen the impact. The rest of the shock is absorbed by a special pallet placed under the vehicle (see *VLAE kit*, p.92). The aircraft's flying speed must not exceed 8 or the item dropped will suffer damage as a normal crash. Characters aboard a vehicle during such a drop must make a Fitness roll versus a threshold equal to twice the aircraft's speed. If missed, use the Margin of Failure to calculate damage, taking the Size of the vehicle as the damage multiplier.

4.3 AIRLIFTING

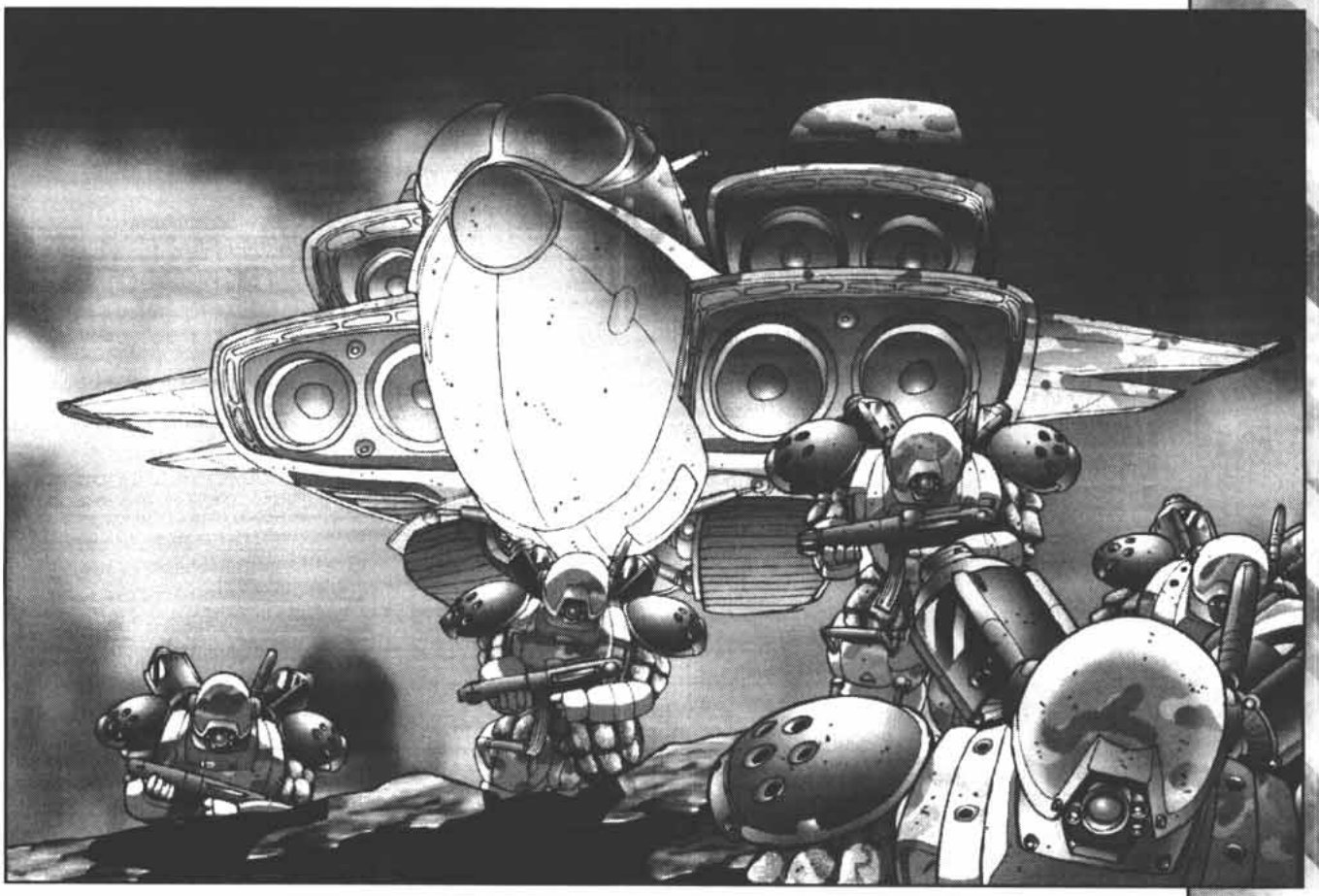
For most aircraft, airlifting requires landing, opening cargo doors and getting people, vehicles and other materiel in as fast as possible before taking off again. This can take quite some time (at least one round to land, one Air War round for an infantry squad/single vehicle to get in, at least one round to take off, etc.). Some VTOL vehicles, however, have the Airlift Winch perk, which enables them to pick up personnel and equipment without ever having to land. This is ideal for campaigns on rough terrain where it is difficult, if not impossible, to land and there would be no other practical way to retrieve a squad in trouble.

To accomplish the Airlift, the vehicle must remain stationary over the hex where the person/items to be picked up are situated; every two Air War rounds the plane can pick up one infantry squad or a single vehicle. Then the aircraft simply flies away. As usual, multiply time values by five for the Dogfighting scale.

4.3.1 VTOL CARGO CAPACITY

VTOLs (flying vehicles with a Stall Speed of 0) are often equipped with internal cargo bays. Many also routinely carry cargo suspended under their main body: such external cargo is called a "slung load." For game simplicity, all VTOL vehicles are assumed to be capable of lifting a slung load — large pieces are attached to hardpoints via strong cables, while smaller items are placed in large suspended nets.

A slung load is considered "towed" by the VTOL for game purposes. Unlike other vehicles, a VTOL's maximum lifting capacity (in kilograms) is equal to *half* the vehicle's mass due to the VTOL movement mode's limitations. VTOL vehicles can lift up to half their maximum lifting capacity (i.e., a quarter of their total mass) without a reduction in speed. Vehicles lifting between half and three-fourths of their total capacity are limited to Combat Speed, and loads from three-fourth to full lifting capacity reduce the speed to half Combat Speed until the load is dropped. Dropping a load costs one action.



Hardware - 2.1

In space, technology is vital and pervasive — human life is utterly and totally dependant on it for its survival in this hostile environment of hard vacuum and deadly radiation. In the darkness between planets, man and machine have evolved together rapidly under the deadly struggle for survival against the harshness of cold space. This is a relationship less like that of master and slave, as it is that of a symbiosis between equally complex organisms.



The marriage of human need and raw mechanical capability is balanced by the need for constant technological maintenance and innovation with pure human ingenuity and skill. It is therefore not surprising that the level of technology 'home grown' by spacers intimately familiar with the cruel coldness of death in space resembles less the monolithic complexity of the first Earth-orbital pioneers, so much as the welding of form and function, order and chaos, of a biological system permanently welding human and machine together.

This overall dependance on technology by spacers has a logical and inevitable corollary: these are a highly ingeneous, adaptable and technically-oriented people, in professions such as medicine as well as mechanical engineering. Those that are not, or do not wish to learn the rules of this last great survival game, are weeded out through the natural selection of the deadliest environment imaginable.

Sensors and Communication - 2.2

In the military environment of deep space, where stealth is the key to survival, using long-range active sensors systems is extremely dangerous. In many cases longwave 'pulse' systems used briefly, like the pinging of submarines from Earth's oceans, are much safer than laser or directed microwave 'sensor beams' which would require the system to be on and scanning for extended periods, giving the enemy a target virtually broadcasting its own position in space.

Specialized radar/lidar units or drones, operating in pairs or alone far from a well-stealthed mothership, are ideal for this sort of task. Most long-range sensor systems don't have the resolution necessary to accurately guide ballistic or direct beam weapons, leaving battles at great distances in space to automated self-seeking weapons. As it was once in the depths of Earth's great oceans, death in space is silent, swift, sudden and cold.

Visual Detectors ◆

Simple cameras can be used for primitive parallax-ranging of targets within a few kilometers of the vehicle. A wide-angle omnicamera produces a clear image in the center of the visual field, but progressively more distorted images towards the edges. These images can be reconstructed using a computer (though images towards the edge of the field will still seem more pixelated) to produce a fullfield of view. This kind of sensor is not appropriate for zoom-type applications; it is designed more for fixed-focus situational awareness.

Telescopic visual sensors are heavily baffled/shielded systems, preventing reflections bouncing off the ship itself from interfering with the observations of the scope. Longer-barreled systems are more robust and easier to focus in general, while shorter barreled systems make up in compactness what they lose in simplicity.

Image intensifying systems are basically the same as a standard visual systems, but are equipped with large light-collecting apertures tied into racks of photomultipliers or other amplifiers to boost faint signals from dark objects far away (or stealthed). These systems generally produce monochromatic output with very grainy resolution. Intensifiers are easily oversaturated by sudden bright sources in their field of view or (even worse) a laser sweeping across the array; therefore they are of limited usefulness on a military vehicle.

Infrared-band (IR) systems track targets via their heat signatures, be they from radiators or exhaust plumes. These systems are always employed in a passive scan-mode, but must be actively cooled to have a high signal-to-noise ratio. Ultraviolet (UV) sensors are largely useless in terrestrial environments; given the extremely high operation temperatures of fusion-plasma engines, however, UV detectors play a key role in long range space detection. Like IR systems, UV detectors can be easily blinded when looking to within 5-10 degrees of the system's star(s). UV systems are fairly easy to implement, but require some specialized optical components making them unusable for standard visual-spectrum operations.

Radar ◆

One of mankind's oldest long-range sensor systems, radar has not lost any of its utility in mankind's latest frontier. Low resolution simple radars are ubiquitous in space, from helping shuttles and transports maneuver into a docking berth, to tracking satellites and payloads, to monitoring for micrometeors and other debris. High-resolution millimeter radars are used on military vehicles for tracking and locking onto targets. A phased array radar system incorporated into either a set of radomes, a deployable network of radar booms, or built into the hull itself are very useful for the tracking of multiple targets, and the guidance of various forms of ordinance.

◆ LIDAR

Lidars, by their usage of tightly-focused laser beams, are excellent systems for locking onto, illuminating and identifying mobile targets within a few dozen kilometers of the sensing vehicle, especially when combined with positional information from a radar. The high signal bandwidth means that only a limited number of targets can be tracked at once, depending on the available computing resources. Lidar, however, allows the precise identification of the target, its type, speed, heading and damage status. By its nature, lidar defeats any stealthing that the emitter may have, making it an active target. Infared and red laser lidars are common inside terrestrial type atmospheres, while ultraviolet and blue laser systems are prefered for deep space systems.

2.2.1 - Sensor Signatures

From planets and stars to space stations, space junk and stealthed military craft, the truest test of a sensor system's capabilities is not just its ability to detect a target at a distance; it must accurately identify the target's position, nature and intent, and then pass that information to its crew. The wide variety of objects and phenomenon that can occur in deep space requires every sensor system used on spacecraft to be equipped with substantial signal processing capabilities, and most importantly, a very comprehensive database to identify and catalog what it detects.

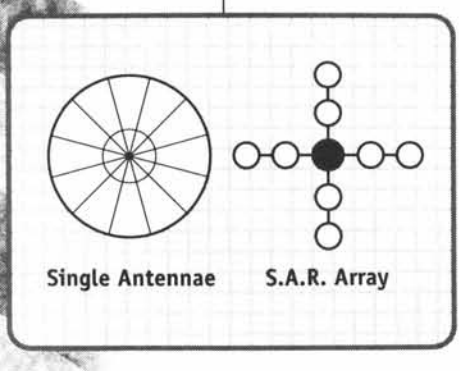
It is not surprising that most spacecraft employ sensor suites of various kinds rather than a single system. Planets and other celestial bodies are generally well catalogued in a spacecraft's database; simple star-scope sensors often use their unique spectral characteristics to help determine spacecraft orientation and heading. Various types of passive large-bandwidth sensor suites have been used for centuries helping asteroid miners and prospectors alike to find mineral and water deposits in asteroids and cometary cores.

Microwave radar (for long range detection) to lidar (for medium range tracking and identification) to visual cameras (for close range observation) supply the crew with progressively more detailed information as the target approaches. IR and UV imaging systems can detect the tell-tale spectrum of a spacecraft's chemical or fusion engines, as well as the heat signature of weapons fire, rocket flares and heat sinks. Radar can determine bearing, range and speed, while lidar can provide target identification and orientation for threat assessment.

Clearly, if sensor systems must deliver accurate and detailed information, their resolution and ranging abilities become critically important. The art of detection is a subtle one, balancing the size and sensitivity of the sensor system against its bulk, power requirements, and the narrowness of its field of view. In general, larger antennae or lenses are able to image/detect farther out or with greater resolution than smaller systems, at the cost of bulk, and with the narrowness of their field of regard; such systems operating alone might detect a target a great distance away at the expense of missing a closer target just barely out of the field of view of the sensor. Active sensor systems attempt to defeat this dilemma by pumping out a great amount of power in a wide cone to detect as many objects as possible, at the cost of making the sensor-vehicle itself an inviting target.

When a target is detected at the extremities of a spacecraft's sensor range, the game of detection and evasion begins in earnest. Long range sensor systems such as radar, while providing a crew with rapid information about a target's position and heading, lack anything near the level of resolution required to identify it, much less determine if it is a hostile spacecraft or an errant meteor. When this happens a judgment call is made, balancing the need to quickly identify the intruder with active systems and risk giving the sensor vehicle away, or to wait with passive systems for the possible aggressor to engage his engines, reflect starlight, or make a move to identify himself visually. Waiting too long could leave a spacecraft in danger of being targeted by an enemy's passive systems, while the dangers of acting too quickly are well publicized, as when warship accidentally open fire on civilian transports. Incomplete, inaccurate or poorly interpreted sensor information due to faulty or noisy sensors, a cluttered environment with spurious signal readings and false sensor lock-ons have resulted in many a tragedy in deep space. The stages of an encounter can be intensified in terms of range, in the case of a small spacecraft approaching and being scanned for threat assessment by another spacecraft. Clearly, the rule of thumb for sensor systems in space is "to see without being seen."

Antenna



In general, there are only two important types of antenna arrays; single antennae, and phased array synthetic aperture networks. Single antennae systems are cheap, easily maintained and are ubiquitous in space, appearing as anything from long antenna masts for omnidirectional detection, to giant swiveling parabolic dishes used for long-range tight-beam directional detection.

Phased array and synthetic aperture (SAR) systems avoid the large, ungainly antennae of typical radars and instead spread their emitter and detector elements over a much larger area. Phased-Array networks can be as simple as a group of tiny dishes mounted in the bow of a spacecraft, or as complex as an interconnected array of solid-state emitters built along the entire hull. In the case of synthetic aperture radars, smaller dishes widely separated along the keel (or suspended far away from the craft on booms) allow smaller, more compact systems to attain the same resolution as a radar dish the size of the separation between the detector elements. On some deep-space SAR networks, radar systems with effective receiver sizes on the order of tens to hundreds of kilometers are not uncommon.

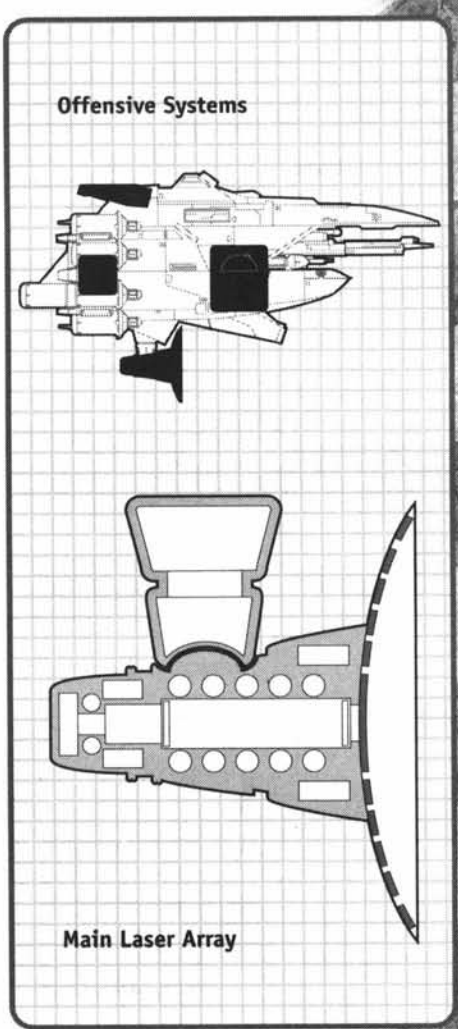
Offensive Systems - 2.3

Space is a very special environment for weaponry due to the absence of atmosphere and gravity. Some have even called it "the ideal environment" for these reasons. Specific weapon types have evolved over the years to answer the particular requirements of space combat, such as the vastly increased ranges over which combat may occur, and the lack of an atmospheric medium to slow a projectile with drag, or to disperse an energy weapon with scattering and absorption. The lack of gravity and wind resistance makes the use of small autonomous drone weapons that operate over extended periods of time and over great ranges both economical and deadly efficient. In many cases it is the sensor system and not the weapons system that determines the range of engagement, with the game of hide and seek played till the last possible moment before firing. Even after firing, the game can continue for seconds, minutes, and even hours with automated and guided weapons fighting their own battles on their way to their targets, evading point defense lasers, anti-missile-weapons and active countermeasures of an almost infinite variety. Even after a target is destroyed it may still strike back one last time as its automated drones and torpedoes continue a lost battle. In space, the price of survival is one of eternal vigilance.

Unlike their terrestrial cousins, space weapons are also capable of more than just simple destruction. Lasers are used for secure communication over very long distances, as well as sensor systems. Kinetic weapons use the same basic technology as a massdriver reaction engine or an asteroid refinery's slug-catapult. Giant laser arrays use technology analogous to those used by solar-sails and solar power stations. Particle beams can be used both to probe an asteroid for valuable minerals or to cut open a space-station's hull. A modified anti-ship missile can be used as a message torpedo, a sensor-probe, or in some famous cases, as an impromptu lifepod. In space, flexibility is key to survival and the nature of a warship's considerable arsenal is no exception.

Energy Weapons - 2.3.1

An acronym for Light Amplification by Stimulated Emission of Radiation, the laser has been widely used since its development both as a tool and as a weapon. Any laser, whether it is being used for guidance, ranging, sensing, illumination or as a direct-fire weapon has some basic characteristics shared by all lasers. To operate a laser, energy (electrical, photonic or chemical) must be 'pumped' into a gain medium (a gas, plasma, or solid crystal), generally held inside a resonating cavity. The resulting stimulated emission of radiation is channeled through the cavity and then through focusing optics on the other end and is output as a collimated shaft of coherent light. Most simple laser systems therefore resemble cylindrical housings attached to the back of reflective telescopes. Variations on this basic scheme are seen in small solid-state handheld lasers and in the Vertical-Cavity Semiconductor arrays used as part of a spacecraft's micrometeor defense screen, where thousands of microscopic semiconductor junctions emit bursts of electrically pumped, magnetic-field aimed laser energy.



In general, the larger the aperture of the focusing mechanism in front of the laser source (in most cases, a simple large reflecting-type Cassegrain or Gregorian telescope for high power systems, or a Newtonian refractor for low powered lasers), the better the collimation of the beam and the less geometric dispersion at long distances. At short ranges and in atmosphere, fairly small laser focusing systems are compact and light and provide good enough operation at range for most purposes. In deep space however, the situation change markedly because of the extreeme ranges involved. Even with the best quality and well focused optics possible, laser beams diverge and dissipate due to diffraction and other physical effects. The amount of dissipation depends both on the wavelength of laser light used and the size of the optics used to focus it: the shorter (bluer) the wavelength and the larger the optics, the less dissipation a beam will suffer.

For example, a red laser fired from a barrel half a meter in diameter (just a little larger than the barrel of an old Iowa-class battleship's cannons) will disperse out by almost a factor of four after just three hundred kilometers, spreading out the beam and dropping the power transmitted to a given target by 75%. Using a blue beam rather than red decreases this loss to 50% over the same range. Shorter wavelength lasers also have the advantage that they deliver more energy per photon, dumping more power on a given target than longer wavelength beams. Blue and ultraviolet beams are easily scattered, however, and absorbed by atmospheres. For this reason, spacecraft generally use green, blue and UV laser systems for defensive purposes, while using red and IR beams for navigation, meteorite defense, sensors and communications. Short-wavelength lasers, while powerful, require much more power to operate than red/IR lasers, and also produce a great deal more heat which must be dissipated. An overheating/overused laser can suffer a decrease in targeting efficiency, suffer permanent damage to its focusing optics, and may even (in certain special cases) destroy themselves and damage the ships they are mounted on.

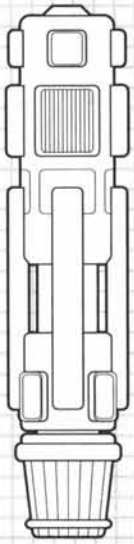
Many space vehicles are equipped with at least one type of laser cannon because of its practically unlimited shot supply and great accuracy. Lasers can also be used to send coded messages over very long distances (see page 62). In general, this is practical only for large installations or in emergency situations, since both the emitter and receiver must remain at the same velocity during the transfer.

◆ Particle Cannons

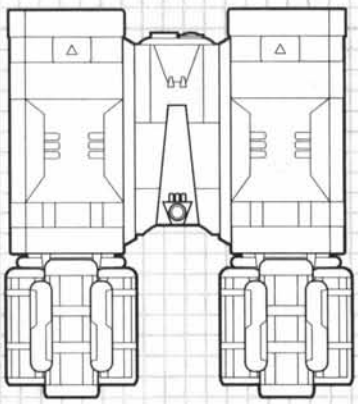
Particle cannons are magnetic acceleration devices designed to shoot high energy charged particle streams instead of a solid projectile. They cause damage through a combination of kinetic energy, heat and electrical induction. Often more powerful than lasers, they can cause a great deal of collateral damage by shorting out electronic circuitry in the target, as well as through radiation embrittlement of the target's hull and direct physical damage to its structure.

Neutral particle cannons, such as neutron guns, do their damage by propelling a tightly focused stream of particles at their target, damaging the very microscopic lattice structures holding the metal of a spacecraft together like a sandblaster cutting through rock. Generally, neutron guns are simple, robust systems that can be used at greater ranges than charged particle cannons. Charged particle cannons, alternately, fire a high-velocity (but rapidly dispersing) stream of ions at their target, warping the chemical structure of the target's hull (similar to high speed decomposition) in addition to super-heating the target and causing massive electrostatic disturbances in its electronics. Much more violent than the neutron guns, charged particle weapons are significantly more powerful, but closer-ranged, higher temperature, and higher maintenance weapons. A neutron gun failure generally results in a defunct weapon, while a charged particle gun failure can have catastrophic results, doing massive electrostatic damage to the structure supporting it.

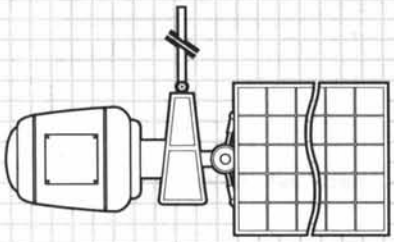
Missile



Heavy Drone



Towed Sensor Array



2.3.2 - ASATs and Missiles

Missiles are self-propelled, self-guided projectiles. Using sophisticated guidance computers and laser targeting technology, the missile is one of the most deadly weapons available to a space ship. There are no set standards; some designs call for a few accurate and powerful missiles, while others use hundreds of small unguided rockets to saturate the defenses of the target.

The most basic missile design is composed of a solid fuel booster for the initial launch, coupled with a liquid fuel rocket (which is colder and thus harder to detect than a fusion plume) for the main propulsion. The entire device is covered in stealth devices and use cold gas maneuver jets to be as discrete as possible.

The guidance system is composed for the most part of a sophisticated target acquisition package. A multi-frequency scanning device, using omnicameras and other detectors, utilize image scanning and recognition, heatseeking, signal homing and pattern matching techniques to find its quarry against the star field and home in on it.

Various types of warheads are used, from the simple shaped explosive to the low-yield tactical nuclear charge. Many common missiles rely entirely on kinetic impact, either crashing directly into the target or detonating a few kilometers from it to ensure a wider attack profile from the cloud of debris. Regardless of their warheads, missiles are among the deadliest space weapons: not only can they correct their trajectories in mid-flight (though at the risk of being detected), but their killing power does not drop with the distance.

2.3.3 - Projectile Weapons

Most of the space-based projectile armament is based on Gaussian effects, or magnetic acceleration technology. They require a lot of power to function, but thanks to superconducting technology they are fairly energy-efficient (which is good from a waste heat stand-point). Gaussian weapons cause damage by kinetic energy (i.e., impact) and are divided in two general classes: railguns and massdrivers.

A railgun uses a single projectile and accelerates it via twin rails supplying the necessary current along the length of the barrel. The projectile bridges the gap between the rails and closes the circuit, causing it to be accelerated ever faster along the rails until it is ejected for the gun. Because the projectile must be in contact with the rails, railguns suffer from high levels of wear.

Massdrivers use a similar principle in that a magnetic effect is used to accelerate a projectile. Massdrivers, however, employ a series of sequential magnetic rings to rapidly fire a hail of smaller shells. Each impact causes less damage overall, but the attack is generally spread over the whole of the target instead of just a spot. It also allows a greater rate of fire.

Classic projectile weapons, based on chemical technology, can be used in space with some modifications, but their low performances (at least compared to the other weapon classes available) restrict them to close-in defense roles.

Defensive Systems - 2.4

Space is one of the most hostile milieus ever encountered by man. It is a place where metal shatters from the cold, where oils and lubricants evaporate or break down, and where water, fuel and blood boil off almost instantly. Spacecraft rely on a number of special devices and systems to ensure their safety and continued existence as well as the lives of their crew.

Sensors - 2.4.1

A spacecraft's sensor systems are its first line of defense, allowing it to get out of the way of danger before it has a chance to harm the vessel. Radar probe ahead to detect incoming collisions, lidar arrays detect and burn off small particles, and remote probes warn of solar flares and other radiation perils. A ship with no sensor is not just blind, it is extremely vulnerable. Sensor systems have been discussed in greater detail on page 19.

Electronic Warfare Equipment - 2.4.2

Each modern fighting vehicle carries a host of defensive electronic modules. Some break up their radar signature, while others interfere with the opponent's targeting equipment. These modules are built-in, and no combat spacecraft would be designed without them. As a result, they usually have a sensor signature that has little relation to the size or power output of the ship and is more related to its intended purpose (civilian ships, for example, are always much "noisier").

Magnetic Field - 2.4.3

In space, even the smallest grain of sand is a deadly danger if moving at very high velocity. Any hit is likely to cause damage to the vessel. To prevent this, all ships are equipped with a deflector shield composed of two parts: an ionizing laser or magnetic field, and the magnetic shield proper. When the ship is moving at high velocity, the particles in its path are first ionized and then swept out of the way. This only works with small particles, though, and larger ones must be either destroyed by the defense lasers or completely avoided. The shield is of very little use against anything larger than a speck of dust and is completely useless against non-charged particles such as photons and neutrons.

Armor - 2.4.4

Space is not an empty void: micro-meteors, dust and solar radiation cause a slow degradation of all space constructs. This problem was lessened by the development of the magnetic screen, but small vehicles and spaceships must still be weather the elements, so to speak. This is why the outer hull of most modern ships is composed of tough armor plates: it is the very last line of defense.

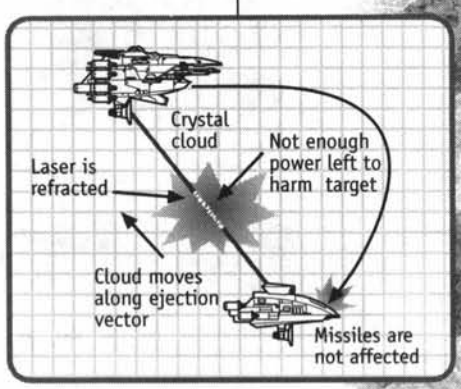
Armor is generally made from a special polymer-ceramite composite with good heat conduction and limited flexibility. This allows it to absorb superficial impacts by dispersing their energy across a wider surface. Additional layers, each with slightly different conductive and ductile characteristics, are sandwiched one above the other to improve the resistance of the panel. Sometimes, a special mesh of artificial diamond fibers is added for extra strength and durability, although this increases the cost of the material.

Special care is taken to include limited radiation-absorbing elements within the panels as well as making sure there are reduced possibilities of a catastrophic radiation cascade should the armor be hit by high energy cosmic rays. The inner foamed polymer layer is a combination spall absorber and radiation shield, and is separated from the hull's internal pressure vessel by yet another liner.

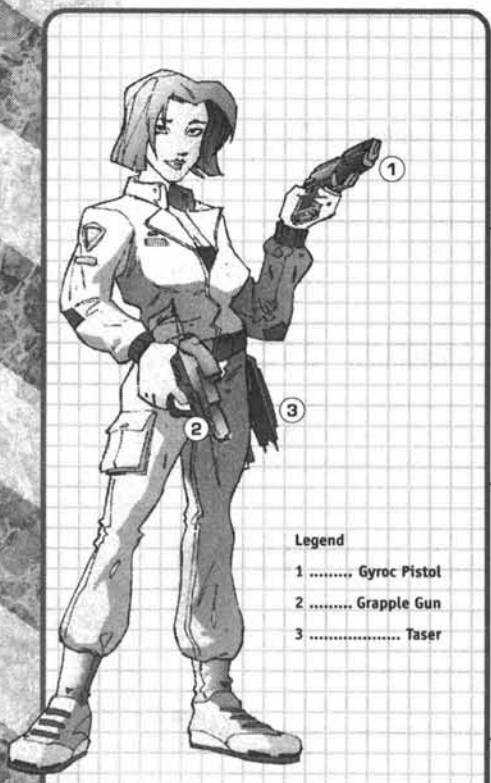
Fog Launchers

"Fog Launcher" is the common shared name for a number of defensive systems that work by releasing clouds of sand, crystals or dust at high velocity in the direction of the attack so that they refracts energy beams and ablate incoming projectiles. Incoming beams must expand energy to burn through the cloud, reducing and possibly even eliminating any effect on the ship's hull. Fogs also affect target designation but to a lesser extent, since by reflecting part of the designation laser they actually help the process.

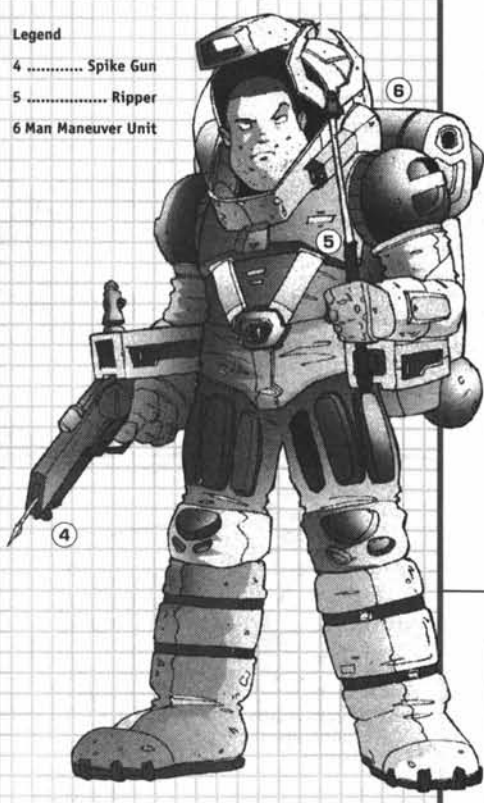
Having no propulsion system of its own, the fog cloud disperses as soon as the ship apply an acceleration. Experiments were made with ionized dust particles coupled to a magnetic field to force the fog to remain near the ship, but they have been only partially successful. This means that the available protection tends to diminish as the battle wears on and less and less material can be committed to the defensive cloud. See *Ablative Armor* in Chapter 4, page 60 for game rules.



2.5 - Tools and Equipment



Legend
1 ..... Gyroc Pistol
2 ..... Grapple Gun
3 ..... Taser



Legend
4 ..... Spike Gun
5 ..... Ripper
6 Man Maneuver Unit

Working in space presents a number of additional difficulties that make even the simplest job challenging. The absence of a gravity field means that tools and objects will tend to float away, and any action must be carefully checked for the inevitable reaction. Both repairs and equipment are made more difficult by the spacesuit gloves, which, although very fine, cannot offer the same dexterity as a naked human hand. To get around these problems, a number of special tools have been developed specifically for use in space. In addition to the ones listed below, any of the equipment shown in another Heavy Gear book can be found in a space-adapted version for twice the cost.

◆ Grapple Gun

Grapples and lines are simple tools that have saved the lives of many spacers. They are used to tether oneself to a spaceship or rock while working, so that a false move will not send the person tumbling into space. The compressed gas gun allows the grapple and line to be fired at a distant surface. The gun has the following stats: Accuracy 0, Base Range 10 meters, x2 Damage Multiplier, costs 40 marks or dinars and weighs half a kilogram. The gas canister is good for ten shots, and reloads are available for one mark/dinar (though the canister can be recharged by any standard pressure line).

◆ Man Maneuver Units (MMU)

In space, there is nothing to push on – any movement is based on jettisoning reaction mass in the opposite direction to the one in wich you want to go. A space-suited person must thus rely on an external apparatus to have movement or else be tethered to a large object (a ship or a space station). The MMU is a small hand-held or backpack-mounted unit that provides thrust, allowing the user to move about. The smaller MMU provides 0.2 g (2 MP) of thrust and has four Burn Points. The backpack version is more massive, can provide up to 0.6 g (6 MP) of thrust and has 60 BPs.

◆ Personal Weapons

All weapons and armors require a permit for carrying. In civilian areas, concealed weapons are illegal, as are heavy weapons. In the space settlements and ships, any weapon capable of damaging the installations is banned, though low-powered weapons can be carried with the required permits (generally only given to military personnel).

Gyrockets are handguns and rifles that fire small rocket-propelled bullets. These weapons are more efficient at medium and long range than from up close, as the bullet is still accelerating at short range. The first (lower) Damage Multiplier should be used if the target is at Short range; otherwise, the second one is used. Gyrockets have little or no recoil, making them perfect for use in space.

Ripper: this is little other than a spring-loaded, serrated shear that is designed to cut or rip open a spacesuit. It is mounted on the extremity of a tanto-like stick, giving it good reach.

Spike Gun: this is an unusual weapon/tool. The Spike Gun is a chemically powered, armor-piercing ram. A tiny explosion propels a hardened alloy spear forward with enough force to punch through spacesuit armor (halve the Armor value of the suit); the exhaust gases are vented to the rear to kill the momentum. The spear can usually be replaced with a chisel-like device for engineering work.

Taser: this weapon fires small electrically charged darts at their target. If the opponent is not wearing armor, he receives electrical damage equivalent to an Intensity 5 shock. No matter what the result, however, the victim will not suffer anything more than a Light Wound. When rolling for side effects, fatal results are ignored but the Margin of Success of the attack is added to the Intensity. Tasers use standard power packs.

Weapon Statistics

Weapon	ACC	DM	Range	ROF	Ammo	Cost	Wt.
Gyroc Pistol	+1	x15/25	10/20/40/80	0	15	675/15	1
Gyroc Rifle	+1	x22/32	80/160/320/640	0	15	950/15	3.5
Ripper	0	x15	Melee	0	N/A	700	3
Spike Gun	0	x10 (AP)	Melee	0	3	860/10	2
Taser	0	x3 (Elec.)	4/8/16/32	0	30	60/10	0.5

DRONES AND TELEOPERATORS - 2.6

"Drone" is the common name applied to a wide category of robot vessels that serve a variety of purposes in space. They are controlled by advanced computer brains that are capable of guiding them through a battle or surveillance mission with great precisionDue to their programming, however, they are quite predictable and must be backed by human decisions. Drones can be controlled either by their onboard computer or by teleoperation (remote control). Whenever possible, drones are remotely operated instead of being left to their own (limited) devices. This can be made impossible by several factors: distances (the speed of light imposing a lag on drone/operator communication), radiation belts, solar flares or electronic countermeasures (all of which make the data hard to exchange).

Game Effects - 2.6.1

Remote control equipment is a software modification of the Autopilot Perk, which is required for all drones regardless of their shape or function. In addition to directing the drone according to its internal programming, the Autopilot can receive instructions through the Communication system and sends back environmental data gathered by its Sensor array. Remotely-operable drone must thus be equipped with all three of the above systems. Drones are not affected by "Crew" hits, though Armor points are lost as usual.

If the drone is to perform actions (i.e., fire a weapon, make an Active Sensor sweep), it must be equipped with the Automation Perk to represent the mechanical systems (this is an exception to the rule stating that at least one crewman must be aboard for Automation to be used). A drone cannot perform more actions than those afforded by its Automation level; for example, Automation 4 would allow up to three actions per turn. If teleoperated, drones are also limited by the controller's own action total. In the above example, a single controller could perform three actions at -2 each, but not four at -3. Two controllers could handle the three actions with only a -1 penalty. A single person cannot control more than one vehicle at a time, though a drone can have multiple controllers.

Data Transmission and Lag ◆

Because of the associated data-encoding procedures and control lags, remotely piloted vehicles suffer a basic -1 modifier on all of their rolls. If the drone is controlled through a Satellite Uplink, the extra lag increases the penalty to -2. The vehicle must be within communication range or contact will be lost. ECM affects the control link normally, and must be tested against every turn when present. The Stealth Perk can be bought for a drone, but it becomes useless when the drone is under direct guidance, since the remote control two-way transmission always points to its general location.

If contact is lost, the software automatically switches to a predetermined program, just as if the drone was set for autonomous operation. The vehicle is then controlled by the Autopilot until contact is regained or the vehicle runs out of fuel, whichever comes first. The program should consists of a single line of text and should be written down when the drone is released.

Wire Guiding ◆

Drones may be wire guided; this is also used to represent towed sensor array. This removes the need for a communication system as well as the time lag, since wire transmission cannot be intercepted and are thus not encoded. Wire guiding also makes the drone immune to ECM, but it implies that the vehicle is trailing a very fine wire for control. A Piloting roll must be made every turn against the highest Movement Point cost for the hexes traveled to avoid snagging the cable. Flying drones must test also and use the overflown ground's MP cost. Failure means the cable is stuck and the drone must halt for the next round to free it. A fumble means the cable is severed. For simplicity's sake, it is assumed that the length of the control cable is equal to the Communication range of the drone.

ASATs and Planetary Defense Drones

ASATs (Anti-SATellites) and drones form the bulk of modern space combat. Almost every ship carries a small squadron of these versatile little machines for use both offensively and defensively. The simplest models are little more than a tiny brain wedged between a sensor package and a large thruster and fuel tank, and cause damage by ramming at very high velocities. The more sophisticated models have their own onboard weapon systems, such as a gigawatt laser or a battery of nuclear missiles, and sufficient fuel to harass enemy spacecraft for weeks if need be.

Planetary defense drones formed the bulk of the space defense during the War of the Alliance. At the beginning of the conflict, each league was stockpiling a large number of those machines mounted on disposable booster rockets. In the event of interpolar conflict, these would have been launched as needed to clear the skies of hostile observation, C3 and fire support assets. As history showed, though, they were instead launched *en masse* against the CEF fleet as it entered orbit and began laying down suppressive fire for the descending troop carriers. Though casualties were high, they managed to drive the fleet into a retreat, followed by cat and mouse engagements over the next few cycles.

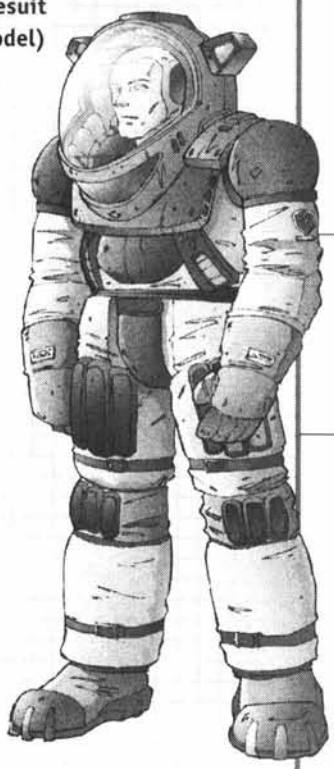


2.7 - Space Suits

Marine Suit (UMF's SDF Model)



Heavy Spacesuit (Civilian Model)



Space suits have not changed much over the millennia, though they have become vastly more efficient, less prone to leaks and are now mostly self-maintaining. Their basic function is to protect the wearer against the hard vacuum and excesses of temperatures of the space environment. They also provide a convenient mounting frame for tools, comm devices and survival equipment.

Terranovan space suits are self-adjusting: the wearer modifies the fit of the various parts rather than have a suit custom-designed. The various connectors and inner liners use memory plastics and various mechanical systems to ensure proper fit and movement range, regardless of who is wearing them. This does require a suit fitting to avoid penalty during use. A normal fitting takes about an hour to do properly, reduced by a Survival (Space) Skill test against a Threshold of 3; multiply the MoS by five to know how many minutes are saved. An unfitted suit (used in an emergency, for example) gives its wearer an Action penalty equal to 1d6/2 (roll at the beginning of each round), rounded up.

◆ Pressure Suit

Pressure suits are low-pressure light suits worn by crew in spacecraft. They offer little protection against radiation, temperature variations or impacts, but they are light and easy to move in, having few hard pieces. They are made of a self-sealing material that will repair a hole of up to 0.5 cm in diameter in one round. The air and power reserve usually contains up to six hours' worth. They offer total insulation against cold and temperatures of up to 250 degrees Celsius. They are sealed against NBC effects, like all spacesuits. They require (15 - Space Survival Skill roll) turns to put on.

A slightly different type of suit is used by marines and engineering crewmen. They have the same basic configuration as the basic pressure suits, but feature additional layers of puncture-resistant material as well as radiation shielding. Many have reinforced pads in heavy duty areas. They are equivalent to pressure suits, but have Flak (+10 Armor) and Rad armor (RPF 15) woven into them.

◆ Spacesuit

The "true" spacesuits are equipped with reinforced parts and components for extended stays in space. These suits are built around the basic structure of the lighter pressure suits, but they also feature reinforced "shell" sections for improved performance and reduced wear and tear. The torso is a one-piece hardshell and the limbs are encased in articulated armored sheaths. In game terms, they are equivalent to pressure suits, but have heavy padding (+20 Armor) built into them.

Hostile planetary worksuits are similar but equipped to deal with poisonous or heavy atmosphere. They feature reinforced boots and leg pads and can withstand higher pressure than other types of space suits. In game terms, they are equivalent to pressure suits, but have turtleshell armor (+40 Armor) built into them. They impart a -1 penalty to all actions in addition to preventing sprinting.

◆ Helmets

Helmets have an almost endless variety of design, but they share some common ground. All house a short range radio apparatus (Comm -5, range 10 km) and a headlight. A polarized anti-glare visor can be adapted to the faceplate. Some heavier models manufactured for worksuits feature drinking tanks, emergency oxygen microtanks (5 minutes), food tablets and powerful headlights.

◆ Life Support System

All spacesuits have connectors to attach a life support unit. Transfer LS packs are little more than a small oxygen reserve (20 minutes) to maintain the suit's functions when moving between pressurized environments or switching from one LS pack to the other. Transfer packs are usually quite small and worn on the belt or on the chest plate for easy access.

Short-term packs are the standard space suit packs. They contain the main radio equipment, oxygen tanks (six hours), recycling units and cooling equipment. Some feature an emergency jet option: there is enough fuel for a velocity change of up to 34 m/s (2 MPs, 2 BPs for tactical gaming). Long-term packs feature all the functions of a short-term life support backpack plus another ten hours of air, and have headlights, modular tool hardpoints and an integrated maneuver unit (140 m/s total velocity change, or 4 MPs and 8 BPs).

Survival Equipment - 2.8

Not all contingencies can be foreseen, but having the right tool at the right time can make the difference between life and death. Most of the spacer's emergency tools deal with pressure loss and radiation bursts, since these are the two most urgent problems that they can face.

Emergency Tools - 2.8.1

Bubble Shelters: though they are often cylindrical, bubble shelters are named because of the dome shape of the basic model. A shelter is an air-tight tent equipped with a basic cloth airlock. It is used to change out of a damaged spacesuit or as a more confortable means of waiting for help. Some bubble shelters come with a small explosive charge to dig a hole in the ground for the tent, effectively giving them the ability to act as a temporary rad shelter as well. Shelters have an average twelve man-hours of reserves.

Emergency Power Supply: this is a small power pack with universal connectors designed to supply power for a short time to critical systems. It will provide enough energy to fire a personal weapon once, or keep a suit active for another six hours.

Slap Patches: these ubiquitous polymer sheets are carried by every spacer and found in every room. They are made of a tough fabric coated on one side with molecular bonding glue. If a pressure environment suffers from a leak of up to 10 cm^2, a patch can be applied to the opening to seal it instantly for 1d6 hours. Each costs one mark/dinar.

Sealer Spray: this is a can-based polymer agent that has been designed to make secure links with most materials. Sprayed directly into a puncture or fissure, the spray quickly hardens and seals the opening. Each finger-sized can plugs up to a fist-sized hole (50 cm^2) and costs about 25 marks/dinars.

Sleep Tubes - 2.8.1

One of the most ancient technologies used for space flight, this relatively simple apparatus (by 62nd century standards) keeps a living being alive for long periods of time while requiring a minimum of supplies. Without it, large scale space colonization would have been impossible — no ship would have been able to carry the enormous life support system required by its passengers.

The average sleep tube is composed of a cylindrical transparent chamber about two meters in length by seventy-five centimeters in diameter. One extremity contains the life support mechanisms and the back-up power packs while the other is the access hatch. A composite mesh gurney fits within the tube and can be pulled out to allow easier ingress and egress.

A sleep tube does not properly freeze the voyager, for this would cause ice crystal to form within the cells and would quickly kill him. Rather, the principle used is similar to the hibernation process used by frogs and other creatures on Earth. The body is chilled to near freezing temperatures and immersed in an oxygen-rich liquid medium (this also serves to buffer the sleeper against acceleration).

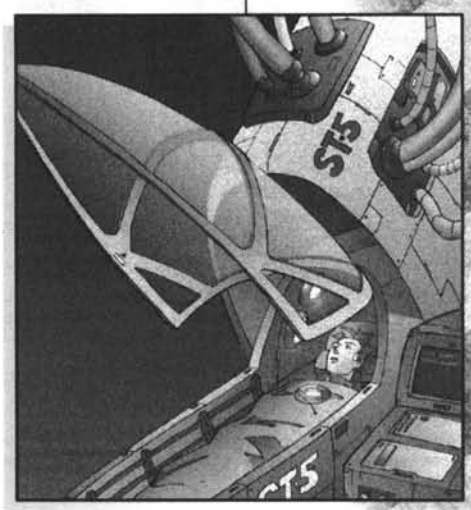
In game terms, a person can handle ten times as much acceleration as normal without ill effect while in the tube; they are not conscious of the passage of time, and neither can they act or react to outside stimuli. The aging process is slowed down by a factor of twenty, but the person cannot stay in cold sleep longer than the MoS of a Health roll (Fumbles count as a result of one) in cycles. If they do, each additional cycle causes one automatic Flesh Wound. A one-month rest period is required between uses.

Sleep Traveling

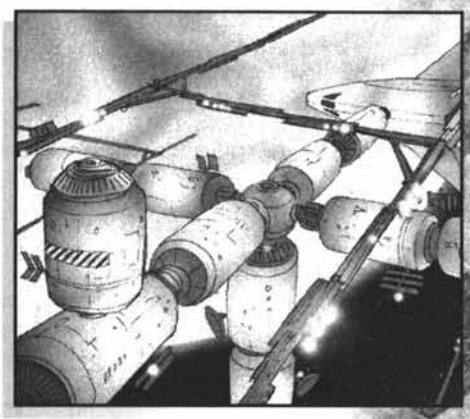
Traveling within a sleep tube is a preferable alternative to the extreme boredom of "awakened" transit, but the whole procedure is uncomfortable to say the least. It begins one month before the flight proper with a low residue diet, special medication and fluid injections. An exercise regiment, with emphasis on suppleness, is highly recommended but not vital.

The traveler must first strip naked and then attach medical sensor leads and the low temperature limb sleeves. Once the person is laying down on the tube's internal gurney, assistants secure the rest of the medical sensors, install relief tubes, secure restraining straps and attach cooling tubes to limb sleeves. The traveler is then injected with a sedative and a special mouthpiece is placed to ensure free fluid passage to the lungs. The gurney is pushed into the tube and secured, and the hatch is closed shut. Some designs use a canopy-like device; others have a drawer-like system which requires less room but is more claustrophobic. Once the patient is comfortable and numb, the tube is filled with the clear breathing fluid. After one hour, the fluid is gradually chilled to its flight temperature of 2° C, while the limbs go down to 1° C.

The patient will then remain in a fugue-like dream state for the duration of the trip. The metabolic processes are slowed down, but not stopped: the slowdown ratio is approximately 1:20, meaning that twenty months spent in hibernation will age the body one month. Emerging travelers will thus typically need a good shave and a manicure, and will feel weak for 1d6 day afterward.



THE PHYSICS OF SPACE FLIGHT - 3.1



Space is mostly an empty vacuum, so the only forces at work on a spaceship are thrust and inertia. Since there is no atmosphere to bleed off kinetic energy through friction, an object launched along a vector will keep moving until another force is applied to it. Because of the absence of gravity, there is also no up/down reference. Artificial gravity is still a science-fiction concept, even in the 62nd century, so continuous acceleration and centrifuges are the only means of simulating gravity. In effect, the direction toward which an object travels is "up," as long as it keeps accelerating. In the case of centrifuges, the direction toward the axis is "up," while away from the axis is "down."

The lack of atmosphere and gravity means that moving around in space is very different from flying. A ship cannot cut power to its engines and lose speed or altitude, and nor can it push against the atmosphere to turn. According to the Third Law of Motion, a ship needs to create an action, in this case firing a rocket engine, to create a reaction, the ship changing trajectory. Likewise, to change the velocity of the vehicle, thrust needs to be applied in the direction of travel. This makes for a very non-intuitive and confusing environment for anyone born within the up/down frame of reference supplied by the gravity field of a planet.

The Laws of Motion - 3.1.1

Newton's Laws of Motion, as elaborated long ago by the English physicist Sir Isaac Newton, are at the base of sub-light, non-relativistic space flight and navigation, though the actual navigation number crunching requires the more advanced corrections elaborated by Einstein for accuracy. All three Laws apply at all times throughout the universe, but they are much more apparent in space where gravity and atmospheric and surface friction are not factors in movements.

These laws, along with a number of basic security procedures, are always in the mind of the experimented spacers. They are the rules of the game — a game that allows no cheating, no bending the rules, and no way to stop playing when the going gets tough (except permanently).

Inertia ◆

Law Number One: unless an external force is applied, a body at rest will tend to remain at rest and a body in motion will tend to remain in motion along the straight line it is following. A spaceship or other object will not move unless a force is applied to it. Likewise, a ship in motion will not stop or change direction unless a force is applied to it. This means that without a way to apply force on its own (in this case, by thrust or recoil), a spaceship is helpless and subject to external forces — a planet's gravity well, for example.

Inexperimented spacers are sometimes killed because they have not taken this law into account. Objects may be weightless in free fall, but they are not mass-less. Stopping a two-ton cargo container from crushing someone against the wall of the docking bay, even if the container is moving at a very slow pace, will require as much energy to stop as it did to start it moving.

Acceleration ◆

Law Number Two: the acceleration of a body is proportional to the force applied to it. Simply put, if there is more thrust, the ship will accelerate (and thus move) faster. The reverse is also true, as a deceleration is merely an acceleration in the opposite direction of the movement. This assumes that mass is constant; if it changes, it will directly affect the acceleration: for a given force, a mass half the size will accelerate twice as fast, and vice-versa. A spaceship that sheds mass, either by burning fuel or by leaving parts of itself behind (cargo, armor plates, crew) will accelerate faster.

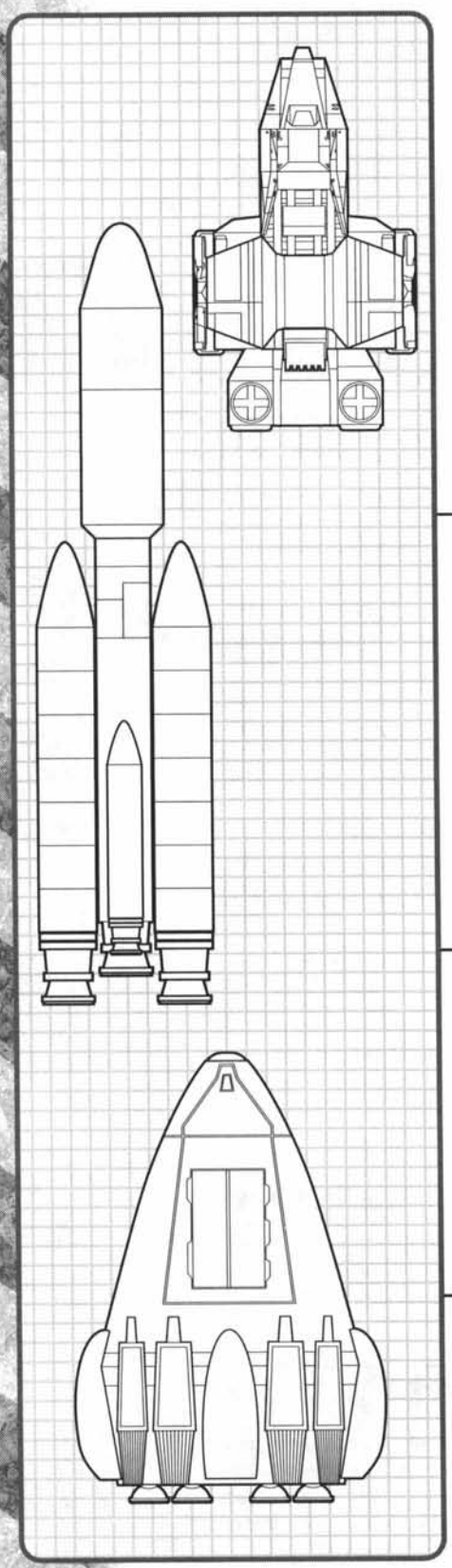
Action/Reaction ◆

Law Number Three: an action always has an equal and opposite reaction. Also known as the rocket principle, this is the basic concept on which spaceship thrusters are based. In this case, superheated gas or particles are ejected out (the action), and the ship moves forward (the reaction). This law also applies to everything in space: if a crewman kicks a wall (or somebody else), he will find himself flung toward the other side of the room.

Space Navigation - 3.1.2

Though objects in movement tend to remain on the same trajectory, the gravity wells of the various bodies within a star system (and especially the one of the star or stars) curve these trajectories until they close on themselves, forming a circular shape called an orbit. Unless one can apply a significant amount of power, all trajectories will be composed of curves as the orbital velocity of the ship around the star must be changed to arrive at its new destination. This is why space navigation is never as simple as the above Laws would have one believe; see Chapter 4 for more on navigation and orbital maneuvers.

3.2 - Ground to Orbit Vehicles



As a general rule, the larger interstellar spaceships and Gateships in wide use in the 62nd century are too massive to descend onto a planet's surface. They can park themselves in low orbit, but that is about the extent of their capabilities. Most in-system spacecraft are not much better: very few are light and aerodynamic enough to be atmosphere-capable. Thus, ships need to carry interface vehicles capable of flying down to the ground and back up into orbit to transfer crew and cargo.

In addition to their shuttle duties, most interface vehicles can also be used for fast deployments of troops via sub-orbital flights. The vehicle simply climbs up to orbit altitude, makes the required fraction of an orbit necessary to bring it over the target site, and then re-enter the atmosphere to come down. If the site is close enough, a simpler sub—orbital parabola will suffice. With this method, no location on an Earth-sized planet is more than an hour's flight away (see the Advanced Space Movement rules on page 53 for more on this maneuver).

A wide variety of vehicles are used to fill the gap between orbit and ground. Their shape, size and method of propulsion depend on their function (cargo, passenger, military, etc.), but most modern vessels are based around an aerodynamic hull that provides some lift to supplement the thrust of the engines during atmospheric flight. Some older models are built around a rocket or spherical shape which, despite its increased internal volume, is completely dependent on its thrusters for lift and much more fuel-hungry.

3.2.1 - Shuttles and Scramjets

Shuttles and scramjets are the most common appellations for aerodynamic vessels capable of short orbital flights and subsequent reentry. They are mostly used for passenger and rapid cargo transport and military missions, ferrying everything from troops to ordinance to the target zone.

Most of the shuttles currently in service use a scaled-down version of the fusion tube used by spaceships, often supplementing it with intake venturi for diluting the pure fusion exhaust with cooler air. This create a cooler and quieter exhaust that is more manageable and less dangerous to the vessel's immediate environment. Many shuttles have additional ducting to allow the exhaust stream to be vented downward, providing them with vertical landing capability.

Civilian scramjets, lacking the expensive fusion thrusters, use more classic hybrid engines that are based on chemical rocket technology. Though less performant, they are easier to maintain and operate. Both the military and high-end civilian shuttles sometimes use solid fuel boosters to reach escape velocity faster, switching to chemical or fusion engines for final boost and orbital maneuver.

3.2.2 - Rockets and HLVs

Rockets and HLVs (Heavy Lift Vehicles) are used to boost large amount of cargo into space. Rockets are disposable, one shot vehicles that are discarded or dismantled for material once in orbit. HLVs are similar to rockets but are equipped for reentry and recuperation. Both of these are either remote or robot-controlled.

Rockets are often use to boost clusters of combat drones into orbit. The process is done by automation because there are always lots of casualties and multiple launches are generally required in very short delays (crew costs becomes an issue). Just as well, it is better to have twenty rockets lifting off from various points than one vulnerable shuttle (spacecraft can't dodge very well during climbout, no matter what engine they have, because of the acceleration and aerodynamic pressure).

3.2.3 - Clippers

Clippers are used for any surface-to-orbit or orbit-to-orbit task that requires high capacity and flexibility. These vessels are equipped with nuclear fusion thrusters and use air, hydrogen or water as reaction mass. They can thus travel great distances at high speed and acceleration, and have a longer range than chemically-propelled vehicles. They are also much more expensive and complex.

Clippers are built on a cylindrical or spheroid frame, looking either like a regular rocket or a gigantic metallic cone. A few rare designs are aerodynamic, taking the form of a large plane or flying wing. Both types of vessels are fully re-entry capable, as they use heat-resistant composites for their lower hull.

The Flight Out - 3.2.4

All orbital flights start at one of the Terranovan spaceports, which is often little more than a ferrocrete area with passenger processing and maintenance and fueling facilities. Once the identity of the passenger has been confirmed with a battery of tests ranging from fingerprinting to retinal scans, he is free to move to the main departure lounge.

Basic safety courses are given before boarding, and attendance is mandatory; even experienced spacers must get a refresher in emergency decompression, crash and collision protection, space sickness (nausea), space cough (accidental inhalation of floating liquids in the lungs), airlock operations (certified personnel only) and more. There are constant security checks and some locations even impose a basic quarantine. No one wants to bring dangerous weapons or micro-organisms in the closed environment of a spacecraft. Most commercial passengers are put under in sleep tubes at this point, both to reduce life support requirements and to avoid potential zero-gee sickness problems.

Once all the passengers are present or accounted for, they may board the vehicle (or be loaded into it). The hatch looks like a standard aircraft door, except that it is actually an airclock. The interior of the main cabin is a muted color and has well padded walls with recessed handholds everywhere. The seats are wide and deep; the adjustable harness covers most of the torso.

Launch ◆

The departure is always a dramatic moment. Though the flight control centers do not use countdowns anymore — those being replaced by pre-flight checklists — the tradition continues aboard the vessel itself. Just to make sure that no one is frightened by the sudden engine ignition, most crew will at least do a ten-point countdown on the public address system.

As the vehicle leaves the ground, its engines emit a deep bass sound muffled by the cabin's walls. Slight vibrations due to aerodynamic tensions can be felt. The acceleration isn't heavy, except on military craft: it rarely go higher than two or three gees (a gee is equal to one Earth gravity).

The sound and vibrations grow progressively deeper as the craft approaches Max-Q (the point in its flight where all forces, acceleration and dynamic tension, are at maximum); then the sounds gradually mute down but never completely disappear, even once in space (the hull itself transmits them).

Orbit ◆

The arrival in orbit is unmistakable. Once the final orbital burn is complete, the engines are shut down. The spacecraft then enters free-fall, falling toward the ground as it moves around the planet, but never reaching it. Commercial flight crew ask that travelers do not leave their seats at this point, with some rare exceptions; military crew generally just order their passengers to stay put. This avoids having problems with a cabin full of flailing, space sick people. Anti-nausea drugs are available, but their efficiency varies from individual to individual and is hard to predict.

Flight time depends on the final destination. A flight to low orbit will take about half an hour; one to a higher orbit can take up to half a day. There is little to do except read, watch a video or sleep. Very few crew let the passengers enjoy the novelty of zero-gee acrobatics: cabins are not that spacious to begin with, and it is very easy for an unexperimented pleasure seeker to bump (often with dramatic results) into something or someone.

Upon arrival, the vehicle dock with the ship or space station. There is a slight deceleration, followed by a gentle bump as the two mechanisms make contact. A few minutes go by while connections are checked and air pressures equalized. The travelers have ended their journey.

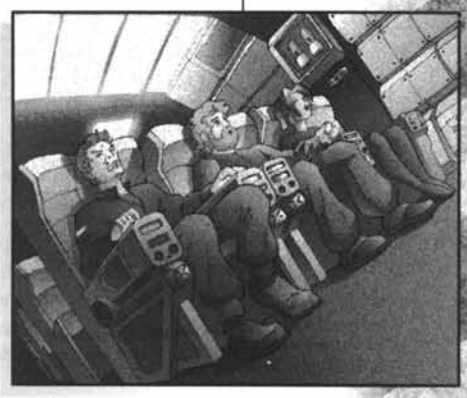
◧ Creature Comforts

"Unlike the earlier space travelers, who endured launches and reentries buried within a cumbersome pressure suit, most modern spacecraft allow their passengers to remain in shirt sleeves. You will thus not be required to go through a lengthy suit fitting and process, but you had better listen when they teach you how to use the emergency suits.

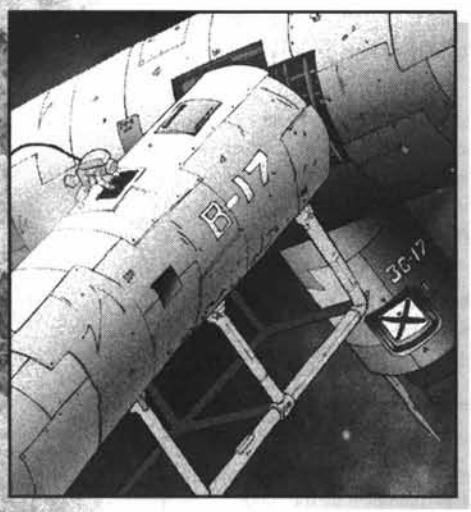
"They make you sit in those big padded chairs with the five-point seatbelts. They look a lot heavier than they are, but most of their bulk is foamed polymer on a light alloy armature. Sturdy as hell, though. Just find a confortable posture and relax. Take a deep breath. The sound levels are high, but there's not much we can do about this.

"Don't fret about the launch. The rumors of crushing acceleration are just that, rumors. It's actually a quite gentle climb. Well, in peace time operations, anyway. We'll see how you boys handle six gee of evasive maneuvers."

— Unidentified Recruitment Officer, NGSS



3.3 - Space Stations and Bases



The first bases were built to accommodate ships coming in system. They were often made of cast-of fuel tanks and vessels with disabled propulsion systems, though sometimes a pre-fabricated commercial station module was towed in-system through a Gate.

After Earth left, the stations of the Helios system made do with what they had, keeping contact with the world below. Aware of their precarious situation, they always remained fairly neutral in the conflicts that wracked the planet.

As leagues formed, they assimilated ground installations and their associated crew. In space, stations changed allegiances and went to specific leagues, but relations always remained more cordial up there than on the planet below (probably due to the difficult environment shared by spacers). During wars, there were very few actual combats, and most of them were between space-suited infantrymen. Once Gears were developed, a few were modified and vacuum-proofed to be posted in the surface installations and aboard ships as oversized marines, but they were never very useful space combat vehicles.

Half the orbital installations were destroyed during the War of the Alliance. After the conflict, many leagues put temporary stations and satellites in orbit to compensate for what they had lost. Some thought it simpler to take over the existing network deployed by the invaders, and the Hermes 72 satellite constellation was quickly co-opted.

3.3.1 - Design

The configurations of a 62nd century space outpost depends greatly on its intended use. The smaller stations are little more than a pressurized cylinder attached to a vacuum-dwelling machine-tool and the solar panel needed to power it all. Most are automated, others require a live-in technician/operator/repairman. These workshacks can be launched fairly easily and are inexpensive to maintain.

They are followed by the larger factories and orbital bases, which are similar in construction but on a grander scale, using long metal trusses to hold the modules together. Factories and bases generally have roomier living quarters as they have a semi-permanent staff. For this reason, most have at least one gravity simulation facility, such as a rotating wheel, to maintain muscle tone and bone strength. The larger space stations include Ellis Island and the Caesar series, which are designed around a cylindrical spinning model to generate simulated gravity at the rim. Ellis Island is the largest, being more than a kilometer in diameter (though a large section of Torus "A" is still missing, the hit that caused the station to surrender during the War of the Alliance).

Most modern Terranovan stations are built out of locally available material. Many of the autofacs are ore converters and solar smelters feeding off asteroid stock and supplying high quality metal and polymer blocks to the construction teams. The original colonial settlements have long since become obsolete or too worn out to safely inhabit, and have since been recycled.

All the modern space stations use a semi-closed cycle ecology to help in life support and reduce maintenance costs. Plants and solar-powered scrubbers supply the installation with circulating fresh air, and food is grown locally to avoid huge transport bills. The stations use either radiothermal generators or fusion plants for emergency and back-up power, but most of their energy needs are fulfilled by solar collectors. These cover most of the habitats' surfaces and extend like gossamer wings on areas hundreds of meters per side.

◆ Moon and Planetary Bases

The Helios system is home to several lunar bases, the largest of which being Hope Interleague Moonbase. This interleague city has been created on the site of a previous installation not long after the end of the War of the Alliance to serve as a meeting point for the various Terranovan fleets of the Joint Space Initiative. Hope is also home to scattered outposts and mines all over its surface, often separated by hundreds of kilometers. There are also installations on Ares (mostly science stations) and Hades (deep space surveillance network).

On Hope and most close celestial bodies, the buildings are mostly build underground to protect them from the radiation and occasional meteorite. On the more distant planets and moons, all the buildings have been built on refrigerated mounts so that the temperature differential between the equipment and the soil do not cause catastrophic sublimation of underground gas pockets.

The internal design of the base buildings is very similar to the one found aboard space stations, and indeed the two share many systems. The bases are composed of several clusters of buildings, each with its own life support system. They are linked by underground tunnels (some wide enough to accommodate vehicles and Gears). Pressure doors are found at every corridor junctions and every fifty meters elsewhere. Airlocks to the outside are restricted to a number of "white room" facilities, which are invariably coupled with a security station.

Daily Life - 3.3.2

It takes a special breed of people to live in space, the most hostile environment known to Man. The physical requirements and limitations of the space environment have forced the adoption of a set of specific rules designed to facilitate and safeguard the lives of people living in space. These rules are drilled into every traveler before they are allowed to set foot into space, for their safety and the safety of the people around them.

One of the oldest rules is that loose liquid, crumbling stuff and smoke are unwelcome in free fall. These float into the air conditioning system and foul it up, and can make breathing difficult or even hazardous as loose particles are absorbed into the lungs. Hair should be worn short or attached; loose clothes or jewelry can become entangled and so are normally shunned. Pockets, belts and Velcro straps are useful to keep personal possessions at hand, and visitors are encouraged to use them.

All corridors are normally lined with strips of bright colors, usually with arrows on them. Traffic should attempt to remain nearby the strip indicating their direction. All markings, such as shipboard indications, warning labels, etc. are printed twice, 180 degrees from one another. They can thus be easily read regardless of orientation. Each compartment generally also has its volume and rad shielding factor stenciled on the wall near the doors and hatches.

Visitors must keep one hand on a handrail or other fixed object at all time, or else be tethered; only trained crew are allowed free flight, and then only in specific areas and emergencies. Large gestures are discouraged in space: flailing around might send someone flying off, or hurt a passing fellow spacer. Regardless of the location, ship, hangar, station, etc., people on duty, such as crewmembers, have right of way in corridors and access shafts. They may need to get somewhere fast to respond to an emergency.

Typical costs ◆

All the requirements of life, such as air, water and food must be gathered and supplied to the spacers. As a result, the cost of living in space is extremely high, and most of the Terranovan spacers are there as employees of a corporation or as representatives of a given government. Very few private individuals can afford the day-to-day expenses of life in space, though they are very few restrictions on traveling: if you can afford it, you're welcome to stay.

Cost of Living

BASIC NEEDS	COST	BASIC NEEDS	COST
Air Tax	2/day	Clothes, Light, Upper-class	500*
Water Ration	1/liter	Shoes	50
Sleep Cubicle (2 m²)	25/day	Cap	10
Cabin (10 m²)	200/day	Audio Recorder	60
Private Quarters (100 m²)	1500/day*	Video Recorder	200
FOOD ITEM	COST	Trideo Recorder	2000*
Bottled water	3	Data Disk (box of 10)	20
Fruit Juice (Saguarro, Waterroot)	8	Personal Computer	400
Cawfee	10	Audio Receiver	20
Beer	10*	Video Receiver	120
Wine	20*	Trideo Receiver	350
Sapa gum	1	Personal Communicator	40
Algae Loaf	3	Throat/Ear Comm Set	70
Ross Lichen salad	3	Flashlight	15
Generic snack	6	Mechanical Tool Kit	600
Generic dinner	9	Electronics Tool Kit	800
Springer steak dinner	95	Geiger Counter	80
Barbecued hopper dinner	45	Metal Detector	80
PERSONAL ITEM	COST	Rope (50m)	10
Sleeping Bag	90	Cutting Torch	25 (Reload 10)
Clothes, Light, Jumpsuit	20	First Aid Kit	10
Clothes, Light, Medium-class	50	Medical Kit	100
*When available			

Supplies

The spacers' food is generally grown locally to help close the recycling cycle and to reduce shipping costs. Most spacers follow the Terranovan custom of four meals per day, though the portions tend to be smaller. The food is a bit on the bland side, being composed mostly of easy-to-grow vegetables and plants such as algae, soya and fungi. Sauces and spices are used to make the meals more palatable, and there are a limited quantity of more "exotic" food available for those with money or the right connections.

Though the abundance of ice-bearing planetoids and fusion power means that water is available in large quantities, it is very massive, and thus costly to ship around. Recycling is the preferred alternative: it is not perfect, but it does reduce the need for raw material. To prevent abuse, water is rationed out at the rate of one mark/dinar per liter (including both drinking and hygiene water). As a result, most drinks are somewhat more expensive than planetside. Shower rooms are often communal and metered to reduce recycling strain on the water supply.

Air is paid for by taxes, to the average tune of two marks/dinars per day, billed to any valid account. Corporations and armed forces cover this costs for personnel assigned to a space posting, but freelancers and individuals must pay the tax. No one is thrown out of an airlock for failing to pay; it's possible to reduce or even eliminate the cost if willing to serve as part-time maintenance crew, but the job of cleaning filters and checking tanks is a definitely unpleasant one.

All spacers are supplied with a sturdy jumpsuit when they are cleared to leave the planet. Some people prefer to use their own clothes but soon discover the usefulness of multiple pockets and no loose garment in micro-gravity. Patches and other decorations are often used to individualize clothing, especially amongst long time spacers. Uniforms are also common, since a great deal of the Terranovan space populace is composed of military personnel and ship crew.

Crew Areas

All stations have an Ops Control Center, generally located at the center of the installation. It is from there that the station's day-to-day operations are supervised. The duty personnel manages the maintenance schedules, act as flight controllers for spacecraft in their air space, and generally resolves crisis as needed. The sections of wall not made up of windows or computer screens are covered with hand-scribbled memos and announcements, though a computerized message board is also available.

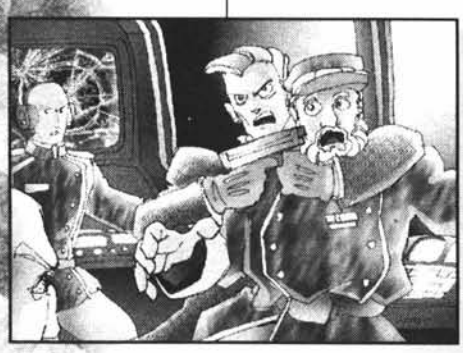
The Security Station is a heavily armored room. It is locked at all times, and can only be opened with the proper code or keycard. From there, the station's security officers can keep watch, assisted by a large network of small cameras routed to the room's multiple screens. The computer can also integrate the data from the ship's internal sensors and allows the security personnel to track intruders in real time as they move through the station. A locked weapon rack is on the far wall of the room. Protocol dictates that all personnel on duty must wear sidearms at all time, generally tasers.

It is fairly easy to find and rent a sleep cubicle, in fact little more than a coffin-sized room equipped with a mattress, basic hygiene equipment and a multi-purpose computer terminal. The cubicles can be made airtight and are equipped with an emergency life support system (similar to the ones used for spacesuits). If money is no object, it is sometimes possible to find a cabin or even a small suite, but those are few and generally occupied by permanent residents.

The station's various locations are linked by corridors that are wide enough to accommodate two people side by side. There are light fixtures behind translucent panels along the "ceiling" to help give an up/down orientation to the crew. Many of the onboard systems and conduits are located behind modular floor and wall panels to be easily accessible for maintenance and repair work. Some of the pipes are too large to be hidden behind panels and simply follow or cross the corridors wherever they happen to be installed. The corridors are painted in a neutral colors, with colored tags to indicate various locations and systems. Handholds and velcro pads are omnipresent.

The computer mainframes and other systems that maintain the station operational are housed in engineering bays. These are highly redundant and located in separate locations to augment the survivability of the station in case of combat damage or accident. Each bay is fully shielded against EMP effects and its walls are reinforced by extra plates and foamed spacers.

Security

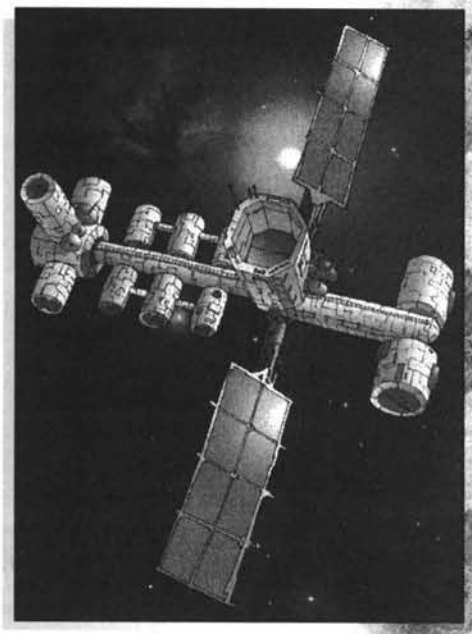


Security is always high in space. There are too many ways to endanger the lives of everyone on board to allow any kind of leeway where access and procedures are concerned. There are always restrictions and off-limit areas, and everyone is expected to respect the posted signs for their protection. Some mission-critical sections, such as command, engineering and life support, are restricted to ranking personnel and safety/maintenance people. Special badges tied into the internal security network are used to identify authorized visitors within a given area.

It is very hard to circumvent the safety measures. Visitors are carefully screened for weapons and other prohibited substances, and the station layout is planned in function of the security. For example, there are no airduct to scamper through: life support nodes are well distributed and isolated from one another to prevent contamination and accidental decompression.

Transfer Stations - 3.3.3

Space travel is a major undertaking, requiring considerable time and resources. For most people, it is simply out of reach, or is a "once in a lifetime" affair, unless they are part of a group or organization that is willing to foot the bill. Even if they manage to secure a ticket, it will only take them as far as one of the many transfer stations located in Terranovan orbit.



A trip to and from a Gate — never mind another star system — may take anywhere from one to three months, depending on the ships and the astronomical positions of the planets at the time of the travel. As a result, transfer stations have become nexus of travel where passengers can await until the celestial bodies are correctly aligned or a high speed ship goes in the same direction as the one they want to go. The station has extensive hangars and repair facilities where ships can dock and be maintained.

Station-side facilities are more spacious than those aboard spaceships, but they remain somewhat spartan and austere. Most of the nicer habitation facilities are reserved for the use of the permanent spacer staff, but there are always plenty of sleep cubicles to go around (see page 33 for sample prices). A series of small entertainment facilities are available to pass the time, but outside of a small gymnasium, library and "bar" (actually a combination of bar, meeting place, dance hall and restaurant), there is little to do but read and wait.

Transfer stations do tend to have fairly extensive greenhouses and hydroponic bays, which are often designed in such a way that they can accept visitors and let them enjoy the fresh air and peace and quiet without disturbing the normal operations of the facilities. These have another added benefit: the food on transfer stations is usually more palatable than the recycled algae glob served on orbital flights.

Finding Transport ◆

Getting off planet in the first place is not easy. There are only a few large spaceports on the planet, and most of the smaller ones are restricted military installations. People with a lot of money and the right connections will find it relatively easy to book a flight on a shuttle leaving for one of the space stations, but most of the time access to space is well controlled. People will want to know why you're going up there, and what you will do once you arrive. Life support equipment must be adjusted in function of the number of occupants, resources measured, etc. One does not visit the Terranovan low orbit on a whim.

Going beyond low orbit is an even more difficult proposition. Unless one has secured employment with a privately-owned spacecraft, the only way to visit one of the moon bases or deep space stations is to be assigned there. Some scientists manage, through research grants, to get sent to Ares or another of the outposts, but they are often bound by severe restrictions regarding the lengths of their stay and their duties. Getting to a Gateship is even more difficult, and for the time being, travel to another star system is impossible unless it is as part of a government-sponsored mission (for diplomacy, trade or combat).

Hiring On ◆

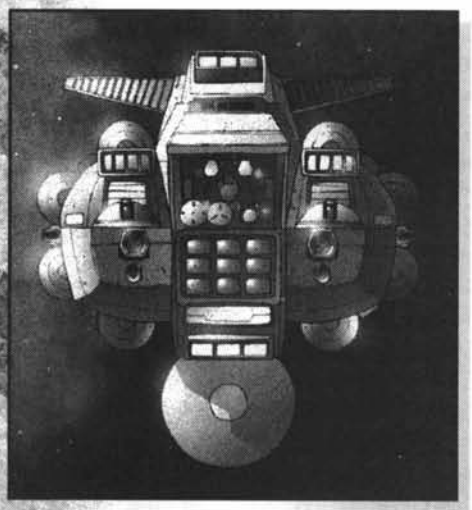
One method of getting to space without being a member of the armed forces is to hire on as a crewmember. Companies and governments are always looking for able people ready to learn a new set of skills, since the attrition rate among spacers (due both to accident and retirement) is fairly high. This doesn't mean they hire any joe showing up at their offices, however: applicants must possess useful skills and have a clean background, both of which are meticulously checked (though with enough ingenuity, it's possible to bluff one's way through).

Once hired, the new spacer will not get to orbit immediately. Companies and governments alike like to protect their investment and will put the characters through an extensive training regiment that includes both safety and zero-gee operations. Once the training program is completed, the characters receive the Survival (Space) and Zero-Gee Movement Skills, both at level 1, for free (existing Skills are not modified — the introductory program isn't extensive enough to boost existing knowledge).

Spacer Hiring Requirements

- **AGI +1, KNO +1, higher Attributes and Skills preferred;**
- **Ability to work well with people (INF 0 or higher);**
- **No outstanding psychose or medical problem (PSY 0, HEA 0 or higher);**
- **At least one useful specialty at Level 2 (Mechanical, Electronics, etc.).**

3.4 - Spaceships



Several types of spaceships are currently in use on and around Terra Nova. Many are artifacts from a more prosperous past when human beings explored the galaxy, yet many more are the product of a slowly re-emerging space industry.

Most spaceships are not equipped with the expensive and cumbersome Tannhauser Drive. Should a slower-than-light vessel need to move to another planetary system, it only has to move through an opened Gate to do so — as long as there is at least one Gateship in the fleet, the other spaceships do not require a Drive, just the proper shielding. The STL ships are mainly intended for in-system trade and transport, and sometimes warfare as well. There are as many designs for conventional spaceships as there are shipyards building them. Depending on their function and origin, they can take the shape of large planes, metallic spheres or cylinders, or a lattice of support beams to which the various modules are attached. Combat vessels often have a similar layout: drones and mines are stored in the aft bay to be easily dropped; missiles benefit from the ship's velocity and are located forward. Gun and laser turrets are located on the side, or in spinal mounts.

Each of the human colonies maintained at least one small shipyard in orbit to repair and build small transport vessels and make routine maintenance on visiting spaceships. Terra Nova currently has three functional shipyards remaining in orbit, along with two more on Hope. Construction and repair methods vary, but most are automated.

3.4.1 - Internal Layout

Bulkheads are massive structural walls that divide the interior of the ship in broad sections. These are thick loadbearing structures that are completely airtight. The resulting volumes are further divided by internal partitions, which are flimsier but also airtight. See page 69 for Armor Value and pressure-related rules.

Bulkheads are pierced at regular intervals by solid hatches called containment doors. These provide access between the sections but close automatically once their quadruple-redundant internal sensors detect a drop in pressure in one of the adjacent compartments. This can be overridden from the bridge. The door opens as soon as conditions stabilize and return to normal. Sometimes, standard hatches and containment doors are built close to one another to serve as a makeshift airlock as an added safety feature, giving access to depressurized areas.

All compartments have engineering hookup panels, at least two per room (one on either side). These panels contain standardized air feed, power hookups, emergency lights and environmental sensors, plus a small communication panel. Panels placed adjacent to a door also have a manual release lever to open the door when no power is available (requiring 1d6 turns, minus Space Survival Skill, to do so).

Floors are composed of metal grates held to the structure by quick release bolts. The shape of the grates interface with the soles of the boots worn by the crew, helping them move under microgravity. The area under the floor panels is filled with airducts, water and coolant lines, power conduits and fiber optic datalines, all color-coded and easy to access for fast repairs.

3.4.2 - Propulsion Systems

Most spaceships use a standard fusion thruster array called a fusion tube. These systems are efficient, well-understood, and can use almost any liquid or gas as reaction mass. They are based on the improved understanding of sub-atomic physics that came with the development of Tannhauser's theories, and use subquantic interactions to liberate massive amounts of energy. This energy is then used to superheat the reaction mass and throw it out the back of the ship at relativistic speeds, propelling the ship forward. Part of the waste heat is used to power the magnetic coils that collimate and contain the plasma.

Some vessels, mostly the smaller ones, rely on chemical propulsion, most often with liquid oxygen and hydrogen as fuel. Disposable solid fuel boosters are widely used to help reach higher velocity as they pose less problem than complex fuel pump systems and are less likely to break down. This is the case for small interstation shuttles and the smaller space utility vehicles.

◆ Engineering Aspects

Fusion tubes are fickle yet very powerful engines. The must undergo regular maintenance to clean the injectors and ensure that the containment coils are well aligned and free of micro-defects that could result in catastrophic failures later on. Fusion tubes contains plenty of safeguards, but if they are disabled the reaction soon goes critical, destroying the engine and the ship it is mounted on. Damage is equal to Size of the hull times 10, applied to everything in an area equal to (Size x 500 meters); damage is reduced by 10 points for every additional 500 meters of radius.

Sensor Systems - 3.4.3

A wide range of sensor systems are employed by most military vessels to locate and identify objects in their surroundings (see page 19). Gateships and spaceships carry similar sensor systems, although the latter vessels do not have the sophisticated Tannhauser detection unit of their larger brethren. Laser, radar and radiation sensors are mounted on all ships, regardless of their class. Most of these sensors are of the active type, that is, they probe the environment around them to get information back. Military ships also have theses, but double them with equivalent passive versions which do not give away the ship's position (or at least not as much). The onboard sensors cover all engagement ranges and most of the electromagnetic spectrum. The sensor systems are networked together to provide a coherent picture of the area of space that surrounds the vessel.

Disabling a ship's sensor systems is very difficult, even if one has access to the main computer. There are simply too many redundent systems and dumb terminals available to completely blind a vessel, though combat hits might reduce its capacity so that sensors are, for all purposes and intents, unavailable.

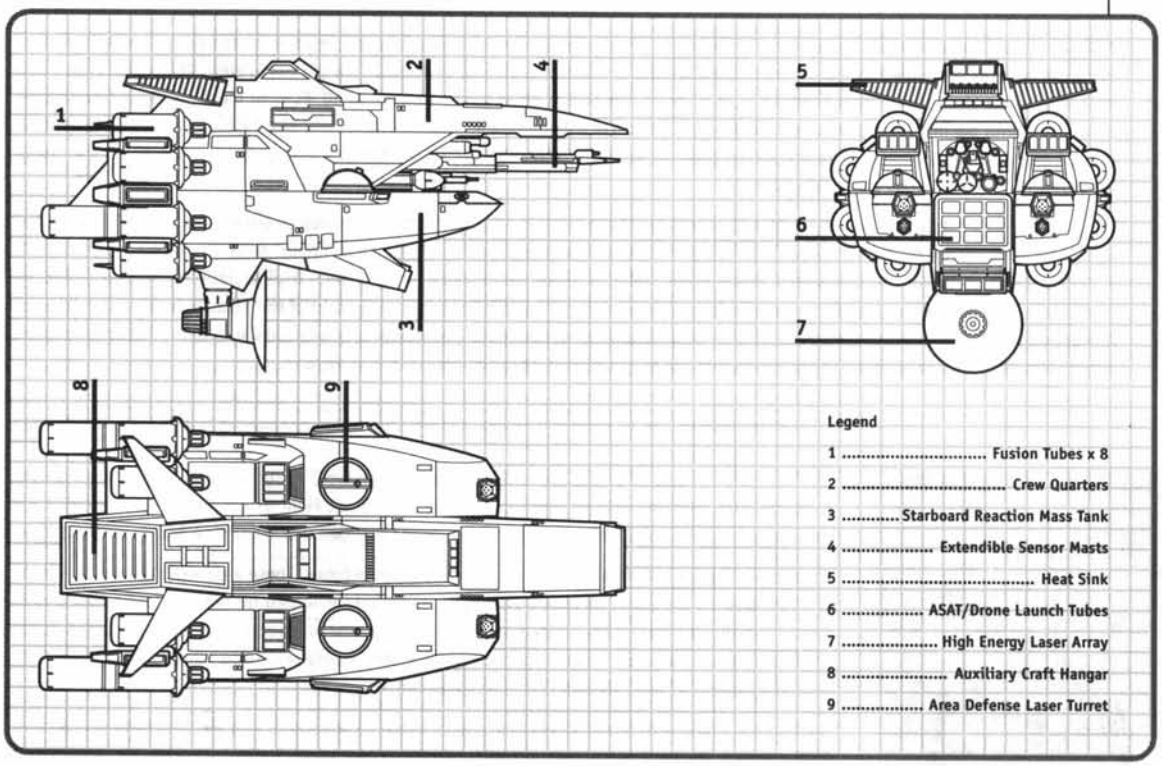
Engineering Aspects ◆

Although the particulars vary with the type of ship, the following descriptions are fairly representative of the types and locations of the main sensor receptors carried. The primary long range sensor system is composed of phased-array radar elements located on the sides and front hull, covering the entire space around the ship in a sphere extending between ten to fifty kilometers. Dish arrays and radomes are available for tracking multiple large strategic targets actively at very long range (a few thousands of kilometers).

Specialized radomes with tight beams and directional ranging abilities are a primary source of information for close-in combat, tracking targets and docking/launching/station-keeping operations. Hemispherical domes fore and aft house sensor systems used for active ranging and scanning at medium-ranges (under ten kilometers).

Close-up sensors are generally composed of concealed clusters of sensors omnicameras and other visual wavelength systems (such as infrared cameras and telescopic devices) for high- resolution use at close range. They are supplemented by very small parabolic recessed bell-antennae on extremities and hull extensions, generally millimeter-band radar systems for use in docking maneuvers and other delicate tasks. Thin reddish strips placed around the hull contain lidar arrays and are part of the ship's anti-collision system. These come in useful when the spacecraft is operating in crowded or cluttered areas.

Southern Republic Richelieu-class Destroyer



3.4.4 - Crew Quarters and Duty Stations

The main bridge, with the navigation, sensor and tactical crew stations all grouped together around the captain's chair, is at the heart of the ship. Large holographic displays and tactical screens fill the place, bathing the bridge in a ghastly electronic glow. Each station has a sturdy acceleration craddle placed on a movable mount. A small holotable is placed slightly off-center in the middle of the room, just beside the captain's station, for real-time battle reports.

The ship's weapons are controlled from gunnery stations located near the bridge. All of the reloading and pointing is done through automated systems, but human supervision is still required. The room is heavily padded and armored, and the gunner sits in a hardened acceleration craddle facing status report screens and waldo controls for the emergency repair equipment. An airlock allows access to the gunnery room, which is fully autonomous life support-wise.

The modular cabins are only a few cubic meters in volume. Each cabin has a storage locker and a foamed-mattress bed that can be isolated by an air-proof curtain for privacy and safety (if the ship suffers decompression while the occupant is sleeping, for example). The locker has modular subdivisions that can be easily reconfigured according to the gravity gradient. A small computer terminal is built into the foldaway desk, as well as an intercom with visual input/output functions. The room is painted in a neutral color; the conduits and power feeds that pass through the hull are concealed by removable panels. There is a private washroom per two cabins; it is reduced to the bare minimum, with only one small vacuum shower, a toilet and a sink with mirror.

3.4.5 - Offensive Systems

All spaceships carry at least one weapon system, most often a laser cannon of some sort, to defend themselves against meteors and other space debris. Many vessels mount more than one to cover all fire arcs. Military ships are equipped with a more diversified armament: in addition to lasers, they carry particle cannons, railguns and self-guided missiles (conventional, kinetic or nuclear). Particle cannons are useful to disable enemy ships, while railguns and missiles are used for more straightforward space combat. These weapons are often mounted in turrets for a wider fire arc, since it is often cumbersome to turn the entire bulk of the vessel rapidly.

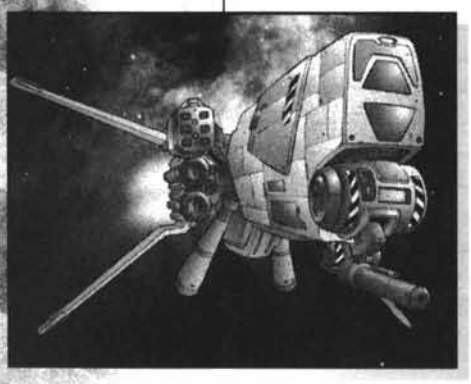
Many vessels have launch bays filled with drones of various types ranging from reconnaissance vehicles to automated combat craft. These bays can also accept deadly space mines and towed sensor arrays, both of which are useful to the intelligent commander. Some military ships also transport auxiliary combat vessels, fighters, gunboats and bombers; predictably, they are called carriers.

3.4.6 - Defensive Systems

Military vessels have several layered lines of defense. Avoidance, a combination of stealth, masker electronics, carefully selected radiating surfaces and emission control procedures, are the first and primary line of defense of a spaceship crew. Given that even a near miss with space-class weaponry is likely to harm a vessel, the best is often not to be seen at all. ECM, or electronic countermeasures, is mostly useful against guided missiles and weapon locks. They can also use flares, aerosols and chaff clouds, although these have limited effect since the ranges involved are so great. It is often better (and safer) to deploy a decoy drone and mislead the enemy completely about the ship's current position.

If the ship does get detected and attacked, and cannot avoid the hit, it must rely on its armored hull to either soak or stop damage. Fog launchers, which throw high velocity dust clouds against the attack (see page 23), are the first "armor" to be throw against the attack. A mixture of heavy composite sandwich of metal alloys, ablative resins, and foamed polymers with high radiation absortion profile are carefully layered within the skin of the vessel, each providing defense against a specific component of the assault. Internal defenses are few, mostly confined to passive systems such as automated door locks and a complex sensor web (which is part of the engineering monitoring network). In general, if opponents manage to get aboard, it is generally too late anyway.

Fighter Craft



"Fighter craft" is more of a class name that a specific ship type; in space, all vehicles share common characteristics, differing only by which one or ones they favor. Fighters are small space craft that put their emphasis on brute acceleration and firepower at the expense of endurance and armor protection.

The average fighter is built around a set of powerful fusion tubes. These are surrounded with "wings" or struts bearing maneuver thrusters. Fuel pods, sometimes mounted on gimbals to distribute mass around the thrust vectors, are located on either side. A large armored crew module is placed at the front and houses the pilot, weapon specialists and system operators. Some fighters are so large they require a captain as well, though this is a rare occurrence.

Fighters are armed with powerful weaponry, most often a chemical or free electron laser and pods of ASAT missiles. The laser is typically mounted in a turret and serves both as an offensive weapon and a mean of communication. Some fighters carry railguns or massdrivers as well; like the laser, these are mounted in articulated turrets for a maximum field of fire.

Spaceship Operating Procedures - 3.4.7



Over the centuries, a number of standardized procedures were developed to regulate life aboard spaceships. Though they differ slightly from one vessel to the next, they generally cover the same situations in much the same ways. Most crew rotate along a three-watch system to keep the ship at the ready. Each watch is monitored by one of the ranking officers, under the captain's direction.

All ships operate on "alert levels," which are displayed on panels on the ship's intercom system. White level is used when the ship is safely secured at a friendly port. During that time, only the life support systems are operational, the rest being either shut down for maintenance and diagnostics or simply removed for security and safety purposes. Mothballed vessels use an even lower alert level, which does not have an assigned color code.

Gray alert is the lowest readiness state under which a ship can be operated. Only a skeleton crew is present on board, and only essential maintenance is performed. This level is used when the ship is in friendly port or moving from one dry-dock to another. Weapons are only partially disabled so that the ship can be rapidly brought into action by a full crew.

Normal military cruise conditions have no associated alert level. The ship has its proper crew complement, which rotates under the normal watch system. A vessel may continue this pattern for months without abnormal affects. Off-duty crew members are allowed to move about non-restricted areas of the vessel. When underway, the ship's engines fire at a regular acceleration, giving a pseudo "down" orientation to the decks. To save reaction mass, most spaceships first accelerate and then coast to their destination, leaving the crew in free fall for most of the trip.

Combat ◆

Whenever the captain of the ship suspects a dangerous situation, he calls for a "yellow" alert level. The watches continue to rotate as usual, but the off-duty crew must remain on standby for rapid response. Loose items must be secured in lockers or otherwise tied-down. Spacesuits are worn continually, even while sleeping. Ships systems and weapons are on stand-by mode, ready to fire but unable to undergo routine maintenance tasks. This state of readiness can be maintained for a few days at most.

Red alert warns the crew that the ship is approaching combat. All hands report to their stations. Helmets are worn, compartments are depressurized, and non-mobile personnel (everyone except selected damage control teams) must be secure at their acceleration stations. Auxiliary craft are readied; some may be launched in provision for the upcoming battle. Weapons systems are loaded, charged and cleared for immediate firing. Passengers must go to their assigned secure location and strap down in preparation for the violent maneuvering that is coming. Gating procedures are similar to combat ones, though most civilians are in sleep tubes rather than spacesuits. Everyone is strapped down in preparation for the after-crossing nausea and illness.

Use and Distribution - 3.4.8

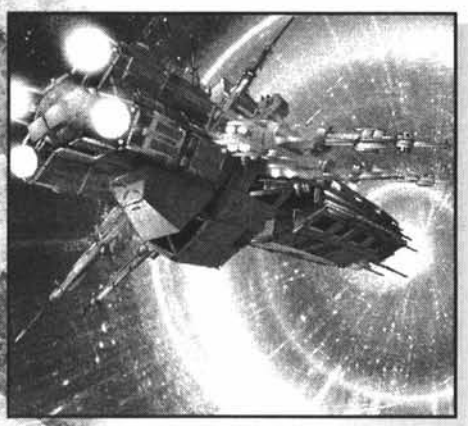
Space ships are a common sight. They are used by all factions, who usually maintain a small fleet for commercial and defense purposes. The most often encountered ships are the cargo and ore mining ships, followed by gas tankers (it is usually cheaper to "mine" gas and transport it to the space stations and Gateships than prepare it from planet-side resources).

Spaceships are built in the same shipyards as Gateships, using similar techniques and materials. Only a couple are built every few cycles as needs dictate. The chart below roughly outlines the space fleets of the leagues of Terra Nova. It is somewhat misleading, since all space-worthy vehicles, regardless of their size, are included, but it does provide a general portrait of the situation. The last column represents the estimated percentage of ships in use (i.e. not in dry-docks or mothballed) at any given moment.

Terra Nova's Spaceships

League	Civilian	Military	% Operational (Est.)
Northern Lights Confederacy	145	42	75
United Mercantile Federation	184	24	85
West Frontier Protectorate	40	35	60
Southern Republic	178	37	75
Humanist Alliance	137	22	90
Mekong Dominion	112	19	65
Eastern Sun Emirates	65	8	70
Independent	220	N/A	95

3.5 - Gateships



Most spaceships do not carry a Gate drive. The first and foremost reason is the cost and complexity of the system: a drive core is of monumental proportions and represents an engineering feat which, while not beyond modern technology, is nonetheless very taxing. Parts have to be manufactured to extreme tolerances, and very rare materials are often required.

Gateships are enormous, often a significant fraction of a kilometer in length. While they are equipped with an array of powerful fusion thrusters, the acceleration they can attain rarely surpasses 0.2 G, and even then the stress is enormous. Gateships are used to open the Gate for a fleet of smaller vessels — the cost in energy and manpower is far too great to spend on moving just one ship. These vessels wait until the Gate is opened and then simply cross over to the destination point.

Very few Gateships are used for travel, though they can do so. It is often much more efficient to send standard slower-than-light ships through a Gate than move the Gateship itself, though this of course requires that another Gateship be present on the other side for the return trip. Most people view Gateships as giant, yet mobile space stations.

3.5.1 - Layout

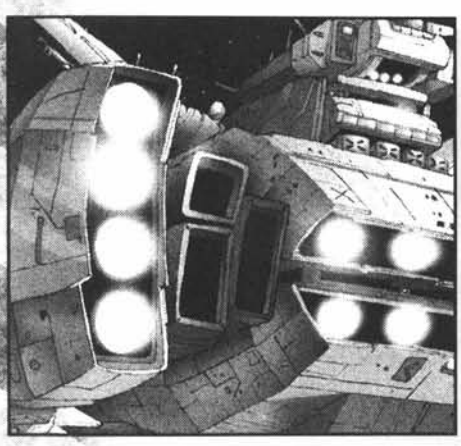
Gateships are usually cylindrical or rectangular in shape. Each vessel is custom-built, so no two are exactly alike, even members of the same general class. They can be roughly classified into three categories: Light, Medium and Heavy. Light Gateships are about 500 meters long (10 tactical hexes), medium ones about 700 to 900 meters (14 to 18 tactical hexes), and heavy being about a kilometer long (20 to 22 hexes). Only one Heavy-class Gateship was ever built: *Pride of Earth*. Its generators could open a Gate in minutes and allow a whole fleet to cross thousands of light-years in just an instant. Its current whereabouts are unknown, although it is safe to assume that it is mothballed somewhere in the Sol system.

The core of all Gateships houses the Gate drive, which is always placed parallel to the main thrust axis of the ship. The Gate Drive is usually the first item built and doubles as the ship's spine, the acceleration ladder supports being built directly into the bulkheads. Additional systems are then laid around it, forming a sturdy shell capable of soaking up considerable damage. Habitation modules are placed near the front, just behind the main deflector shield (see *Defensive Systems*), followed by cargo and fuel tanks (often fitted in modular rack-style mounts). The maneuver engines and reaction mass tankage occupy the rear of the ship.

All Gateships are equipped with one or more rotating decks to provide simulated gravity to the crew. These take the form of large wheels buried within the hull which slowly spin, providing up to 0.5 G to the people inside. The axis of the wheels are parallel with the ship's spine, and the wheels must thus be stopped if the Gateship is to accelerate at full power — standard acceleration is so low it generally only give a slight perceived slope to the living quarters, and is thus not worth bothering with. Many of the living quarters are located on these gravity decks, as are a number of exercise rooms and relaxation areas. The decks operate at all times, even when the ship is moving, since the acceleration of the thrusters is so small it is barely felt on the decks.

Gateships usually sport somewhat garish paint schemes, usually shades of gray along with the occasional patterns of bright color. These patterns are used by spaceships as a handy reference grid for calculating Gate entry vectors, but they also serve as identification markings. Due to the ships' ages, however, the colors have faded somewhat, given widely varied appearance to the fleets.

3.5.2 - Propulsion Systems



A large array of fusion powerplants are used to provide energy to the ship's various systems. The Gate drive itself usually has at least two dedicated powerplants. Solar arrays are also mounted on the hull, where they serve as auxiliary power supply.

Propulsion is taken care of by fusion tubes which superheats reaction mass (generally water) and ejects it at relativistic velocities out of the ship's nozzle. Needless to say, friendly vessels are advised to stand well clear of the Gateship's exhaust. Maneuvering thrusters use small plasma arc engines or, for some large Gateships, miniature versions of the main drive.

During the last few years of the expansion, experimental anti-matter engines were tested for Gate Drive power. This third generation of Gate Drive technology was never completed before the collapse of the Concordat, but the technology derived from its development provided additional knowledge about anti-matter and its possible uses.

Offensive Systems - 3.5.3

Gateships are not very good instruments of war. They are slow, cumbersome, and inherently fragile for their size. However, there were times when a Gateship found itself engaged in battle. Batteries of lasers and particle cannons are mounted on the hull, primarily for defense (see page 85 for turret stats). These are deadly against other ships because of their precision.

The Gate Drive itself can also be used as a weapon, although a grossly inefficient one (see page 59 for rules). The high energy beam can be targeted with extreme precision since it is normally used to find a microscopic point in space, but it is not very agile (i.e., able to respond fast to changing trajectories). It is restricted to a 30 degree fire arc in the front of the vessel, however, and since a Gateship is very cumbersome to maneuver, it is unlikely that the beam will be able to lock on any smart target.

Defensive Systems - 3.5.4

Due to their importance and the fragility of the systems inside, most Gateships are heavily armored and well-armed with lasers and particle cannons. While these mostly serve against asteroids and the like, they can be used very effectively as weapons.

The skin of the vessel is most often a ceramic/alloy composite, glazed in alternating layers to resist micro-meteor abrasions and minor surface collisions. Large plates are mounted on a honeycomb structure filled with radiation-absorbing gel, which is also used to quickly close any hull breach. The sheer bulk of the ship means that it is unlikely to take heavy or crippling damage from anything other than an asteroid collision or by being fired upon by another Gate Drive.

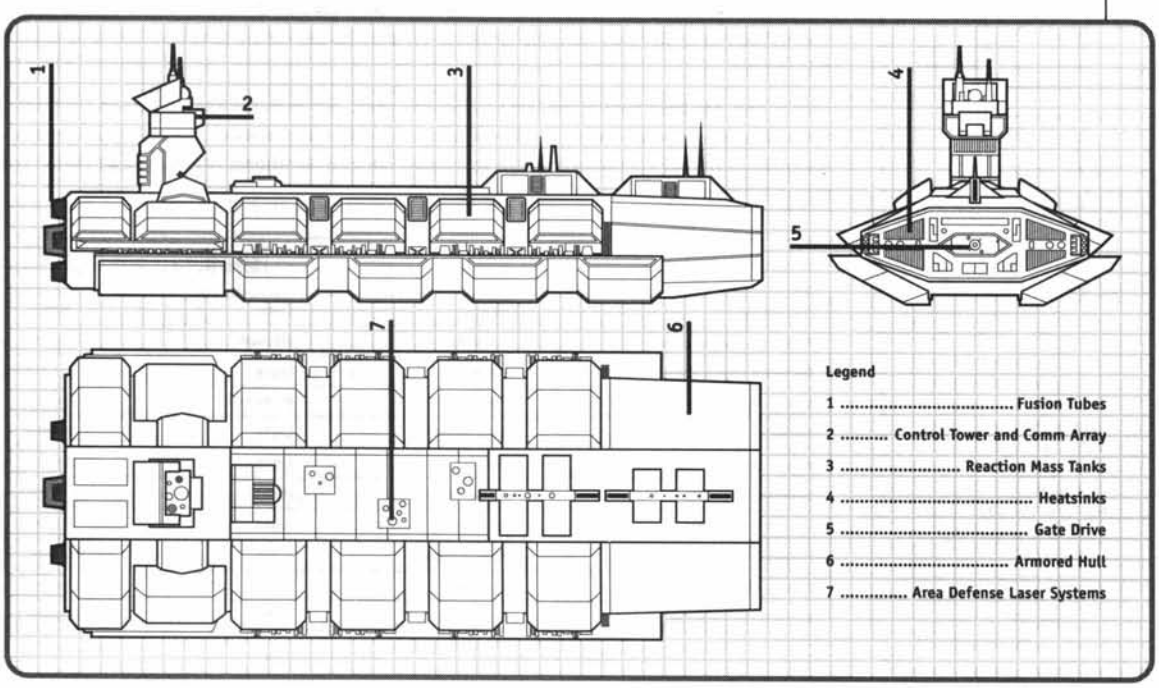
Gateships are also equipped with deflector shields, which are composed of an ionizing laser and a powerful magnetic screen. These serve to protect the ship from stray particles and space dust which could cause serious damage while the ship is moving. The laser probes ahead of the path of the ship and ionizes dust and debris, which are then swept aside by the magnetic field. This also had the added benefit of deviating charged particles.

A Typical Gateship: UMFGS Laban Emuros ◆

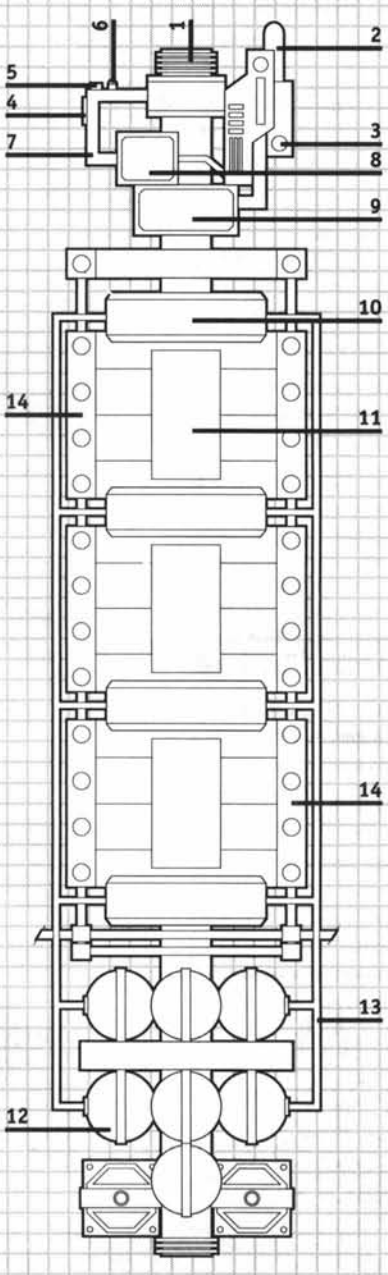
The *Laban Emuros* is the smallest of the two Gateships maintained by the United Mercantile Federation. Nearly half a kilometer long, the Pohlo is a remnant of the colonial and exploration period when interstellar ships routinely passed from one star system to the other. The ship is a huge burden on the economy of the Federation but is (or rather was) crucial to the limited out-system trade of the UMF.

The *Laban Emuros* is presently stationed 23 AU out from Terra Nova, near Gate II. It used to open the Gate every three months to allow commercial exchange with the other colonies, but hasn't done so since the war. It and a small fleet of military ships are now used to stand guard at the Gate in case another invasion is attempted by outsiders. The ship's crew is rotated planetside every six months.

Gateship UMFGS Laban Emuros



3.5.5 - Gate Drive



Gate Drive

1 ..... Beam Calibration Ring
2 ..... Optical Sensor Cluster
3 ..... Plasma Wave Detector Antennae
4 ..... Wide Band EM Sensor Cluster
5 ..... W and M Sub-atomic Detectors
6 ..... Low Energy Particle Detectors
7 ..... Plasma Wave Detector Antennae
8 ..... Neutrino Interaction Detector (NID) System
9 ..... Interaction Boosters
10 ..... Impulse Controller Coils
11 ..... Primary Acceleration Coils
12 ..... Fusion Powerplants
13 ..... Main Power Conduits
14 ..... He_2 Cooling Grid

The Gate drive itself is a massive particle accelerator, nearly a third of a kilometer long and fifty to sixty meters wide. Most of its mass is composed of powerful fusion plants, beam emitters and focusing mechanisms. The particle emission it produces is modulated by complex electronic systems which emit electromagnetic pulses of varying wavelengths and durations.

It must be said that the Gate drive does not create the Gate, but merely serves to open it. As stated before, Gates are natural, localized occurrences in space, which react to the pulse and the energy sent by the drive core. The particle stream "stabs" space around the Gate's coordinates until it finds the Gate proper; it is then used to supply the energy necessary to open it.

An opened Gate transforms itself into an elongated temporary wormhole which is projected to the target location and aimed by the pulses from the Gate drive. This must be constantly monitored and corrected, as the influences from various gravity wells, even distant ones, can affect the position of the emergence point, sometimes with catastrophic results.

3.5.6 - Sensors

Gateships mount a variety of sensors to enable them to relate to the outside world. Every portion of the electromagnetic spectrum in all directions is covered by at least one type of sensor. It is almost impossible to sneak up on a Gateship unannounced. Sensors include radar, ladar, madar, passive receivers on all bands and optical and movement-sensitive trackers. The sheer size of the hull means that the sensor network has a very wide ranging base and equally large detection surface, giving it both sensibility and resolution far greater than the equivalent systems used aboard standard spaceships.

A set of specialized high energy sensors is mounted on the forward bulkhead, to localize Tannhauser Gates and provide data to the control mechanisms in the Gate Drive. These sensors are a high priority target for hostile forces wishing to disable the ship and thus, are heavily armored and protected.

3.5.7 - Use and Distribution

Gateships are owned by almost all factions on Terra Nova. However, they are generally considered a fragile prize, since they represent an enormous investment of time, money and resources. Even Earth Forces only disabled the Terranovan ships during the invasion, perhaps hoping to use them later. All ships were later retaken by boarding actions, except two. One, the *Antam*, was destroyed in one of the early battles while the *Moskwa* was lost due to a main propulsion drive failure as it tried to evade the invasion fleet. Her crew managed to escape via shuttles and escape pods and later returned to Terra Nova.

No new ship has been built in the last two hundred years, although the knowledge and the facilities still exist. There are simply too few reasons to justify the enormous investment of time and resources. If the CEF continues to prove aggressive, however, additional vessels may be needed in the near future.

Terra Nova's Gateships

Affiliation	Ship	Class	Status
Northern Lights Confederacy	Leviathan	Medium	Drydock
Northern Lights Confederacy	Moskva	Light	Lost
United Mercantile Federation	Marcus Pohlo	Medium	Drydock
United Mercantile Federation	Laban Emuros	Light	Active
West Frontier Protectorate	Antam	Light	Destroyed
Southern Republic	Oasis' Pride	Medium	Drydock
Southern Republic	Illustrious	Light	Active
Humanist Alliance	Remar Vajra	Light	Drydock
Mekong Dominion	Tienlung	Light	Mothballed
Eastern Sun Emirates	Eastern Sun	Light	Unknown

Gateship Operating Procedures - 3.5.8

Gateship operational procedures are much the same as the ones in use aboard standard spacecraft, with the possible exception of Gating. These rules ensure the crew is ready to meet any situation which may present itself. Like other spacecraft crew, Gateship crews rotate along a three-watch, with each watch is monitored by one of the ranking officers.

Gateships operate on the same alert levels as their smaller brethren. White level is used when the ship is safely secured at a friendly port. Only the life support systems are operational, the rest being shut down for maintenance and diagnostics. Mothballed vessels do not have an assigned color code, since no one is aboard. Gray alert is the lowest readiness state under which a Gateship can be operated, and is used solely to move from one safe location to another. Only a skeleton crew is present on board, and only essential maintenance will be performed. Under no circumstance can a Gate be opened at Gray Alert or lower.

Normal operating conditions have no associated alert level. The ship has its proper crew complement, which rotates under the normal watch system. A vessel may continue this pattern for months or even cycles without abnormal affects. Off-duty crew members are allowed to move about non-restricted areas of the vessel. Because Gateships have low thrust to mass ratios, the crew is in free fall most of the time; regular visits to the centrifuges are scheduled to allow crew members the opportunity to exercise.

Whenever the captain of the ship suspects a dangerous situation, he calls for a "yellow alert" level. The watches continue to rotate as usual, but the off-duty crew must remain on standby for a rapid response. Spacesuits are worn continually, even while sleeping. Ships systems and weapons are on stand-by mode, ready to fire but unable to undergo routine maintenance tasks.

Red alert warns the crew that the ship is at risk. All hands report to their stations, helmets are worn and compartments are depressurized. Damage control teams move to their assigned posts. Auxiliary craft are launched as needed. Defense systems are cleared for immediate firing. Since the ship is too large to dodge or escape detection, much of the crew's attention is devoted to the sensor systems so that they can properly coordinate the defense craft and intercept incoming projectiles.

Gating ◆

A voyage to a distant star usually begins by traveling to the nearest Tannhauser Gate. At the height of the colonization effort, Gateships were often stationed near the Gates and sold their service to voyagers. A suitably large fleet was first assembled, though, to make sure that the opening of the Gate was a profitable operation.

Once all the spaceships of a fleet are in position (using the patterns on the hull of the Gateship as a reference grid), the Gateship fires up the main particle accelerator. Secondary quantum interactions manifest themselves as impressive but harmless bolts of lightning jumping about the hull in an awesome display of fireworks. Although it is technically inexact, crew call this effect St-Elmo's fire (a visually similar atmospheric effect).

Depending on the size and power output of the Gateship, the Gate opens in between two and twenty hours. The particle beam emitted by the Gateship expands into a cone of light which disappears into the pulsating glow which is the Gate proper.

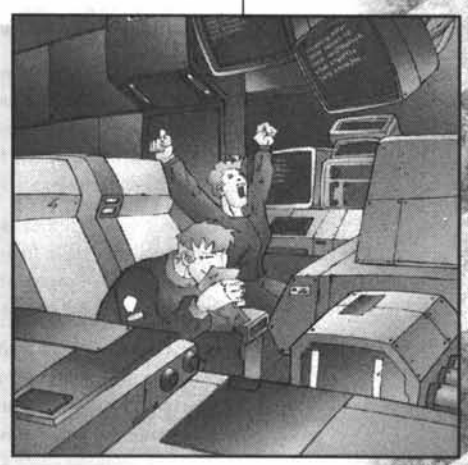
Once the engineers in charge of the drive deem that the Gate is stable, the spaceships activate their thrusters and pass through. The particle beam is regulated so as not to touch any ship as they "Gate" to their destination. If the Gateship must cross the Gate, it waits until all have gone through, then cuts off the beam and traverses the slowly closing Gate. A Gate closes a little faster than it is opened, the excess energy bleeding off as broad band EM energy in the surrounding space.

◧ Gate Sickness

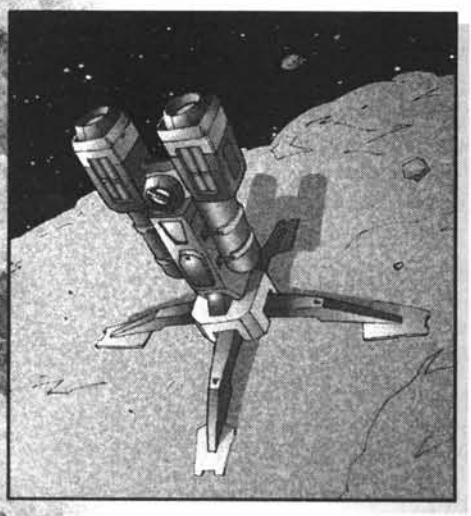
Although crossing the Gate is done in a matter of seconds, the experience is altogether unpleasant. The tidal stress within the Gate itself, although within human tolerance, provokes severe disorientation, hallucinations and limited physical pain as it overwhelms every cell of the body. In his report, Captain Elido Carlomagnes, the first Gateship commander, described the experience as being somewhat akin to hearing odors, seeing sounds and tasting colors while having a headache in his big toe. Although there are no lasting physical effects, most find the experience extremely perturbing, even mildly unpleasant. (see page 71 for game effects)

Most people prefer to be put in controlled hibernation to bypass the experience. Hibernation is also widely used to reduce the quantity of supplies needed by the crew and passengers during the flight to and from the Gate, and provides a solution to the boredom that often afflicts crew on long trips. Automated vehicles are obviously unaffected by Gate sickness.

A few persons actually like the sensations provided by the Gate. These people are often daredevils and explorers who prefer to stay awake during the whole experience. Depending on the energy threshold of the Gate, the sensations can vary from eerie to downright dangerous. "Gatebusters" can be found in many crews throughout human space, especially amongst fighter pilots.



3.6 - Space Mining



Space mining is one of the main activities of the Terranovan spacers. Their life style requires a constant source of supplies for the construction of new habitats and the maintenance of existing ones. Asteroids are one of the main sources of material. Not only are they readily available, they can be moved to the production site and processed *en-route*, saving both time and money. Asteroids provide metals, water, carbon and other volatiles depending on their type.

Asteroids come in many types. The most common are the C-type, of which two-thirds contain at least some trace water in the form of ice, usually frozen within the main body of the asteroid. A few are giant ice-balls (15% of C-types, 11% of all asteroids) composed of 50% to 80% water, the remainder being composed of mostly silicate rocks.

There are two methods to move the water and resources from asteroids to more convenient locations. The first and simplest is to tow the asteroid behind a spaceship (or have the ship push it), either going directly to the target, or slingshotting around a gravity well if one is in a convenient location. Sometimes, a habitation unit and a drive are fitted directly onto the asteroid, the ice itself being used to feed the propulsion system. The other method is to process the material directly on site and ship only the finished products. Asteroid mining factories are huge constructs, with giant ore crunchers at one end and a "slag heap" at the back. Their overall shape reminds many of a dumbbell. Products are picked up in docking bays located alongside.

3.6.1 - Comets & Gas Giants

Like many of the solar systems explored by humanity, the Helios system is surrounded by a large cometary halo, remnants of its formation. Time and again, gravitic perturbations (either natural or caused as a side effect of opening a Gate) throw a few comets in new orbits that fall toward the star and the planets surrounding it.

Comets are primarily mined for their high water content. Water is a precious commodity in space, since it can be used for life support or as a source of propellants. The only other sources of water are the thin rings of the gas giants and the occasional "juicy" asteroid, so called because of their high content in hydrated clays and other water rich compounds. Despite this, comet mining is a rare event because it takes a lot of fuel to match their delta-V. Unless the comet is on a suitable trajectory (or is in a collision trajectory, in which case interception is mandatory), comet mining is not always cost effective. The only place where comet-mining is done on a grand scale is in the Caprice system. The dry surface of the planet means that the water requirement of its large population can only be fulfilled byoutside sources. Fortunately, the Loki star system is home to a large cometary cloud and several asteroid clusters, all of which contains icy celestial bodies with a high percentage of water.

Gas giants are the primary source of many useful materials such as hydrogen, helium-3 (a fusion fuel) and noble gases. Both Zeus and Poseidon are enormous storehouses, but so far only Zeus is extensively exploited. Although it has a deeper gravity well, Zeus is closer to Terra Nova and the inner Helios system and thus is the preferred source. Most of the gas mining is accomplished by automated vehicles and hot hydrogen balloon platforms flying in and out of the atmosphere; every once in a while, one of them suffers a malfunction and is lost to the depths of Zeus' lower atmosphere. Pick-up is done by fusion rockets that use the local atmosphere as reaction mass for the first part of the journey, then burn part of their payload to finally escape the planet's deep gravity well.

3.7 - Shipyards and Orbital Factories

Many of the orbital installations in the Helios systems are industrial in nature. It is far more efficient to manufacture whatever is needed directly in space rather than have to haul it out of the planet's deep gravity well. A small number of shipyards have survived the War and have been kept in operation by various governments and corporations. The smaller ones are little more than workshops where parts are machined and assembled one by one; those are more often used as repair stations, leaving the construction of brand new ships to the better equipped facilities stationed near asteroid clusters.

Most of the orbital factories use similar procedures. Supplies and primary materials are brought over by freelance asteroid miners. Parts are then manufactured in free-flying autofacs orbiting near the main satellite. The main spars that will form the hull are extruded and assembled, and then everything is brought over and fit into place. If any are required, the fusion tubes are always manufactured in distant outposts to prevent catastrophic accidents.

The most common type of orbital factory is a large open framework with solar wings and a few enclosed areas for pressurized work and crew housing. Raw material is delivered by tenders at one end of the main spar, while finished products are expelled at the other end. Some factories have additional side modules where other components are manufactured and assembled. The larger factories are built on the same model but feature several spars attached together by transverses. Large "walkways" made of flat panels are available all along the structure, allowing space suits and vehicles equipped with molecular grip plates to move along the structure without the need for tethers or thrusters.

Power Supply - 3.7.1

All factories require massive amounts of energy to convert the raw ore they receive to usable material and to power the crafting and assembly lines. Solar power, free and available in large quantity, is the preferred source of energy. Large collectors are placed near the structure to supply the necessary power. Some stations, especially those requiring ore smelters, have large mirror arrays that reflect solar light into high temperature furnaces.

Many stations are also equipped with a small fusion reactor for auxiliary and emergency power. Should the solar arrays be damaged for any reason (collisions, combat or sabotage), the fusion reactor kicks in to preserve life support and essential manufacturing processes. This generates large amount of waste heat, which means it is only a temporary solution. The fusion reactor also serves to maintain/correct/change the orbit of the factory, superheating waste material and ejecting it to slowly make course corrections.

Escape and Survival Vehicles - 3.8

Though all spaceworthy vehicles can be turned into an escape raft, a complete class of vehicles has been designed expressively for this purpose. These small vehicles have only a very limited interplanetary capacity, and are designed to keep its crew alive and safe rather than take them somewhere else.

The standard escape pod is a small autonomous spacecraft designed to keep its passengers alive for the longest possible time. It has its own life support system, first aid equipment, propulsion and communication systems. The automatic transponders will relay the position of the pod to all ships in the area. Two-and four-man pods are the most common.

While mobile, it does not possess a large reserve of fuel and is generally incapable of making more than one or two major course change. Practically all escape pods have a built-in lightweight heat shield to allow them to aerobrake or to enter the atmosphere of a planet. Parachutes and floatation devices are then used to ensure a safe landing.

Lifeboats are larger versions of the escape pod. The larger life support gear includes scrubbers, water recycling and food supplies that greatly extend the endurance of the craft. An increased fuel supply gives the lifeboat some ability to avoid hazards while awaiting rescue. Depending on the details of the lifeboat, eight to thirty people may expect to survive several weeks.

Typical Escape Pod - 3.8.1

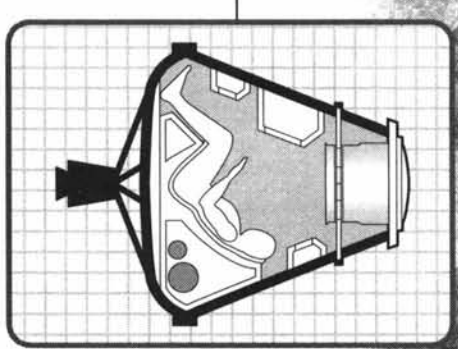
The typical escape pod is a small, conical-shaped vehicle docked to the side of the spacecraft and accessible through a small hatch from a peripheral corridor. It is intended for two persons, but a third one can be accommodated if need be. The access airlock takes up most of the nose; a cloth chamber can be extended to allow spacewalks without having to evacuate the inside atmosphere. A small disposable solid rocket motor is bolted on struts at the base of the pod for propulsion and de-orbiting; it is jettisoned once spent. Small cold-gas maneuver thrusters ring the base of the cone, just above the heat shield rim.

The pod has twelve man-days of air, mostly through the use of scrubbers. Minimum rations, consisting of food bars and a very limited water supply, can keep the occupant(s) alive for the same amount of time. Shaped plastic bags and germicide capsules are used for waste disposal. The pod's locker contains two light vacuum suits, one sealer can, three packs of chemical lights and a first aid kit. A high-power, one-way transmitter pulsing every ten minutes (range 10 km before modifiers) and a conventional radio (range 2 km on the ground, 200 in space, -5 Comm rating) are housed in the top section of the pod. Four radio flares may be ejected, to emit both a bright light and an emergency signal. The pod's hull has an Armor rating of 2, Size 1, and is Re-entry Capable and Airdroppable.

Escape Pod Operating Procedures

Using an escape pod is, by necessity, a very simple procedure. The location of all escape pods is clearly marked throughout the ship, with markers indicating the position of the nearest escape pod. Access is gained through a large pressure hatch that leads directly to the interior of the pod.

The controls of the escape pod are extremely simple and can be operated by anyone without the need for special training. Much of the actual piloting is taken care of by the onboard computer. A large red button, placed underneath a flip-open protective cover, seals the access hatch, activates the pyrotechnics that blow out the lifeboat bay's protective cover and release the craft from its berth. Civilian ships often feature a special computer routine that prevents the craft from leaving until full, with sub-routine watching for danger signs and indications that no remaining personnel are onboard. This safety feature can be disabled by any ranking officer on board, and often is removed from private ships.



Tactical Space Combat System - 4.1



Space is vast, and most of the battles taking place there are deadly games of hide-and-seek. Ships equipped with gigawatt lasers and nuclear-tipped missiles glide silently through the void, surrounded by a formation of deadly combat drones, extending their sensors in the desperate hope of acquiring a lock-on their opponents before they are blown from the sky themselves.

Space combat in the **Heavy Gear** universe is thus a strange affair where long moments of sheer boredom are interrupted with brief flashes of pure terror and where the first captain to detect his opponent is often the winner, with death an almost sure result for the loser. Given this, it would make little sense to set up a board to simulate a tactical battle, since most of it will take place in secret. The Tactical Space Combat System is an abstract system that purposefully oversimplifies several aspects of space combat to make it manageable.

Because of the absence of atmosphere and gravity, space combat is very different from planet-bound conflict. There are two possible forms of space warfare. The most common situation is when two (or more) hostile groups wish to engage each other (or one side is defending a static installation) and all match overall velocities in order to make combat manageable. These battles occur around points of interest — almost always the orbit of an inhabited planet, a Tannhauser Gate or a resource-rich location, such as an hydrocarbon-bearing moon. The second type of space combat is the lightning strike, where two combat groups meet at high velocity to exchange a few seconds of sustained fire.

Units - 4.1.1

Because space combat relies primarly on stealth and deception, it is not practical to use a game board. This also abstracts the third dimension, simplifying the game while retaining the realism of the system. Moving everything into the abstract realm neatly addresses both of the requirements above. It might be necessary to define some units for range and duration, however, in some situations (to approximate sensor ranges, for example).

Space distance units (the equivalent of tactical hexes) are roughly 500 m across. The combat rounds represents about 30 seconds of real time, just like the normal tactical combat round (this allow an interface between ground and space combat). Note that unlike ground and air vehicles, spacecraft have "Thrust" and "Overthrust" MP scores; both are game equivalent to the basic tactical Combat and Top Speed MP scores, except that they represent acceleration rather than speed.

Range Considerations - 4.1.2

One important aspect of tactical game play is the distance between machines. This is the principal reason why hex maps are used. Here, however, range becomes secondary to secrecy, accuracy, maneuvering and tactics, which make abstract combat a better representation than a map-based rule set.

Three ranges are important in any type of combat: a) the distance which the attacker can move during the round; b) the attacker's weapon range; and c) the distance the defender can move to get out of range from the attacker. Furthermore, positioning is often crucial to gain a tactical advantage. To simulate this without the need for a tactical map, two attributes must be determined: the attacker's Offensive Range (OR) and the defender's Evasion Range (ER). An opposed Piloting test will determine if the attacking vehicle manages to properly position itself and establish a good lock on the enemy. The Offensive Range is equal to the attacking vehicle's current speed plus the selected weapon's range. The Evasion Range is equal to the defending vehicle's current speed (this is detailed later on).

Sequence of Events - 4.1.3

The sequence of events is similar to the one used in standard tactical ground combat. Declaration and Initiative are done as usual. Activation itself is split between Lock On and Firing. Lock On is a test where the attacker tries to acquire the exact location of the enemy vessel and position himself to better shoot the enemy from the desired range. Firing is the standard attempt to gun the enemy down and is modified according to positioning. The last phase, Miscellaneous, also follows the standard rules.

Combat Sequence

•	**Step Zero: Set-Up**
•	**Step One: Declaration Phase**
•	**Step Two: Initiative**
•	**Step Three: Activation (Lock On/Firing)**
•	**Step Four: Miscellaneous Events**

◆ Step Zero: Set-up Phase

A battle always begins with the Set-up Phase, which occurs only once. An overall commander must be chosen for each side, with a second in command. Their identities can remain secret, but must be noted down for future reference. If the commander becomes a casualty, he or she is replaced by the second in command. If both are put out of action, all future Leadership Skills are rolled at the Skill level of the next highest ranking officer present (by default, at level 1), except during integrated roleplaying/tactical games. The Player Character with the highest Leadership Skill may choose to replace the commander if the latter becomes a casualty. Obviously, robot vehicles like drones cannot be chosen as commander or second in command.

A Tactics (Space) Skill test is made by each side based upon the Skill level of the commander. Fumbles count as a die result of zero. Reroll ties. The winner chooses which Player will activate a unit first. If, during the first round, a unit is attacked before it has been activated, it is treated as if it were moving at a velocity equal to its Combat Thrust, for the purpose of defense rolls.

The die result of the Tactics roll should be recorded by each Player. Each point represents one Tactical Command point that can be played at any time during the game.

◆ Step One: Declaration Phase

Both sides declare any extra actions and individual evasive maneuvers for the round. If need be, a counter or token can be placed either near the record sheet to mark the unit(s) with extra actions, avoiding confusion during game play.

In normal tactical combat, Players have a visual situation to analyze and on which they can base their decisions. They can therefore select the option to Dodge before rolling for initiative. In space combat, however, they have no way to make that analysis, and selecting the option to Dodge prior to rolling initiative is a tactical decision. At this point, the characters must declare any extra action they wish to take, but do not have to state an intention to Dodge. If they do, the Dodge gives them a +3 defense modifier throughout the round. If they declare a Dodge when they are about to be attacked for the first time in the round (during Step Three), the Dodge only gives them a +2 modifier. Note that it is only possible to declare a Dodge during another Step if the Player who declares it has not spent any action so far.

◆ Step Two: Initiative

If the Player is alone, he makes a Piloting (Space) Skill test with his opponent(s). The Player with the highest result will activate first. Tied results are rerolled. If several Players are facing one or more enemies, the designated leader performs a Leadership test. The winning Player (or team) may activate one of his units first (see *Step Three* below). Once that unit has "moved" and fired, the next Player (or team) with the highest initiative may activate one of his units. The activation sequence goes down the initiative list until everyone has activated one unit. This process is repeated until all participants run out of units to activate.

◆ Step Three: Activation

When a unit is activated, the Player selects the weapon(s) he wants to use. The first part of the Activation phase is the Lock On. The Attacker states how many Movement Points or Thrust Points he wants to spend this round. These are added to the selected weapon's medium range. That gives the Offensive Range (OR). The Defender's current speed gives his Evasion Range (ER).

The difference between OR and ER gives a Lock-On distance which can be cross-referenced on the table below to obtain the Maneuvering Modifier. The opponents then need to perform a Piloting roll to determine who gets better positioning. The Maneuvering Modifier is applied to the Attacker's Piloting Roll versus the Defender. If the Attacker prefers, he may substitute his Tactics Skill to his Piloting Skill for the purpose of this particular roll, at no penalty. Every 2 points of MoS result in a +1 to the Attacker's Gunnery roll. Every 2 points of MoF result in a -1 to the Attacker's Gunnery roll. Just before the Gunnery test is made, however, the Attacker may optionally choose a special combat maneuver (see *Combat Maneuvers*, page 50) to get an additional advantage over the Defender.

Activation Procedure

• Attacker chooses a weapon.
• Attacker spends Movement Points (MPs).
• Attacker adds weapon's medium range to MPs; that's the Offensive Range.
• Defender's last expenditure of MPs becomes his Evasion Range.
• The Lock-On Distance equals OR - ER; cross-reference in the Maneuvering Modifier Table below.
• Roll the Attacker's Piloting Skill and compare it to a Piloting check for the Defender; use NO other modifiers.
• Compare this to the Accuracy Modifier table below.
• Optionally, the Attacker can select a combat maneuver.
• Use the resulting modifier on the Attacker's Gunnery roll. All standard vehicle Maneuver ratings and movement modifiers apply as usual. Resolve damage following the procedures on page 51.

Maneuvering Modifier Table

Distance	Maneuvering Modifier	Distance	Maneuvering Modifier
+32 to +63	+6	-1	-1
+16 +31	+5	-2 to -3	-2
+8 to +15	+4	-4 to -7	-3
+4 to +7	+3	-8 to -15	-4
+2 to +3	+2	-16 to -31	-5
+1	+1	-32 to -63	-6
0	0		

Accuracy Modifier Table

MoS/MoF	Accuracy Modifier	MoS/MoF	Accuracy Modifier
+6	+3	-1	0
+5	+2	-2	-1
+4	+2	-3	-1
+3	+1	-4	-2
+2	+1	-5	-2
+1	0	-6	-3
0	0		

Step Four: Miscellaneous Events

During this phase, any unusual events such as off-board attacks and special scenario-related events are resolved. Ejection rolls, wound checks and general bookkeeping procedures should also be done here. Any action not spent at this point is lost.

Repeat steps 1 to 4 until the battle is resolved or pre-planned objectives are met. A unit or combat group may only be activated once per combat round.

Avoidance - 4.1.4

Being unable to nimbly dodge incoming fire, ships must rely on deception and stealth to avoid being hit. All warships have extensive arrays of electronic countermeasures and decoy generators, designed to mask the ship's actual location and make targeting difficult for enemy gunners. While it is virtually impossible to make a ship truly invisible, all that is really required is to persuade an enemy that his target is a hundred meters or so from its true location, just enough to make any incoming fire miss.

A ship's Avoidance rating represents how well an enemy is able to target it. It is normally equal to zero; if the vessel is equipped with the Stealth Perk, then the base Avoidance is equal to the Perk's Rating. If the vessel has the Large Sensor Profile Flaw, its base Avoidance is equal to zero minus the Flaw's Rating.

Moving, firing weapons, or sending many comm transmissions lowers the ship's Avoidance, while reducing the preceding activities, or diverting more power to the electronic warfare systems (see *Spoof Maneuver*, page 50) increases the ship's Avoidance. Changes in Avoidance can be tracked with a die or noted on the stat sheet.

A spacecraft's Defense rolls are modified by its current Avoidance value. It is thus important to keep the Avoidance as high as possible until it is time to strike. Almost every Action a ship takes will affect its Avoidance. Avoidance returns to its base value at the end of each Miscellaneous Phase.

Avoidance Modifiers

1)	Thrust: -1 Avoidance if thrust is applied during the Turn. An additional -1 is applied if the ship uses Overthrust.
2)	Sensor Search: Each Sensor Search attempt results in -1 to the ship's Avoidance. If a ship is the target of a successful sensor search, it gets -2 to its Avoidance.
3)	Spoof: Every successful spoof attempt adds the roll's Margin of Success to the ship's Avoidance.
4)	Energy and Missile Weapon Attack: -1 Avoidance for each shot from a weapon of these types.
5)	Cover: Every time a ship enters a dust cloud, debris field or other cover, it gets +1 to its Avoidance. In the End Phase, every ship that is still in a dust cloud, debris field or other cover gets +1 to its Avoidance.

4.1.5 - Combat Maneuvers

It is often necessary to outmaneuver one's adversaries, sometimes putting the ship at risk. A wide range of maneuvers and actions are available to the wily spaceship captain.

Every spacecraft gets the opportunity to use its movement allowance (apply thrust) without expending Actions. The Space Movement Points can be spent at once or distributed to facilitate several attacks. Each time thrust is used, reduce the ship's Avoidance by 1, because the engine flares make the ship easier to spot.

◆ Last Minute Vector Changes

Captains often try to get into some "blind spot," an area where the enemy vehicle is more vulnerable and less able to properly defend itself (side, rear or "out of nowhere"). To simulate this, another roll is required just before the attack is rolled, but right after the Accuracy Modifier has been obtained.

The Attacker selects what kind of maneuver he expects to pull (Side: -1 to the roll; Rear: -2 to the roll; Surprise: -3 to the roll). Both Attacker and Defender make an opposed Piloting test, modified for the Attacker by his choice of maneuver and his vehicle's Maneuver rating, and for the Defender by his vehicle's Maneuver rating and any bonus for dodging (+3 if he declared a Dodge at the beginning of the round, +2 if he decides to declare one now). If the Attacker gets a MoS of +1 or better, the Defender will suffer the appropriate penalty on his defensive Piloting roll (see table).

◆ Spoof

The crew devotes power, resources and attention to misleading enemy targeting systems by various electronic and physical means (balloons, flares, etc.). The ship must be equipped with the ECM Perk in order to spoof. A Skill test is made using the ship's Crew Level plus the ECM Rating against a Threshold of 3. If the roll fails, nothing happens. If the roll succeeds, the ship's Avoidance is increased by the roll's Margin of Success. If the roll is fumbled, the spacecraft's Avoidance goes down by 1.

◆ Sensor Search

The ship turns on its active sensors for a few brief moments in an attempt to "light up" another ship. Select a target ship; the range of a Sensor Search is limited by the Sensor Range of the vehicle (the 100x space multiplier applies), and by line-of-sight (it is not possible to ping a ship that is hiding behind an asteroid, for instance).

Each vessel makes a Skill test, the attacker's roll modified by its Sensor Rating. If the defender wins, there is no effect. If the attacker wins, the defender's Avoidance is reduced by 2. No matter what the result of the roll is, the attacker's Avoidance is reduced by 1. If the attacker fumbles, its Avoidance is reduced by 2 instead of 1.

◆ Launching and Recovering Units

Many spacecraft are equipped with bays to carry smaller combat units such as fighters or drones. To leave a carrier, a unit simply drops out of an airlock at no Action cost. The unit appears on the battlefield as soon as it is launched and may move and act as normal.

To land on a carrier, a unit must spend one Action in physical contact with the carrier. At the end of the turn, the unit is taken aboard the carrier and may no longer be the target of any attacks. Missiles hunting the unit will target the carrier, instead.

Additional Combat Modifiers

ATTACKER	
Multiple Actions	**-1 to all rolls per additional action**
Top Speed/Overthrust	**-3 to Gunnery**
Failed Side Attack	**-1 to Gunnery and next initiative roll**
Failed Rear Attack	**-2 to Gunnery and next initiative roll**
Failed Surprise Attack	**-4 to Gunnery and next initiative roll**
DEFENDER	
Multiple Actions	**-1 to all rolls per additional action**
Multiple Attackers	**-1 to defensive roll for each attacker (not attack) past the first**
Successful Side Attack	**-1 to defensive roll**
Successful Rear Attack	**-2 to defensive roll**
Successful Surprise Attack	**-4 to defensive roll**

Spacecraft Damage - 4.1.6

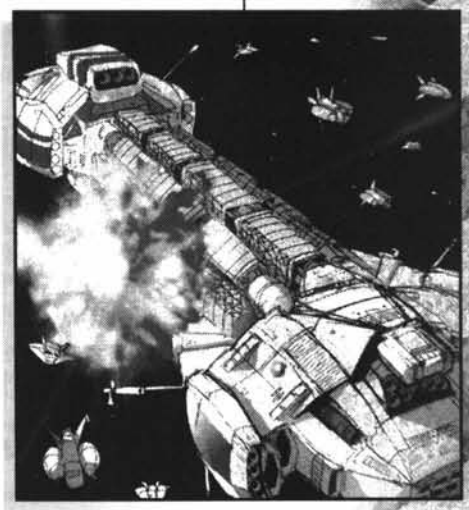
The large distances involved in space combat mean that only very powerful weaponry is likely to be of any use. Laser beams capable of vaporizing a house at close range will gradually disperse and lose their power over distances at the *square* of the range, quickly becoming no more dangerous than house flashlights. For this reason, all weapons mounted on spacecraft are considered to have the Mass Destruction characteristic, which modifies the basic weaponry listed on the spacecraft's game sheet.

All weapons of mass destruction have massive area effects, giving them a free tactical (50 meters hexes) AE, should anyone be foolish enough to fire them at tactical combat ranges, equal to half their unmodified Damage Multiplier. In that zone, their Damage Multiplier is ten times normal. In the area up to their unmodified DM, their Damage Multiplier is five times normal. In the area up to their unmodified DM x 1.5, their Damage Multiplier is normal.

To determine how close the attack hit in open space, an Opposed Tactics (Space) Skill test is made between the two crew, modified by the current Avoidance of the ship. If the attacker wins the test, the Margin of Success shows how precisely they determined the position of the enemy ship before firing: MoS 1, the DM is normal; MoS 2, the DM is five times normal; MoS 3 and higher, the DM is multiplied by ten.

Damage Example

1	***A spacecraft with an Armor rating of 50 is attacked by another ship armed with a laser cannon (DM x15). The ship gets hit full on at Short Range, so a Tactics (Space) roll is made. If the attacker's Margin of Success is 3 or higher, they have pinpointed the enemy vessel, which will take 150 points of damage multiplied by the original MoS of the hit (probably vaporizing the vessel).***
2	***If the range was longer, the damage would be reduced because of the -2 DM per Range Band of the laser, which applies before the Mass Destruction modifier. Say the ship gets hit at Long Range; a Tactics (Space) roll is made. If the attacker's Margin of Success is 2, the enemy vessel will take (15-2-2 x 5 =) 55 points of damage multiplied by the original MoS of the hit. Crippling, but survivable, as long as the Gunnery (Space) MoS was not too high.***
3	***Say the target ship gets hit full on at Extreme Range; again, a Tactics (Space) roll is made. If the attacker's Margin of Success is 1, the enemy vessel, will take only (15-2-2-2 x 1=) 9 points of damage multiplied by the original MoS of the hit. It merely heats up the outer skin of the vessel a bit.***



Spacecraft as Props

In order to further simplify combat and recordkeeping during roleplaying sessions, the Gamemaster may wish to reduce the various enemy spacecraft to the role of simple props. After all, a detailed record sheet is only advantageous when playing a full tactical game, or when dealing with the heroes. Since the GM is expected to run a fast game, he can't be bothered with heavy recordkeeping.

When a spacecraft or auxiliary vehicle, such as Gears or drones, take combat damage, simply roll a six-sided die when the vehicle gets a Light Damage or a Heavy Damage (the results for Overkill are pretty straightforward). If the die result for a Light Damage is 1, the vehicle is destroyed (or, more properly, out of the game). If the die result for a Heavy Damage is 1-3, the vehicle is destroyed. Otherwise, it survives unscathed — even its armor is not dented (to avoiding the need to keep track of damage and modifiers).

RPG Interface with Space Combat

In general, space travel in **Heavy Gear** roleplaying campaigns will be rare; it is expensive, dangerous, and it takes time. It will be used mostly to bring the campaign to an entirely new chapter by moving the characters to a new world. Due to the high mortality level of space combat, it is dangerous to put the characters' ship through the above rules. To avoid eleminating the entire party in one fell swoop, it is better to use a suitably choregraphed space battle scenario instead, where any "kill" hit is converted to something more dramatic and survivable, like a hull breach. The trick is not to kill the character, but to use the opportunity to submit them to sheer terror and anxiety.

Submarine movies such as **Das Boot** or **Crimson Tide** are gold mines of idea. Though the internal layout will be somewhat different (submariners do not have to worry about a crushing five gees of acceleration), the ambiance is similar: red-hued emergency lighting, electronic displays everywhere, crew speaking in hushed tones then shouting warnings, tense expectations about inbound missiles or drones, etc.

4.1.7 - Boarding Actions



In space, infantry can be used as marines to board enemy ships. Boarding actions are rare and difficult to do. Even if marines can be sent over, they must face deadly close combat with their defensive counterparts in the tight confines of space ship access corridors, or even crewmen pressed into action with inadequate weaponry.

In order to dock, the engines of the target ship must first be disabled. The attacking ship must then match velocity and heading and end in the same hex as the target. Alternatively, winch weapons may be used to "harpoon" the target and bring it close enough to disgorge troops. Once on the hull, the marines can attack external subassemblies, enter via airlocks or pierce the surface. If the last option is chosen, a number of Damage Points equal to the Armor rating of the ship hull will make a hole big enough to admit a Size 2 unit (double for each additional two Size points). Armor Crushing weapons do double damage.

Combat takes place as normal, with each 50 meters of the hull counting as a separate Dense Urban hex (see page 154 of the **HG Rulebook**, 2nd ed.); it is thus possible for the attackers to hold only part of a large vessel. The defending Player can assign as many crewmen as desired to the defense, grouping them in ad-hoc infantry squads, but they will not contribute to the ship's Action total anymore. The defenders have an additional one point of Concealment at all time due to their knowledge of the ship's layout and their defensive position, two if the attacker come in via the airlocks.

4.1.8 - Lightning Strike Combat

Lightning strike combat occurs when two opposing groups of spacecraft are streaking past each other at speeds that are measured in thousands of kilometers per second. If the combined total velocity vectors of the combat units are greater than the maximum range of the longest ranged weapon available, the vehicles enter and exit the battlefield in a single turn, enough for only one attack. The resulting battle has much in common with the knightly jousting contests of the Middle Ages, where both combatants have but one single and very short opportunity to deal a crippling blow to their opponent.

This combat consists of a single round which is divided into three stages. Once the encounter is resolved, the inertia of each fleet take them out of range and possible retaliation.

◆ Stage 1: Tactical Advantage

As they hurtle toward or across each other, both factions try to change their vectors in such a way that they will be at an advantageous distance when they pass by each other. An opposed Space Navigation Skill test is required. Each side adds their group's lowest Thrust rating to their Skill roll. The side with the highest roll chooses the range at which the vehicles will engage. Ties are rerolled.

The faction that wins the tactical advantage can easily choose a range that optimizes its own armament while hindering its opponent's weapons. A group with the tactical advantage may also simply choose a range that is greater than their opponent's weapon ranges and avoid conflict altogether. This is a popular tactic when attempting to ferry in ground troops using space ships. If the carrier is destroyed in space combat, the troops it carries will never arrive on the planet.

◆ Stage 2: Attacks

Any and all weapons that are in range may attack once and only once. ROF points may only be used in tight bursts (added to the Damage Multiplier) or for Saturation Fire.

Attacks are rolled as normal. Defense rolls are Piloting Skill rolls to which two numbers are added: the defender's Maneuver score and half of the defender's lowest Thrust rating (round down).

All attacks are simultaneous. Both sides get to roll all attack and defense rolls before any damage is allocated.

◆ Stage 3: Damage Allocation

Allocate damage from all the attacks and determine systems damage and other losses. Whether or not either side is destroyed, the confrontation is now over. It will take many hours of maneuvering by one side or the other to attempt another engagement. Depending on the orbit and velocities, this time is highly variable. 1d6 + lowest Thrust, rounded down, is suggested as the number of hours required.

Spacecraft Operation - 4.2

Spacecraft can perform a variety of special maneuvers and operations due to the nature of their movement system and the milieu in which they operate. The following rules apply to all vehicles operating in space, though some restrictions might apply (for example, special equipment is required for fuel skimming or re-entry).

Flight/Space Interface - 4.2.1

To reach orbit, a vehicle must be capable of reaching orbital velocity by itself (see formula in sidebar). Required Velocity is equal to the planet's orbital velocity minus the vehicle's starting velocity (generally zero, but can be positive — a flying aircraft, for example). If the vehicle starts from the equatorial region and uses the planet's rotation to boost itself, the required velocity is reduced by ten percent. To keep the game simple, planets have been divided in broad categories and typical escape velocities have been given for each.

Acceleration is the vehicle's acceleration in meters/second. Vehicles without the Flying movement system must subtract the planet's gravity from their acceleration before entering it in the formula. Flying vehicles can start from a higher altitude and only use half the planet's gravity.

Time to Orbit shows how long the engine must operate to reach orbit, in turns (divide by two to get the number of minutes). The vehicle must carry enough Reaction Mass to allow the thrusters to operate that long at the required thrust level.

Additional booster vehicles can be added to "tow" the vehicle to the required velocity. Purists may wish to calculate the performances of the vehicle using the modified mass due to the consumption of reaction mass and shedding of booster units. It is suggested to divide the climb in increment of 10% and work from there.

Reaching Orbit

•	square root of (Orbital Velocity / Acceleration) = Time to Orbit (turn)
•	Orbital Velocity is equal to (Escape Velocity / 1.4), in meters/second.

Escape Velocity

Planet Size	Esc. Vel. (km/s)	Example
Asteroid	0.1	Faith, Charity
Moon	2	Hades, Pluto, Hope, Luna
Small Rocky	4	Hermes, Mercury
Medium Rocky	5	Ares, Mars
Large Rocky	11	Terra Nova, Earth, Venus, Caprice
Small Gas Giant	22	Poseidon, Neptune
Medium Gas Giant	36	Saturn
Large Gas Giant	60	Zeus, Jupiter

Re-entry ◆

Re-entry procedures are somewhat different. A vehicle only needs thrust to come out of orbit, not for the re-entry proper. For game purposes, re-entry is assumed to last ten minutes, or 20 tactical game turns. The vehicle *must* be equipped with the Re-entry Perk, either a one-shot system (ablative heat shield) or a permanent feature (aerodynamic design with built-in shielding). If such a system is not present, the vehicle suffer a Fire attack every turn during the descent. The Intensity of the attack is equal to the velocity (in MPs) of the vehicle times 20. Once the re-entry is finished, the vehicle is considered to be at Altitude 12 (Air War) and must have some other way of stopping its fall, either a flight system, extra reaction mass for its thrusters or a parachute.

Aerobreaking ◆

Aerobreaking consists of dipping into a planetary atmosphere to shed velocity, the spacecraft's kinetic energy being converted to heat. This means that the vehicle needs less fuel to brake, either decreasing transit time or increasing cargo payload.

The vehicle must have a re-entry system in order to aerobrake. The pilot must make a Piloting roll against a Threshold of 2 to keep the craft correctly oriented or suffer one Fire attack as per normal reentry rules. Modifiers due to damage apply in full. For each successful Piloting roll, the craft loses ten percent of its speed. If there is no re-entry system present, one can still aerobrake in the tenuous upper atmosphere for a one percent reduction of speed and only half damage.

Coasting

Many of the ships don't have enough fuel or reaction mass to keep on accelerating throughout a long trip, since some must be kept as combat reserve. Fortunately, a spacecraft will keep coasting even if no acceleration is applied. The following formula shows the travel time of a spacecraft based on the amount of Burn Points the captain or pilot is willing to use during the trip. For simplicity, the actual acceleration time is ignored since it will account for only a short part of the total trip time.

Coasting

- **Travel Time = Distance/(BPs x 15)**
- **Time is in seconds (divide by 3600 for the result in hours), Distance is in meters, BPs is the total Burn Points spent.**

Fuel Skimming

Fuel skimming is a maneuver where a scoop-equipped vehicle plunges through a planetary atmosphere and uses its speed to force gases into its holding tanks. Fuel skimming is a relatively complex maneuver, with a Piloting roll versus a Threshold of 4. If failed, the vehicle takes on only 1d6 x 10% of the intended load. A fumble damages the scoop.

Game-wise, the retractable scoop is a Tool Arm that cannot punch. Its Size rating is cross-referenced with the Size-to-Mass table (page 125 of the **Heavy Gear 2nd edition rulebook**) to determine how many tons of gases can be scooped up per turn. These are sent to a dedicated cargo bay. The table on page 58 shows the volume per mass — the gases are counted as Helium for BP calculation purposes. The raw gases can be delivered to a processing facility or processed onboard. It takes one hour to process a number of cubic meters equal to twice the vehicle's Size. Each cubic meter of raw gases yield 0.01 cubic meter of usable hydrogen fuel.

Fractional Orbital Transfer

This is a fancy name for a relatively straightforward maneuver in which a vehicle takes off, climbs above the atmosphere, makes a partial orbit and comes down again. This allows the vehicle to reach a much higher speed than flying through the atmosphere and thus provides rapid transfer between two points on a planetary surface.

To do so, a vehicles must be capable of reaching at least a fraction of the orbital velocity by itself (see *Flight/Space Interface*, page 53) and be equipped with a re-entry system. The same rules apply as for a full orbital climb. The required velocity depends on the distance between departure and destination; determine the fraction of distance between the two points, and apply double of it to the orbital velocity. For example, if a shuttle takes off from a point on the equator to fly to a point located a quarter of the distance away (again on the equator for simplicity), the required velocity would be half the full velocity required to reach orbit for that planet. Going halfway around the world is the same as going to low orbit.

Gravity Whip

The term "gravity whip" is used to describe the maneuver by which a planet's momentum is used to accelerate (or decelerate) a spacecraft. Many space probes used this effect to save fuel and travel time, notably the Voyager space probes. A gravity whip can only be used in an orbital system — the spacecraft gains or loses speed when viewed from the entire system, not the body around which it whips. If the spacecraft is slower than the celestial body, it will accelerate; if faster, it will decelerate.

A Space Navigation Skill test is made against a Threshold equal to the target's velocity in km/s, divided by ten (round up). If failed, the spacecraft gains or loses only half the speed it would normally have. If fumbled, the spacecraft misses its orbital rendezvous completely. Find the speed of the vehicle and the orbital speed of the celestial body used (making sure the measure units are the same). The spacecraft gains twice the difference between its own (pre-whip) speed and the celestial body's orbital speed. For example, a spacecraft moving at 5 km/s whips near Zeus (13 km/s); it gains 2(13-5) = 16 km/s, for a final speed of 21 km/s. A revised travel time based on the new speed can then be recalculated if precision is required.

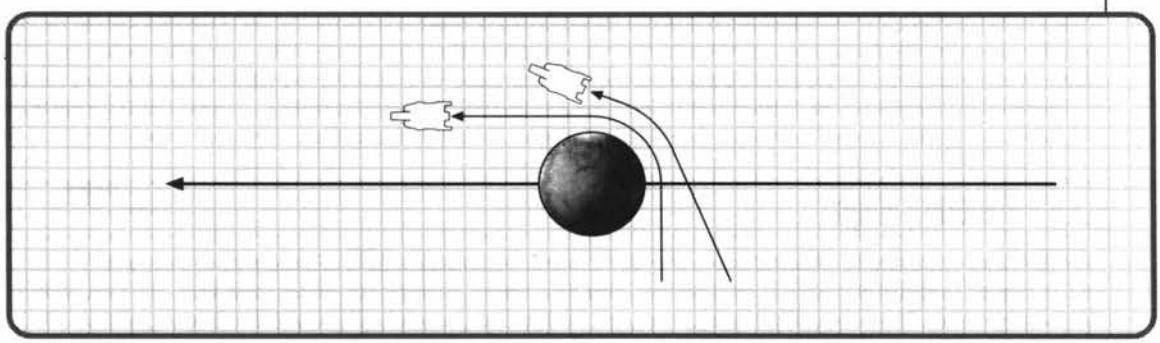
If the spacecraft intersects the orbit at an angle, only its parallel speed vector will be affected. In the interest of playability, the actual equations are ignored. Simply multiply the spacecraft's final speed by the angle multiplier.

Angle Multiplier

Planet Position	Angle*	Multiplier
Far	15	x 1.05
Average	30	x 1.1
Close	45	x 1.3

*Angle between spacecraft's trajectory and body's orbital trajectory.

Gravity whip diagram



Hyperthrusting

Hyperthrusting is a risky maneuver in which the safety parameters of an engine are widely exceeded in order to provide increased thrust. Such a maneuver is very dangerous, as the thrusters may be damaged by overheating, or even explode. When hyperthrusting is selected, the engine immediately supplies twice its maximum Overthrust, at a cost of 3 BPs per MP spent. A Piloting Skill test versus a Threshold of 5 is required. If failed, the thruster permanently loses a number of MPs equal to the Margin of Failure because of heat damage. Should the total reach -5, the thruster explodes, causing one die times the Overthrust rating (in MP) worth of damage points to the vehicle, with any damage applied to the Space Movement system first.

Towing

All types of space vehicles are assumed to be capable of towing or propelling objects. A vehicle has no maximum towing capacity; its velocity is directly dependent on the vehicle's thrust output and the mass (in kilograms) of the object being towed.

The effective acceleration of the thruster array diminishes as the total mass of the vehicle increases. The mass of the vehicle (in kg) should be multiplied by the acceleration (in m/s) to get the available thrust. The mass of any cargo or towed items is then added to the mass of the vehicle, then the thrust is divided by the total mass to get the new acceleration. This is rounded down to the nearest whole MP value.

Players wanting a more realistic representation of space movement may use this method to recalculate the new performances of their vehicle when fuel is consumed and extra mass is dropped. Just subtract the mass dropped from the mass of the vehicle and recalculate the acceleration normally.

Space Environment - 4.3

The environment of space presents a number of unique characteristics that makes it very different from everything humans have had to face before. New rules had to be learned, and new type of danger faced.

Vacuum - 4.3.1

Only vehicles that are specially equipped for vacuum (i.e. have the Perk Hostile Environment Protection: Space) can function in a vacuum. If the vehicle lacks life support, the crew must be equipped with vacuum suits. In that case, treat all vac-suited crew injuries as if they were one damage effect higher. For example, if a Light Damage result produces a crew effect (Stunned), it is replaced with the Heavy Damage result (10% casualties). Likewise, if the vehicle takes Heavy Damage and suffers a crew hit, the damage is increased to the same as Overkill: the crew is dead or incapacitated by the decompression, leaving the vehicle crewless.

Shadows - 4.3.2

Unlike most planetary environments, where objects and atmosphere both reflect light so that it shines on several sides at once, in space light comes from a single source, the Sun. Even though there are some reflective surfaces, most of the time light comes from only one direction, creating deep shadows. These shadows, in addition to being very cold (since there is no heat transfer), make most visual sensors useless. Shadow combat functions as normal combat except that the Night Detection Score of a vehicle is used instead of its Daytime Detection Score. If the unit remains in shadow for longer than a number of turns equal to its Size, it will need the HEP: Extreme Cold Perk or suffer the penalties listed in *Extreme Temperatures* (see next page).

4.3.3 - Extreme Temperatures

Extreme cold (-150°C or lower) or extreme heat (+150°C or higher) is very detrimental to the functioning of vehicles. Any vehicle that lacks the appropriate Hostile Environment Protection Perk automatically suffers Light damage whenever pushed to Top speed. In addition, such vehicles must roll one die at the beginning of each combat round. On a roll of one, the vehicle breaks down for a number of rounds equal to the roll of one die. In space, high temperatures are found only when exposed to the Sun, while shadows are extremely cold. Vehicles can rotate to spread the heat on their hull and thus avoid the temperature problems mentioned above.

4.3.4 - Planetary Rings

Many planets are surrounded by rings, collections of small debris and rock that are trapped by the gravity well and end up in orbit. Because they are composed of millions of small particles, rings pose a travel hazard for fast moving space ships. There are, however, reasons to brave them. They make excellent hiding places, are a good deterrent to pursuit, and can yield ice and other valuable volatiles to a stranded vessel.

Unless the ship is moving at a very high velocity, collisions will generally cause only minor abrasion damage, generally not worth checking for. The *Planetary Ring* table below assigns a Density to typical ring systems (the various ring densities within each system are ignored for playability). The current spacecraft's speed (in MPs/turn) is multiplied by the Density to yield the number of damage point applied to the spacecraft. The Density also show the amount of water, material or volatiles that can be collected within the ring, per turn (in kilogram).

Planetary Rings

Type	Density	Obscurement	Composition
Tenuous	0.00000001	0	Rock, some Ice
Average	0.000001	0	Ice, Frozen Gases, Hydrocarbons
Dense	0.1	2	Ice, Frozen Gases

4.3.5 - Radiation Belts

Many planets have strong magnetic fields, caused by liquid movement within their core. These fields trap incoming charged particles before they can hit the surface, creating multiple radiation belts around the planet (the stronger the field, the more numerous belts there are). These belts are a significant radiation hazard, though most spaceships have shielding strong enough to face them without any problem.

For playability purposes, radiation belts have been abstracted into general types. When a ship crosses a belt, it receives a certain amount of rads and damage points per turn, as indicated.

Radiation Belts

Planet	Rads	Damage	Effects
Small Rocky	1d6 x 5	10	Haywire
Large Rocky	1d6 x 10	15	Haywire
Small Gas Giant	1d6 x 50	15	Haywire
Medium Gas Giant	1d6 x 500	15	Haywire
Large Gas Giant (inner)	1d6 x 1700	25	Haywire
Large Gas Giant (outer)	1d6 x 700	15	Haywire

4.3.6 - Space Constructs

Space stations and Gateships are truly enormous and as such, they are mainly locations in which (or around which) the game will take place. They are much too big to be destroyed outright, although they can be damaged (see page 85 for typical Gateship components). Each 50 x 50 meter section (or hex) of hull has 200 points of ablative Structure (150 for the smaller stations, 100 for any glass panels). For collision purposes, each section is considered to be the equivalent of a vehicle of Size equal to their current Structure.

Depleting half the point total of a given section will result in a hull breach and slow loss of interior atmosphere (a fist-sized hole would take decades to completely empty a large station). Special "goop balls" (Structure value = 5) will appear in 1d6 roleplaying turns (30 seconds to 3 minutes) to start blocking the hole until a repair crew arrives. Completely depleting the Structure points in one turn cause an explosive blow-up which propel schrapnels all around (x50 damage to anything within 100 meters, dropping off by 5 every 100 meters of additional radius).

Terrain Effects - 4.3.7

For the purpose of the rules, "planetary" refers to any place that has gravity, may it be a moon, the interior of a spinning space station, or an actual planet. The effects of the local gravity level and other environmental conditions are detailed further on. Some terrains are found only in space, such as Moon Dust and Liquid Gases, and affect locomotion methods negatively. Unless there is a tangible atmosphere (0.8 atm and more) present, vehicles without the proper environmental protection, aircraft and hovercraft will not be able to function there.

Terrain Costs

Terrain Type	Walker	Ground	Hover	Obscurement
Moon Dust	2	2	1	-
Liquefied Gases	2*	3*	1	**
Frozen Gases	2	2	1	-

Gravity

The speed and acceleration of a vehicle are not very affected by gravity, since they have more to do with mass (which does not change) than weight. It is, however, harder to maneuver in low-g environments because of reduced ground pressure. If the local gravity is lower than 0.8 gee, apply a -1 Maneuver penalty to all rolls; if higher than 1.2 gee, apply a +1 bonus per additional gee (or part thereof).

The maximal jumping distance is, of course, increased or lowered. See *Jumping*, below, for the actual effects. Falling damage is calculated as usual, then multiplied by the local gravity (in gee).

Jumping

Thrusters may be used as a kind of jump jets. The distances covered while jumping depends on the angle of the jump and the speed (in meter/second) of the vehicle. If the vehicle has thrusters (Space movement system), it may subtract their thrust (in g) from G in the formula. Walker vehicles may pick any jump angle, even when using other movement types. Other will need a ramp of some sort (elevation levels count as 30 degrees).

Jumping

Angle of Jump	Max. Distance (m)
15 degrees	(speed squared/19)/G
30 degrees	(speed squared/11)/G
45 degrees	(speed squared/9)/G

Speed in m/s is equal to speed in kph divided by 3.6. / G is the gravitation of the body on which the vehicle is, in g.

Flying with Thrusters

If the vehicle is equipped with a Space movement system that develops more thrust than the local gravity, the vehicle can use any extra thrust to fly. The following formula shows the extra speed supplied by the thrusters, assuming a generic, moderately streamlined vehicle. This can be added to the speed of another movement system, but if the resulting speed is greater than one and a half the normal Flight speed, the vehicle suffers a -1 penalty to Maneuver.

- Thrust = Mass (tons) x (Acceleration (m/s) - local gravity (m/s))
- Drag = (Size - 0.5) cubed/2
- Thruster Flight Speed = square root of (50 x (thrust / drag))

Battles on Hulls

Walker vehicles and spacesuits can be equipped with special sole plates that contain a molecular grip pad. This pad is coated with an advanced polymer compound that adhere to any plane surface when a current of a specific frequency and intensity is passed through it; it is essentially a very sophisticated memory plastic. The cost for this equipment is included in the HEP: Vacuum Perk for simplicity.

This allows walkers and infantry to walk on the surface of a space station or ship as if they were on the ground. If they need to make a Skill roll to remain upright (excessive damage, area effect explosions), they are flung into space at the rate of 1d6 MP instead and will have to make their way back on their own. If they have Jump Jets, they can use them at a rate of 1 Jump MP = 1 Space MP.

4.4 - Spacecraft Design

Spacecraft design is somewhat a lost art to the Terranovans. Most of the vessels they are using date back to the colonial era in design and sometimes construction. They see little need to invest energy improving systems that have proven themselves over many decades of use. In many ways, the Terranovan philosophy toward technology — simplicity and reliance over bells and whistles — applies in space as well as on the ground.

Terranovan spacecraft thus share many characteristics. They tend to be blocky and rugged, their forms dictated more by function than by aesthetics. They use a "brute force" approach, multiplying proven fusion tubes and weapon systems rather than attempting to improve current technology beyond the limits of what it was designed to do. Still, there is always room for innovation, and once in a while a spacer proudly fields a customized spacecraft.

4.4.1 - Space Movement System

The Space movement mode includes all manner of thrust-based movement. The movement mode does not discriminate between chemical and fusion drives. As usual, precise description of how the vehicle functions is left to the designer.

Space Combat MPs represent acceleration rather than speed: about 1 m/s^2 each (0.1 g), instead of 6 kph for vehicles in the basic tactical game. Fractional MPs are possible for vehicles with very low acceleration (solar sails, ion drives).

Space vehicles obviously cover far larger distances than ground-bound vehicles and, thanks to inertia, may not even need to expend fuel to do so. When in space, each hour of operation is treated as one kilometer of Deployment Range. Thus, a spacecraft with a Deployment Range of 500 km can fly in space for 500 hours before requiring maintenance.

◆ Reaction Mass

Some kind of reaction mass (or fuel, in the case of older chemical engines) must be provided in order to propel the vehicle forward. The Reaction Mass rating shows how many Burn Points (BPs) of reaction mass may be carried internally. The weight of the reaction mass is added to the final weight of the vehicle; the *Burn Points Per Ton* table is used to determine its weight. It is important to note that the acceleration of the spacecraft already takes the reaction mass' weight into account.

The amount of Burn Points per ton will depend on the type of reaction mass used. Fusion engines are extremely efficient, while primitive fuel rockets will often carry many times their empty weight in fuel. Reaction Mass and Deployment Range are the twin factors that will determine the autonomy of a space vehicle. It is useless to carry more reaction mass than can be used in the vehicle's entire deployment range, though the reverse is possible (the vehicle can always coast partway to its destination).

If the vehicle has ground-to-orbit capacity, it must carry enough Reaction Mass to allow its thrusters to operate long enough at the required thrust level to get to escape velocity. Refer to *Reaching Orbit*, page 53.

Burn Points Per Ton

RM Type	Weight Multiplier	Volume per Weight
Hydrogen	0.00001 x total BP	0.071 ton/m3
Helium	0.00002 x total BP	0.142 ton/m3
Water	0.0002 x total BP	1 ton/m3
High Efficiency Rocket Fuel	0.01 x total BP	2 ton/m3
Low Efficiency Rocket Fuel	0.05 x total BP	5 ton/m3

Multiply the above number by the empty weight of the craft to know the weight of the reaction mass. The Volume per Weight is given for transporting Reaction Mass as cargo.

4.4.2 - Electronics

All spacecraft are equipped with Sensors and Communication, which they need to navigate and contact other vessels. Spacecraft-mounted sensors have a great environment to work in, since there is no atmosphere or obstruction to distort the readings, allowing them to reach further with the same power. The range of a spacecraft's sensor array is multiplied by one hundred. Thus, if a spaceship had a base 2 km Sensor range, it would be able to passively detect other objects up to 200 kilometers away *while in space*. This base range can be extended by supplying more power to the system (see page 151 of the main rulebook and page 62 of this book for more), but this makes the emitter quite visible to hostile sensors.

Because there are less obstacles to get in the way of radio waves, communication systems have a better range in the air and in space. Communication range is automatically multiplied by a hundred at no cost, *while in space*, for a space-based communication system.

Lemon Rolls - 4.4.3

Due to the meticulous design and construction of spacecraft, they tend to have fewer defects than other types of vehicles. In addition to the basic model Lemon dice, add one die for every ten (10) Perks the vehicle has, instead of the usual 5. Roll once on the Lemon Defect table per defect. If multiple options are available, only one should be selected.

Space Weapons - 4.4.4

Space is a very special environment for weaponry due to the absence of atmosphere and gravity. Specific weapon types have evolved to answer the peculiar requirements of space combat, such as increased range and lack of an atmospheric medium. Unlike their ground-side cousins, space weapons are also capable of more than destruction. Lasers can be used for secure communication over very long distance; kinetic weapons use the same basic technology as a massdriver reaction engine; a modified missile can be used as a kind of message torpedo.

Any of the existing Heavy Gear weapons (with a few exceptions, see below) can be used in the design of a new spacecraft. These will automatically, by virtue of operating in space, be upgraded to "Mass Destruction" status (else they would be completely ineffective, given the ranges involved). If the spacecraft can land on a planetary surface, it has the choice of firing its weapons in either normal or MD mode (though given the resulting area effect, such a move may well be suicidal).

Using Thrusters as Weapons ◆

By definition, a good engine makes a good weapon: superheated plasma is extremely dangerous up close, though it loses power rapidly with distance. The Damage Multiplier of thrusters is equal to the Space MPs spent, times half the Size of the vehicle. The Accuracy of the thruster is equal to the Maneuver of the vehicle. Burn Points are spent as normal. The plasma diffuses rapidly, losing half its DM per hex of range, including the first one.

Unavailable Weapons ◆

Not all weapon types are capable of functioning in space. Some depend on a gravity field in order to work, others cannot operate in a vacuum. If a vehicle does not have the HEP: Vacuum Perk, its weapons cannot function at all in space, regardless of their type.

Mortars depend on the presence of a gravity field to curve the trajectory of their projectile and thus cannot function in space. Other types of weapons with the "Indirect Fire" characteristics can fire but only in direct fire mode. Flamers are too short ranged to be really effective, and they must include their own oxidant to burn their fuel; as a result, they are practically never used in space. Melee weaponry cannot be supercharged to mass destruction levels, and is thus never used. Of course, none of the underwater ammunition types of weaponry can function in space.

The Gate Drive as a Weapon ◆

Due to the staggering amount of energy required, a Gate Drive can normally fire only once per twelve hours. It can be fired prematurely, but will automatically fail to open a Gate (if one is present). It will, however, inflict damage as described below.

Gate Drives are not designed as weapons and cannot track rapidly moving vehicles, but they are still quite accurate since they must hit a very small target (the Gate point). They have a 0 Accuracy and a ROF of +3. However, the ROF can only be used to attack multiple targets, and is never added to the damage. Because of the limited movements of the emitter, the Drive can only be brought to bear on targets within the Gateship's Fixed Forward arc.

A fully-charged Gate Drive used as a weapon has a Damage Multiplier equal to the damage rating of the Gateship's main hull (i.e., between 150 and 300). A partially-charged Drive will cause proportionally less damage — a three-hour charge (one fourth normal) will inflict only 25% of the usual damage (round down if need be). Regardless of when it is fired, the energy capacitors are entirely drained and the charging process must start anew. At least one hour is required to build up a charge large enough to fire the Drive.

Gate Drives emit such a staggering amount of energy that they destroy the structural integrity of an object at the atomic or subatomic level. In game terms, a Gate Drive will completely and utterly destroy anything it achieves a Light Damage result (or more) against. If the Gate Drive fails to do Light Damage but still hits, every point of damage it inflicts reduces the Armor Rating of its target by one point. Targets other than vehicles, which use Damage Points (such as asteroids and structures), take five times normal damage from Gate Drive attacks.

4.4.5 - Perks and Flaws

Many vehicles have special characteristics called Perks and Flaws. Perks are systems or design features that give additional capabilities to the vehicle, and Flaws are design shortcomings or defective systems that impair the vehicle. Remember that it is always assumed that basic equipment is included within the more general attributes. For example, Hostile Environment Protection: Vacuum Perks comes with a sufficient number of airlocks.

The following is a list of spacecraft-related Perks and Flaws. Perks whose name is followed by AUX are defined as Auxiliary Systems for damage purposes. Perks whose name is followed by R have a Rating.

ABLATIVE ARMOR R

One (or more) facing of the vehicle is covered with a special armor plating which shatters under kinetic stress or vaporizes when hit. Spacecraft can also be equipped with launchers that throws a "fog" of charged crystals/metal particles to shred incoming projectiles and diffuse laser and particle beams. The effect is much the same, and they are thus covered by the same Perk. This absorbs incoming damage, but the ablative armor must be replaced after each battle. The maximum amount of ablative armor that may be carried is equal to half the Armor rating of the vehicle, rounded down. Each defensive arc (Front, Sides and Rear) must be protected separately.

When the vehicle is hit, the current Perk Rating is added to the Armor of the vehicle. Ablative armor automatically looses 1 point from its Rating per ten points of damage every time it is hit, in addition to any normal Armor damage suffered, if applicable. The Ablative Armor loses points on every hit of ten or more points of damage, whether the attack inflicts a damage result to the vehicle or not.

- **Cost = Rating/2 (per Defense Arc)**

BACKUP SYSTEMS

This is a package deal which contains one of each of the followings: Backup Communications, Backup Fire Control, Backup Life Support and Backup Sensor. The usual rules for these apply in full.

- **Cost = 12**

DECOY SYSTEM AUX R

A Decoy system allows a vehicle to project phantom images of itself or another object by using inflatable decoys, holography or electronic signal imaging technologies. In tactical game terms, the Decoy system can create as many false images as its Rating. The attacker must make a Notice Skill check against the Rating with a modifier of -3 in order to hit the correct target. Both Sensors and active ECCM system add their Rating to this roll.

Visual decoys only affect visual detection and are automatically identified as decoys by Active Sensor rolls. False sensor targets with no visual images are automatically identified as phantoms once in visual range, but have their Rating boosted by the Rating of active friendly ECM. More advanced decoys can imitate both the visual aspects and the sensor signature of the vehicle they emulate. Guided, Smart and Sensor-homing weapons are just as likely to go for a sensor decoy, though they won't be fooled by a visual one.

- **Cost = Rating (Visual or Sensor), Rating² (both Visual and Sensor)**

HOSTILE ENVIRONMENT PROTECTION

The vehicle is specially designed for prolonged exposure to some hostile environmental conditions. This Perk is noted "HEP: <chosen environment>" on the vehicle sheet. The following options are available.

Extreme Heat: the vehicle is designed to withstand exposure to scorching temperatures, often well into the hundreds of degrees Celsius, without taking severe damage. If combined with the Fire Resistance Perk, the vehicle is effectively immune to incendiary attack. Cost = 4

Extreme Cold: the vehicle is designed to endure freezing cold temperatures, such as those found in Earth's Arctic and Antarctic regions, without freezing up or otherwise breaking down. Heaters, special lubricants and other modifications are part of this Perk. Cost = 1

High Pressure: the vehicle is designed to endure the great pressures of locations like ocean depths and the upper layers of gas giants. A variant of this Perk (Extreme Pressure) allows the vehicle to endure even the most extreme pressures, such as those found in the deepest of ocean depths or within the atmosphere of gas giants. Cost = 4 or 10

High Gravity: the vehicle is designed to withstand very high gravity environments (3 gee+) for extended periods. This does not, however, guarantee that the crew can do the same. Cost = 1

Vacuum: the vehicle is designed to withstand the lack of pressure found in vacuum environments. This means airlock hatches, pressurized hull, and so on (a life support system must still be bought separately). This Perk does not, however, grant a vehicle the ability to perform atmospheric re-entry. Cost = 1

Vehicles which have the "Hostile Environment Protection: Vacuum" Perk can freely operate in space and other airless environments such as the various moons and planets of the Helios system. The Perk seals all the openings and replaces the various oils and lubricants with vacuum-proof versions, as well as ensuring that the powerplant can function effectively. Vehicles without the Perk cannot operate in space at all. In fact, every hour the crew must make a Mechanical Test; if failed, the vehicle takes a random Light Damage effect as fluids boil away, mechanisms undergo vacuum-welding and parts melt or freeze up.

Radiation: the vehicle is designed to withstand high radiation levels. Foamed armor, rad-absorbing gel layers and additional shielding protects the vehicle's sensitive systems (especially the crew). The rad protection level, in rads/hour, is equal to ten to the power of the rating (e.g., a rating 3 system would give 10^3 rads/hour of protection). Cost = Rating

All Purposes: the vehicle is designed to withstand *anything* thrown at it. It can go over land, in space, underwater, etc. It possesses all the HEP abilities at no additional point cost, except Radiation and Extreme Pressure protections. Cost = 12

NO FUEL REQUIRED

The vehicle's main powerplant does not require regular fill-ups with fuel or reaction mass. It draws its energy from the environment around it (a solar-powered or sail vehicle, for example). The vehicle still has to undergo basic maintenance from time to time, though. This is what the Deployment Range rating represents in this case.

• **Cost = 10 (permanent) or 6 (cut off)**

REDUCED G-EFFECT

Aircraft and spacecraft with this Perk have been modified to reduce the strain of acceleration on its crew, either through special cockpits, G-seats or advanced flight suits. Crew have a +1 bonus whenever they have to make a FIT roll due to the effects of acceleration. Only Flying and Space vehicles can take this Perk.

• **Cost = 4**

AUX

REENTRY SYSTEM

The vehicle has been specially reinforced to withstand the high temperature and stress of atmospheric reentry. Every five turns, the pilot must make a Piloting roll against a Threshold of 2 to keep the craft correctly oriented or suffer one Fire attack as per normal reentry rules (see p. 53). Modifiers due to damage apply in full.

• **Cost = 4 (single use), 8 (permanen.)**

STRATOSPHERIC FLIGHT

An aircraft with this Perk can climb past the habitual ceiling of 12 km (altitude level 48), going into the stratosphere up to 50 km (altitude level 200). The Space movement mode is required in order for the vehicle to move into orbit, however. Flying vehicles in the stratosphere double their Flight MP at no cost because of the rarefied atmosphere. Only Flying vehicles can take this Perk.

• **Cost = 8**

STREAMLINING

The vehicle is shaped to present minimal resistance to the medium through which it moves. It gets +1 MP when moving at Top Speed. Streamlining has no effect on space movement, but reduces the amount of thrust required to fly within an atmosphere (see page 148 of the rulebook). Aircraft are already considered to be streamlined, but taking this option makes them even more so.

• **Cost = 2**

AUX

EXTERNAL POWER

The vehicle does not have a powerplant and does not require regular fill-ups with fuel or reaction mass. It draws its energy from wired or beamed power. Basic maintenance is derived from the Deployment Range rating. External power can be beamed in, a collector receiving the energy and converting it for use by the vehicle's systems. The vehicle must remain in line-of-sight with the power supplier. If the Perk is destroyed, the vehicle will suffer total power failure.

The energy may be wire-fed instead, the vehicle trailing a wire for power. A Piloting roll must be made every turn against the highest MP cost for the hexes traveled to avoid snagging the cable. Flying drones must test also and use the overflown ground's MP cost. Space drones are not affected. Failure means the cable is stuck and the drone must halt for the next round to free it. A fumble means the cable is severed. The cable has a Damage Point Capacity equal to the vehicle's Size, per hex.

• **Cost = -2**

4.5 - Advanced Rules



Beyond combat and maneuvering, there are a number of things that requires rules but do not fit in the above categories. These include mostly uncommon events and special abilities that require some explanations in order to be used in the game. All of them are based on scientific principles that may or may not be known to the Players.

The options below will not unbalance the game, nor will they slow it down too much. They will, however, bring an additional element of complexity that may not be appreciated by all playing groups. Their use is thus optional and subject to the veto of the Gamemaster.

The following section contains all the rules related to the technology described in this sourcebook. In order to avoid lengthy searches through the book every time a certain item is used, the rules are grouped here for the Gamemaster's convenience. The topics are listed in alphabetical order; additional cross-referencing is available both in the Index (page 96) and throughout the text itself.

4.5.1 - Advanced Sensor Operation

Large space craft can dedicate part of their computer power and crew to work with the sensor arrays and correlate the data they receive, increasing the vessel's detection potential. While this requires relatively little computing and manpower, it does require the ship to reduce its own electronic and heat emissions in order to get a better reading. This somewhat limits its ability to take actions during the round.

The sensor bonus depends largely on the size of the vessel, both because its computers will be more powerful and because there is more sensor surface to receive the incoming signals. The vessel receives a +1 bonus for each full 30 points of Size, provided an action is spent. Bonus can be accumulated by spending multiple actions in order to detect very far away (or faint) targets.

A unit also receives a Sensor bonus when trailing antennae behind it (see page 20). The vessel receives a +1 bonus for each kilometer of distance with a wire-guided recon drone (see page 86), but cannot expand thrust without loosing the drone.

◆ Passive Sensor Arrays

Following the War of the Alliance, the Terranovans have built a network of large early warning antennae throughout the system. These huge constructs are gossamer-thin structures that extend for many kilometers but are utterly incapable of withstanding acceleration. They typically have an Armor value equal to a tiny fraction of their Size, but compensate with huge Communication and Sensor ranges (see the *Advanced Sensor Operation* at the head of this section). These arrays use the low-grav structure rules found on next page.

4.5.2 - Anti-missile Fire

Any ranged weapon can be used to defend against a missile attack, but most do poorly unless they have been specifically designed for this task. All weapons suffer a -6 modifier to hit when used in Anti-Missile (AM) mode. Weapons with rapid-fire capacity can use ROF points to reduce or eliminate this penalty. The amount of shots spent each time the weapon is fired in AM mode is equal to five minus the MoS, with a minimum cost of 1. If ROF points are used, multiply the previous result by five (2 for missiles). If there isn't sufficient ammunition, the result still stands. At least five shots or two missiles are required for Anti-Missile fire.

The weapon completely destroys the missile when successfully used versus a single shot attack. When used to defend versus a missile cluster (ROF attack), burst fire *must* be used. Each point of MoS reduces the incoming cluster's ROF bonus by one. If the ROF bonus drops to zero, all of the incoming missile flight has been effectively destroyed. Because it is a wild attack, anti-missile fire do not use up actions and may be rolled versus every incoming missile or missile cluster, provided the player is willing to spend the ammunition.

4.5.3 - Communication

Even though signals travel at near light speed, space communications almost always suffer from delays due to the large distances involved. In addition, many factors can cause interference with radio waves (strong magnetic fields, solar flares, planets on opposite sides of the sun, etc.). The time lag can be determined by dividing the distances by 300, if they are in thousands of km, or by 18, if they are in millions of km (this will give the delay in minutes rather than seconds).

A conversation between the Moon and Earth is almost in real time (average distance of 384 000 km, gives 384 divided by 300, gives a 1.3 second delay). A call sent from the Inner Belt to Mars, however, would take 5.6 minutes to reach its destination (average distance of 101 million km, gives 101 divided by 18). Any reply from Mars would take the same time to get back.

Lasers can also be used to send coded messages over very long distances (see table). In general, this is practical only for large installations or in emergency situations, since both the emitter and receiver must remain at the same velocity during the transfer.

Laser Communicator Ranges

TOTAL MODIFIERS	BASE RANGE MULTIPLIER	TOTAL MODIFIERS	BASE RANGE MULTIPLIER
+5	700	-1	0.5
+4	120	-2	0.333
+3	24	-3	0.25
+2	6	-4	0.2
+1	2	-5	0.167
0	1		

Total Modifiers = Fire Control + any applicable modifiers / Base Range = 100,000 km per point of Damage Multiplier

Continuous Fire - 4.5.4

By spending two actions instead of one, a ship can play its energy weapons continuously on the surface of its target, rather than go for a millisecond burst. If the attacker can pump energy into the defender faster than the latter can get rid of it, the accumulated heat will start to cause damage by warping hull plates, boiling away fluids and generally sending systems into overheat. This tactic comes in useful at long or extreme range when the beam is not concentrated enough and is too weak to cause damage right away.

Only laser and particle accelerators are capable of using this advanced rule. If the weapon hit but fails to cause at least Light damage, the damage points accumulate anyway; keep track of them on a scrap of paper. As soon as the damage points, now referred to as heat points, beat the Light damage Threshold, the vehicles takes a Light damage result to a random location.

The attack must be rolled every turn to maintain the beam on target, though at the cost of a single action, not two. If the defender wins a defense roll at any point, it will break the lock and no more damage will be pumped into it. If the contact is broken, the accumulated heat points dissipate at a rate equal to half the Size of the affected unit every turn, rounded down. Keeping a beam on target makes one fairly visible; if it is fired upon by the defender while locked on, the attacker has a -2 penalty on his Avoidance for that attack only.

Low-gravity Structures - 4.5.5

Incredibly large structures can be built in space since they do not have to support their own mass, unlike their ground-bound cousins which have to resist a constant 10 m/s^2 acceleration. In game terms, this means it is possible for a vehicle to go below the Size/5 minimum for their Armor Attribute. Such a construct or vehicle, however, will begin to collapse when submitted to an acceleration, either due to a gravity field or movement. Everytime their limit is exceeded, the unit takes Light damage to its Structure. If the acceleration is greater than twice the maximum, Heavy damage, and if three times as great, the unit collapses on itsef completely.

The maximum acceleration that can be withstood by such a construct is inversely proportional to their Size to Armor ratio. For example, a Size 30 ship with an Armor value of 3 (Size/10) cannot move faster than half a gee (5 m/s^2). A Size 150 antenna array with an Armor value of 5 (Size/30) cannot withstand more than one-sixth of a gee (1.6 m/s^2).

Weapons against Known Trajectory - 4.5.6

Trajectories are fairly easy to predict in space. This allows targeting of weapons at extreme ranges, especially if the target is immobile, unaware or not dodging. Any targeting error, however, is more likely as well, since even a micro-radian mistake in aiming will eventually translate into several kilometers errors down the line. Such attacks are serve better as plot tools in a roleplaying campaign, given that they involve limited tactical decision-making.

All kinetic weapons, such as railgun slugs and missiles, keep their velocity and thus killing power at long range. Unless they are guided, however, the slightest course change will cause them to miss their target. Energy weapons lose power fairly fast, but may still cause damage by slowly heating up surfaces (see *Continuous Fire*, above).

Such a long range attack (from well out of sensor range — many thousands of kilometers) requires that the trajectory of the target be known precisely, either through espionage or other source of information (such as an ephemeride table). The attack uses the Navigation (Space) Skill for the attack roll instead of Gunnery (Space). Range bands are irrelevant for projectiles and missiles, but Accuracy applies; energy weapons use their basic unmodified Damage Multiplier, with no Mass Destruction effect.

The basic Threshold is 5 for a ship-sized target, 3 for a Gateship or station, and 1 for an asteroid. The target is allowed a defense roll only if they are aware of the attack (during declared hostilities, they are always aware, thanks to regular sensor sweeps).

4.5.7 - Orbital Artillery



Also known as orbital support or strikes (or, more poetically, "death from above"), orbital support is probably one of the most feared tools of war. Orbital weapon platforms, fitted with railguns, high-powered lasers and particle beams, can be called to fire by forward observer units with the Satellite Uplink Perk.

Ortillery can be placed in any desired orbit; theoretically, all orbits can be shifted to place the platform over a troubled region within hours. Orbits are tricky, however: in order to cover the entire planet, ortillery platforms are generally placed in polar orbits which precess around the planet as it turns. A satellite will thus only pass over any given target for a few minutes every two weeks. A huge number of platforms would be required to have assets available at a moment's notice.

Because orbital fire support must punch through the atmosphere and face severe targeting difficulties, most fire support missions will take place from ships or satellites placed in low orbits. However, low orbits mean high speed, and so the craft will only fly over the battlefield for a short time before going over the horizon. In game terms, this means that orbital fire support will only be available on selected turns.

◆ Technology

All ortillery platforms orbit within a fairly low zone around the target planet. The standard LTO (Low Terranovan Orbit) is approximately 150 to 250 kilometers in altitude. Ortillery weapons are somewhat customized because they have to fire through two very different — and mostly opposed — milieus, vacuum and atmosphere. There is no friction to slow down or deviate projectiles in vacuum, there is a lot in atmosphere; particle beams act differently (see page 22 for more information); laser energy is absorbed. In fact, even the interface between the two has the potential to skew the beam or trajectory off target.

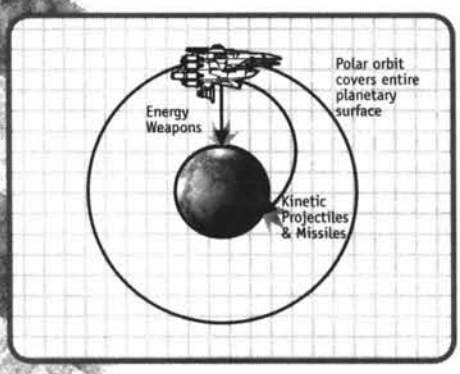
Very few weapons have the kind of range and power this requires. Those that do will be capable of deployment into even higher orbits, or be more accurate at lower ones. Most of the energy-based ortillery platforms usually have only enough energy for a single shot, but their capacitors can be recharged either by solar collectors or on-board fusion reactors (see page 67). Although kinetic projectile-based platforms carry more ordnance than their counterparts, the energy-based types do not need to be resupplied by ship and when given time, have an almost unlimited firing endurance.

The advantage of an orbiting weapon platform are enormous. It is conceivable that a powerful attack can be launched anywhere, on any hot spot on the planet below, given that the orbital mechanics are worked out. The incoming attack, especially if kinetic in nature, will easily penetrate any reasonably-sized bunker and devastate large tracks of land.

Ortillery, however, also has its limitations. It is much too slow to react to the changes of direction of a mobile unit, and can thus only target ground features. It may not function well under cloud cover or during sandstorms when the launching vehicle cannot see its target or communicate reliably with the forward observer. Ortillery require a ground targeting system for good accuracy and precision strikes, or it will fire so blindly as to be equally dangerous to its own side and the enemy. In any case, it is preferable to have reliable intelligence about the target beforehand.

Another disadvantage of ortillery is that one has to wait for the firepower (except in the case of energy weaponry, obviously). Switching orbits is not something that is done lightly or rapidly. One must also spends enormous amounts of money and resources getting the platforms into orbit, given that a relatively large number of platforms is required for effective coverage and a practical military strategy. Given that spacecraft are very vulnerable, there is always a risk that all those expensive orbital assets could be lost in the first minutes of a pre-emptive enemy strike.

◆ Ortillery Weapon Trajectories



The simplest form of Ortillery is an ICBM-like weapon that achieves a borderline, decaying orbit, dropping back down onto its target. Ortillery kinetic attacks require a significant amount of time and energy to de-orbit and head for their targets, plus substantial guidance systems to control themselves during their fall. An ortillery strike on a particular target often has to be launched from the other side of the planet, taking up to a half-hour to reach its target. The rounds will leave blazing comet-like ion-trails as they fall, making their approach and nature very obvious.

For simplicity, ortillery does not take into account the horizontal distances involved as those are dealt with through orbital mechanics (for kinetic ortillery), or are much smaller than the vertical distances involved (for energy ortillery).

Game Effects

Any space weapon (see page XX for the restrictions) can be used as the basis for an ortillery weapon, though it cannot be used against space targets. Energy weapons' DM is reduced as if they were five Range Bands away (-5 multiplied by whatever -xRB they suffer from). Projectile and missile weapons fire as if they were at Extreme Range. Ortillery, like other space-based weapon, is a Mass Destruction weapon system. Even a small SLC-based ortillery system will inflict a x70DM, AE=8 attack (after range reduction and including Mass Destruction modifications). Kinetic projectile-based ortillery will produce even higher damage (using a LAG system will give x120DM, AE=13). Due to its nature, ortillery ignore the Open Sheaf/Closed Sheaf scatter rules.

Players can buy as many ortillery strikes as they desire (and can afford). Each strike comes from a different orbital weapon platform, since their orbits take them out of sight of the battlefield much too fast for more than one attack. The cost for *each* strike is equal to the base TV cost of the weapon system, multiplied by one hundred.

Target Acquisition

Orbital support can be called by ground-based forward observer units with the Satellite Uplink Perk. Although orbital communicators can be quite small, only the dedicated Sat Uplink is accurate and powerful enough to pierce through the battlefield electronic fog and accurately request orbital fire. The ground observer who is calling in the Strike must have the Forward Observer Skill, an operating Satellite Uplink and have LOS to the terrain feature to be targeted (vehicles are too nimble to be used as a targeting goal).

Unlike regular tube artillery, ortillery does not get to use Ranging Shots; it can, however, gain the same game benefits if the forward observer maintains communications with the ortillery battery (and LoS to the target terrain feature) for more than one tactical turn. For example, an observer unit spends 1 turn communicating to call in a strike; the battery will make its attack with a +0 modifier. If he spent 4 turns communicating, the battery would attack with a +3 modifier.

Due to the extremely precise gunnery required, most ground observers will try to spend more than the minimum necessary time "painting" the desired target so as to minimize the margin of error in the strike. Since ortillery is firing from the weapon's Ultimate Range (-5 to hit due to range penalties) this can be extremely important. The maximum time that an observer can spend is 8 tactical turns (4 minutes); any extra time spent beyond this does not confer any additional bonus.

The accuracy of ortillery is only as good as the coordinates received from the ground. When making Gunnery Tests for ortillery, the lower of either the ortillery's Gunnery Skill (+ Attribute if manned) or the observer's Forward Observer Skill + Attribute when making the attack roll. For example, a ground observer with a Forward Observer Skill of 1d+2 calls for a strike from a manned ortillery battery with a Gunnery Skill of 3d+1. All Gunnery Tests are made at 1d+1.

All communications with the ortillery satellite must take place before the weapon fires. The satellite need not fire immediately upon receiving firing coordinates if it has not yet reached its fire window. Gunnery bonuses for additional observer time are not lost during the interim, however.

Fire Procedures

Ortillery must make a Gunnery Test with a Threshold of 8 to hit the desired target. Ortillery is considered to be Stationary (+2 to hit) and it will often have the Sniper Perk (+1 to hit). Failures scatter in a random direction; roll one die to determine hex side. The scatter distance is a quarter of a kilometer (5 tactical hexes) per point of MoF.

Energy weapons will strike almost instantly. Projectile weapon strikes, however, will take anywhere from ten to thirty minutes to reenter and align themselves, depending on their launch window. These thus have to be called before the battle proper (the player must specify in writing on which turn the strike will land), though the target(s) can be designated when the attacks actually arrives.

The Delay Time in tactical turns from firing of the weapon to ground impact for Kinetic Ortillery is equla to the orbital altitude of the firing satellite in kilometers divided by five (round fractions up). This means that a Kinetic Battery at an altitude of 300km would have a delay of 60 tactical turns (30 minutes) between firing and impact. Energy Ortillery Strikes arrive at lightspeed and are resolved during the Miscellaneous Phase of the Turn in which the weapon fires.

Terminal Guidance

Ortillery missiles can be given further guidance instructions just before impact, if they have the "Guided" characteristic. The ground observer (not necessarily the same one as before launch) still needs the Forward Observer Skill, a Satellite Uplink and LOS of the original terrain feature targeted. At any time during the four turns (2 minutes) prior to the Strike arriving, the observer can spend up to two turns communicating additional information to the incoming missile to gain up to an additional +2 (which can exceed the eight turn bonus limit previously mentioned). Ortillery Missiles arrive too fast to benefit from target designators, though this capability adequately replaces it.

4.6 - Maintenance



There are many "weathering" effects occuring in space that cause wear and tear on machinery, especially those that periodicaly visit the atmosphere. Irregular heating, as during re-entry or combat, will cause one section to expand more rapidly than others. Irregular cooling will cause one section to contract in like fashion. Parts will warp, exposing surfaces that would otherwise be protected to reactions for which they were not designed. Radiation from the sun, from ultraviolet all the way to X-rays, will bleach surfaces and break down atomic bonds over the long term. Some particulate matter spontaneously bonds in vacuum — a process called vacuum welding — which can result in stuck mechanisms and damaged parts. Irregularities thus created in the surfaces of the hull may turn into regions of atmospheric drag. Many materials that are solid under pressure liquefy or sublime into gas. Even vehicles that never come down into the atmosphere must face "rust." Rust need not be oxidation; it could also be fluoridation or chlorination or hydrogenation or any other chemical reaction between an exposed surface and a highly reactive fluid, such as many rocket fuels. Electric and electro-chemical reactions are a constant worry. Any juncture of dissimilar metals can cause problems if they galvanize. A spacecraft moving through a magnetic field will generate an electric charge and possibly some quite powerful discharges throughout the vehicle. Filters will clog and get fouled up.

Constant maintenance is thus crucial to the continued good operations of both machinery and vehicles. Indeed, without it, continued existence in space would become impossible.

4.6.1 - Basic Maintenance

A minimum number of man-hours equal to the Size of the vehicle times the Maintenance Multiplier(s) must be allocated every Terranovan week for general routine maintenance. Skipping this might lead to mechanical breakdowns later. Each vehicle is also assigned a Condition rating that quantifies its mechanical status. Condition goes from 1 (mint, factory fresh) to 6 (barely functional hulk). Whenever a new vehicle is introduced during the campaign, roll one die to determine its actual Condition. Note that a vehicle currently employed by an army will never have a Condition rating worse than 3 (reroll any result above 3).

Maintenance Multiplier Table

VEHICLE'S CHARACTERISTICS	MULTIPLIER	VEHICLE'S CHARACTERISTICS	MULTIPLIER
Testbed Prototype	x10	Scratch-Build	x3
Early Prototype	x5	Flying Vehicle	x3
Late Prototype	x4	Space Vehicle	x5
Early Production	x3	Easy to Modify Perk	x0.5
Limited Production	x2	Heavy Combat*	x2
Mass Production	x1	*The vehicle has been used in at least one battle per day.	

4.6.2 - Breakdowns

Before any battle or after a complete Deployment Range cycle, the player must make a Piloting (or Drive) skill roll against a Threshold equal to the Condition rating of the vehicle. If the vehicle did not receive its minimum amount of maintenance the week before, the Threshold is increased by 2 for each week missed.

If the test is failed, the vehicle suffers from a potential problem: strange noises will be heard, smoke and/or oil will leak out, electronics will blink, etc. Fumbles are ignored and count as a result of one. A number of man-hours equal to the Size of the vehicle is required to correct the situation, or the next check for breakdown will be at +2 (cumulative with the +2 for missed maintenance, if applicable). If the vehicle did not receive its minimum amount of maintenance the week before, it automatically suffers a breakdown.

If the vehicle does suffer a breakdown, roll one die to determine the location of the damage: the vehicle takes Light Damage to its Movement System (1-2), Auxiliary System (3-4) or Structure (5-6). If the roll is fumbled, the vehicle takes Heavy Damage instead of Light.

◆ Wear

All these breakdowns will take their toll on the vehicle after a while. After 10 breakdown (no matter which system is affected), the vehicle's Condition goes up by one point. If the Condition goes above 6, the vehicle cannot be repaired further — it is completely worn out and may only be salvaged for parts. Even then, it only yields half as many Mechanical or Electronic salvage points as normal.

Reserves and Power- 4.6.3

Extra reaction mass can be carried in cargo bays, if defined as such during the construction process. Note that the fuel contained inside cannot be used by the engine unless the vehicle stops and refuels its own tank from the cargo bay.

The ship's engine(s) can produce extra electrical power to recharge systems as required. This is measured in Energy Points (see **Tech Manual 2**, page 153); the number of Eps supplied per hour is equal to the Size of the ship multiplied by its Overthrust Space MP multiplied by one thousand.

Some vehicles use solar panels to supplement their internal power sources. These are thin polymer films that can be applied to any surface, or be deployed out on a thin metal frame massing 10% of the total film mass deployed. Polymer films attached to the hull are destroyed on any AUX hit; deployable films is destroyed only when deployed, but it cannot take any acceleration and requires one minute per square meter to stow properly.

Kinetic generators are small heat pumps that use the heat differential between the ship and the vacuum to generate power. They are included in the stats of most vessels, but can be removed and jury-rigged if need be.

ENERGY GENERATION

NAME	TYPE	WEIGHT (KG)	ENERGY/HR
Solar Panel	1 m2	5	200
	10 m2	55	2300
	100 m2	550	25,000
Kinetic Generator (Heat Pump)	Small	15	1,500
	Medium	50	5000
	Large	100	10,000

Recharging energy weapons

A standard vehicle powerplant (or the above mentioned solar panel) can be used to recharge the batteries of an energy weapon. Although the process is not very efficient, it permits "reloading" in the field, albeit over a long period of time.

Energy Weapon Recharge

WEAPON	ENERGY REQUIRED PER SHOT	WEAPON	ENERGY REQUIRED PER SHOT
Sniper Laser	1,200,000	Heavy Pulse Laser Cannon	19,000,000
Gatling Laser	3,600,000	Light Particle Accelerator	600,000
Light Laser Cannon	3,600,000	Heavy Particle Accelerator	3,000,000
Heavy Laser Cannon	9,000,000	Light Railgun	2,400,000
Light Pulse Laser Cannon	9,000,000	Heavy Railgun	98,000,000

Weapon Maintenance - 4.6.4

Any weapon with moving or electronic parts also needs to be maintained to keep operating at peak performance. Each weapon requires weekly maintenance equal to its Damage Multiplier plus its ROF bonus, times 5, in man-minutes. Personal weapons should use the Personal Scale damage multiplier and vehicular weapons use the Vehicle Scale damage multiplier for calculation purposes.

If the weapon does not receive its weekly maintenance, it may breakdown during use. Whenever a fumble is rolled when firing the weapon, the weapon jams and must be cleared before firing again. One die should be rolled to determine the problem: 1-2, the weapon requires one action to clear; 3-4, the weapon requires one action to clear and one die's worth of ammo is lost; 5-6, the weapon is useless and must be repaired. Add two to this die roll for each week of maintenance missed.

Multipliers To Weapon Maintenance Time

Weapon/Ammo has the Guided or Haywire perk	x2
Weapon is a Laser, Particle Cannon or Railgun	x5
Weapon has Mass-Destruction ammo	x10
Weapon has been used in more than one battle per day	x2
Weapon has not been used during the week	x0.5

4.7 - Life Support



Life Support is a catch-all category for all the rules related to the basic needs of the human body in the environment of a spacecraft. There are three basic areas that have to be seen to: atmosphere, gravity and radiation.

Atmosphere is the first and most important. Without adequate pressure, the blood and moisture of the body will boil off, and the oxygen will not be able to enter the bloodstream. The right mixture of gases is critical as well, as it might not be apparent right away that there is something wrong until someone loses consciousness from the lack of oxygen. Monitoring the condition of the atmosphere within a space habitat thus soon becomes second nature to most spacers.

The second factor is gravity, or rather its absence. The human body requires that a certain amount of stress be placed upon it every day to keep it in shape. In the weightlessness of space, it is important to follow a strict exercise regime and visit a gravity enviroment (centrifuge, ship under acceleration) once in a while. The last factor is radiation, which is insidiously dangerous. It consists of tiny atomic level particles moving rapidly through the human body, ravaging any stray cell they happen to strike. Radiation comes from a number of sources, both natural and artificial. Just like atmospheric pressure, radiation levels need to be closely monitored to avoid suffering from its far ranging effects (cancer, mutation or even death).

4.7.1 - Atmosphere

The contents and pressure of the artificial atmosphere are crucial in space — if either is improperly monitored and controlled, people can and will die. Obviously, lack of oxygen is detrimental to the continuation of human life. There can be several causes of oxygen deficiency: an excess of carbon dioxide in the atmosphere, defective air reserves or decompression. If the air supply is compromised, characters suffer as their body tries to make do with insufficient resources.

If the atmosphere degrades due to lack of clean air, characters will suffer from physical and mental penalties. Penalties start ten minutes after fresh oxygen is last supplied. Characters have a -1 to all mental Attributes (CRE, INF, KNO, PER, PSY, WIL) as their concentration decreases due to lack of oxygen. All mental Attributes drop at a rate of -1 per two minutes. All characters in the location must make a Fitness roll against a Threshold of four to avoid unconsciousness, with a penalty equal to the mental Attribute penalty. In Cinematic campaigns, the Player can chose to use WIL if it is higher than FIT.

Twenty minutes after fresh oxygen is last introduced, the character automatically loses consciousness. A random mental Attribute drops by one every turn. If any of them reaches -5, the character dies.

This rule assumes a normal oxygen content of 20%. If the oxygen content of the air is higher or lower, the durations are multiplied accordingly (e.g. twice as much oxygen means Attributes drop every four minutes instead of every two).

◆ Pressure

A loss of pressure means that although the atmosphere has the proper oxygen content, there is not enough of it or not enough pressure to force the oxygen into the bloodstream. Loss of pressure can come from several sources, from a faulty regulator to a leak or hole in the hull of the spacecraft. The *Atmosphere Loss sub-table* (see next page) shows the average amount of time it takes for the pressure to completely degrade in a given location. At each stage of decompression (three-quarter pressure, half, quarter) all characters in the location must make a Fitness roll to avoid unconsciousness, with a penalty of -1 to the roll for each level of degradation. They also suffer from the effect of lack of oxygen (-1 to all Mental Attributes per stage).

If the pressure drops a quarter or less, the character suffers the same effects as if there were no oxygen (see the *previous section*).

◆ Losing Pressure

There are two ways to lose pressure: slowly, through a leak, and all at once, through explosive decompression. The latter is much more dangerous as the body does not have time to adjust and often reacts very badly (see *Exposure to Vacuum*, below).

The table below gives Armor ratings and volumes for typical locations; these can be modified by the Gamemaster by up to 50%, depending on the situation's requirements. The Armor rating shows how many damage points the walls have. This is listed in Personal Damage Scale (see page 126 of the **rulebook**). Doors generally have lighter effective Armor because of their opening mechanisms, and structural bulkheads are much tougher. If the Armor is exceeded by the damage received, a one-centimeter hole is made (for simplicity, assume the hole is roughly square). The dimension increases by one centimeter for every additional time the Armor is exceeded by (for example, 35 points of damage, applied to an Armor 10 wall, will cause a 3 centimeters wide hole, or 9 cm^2). If desired by the Gamemaster, these rules can also apply to spacecraft and spacesuits.

Pressurized Area Information

Location	Wall Armor	Door Armor	Bulkhead Armor	Volume (m^3)
Airlock	15	15	20	20
Room	15	10	25	200
Hangar	20	20	40	5000
Station	500	350	1000	4×10^{11}
ATMOSPHERE LOSS				
Hole/Location	Airlock	Room	Hangar	Station
Leak-Sized (1 cm^2)	1 day	4 days	12 days	300 years
Fist-Sized (100 cm^2)	2 turns	8 turns	24 turns	100 years
Man-Sized (1 m^2)	1 turn	4 turns	12 turns	20 years
Vehicle-Sized (100 m^2)	Instant	2 turns	8 turns	1 day
Ship-Sized (1000 m^2)	Instant	Instant	1 turn	1 hour

Hole is the approximate size of the air evacuation duct or hole;

Location is the approximate comparative volume of the pressurized area.

Exposure to Vacuum

Contrarily to what most people believe, exposure to the vacuum of space does not kill instantly. An unprotected human being can survive up to three minutes before his brain dies from oxygen starvation, though there are some severe side effects from other sources.

First, the lack of pressure on the body will cause any internal gases to try and escape. Capillaries close to the skin will burst, resulting in one giant bruise across the entire body. If the person tries to hold his breath, severe damage will result to the lungs and inner body membranes (automatic Deep Wound). If possible, it is better to try and hyperventilate to charge the blood with oxygen, then exhale as vacuum is entered. The second major side effect comes from the temperature. Space is cold, except where a space body can provide heat. In the case of the solar system, this would be the Sun. A person exposed to vacuum will thus be roasted on the Sun-facing side will freezing on the other. In general, burns will be the least of a survivor's worries, but a Flesh wound is generally the result of more than one minute of direct space exposure.

For game purposes, a character can remain conscious for a number of 6-second turns equal to twelve plus his Fitness Attribute. In Cinematic campaigns, the Player can add the character's WIL to his FIT. After this period is elapsed, the character automatically loses consciousness. A random mental Attribute drops by one every turn. If any of them reaches -5, the character dies.

Gravity - 4.7.2

What is casually referred to as gravity is in fact a constant acceleration applied to the body by the gravitational field of a large mass. There is no practical difference between the acceleration provided by a gravity field and other types of accelerations, as demonstrated by the famous "elevator experiment" (refer to any basic physic textbook). Gravity is easily simulated in space by firing thrusters or rotating a living section, thereby creating centrifuge acceleration.

The following rules apply to zero-gee conditions, which should more accurately be called free-fall. Indeed, all objects in the solar system are subject to the gravitic pull of the Sun, and only the orbital speed prevents them from falling on the surface of the star. Everything is, in effect, perpetually falling.

Space Adaptation Syndrome (SAS)

The first astronauts reported the presence of a strange kind of sickness that affected them when they reached orbit. They would feel sick and nauseous, with any sudden motion making all other symptoms worse. It was soon discovered that more than half to two-thirds of the people going into space would suffer from what was termed the Space Adaptation Syndrome: the inability of the body to reconcile the various sensory signals received. There is no way to predict who will be affected and for how long, though certain exercises and chemical compounds have been developed to help the transition.

When the character first enters micro-gravity conditions, two die should be rolled. If he has received either motion training or drugs, add a +1 to the die roll (+2 if both are used). On a five or more, the character is completely immune to the SAS effects. Otherwise, the character suffers from an action penalty equal to five minus the roll of the dice. A HEA roll versus five is made at the end of every day to see if the character recovers. Once recovered, the character is fine and gains a +1 to the roll the next time he enters microgravity. The majority of mundane people, however, are incapable of adapting and are perpetually ill in free fall.

◆ Moving in Low Gravity

Movement under low gravity conditions (between 1 and 0.1 gee) is similar to standard movement. The exception is, obviously, that the person will be able to take much greater leaps and will have a harder time controlling the direction of the movement due to the reduced traction. A penalty of -1 is applied to all movement-related Agility tests. Movement rates are divided by the local gravity (in gee). Falling damage is multiplied by the local gravity (in gee).

Thus, an average person (FIT 0, no Athletic Skill) would be able to jog up to (12 / 0.16 =) 75 meters per round on Hope, though he would do so in great bounding leaps and would have trouble controlling his direction. Should he fall, though, he would receive only one sixth of the normal falling damage.

◆ Movement in Free Fall

Moving in space is a totally different experience than moving under gravity. Masses in space keep their inertia at all times, meaning that no effort need be expended to move except when changing direction or velocity. Inertia also has unfortunate side effects, such as the impossibility to changing direction in mid-air.

The speed that can be reached by a person is directly related to their strength. The stronger the person, the greater the initial impulsion can be. Obviously, characters can chose to move slower, if so wished. If pushing objects, or carrying them, multiply speed by basic body mass, then divide by new mass. One must not forget that action equals reaction of equal value: if pushing off another person, he will also float away.

Free Fall Movement Speed

- **Maximum Speed (m/s) = ((Mstr x 4)/Mbld) squared**
- **Mstr is the maximum mass lifted by the character in one gee (see rulebook, p. 54).**
- **Mbld is the character's body mass (see rulebook, p. 54).**

◆ Collisions

Collisions are the main danger in micro-gravity movement. Since there is no way to change direction or velocity without some kind of reaction, inexperienced freefallers often collide with objects in their path, powerless to prevent the collision. This can result in bruises, contusions and even broken bones. In the most extreme cases, collisions can kill.

Two dice are rolled and the result multiplied by the speed, in meter/second, of impact. This is the damage taken by the individual. If the floating person was purposefully launched in a manner that would cause him to impact head first, add ten to the die roll. A conscious person may attempt to soften the reception.

To do so, the character must roll a Zero-G Movement Skill test. The number rolled is subtracted from the speed for the purpose of damage calculations. If the number rolled is equal to or greater than the actual speed, the person "lands" unharmed. If the roll fumbles, the person hits head-first and takes the extra damage associated (+ten to the die roll). If the character does not manage to land, he will rebound from the collision and float away — assume half his pre-collision speed for simplicity.

Base damage assumes that a moderately solid surface will be impacted. Unusually hard surfaces, such as armor, can double the effective speed for damage and rebound speed purposes. Soft surfaces such as water halve the effective speed. Special crash pads or nets can divide the collision speed by up to ten to twenty times (Gamemaster's decision).

◆ Combat

Personal combat in space is mostly of the hand-to-hand type. The limited confines of many habitats mean there is little room to use ranged weapons. Moreover, the extreme danger caused by straiying shots hitting the life-supporting bulkheads and recycling systems is too great to ignore.

Ranged weapon fire is possible, though the recoil must be taken into account by the firer. For this reason, nearly recoiless weaponry such as gyroguns and lasers are preferred. Many weapons have recoil and will push back the user at a certain velocity unless he is braced. In space combat, an acceleration equal to 0.01 g (0.1 MP) is applied *opposite* the firing direction per point of Damage Multiplier (to translate this into meter/second speed, simply divide the MP value by ten — a good enough approximation).

Close combat should use the normal rules, except that any hit will cause the combatants to fly apart unless they are braced. Use the above rules to calculate kickback speeds, remembering that both combatants are pushed in opposite direction.

Gravity and Health ◆

Zero and micro-gravity conditions cause a variety of health problems. The human body has been designed to function under gravity, and while removing it does confer some short-term benefit, complications will occur in the long run.

Bone decalcification, whereas the calcium literally "oozes" out of the skeleton, occurs after a few weeks of zero-gravity. Certain compounds have been developed to help fix calcium into the bones to alleviate the problem. Taken with calcium supplements, they are generally enough to take care of the problem. Since the compounds are mass-produced, the cost is negligible and they are available practically anywhere.

Loss of muscle tone is a more common and serious problem. Regular exercise sessions and visits to the centrifuge are recommended to prevent it. Electrical stimulators are also available; these are often used by spacefarers who do not have the time or the living space for a complete exercise regiment. If this is not taken care of, health problems can occur and the person will soon be incapable of tolerating acceleration, not able to visit other worlds.

In game terms, one point of FIT is loss on the first month spent without exercising. Another is lost after two months, another at four months, and so on, doubling the interval everytime. At least two hours per day of vigorous exercises are required to avoid this effect, increasing by one hour every three months spent in free fall until it reaches six hours per day. One point of BLD is lost per two points of FIT, and both HEA and STR are recalculated to take any losses into account.

Gate Sickness ◆

During the trip through a Tannhauser Gate, the human body is submitted to strange conditions which affect its normal operation. People suffer the following effects: -1d6 to the following Attributes: AGI, BLD, FIT, CRE, INF. All return to normal 1d6 x 10 seconds after emerging from the Gate. PER automatically goes down to -5 during the trip, regardless of the actual Attribute value. It returns to normal 1d6 seconds after exiting the Gate.

Unless they are unconscious or in sleep tubes at the time of the crossing, characters must make a PSY roll against a Threshold of 4; a +1 bonus per transit previously experienced is added for veteran travelers. On a success, the character suffers from mild and pleasant hallucinations. On a failure, the hallucinations are quite unpleasant. A Fumble causes such horrible nightmares that the character refuses to Gate again for the next 1d6 months, unless he passes a WIL check against a Threshold of 4. If a fumble occurs again during this period, the character will not willingly go awake through a Gate ever again.

Radiation - 4.7.3

If only for the nearest star, every character is constantly subjected to subatomic bombardment — radiation — though temporary and permanent damage is rare. Such circumstances usually involve nuclear power (reactors, plants, bombs) or space travel (cosmic rays, solar flares, etc.). The results are usually pretty ugly, even though it often takes a few days or weeks before the silent killer completes its work.

Like the rest of the game system, the radiation rules are a compromise between simplicity and realism; some scientific accuracy has been set aside to make them more playable. This was especially necessary in dealing with such an insidious ailment as radiation poisoning, whose effects on the human body are more complex than the average gamer cares to include in his game.

Rads ◆

One rad (Roentgen Absorbed Dose) is the effect of one roentgen – the standard unit for measuring radiation – on a living organism. Absorbed rads are cumulative: a tally of the character's current irradiation level must be kept. These rads are included in effect calculation until they are eliminated by the organism, which can take quite some time. Every week, a character can purge a number of rads equal to the amount given by a Health roll, as long as he was not further exposed to radiation during that period. A character can never fully purge them out and will always retain a number of rads equal to one-tenth the largest number ever accumulated.

The following table gives sample rad contamination values from various sources. The values are either absolute numbers, for one-shot radiation bursts, or rates, for prolonged exposure.

Sample Radiation Levels

1-kiloton air burst at 1 km	100 rads
1-megaton air burst at 2 km	6,000 rads
1-megaton air burst at 10 km	500 rads
1-megaton air burst at 25 km	100 rads
Neutron bomb air burst at 3 km	500 rads
Fallout at ground zero, 1-megaton ground burst	
after 1 hour	1d6 rads/minute
after 2 hours	1d3 rads/minute
after 6 hours	1d6 x 5 rads/hour
after 1 day	1d6 rads/hour
Nuclear Reactor Meltdown	1d6 x 10 rads/minute
Solar Flare	1d6 x 5 rads/minute
Background Cosmic Rays	1d6 x 0.001 rads/hour

◆ Protective Equipment

Lead and NBC suits protect against radiation and radioactive fallout. Anti-radiation suits are given a Radiation Shielding Factor (RSF) in rads/hour. This amount is subtracted from individual bursts or from hourly rad rates for prolonged exposure. This value is divided by 60 to get the protection in rad per minute.

Protection can also be derived from a large mass, which will absorb most of the energy of the radiation. Water is one of the best radiation shield there is, but other inert material, such as rock, also provide respectable protection if there is enough of it. Non-shielded vehicles provide a minimum amount of protection equal to their Armor rating squared, in millirads (0.001 rad) per minute. Buildings, constructs and large natural objects follow the same formula, but double their Structure points before squaring.

In addition, many vehicles are equipped with screen generators, devices that absorb or deflect incoming radiation. This is noted as HEP: Radiation in their statistics. The rad protection level, in rads/hour, is equal to ten to the power of the rating of the system (e.g., a rating 3 system would give 10^3 rads/hour of protection).

Radiation Protection

Type	RSF
NBC Suit	5 rads/hour
Space Suit (any type)	5 rads/hour
Rad Suit	10 rads/hour
Water (one centimeter)	Equivalent to 25 points of Structure
Rock (one centimeter)	Equivalent to 15 points of Structure
Metal* (one centimeter)	Equivalent to 15 points of Structure

*Powerful radiations cause secondary cascade effects in metal if the thickness of the shielding is insufficient. If the total RSF provided by the metal is lower than half the incoming radiation, the shielding is ignored and the radiation level is doubled.

◆ Radiation Effects

The first time a character's accumulated rads exceed 50, or at any time the character receives at least 1 rad thereafter, secretly roll his or her Health against a Threshold set by the Irradiation Table, below. Do not roll more than once a day and do not apply more than one effect at a time (pick the worst). The Gamemaster should not tell the player the result of the roll, but rather describe the symptoms as they manifest themselves.

If the character succeeds the roll, he is totally unaffected by the radiation, though his level of accumulated rads stays the same. Failed rolls have a variety of effects, as detailed below. On a fumbled roll, apply the corresponding Fumble effect as dictated by the table, then the normal failure effects. Make a further Health roll in the case of a fumble: the result gives the number of minutes before the effect takes place.

Irradiation Table

Rads	Threshold	Fumble effect
50-99	6	none
100-199	7	Flesh wound
200-299	8	Flesh wound
300-399	9	Flesh wound
400-499	10	Flesh wound
500-599	11	Deep wound
600-699	12	Deep wound
700-799	13	Deep wound
800-899	14	Deep wound
900-999	15	Deep+Flesh wounds
1000-1099	16	Deep+Flesh wounds
1100+	17	death

The values on this table are higher than most studies have shown. This was done to both increase character survivability and take into account the fact that some parts of the body may escape irradiation, thus lowering the overall effects.

Short-Term Effects

A roll failed by 1 to 4 produces mild radiation sickness. Symptoms will appear in a number of hours equal to the result of a Health roll by the character. He will be fatigued and nauseous, incurring a action penalty equal to the Margin of Failure. Reduce the penalty by one every 12 hours. There are no other short and medium term effects, though later complications are possible; see *Long Term Effects* section below for more details.

A Margin of Failure between 5 and 7 will have effects similar to those of a mild radiation illness, described above, with a penalty of -4. Secondary symptoms will appear after a number of days equal to the character's Health roll: lingering fatigue, muscle pain, loss of hair. The character will be at -1 to all activity, except Health rolls which are at -2. The character must make a daily Health roll vs. 4 to recover from the sickness. Success means that the character completely recovers in 10 days, minus his or her System Shock rating (minimum of 1). A fumble will inflict a Flesh wound on the character.

A Margin of Failure of 8 or 9 is similar to one between 5 and 7, described above, except that the secondary symptoms are more severe. The general action penalty is -2, -3 for Health rolls. A failure on the daily recovery roll will inflict a Flesh wound, a Deep wound in the case of a fumble.

A roll failed by 10 to 14 gives results similar to those detailed above, but graver still: the action penalty is -3, -4 for Health rolls. A failed recovery roll delivers a Deep wound, while a Fumble means that the character succumbed to the radiation. On a successful result roll again, with no penalties this time: a second success means that the character miraculously recovered, as explained above.

A roll failed 15 or more kills the character in a number of hours equal to a Health roll.

Long Term Effects

The effects of radiation on human DNA are very subtle and it can take years before the full effects manifest themselves. People who have been subjected to large doses of radiation are more prone to develop cancers and other troubles in their later years. Other unpleasant legacies of radiation effects, such as sterility or offspring mutations, are left to the Gamemaster to use as plot devices.

To simulate the long term effects, the GM may decide to have a character who suffered from radiation sickness make a yearly Health roll against half the highest Margin of Failure he ever had in resisting the effects of radiation, rounded up. Failure means that the character has contracted a life-threatening cancer — which may or may not be detectable and treatable, depending on the timeframe and the style of the campaign.

Treating Radiation Sickness

Depending on the campaign's level of scientific development, it may or may not be possible to treat characters suffering from radiation poisoning. If treatment is available, it will probably come in two steps: recovery from the sickness proper, and accelerated purging of accumulated rads. Depending on the technology, a +1 to +4 bonus can be added on the recovery roll, and the purging rate may be multiplied by a factor of 2 to 8. If the character receives regular check-ups, the recovery bonus is applied for Long-Term Effects' Health rolls. Once again, depending on the location, the treatment may range from relatively cheap and commonly available to extremely expensive and rare.

Life in Space - 5.1

In the 62nd century, most of humanity live on Earth-type planet. Those that ply the spacelanes are a different breed of humans, able to stand the isolation, the claustrophobic surroundings, and the stress of living day to day in an environment where death is the only outcome of mistakes. Like the mariners of old, they provide the vital links between the colonized islands that dot the skies, providing both prosperity and defense to their earthbound brethren. And, again like the mariners, they form their own society, bound by its special rules and traditions.

In the **Heavy Gear** universe, space is like the oceans of old: a void to cross to get from one place to the other, a place to exploit natural resources, and occasionally a battlefield. Space travel for its own sake is a dream that long succumbed to reality: there is nothing romantic about spending a month cooped up in a small cabin while the ship makes its way to a station orbiting the next planet over. Yet, space can be the location of some fantastic adventures in their own merits.

Spacer Philosophy - 5.1.1

Spacers, as a rule, tend to be neat and tidy. They constantly look after the states of thing and are almost obsessive about cleaning up. Most "groundhuggers" find this exasperating — it is hard to speak to a spacer for more than five minutes without him interrupting to check a system. This is not insanity: messy spacecraft and habitats are a constant danger. Items floating about may become deadly missiles under acceleration, loose dirt may foul up the air conditioner, or a ripped pocket may spill the tools needed to repair a critical system. An unkempt spacer is a dangerous individual, and is often shunned by others.

Spacers are also known to rarely make unnecessary gestures, an habit developed because of the confined space in which they live. The less extra gestures made, the less chances of bumping into someone or something, or hitting dangerous controls. They make extensive use of hand signals to emphasize their instructions, however, just in case a radio failure prevents communication between two workers in space suits.

The unforgiving environment of space means that spacers are very serious about their duties, especially when it comes to maintenance, and they despise laziness above all. Each individual represents a pool of knowledge and technical skills that are vital to the communities and ships. Experts are rare (crosstraining is a survival trait), and all spacers are computer-literate.

Spacers value loyal friendship and family bonds. They feel somewhat uncomfortable around total strangers, though they do not shun them. Families are rare and highly regulated, both to prevent overcrowding and because low-gravity pregnancies require special attention that may not be available during certain periods.

Spacers cannot produce all they need by themselves, and thus depend on other settlements or the planet down below to a certain extent. Spacers have few personal belongings, but are protective of what they do have. Tools and instruments are generally well looked after. Resources are also precious, especially water, which is found only locked in certain types of asteroids.

Spacers

The Terranovan that lives in space is a slightly different breed than its ground-based counterpart. The spacers have their own philosophy and traditions, and many seem very strange to the average groundpounder — until they stop and look at them closely.



For example, experienced spacers are easy to recognize by their careful gestures and economy of movement. Broad or quick movements are a sure way to lose control and spin out in micro-gravity, and both are likely to result in damaged equipment or hits on crewmates. All spacers like to tell the story of the cadet who liked to emphasize his words with slashes of the arm — until the day he accidentally hit the airlock emergency release button. All spacers are very serious about space emergency procedures, and will look coldly upon anyone ignoring basic safety rules or taking brash risks.

Spacers must by necessity spend a great deal of time close to one another, and it has become natural for each member of the crew to have a private place of his own. They are likely to have good educations (there is little to do but read and talk out there) and most have average or above average human relation abilities (a survival trait in such a confined space).

Spacers tend to be resourceful people, and nearly all of them have at least some kind of technical or computer-related skill. A space-based character should be fairly skilled in zero-gravity operations, and some will have been physically affected by their extended stay in freefall (low BLD or FIT). All will have at least a good education (average KNO or better) and tend to be bright and level headed, as carelessness kills in space (slightly above average CRE and WIL).

5.1.2 - Cabin Fever



Space travel forces people to live in very close quarters for long periods of time. Once a ship is underway, there is often nowhere to go to gain some privacy and this lasts for up to a few months at a time. In such close groups of people, there are generally few secrets - or else there is a lot of trouble. If a crime is committed the culprit is likely to still be on board, with all the drama and suspicion that then ensues. Combat is never a very good option aboard spaceships or other pressurized environments. Disagreements and conflicts have to be solved using other methods. Space travel is thus good for intrigue campaigns and for players who like a high level of personal interaction.

◆ Starting Point: Murder on the High Frontier

Someone has been murdered aboard the ship or station. His lifeless body has been found floating in the engineering bay, surrounded by a cloud of blood globules. The station being a closed environment, the killer *must* be one of the people present. A crime campaign, or even an isolated "incident," is great for inducing paranoia among Players. In general, they will create plot complications for themselves as they play the detective game, trying to find the real killer before they are framed for the deed. Perhaps the killer is willing to eliminate many other people to cover his tracks - who will be next? And what if it was not a murder? After all, accidents do happen...

Possible Campaign Variations

Variation	Description
1	One of the crew is a mole on a secret assignment.
2	One of the crew has developed a psychosis that threatens the safety of others.
3	Some strange malfunctions keep occurring; could there be a saboteur aboard?
4	The Players uncover some piece of information they were not meant to know.
5	The Players accidentally overhear a threatening conversation.
6	One of the PCs narrowly escapes a life-threatening situation.

5.1.3 - Starship Troopers

A large segment of the Terranovan spacer population is constituted of the armed forces personnel that assure the defense of the Helios system. They man the ships and stations that are the first line of defense against invading off-world fleets. Because they are the only ones with the means to do so, the spacers must also deal with minor invading forces, such as CEF infiltration teams, in remote locations. It is a dangerous life, made up of long periods of boredom with the occasional moment of sheer terror. Despite the current peace talks, the space troops might still get caught up in battles, perhaps against reactivated drones left over from the War of the Alliance. The rapid intervention teams that protect Terra Nova against small infiltration units are likely to be part of the Black Talon program, but other space forces are in existence (see page 16).

◆ Smuggler Run

Life in space is dangerous, but once the routine maintenance and check-ups are done, and the computers oversee everything, it becomes somewhat boring. Many spacers will do almost anything to spice up their daily routine: alcohol, drugs, promiscuity, and other things of that sort. Alcohol is fairly easy to make — after all, there is plenty of vacuum just outside the viewport for several thousand stills. Authorities close their eyes as long as it does not become a problem, and most spacers are responsible enough to take safety precautions while they are drinking. Other material, however, is more frowned upon and needs to be smuggled in. Since security in space is very tight, this requires imagination, determination and a wide web of contacts.

Possible Campaign Variations

Variation	Description
1	A fugitive comes into contact with the Players.
2	A new drug supplier, backed by an earthbound cartel, tries to muscle into the territory.
3	The Players come across a vacuum still during a routine spacewalk.
4	An unrelated search turns up prohibited material in one of the PCs' cabin.
5	The Players fall into the middle of a Military Police sting operation.
6	The Players are asked by a friend to help him defend his bar/ship/business.

Mighty Space Miners

Not all Terranovan spacers are soldiers. Many of them are rock hounds, making a daily living out on the frontier by investigating and scavenging ghost ships or mining asteroids for their water and metal content. Others are technicians and support crew aboard the space stations and bases scattered throughout the system. Without them, spacer society would grind to a halt. The rock hounds are hardy souls, able to rely only on themselves to face down nature and its dangers. Sometimes, the dangers are man-made — CEF boobytraps, old combat drones, and so on — but that does not make them any less threatening. Most of their day-to-day lives are filled with exploration and action.



Starting Point: Ghost Ship ◆

There are lots of ships out there dating back from the War of the Alliance. Most of them are derelict hulks, victims of drones and other high-powered weaponry. Some are ships that malfunctioned or worse, ran out of fuel, and are now locked on the last trajectory they acquired. These debris turn around the sun in an endless dance, sometimes disappearing at the edge of the system only to come back, seemingly out of nowhere, many months or even cycles later. For the brave souls willing to board these flying mausoleums and disturb the eternal rest of their doomed crew, there is a lot of money to be made in salvage and new technology acquisition (especially aboard CEF ships). Not all hulks are entirely dead, however, and may reserve many unpleasant surprises...

Possible Campaign Variations

Variation	Description
1	A new team arrives in the vicinity to compete for exploitation rights.
2	The new outpost director is a puritan who intends to shut down the bar.
3	An incredibly rich asteroid is discovered.
4	The internal security systems on a derelict CEF cruiser are still operational.
5	A derelict ship is encountered, its crew still alive but locked in sleep tubes.

Blow Out!

Space is the most hostile environment known to Man. It's impossible to survive more than a few minutes unprotected, and virtually all life functions must be supported by machinery. This makes it an ideal setting for emergency/high tension scenarios designed to scare the Players out of their wits without having to pit them against opponents.

The laws of physics are an implacable adversary. They cannot be pleaded with or argued against; weapons and other tools of war, unless used creatively, are totally useless. The Players must find a way to use the equipment around them in creative ways in order to fulfill their needs.

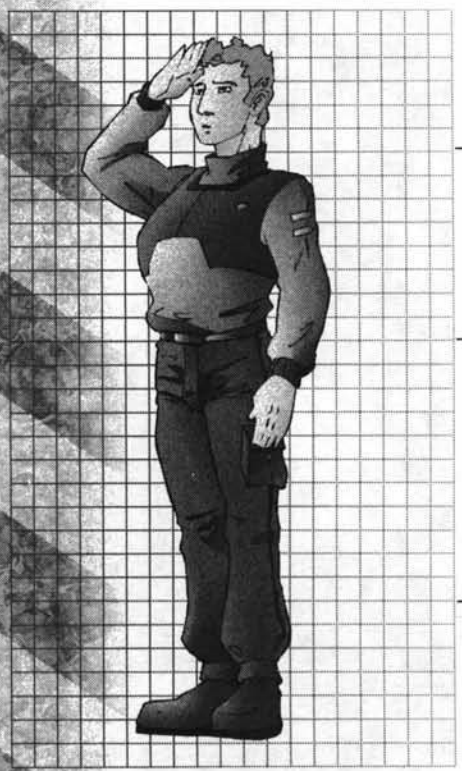
Starting Point: Stranded! ◆

All was going well until the fusion tube malfunctioned and had to be ejected. Now the Player Characters are stuck on the derelict ship, with no way to slow down to enter a proper orbital trajectory. They must find some way to contact rescuers and then survive until friendly forces can reach them.

Possible Campaign Variations

Variation	Description
1	A ship has suffered a critical malfunction and is on a collision course with a station.
2	A micrometeor has punctured the main oxygen reserve.
3	The ship has developed a leak, but half the spacesuits are currently under maintenance.
4	The ship is on a collision course; the crew needs to secure everything before the avoidance burn.
5	A freak radiation storm has fried the main comm array.
6	The Players must limp home on a damaged ship, cutting as much mass loose as possible.

CREWMAN



The crew and staff of the Terranovan space assets are a breed apart. They are highly intelligent people who are able to handle isolation and boredom well, and who can keep a cool head during emergencies. Many of them have lived through the brutal battles of the War of the Alliance and are reticent to fight for mere political motives.

Attributes

AGI	0	APP	0	BLD	0	CRE	0	FIT	0
INF	1	KNO	1	PER	0	PSY	1	WIL	0
STR	0	HEA	0	STA	25	UD	3	AD	3

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	1	0	First Aid	1	2	Physical Sciences	1	1	Tinker	2	1
Communications	1	1	Mechanics	2	1	Survival (Space)	1	1	Zero-G Mvmt.	2	0
Computer	1	1	Navigation (Space)	1	1						

*Optional Additional Skills: Business, Computer, Electronics, Gunnery (Space)

Typical Equipment

Tool kit, coveralls or uniform, personal datapad, 1d6 x 100 credits

MARINE



Marine stand somewhat apart from the other spacers. They are the ones that find themselves thrust directly into the thick and ugly of vacuum hand-to-hand fighting rather than the clean, "instant kill" world of a ship's crew. The dangers inherent in their job give them a fatalistic, almost devil-may-care attitude. They remain spacers, however, and will not tolerate incompetence or foolishness. Because they also fulfill security duties, the marines tend to be carefully screened by the powers-that-be planetside before being assigned to a space facility.

Attributes

AGI	1	APP	0	BLD	1	CRE	0	FIT	1
INF	0	KNO	1	PER	1	PSY	0	WIL	1
STR	1	HEA	0	STA	30	UD	7	AD	6

Skills

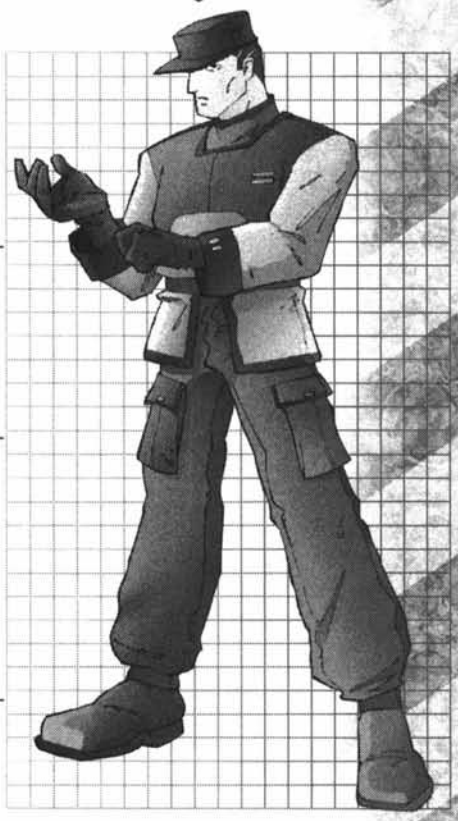
Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	1	1	Hand-to-Hand	2	0	Notice	2	1	Survival (Space)	1	1
Combat Sense	2	1	Intimidate	1	1	Security	2	2	Zero-G Combat	2	1
Dodge	1	0	Melee	1	0	Small Arms	2	0	Zero-G Mvmt.	2	1

*Optional Additional Skills: Camouflage, First Aid, Navigation, Pilot (Space), Streetwise

Typical Equipment

Spacesuit, sidearm, uniform, comm gear

OFFICER



Spacer officers come in two general types, volunteers and exiles. The former have requested assignments to one of the off-world bases, either because they like space travel or because they feel they will have a greater effect on things up there (such is the case with many officers affiliated with the Westphalia Cabinet). The latter have received this assignment to take them out of the way, either because they prove incompetent or too rebellious or outspoken. In general, however, the incompetent do not live long.

Attributes

AGI	1	APP	0	BLD	0	CRE	1	FIT	1
INF	1	KNO	2	PER	1	PSY	0	WIL	1
STR	0	HEA	0	STA	25	UD	3	AD	3

Skills

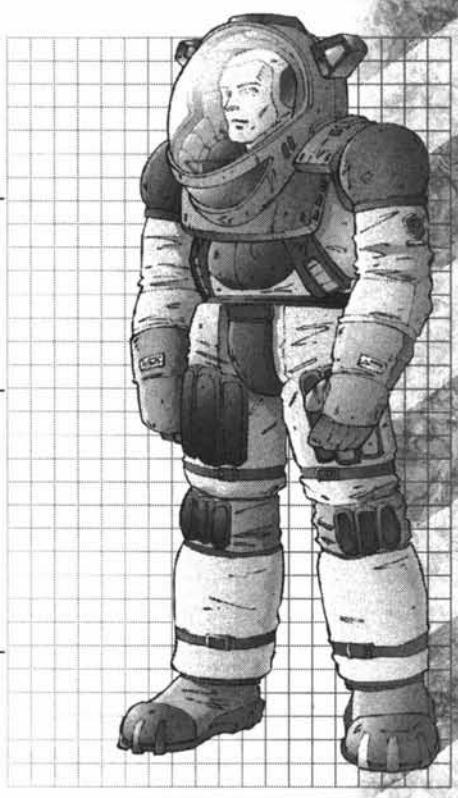
Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Bureaucracy	1	0	Electronic Warfare	1	0	Notice	1	1	Tactics (Space)	2	2
Combat Sense	2	1	Leadership	2	0	Small Arms	1	1	Zero-G Movement	1	1
Computer	1	2	Navigation (Space)	1	0	Survival (Space)	1	2			

*Optional Additional Skills: Hand-to-Hand, Navigation (Air), Zero-G Combat

Typical Equipment

Datapad, access to military vehicles and bases, 1d6 x 500 credits

SPACER



Not all people living in space are military; some hardy souls have decided to make a living among the stars and ply the space lanes of the Helios system, filling most of the support positions that the Terranovan space society needs to function. They are the technicians, the asteroid miners or the bartender/cook aboard the space stations. All are uniformly intelligent and level-headed; natural selection (and, sometimes, human selection) rapidly takes care of those that are not.

Attributes

AGI	0	APP	0	BLD	0	CRE	0	FIT	0
INF	1	KNO	1	PER	0	PSY	1	WIL	1
STR	0	HEA	0	STA	25	UD	3	AD	3

Skills

Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.	Skill	Level	Attr.
Athletics	1	0	Electronics	1	2	Pilot (Space)	1	1	Tinker	1	0
Communications	1	2	Notice	1	0	Survival (Space)	2	1	Zero-G Movement	2	0
Computer	1	2									

*Optional Additional Skills: Business, Bureaucracy, Human Perception, any science or technical Skill

Typical Equipment

Spacesuit, datapad or tool collection, 1d6 x 100 credits

CAMPAIGNING

This book would not be complete without a chapter on campaigning. As described in Chapter 1, Heavy Gear is a two-in-one game. It can be played as a pure roleplaying campaign or as an all-out tactical extravaganza. Also, because of the game's dual nature, it is highly recommended that gamers incorporate both gaming styles in one. More often than not, Heavy Gear fans play the game as a roleplaying game with tactical interludes, or as a tactical campaign with roleplaying moments. Both styles are perfectly enjoyable on their own or combined together. The truth is that Heavy Gear is neither one nor the other: it is a science fiction universe which finds its applications in one genre or the other depending on the Players' preferences. While most of the Heavy Gear campaigns tend to revolve around military life, it should be emphasized that the world of Terra Nova is extremely rich and it is entirely possible to have a roleplaying campaign that never involves a single Gear if everyone agrees to it. This game is a science fiction epic, not a giant robot bash-fest.

For someone who has not played these types of games before, however, the concept of a campaign may be slightly confusing. If such is the case, read on. Otherwise, skip this and move to the campaign style of your choice.

A gaming campaign is very similar to an ongoing television series. Each week (or each night, or each month, depending on your gaming group's meeting schedule), the heroes get together for a new adventure (a gaming session). If the adventures have a common thread (usually, the recurring Player Characters, but it could also be some persistent background element or organization), you have a campaign. The Players cumulate Experience Points and increase their PCs' Skills and Attributes over time, improving their overall performance in the game.

A campaign, unlike a simple night of mindless tactical combat, requires the intervention of a Gamemaster to keep track of the various events and opponents that occur during a game session. The Gamemaster's main task is to build scenarios and Non-Player Characters (NPCs) around the campaign's main storyline, and to run the Players through these adventures through several sessions. Occasionally, just to spice things up, the Gamemaster may throw a wrench into the Player Characters' plans and see how they react to it. Some will even pound consistently on some characters to create true drama. One word of warning, however. Gamemasters must never forget that the Player Characters are the heroes of the campaign (or the TV series), and they must look good in order to enjoy the game. They may despair at some point, but it is their ultimate triumph which will make the campaign interesting for the Players. Never EVER let the NPCs win the game for them.

8.1 - ROLEPLAYING CAMPAIGNS



The hemispheres of Terra Nova are rich with mysteries, conspiracies and intrigues, and offer countless campaign opportunities. To better start adventuring in the world of **Heavy Gear**, however, we feel that the Badlands city-state of Peace River offers the best background. Set in the middle of the desert, not far from the alpha maglev line that connects North and South, are owned by Paxton Arms, Peace River is at the same time lost in the desert sands and at the center of all things. Its intervention at the end of the War of the Alliance gave victory to the Terranovans and made the huge corporation into a planetary savior — for a time, at least. Over the last fifteen cycles, however, Peace River has felt the burden of its responsibilities increase as a disgruntled worker class strives for better living conditions and career opportunities, and as terrorrists from the Badlands Revolutionary Front oppose Paxton Arms with fanatical determination. President Gerald Simosa, Head Executive Officer Milani DuBeau-Slovenski and city administrator Helena Hitashi have their plates full.

Together, Gamemaster and Players should decide whether they want to have a military or a civilian campaign. While **Heavy Gear** offers a great deal of military background, it should not be assumed that it is a militaristic game. Especially in a city such as Peace River, it is entirely possible to play a campaign without ever encountering or handling a combat vehicle. Depending on the preferences of the participants, the campaign can be pro- or anti-Paxton Arms, and the PCs get to act as agents of either side. They can also totally ignore the political situation and focus their efforts on self-centered goals (hopefully, goals common to all members of the group).

We provide in the pages that follow a few angles from which a campaign can be approached. Gamemasters and Players are encouraged to create their own when they become more familiar with the game.

8.1.1 - Militia Campaigns

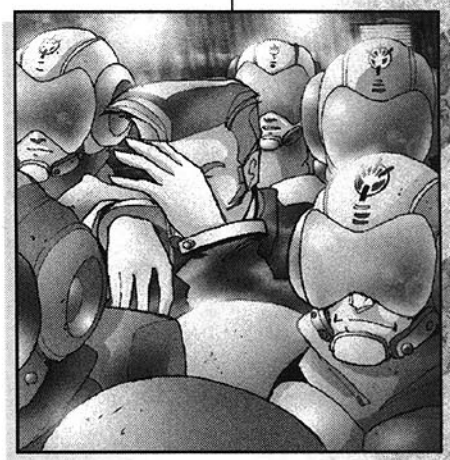
One of the most obvious campaign setup on Terra Nova is to be part of some militia, go on missions and obey orders. This is particularly attractive to beginning Gamemasters who need a quick reason why the Player Characters stick together. As part of a militia unit, they become closely tied, and need to trust and work with each other. They all share something in common (the combat unit), but can have specializations and their own "schticks" that no one else has. (In gaming, a "schtick" is a Skill or a group of Skills that distinguish a character from everybody else.)

Peace Officer Corps ◆

"Join the Peace Officer Corps, they said! Help defend the city, they said! They never talked about the crummy pay, the internal corruption, the bad reputation and the lousy hours. Figures." In TN 1933, Paxton Arms is a social powder keg and the Peace Officers have more than enough work maintaining the peace without the Badlands Revolutionary Front (BRF, or "BaRF" to their enemies) adding to their problems. The terrorists make sure they're present at every important event and that they blow up every resource they can given the slightest opportunity. Life in the POC is never boring, that's for sure. Still, once a cop, always a cop, and most Peace Officers still believe in what they do.

Random Mission Table (roll or select one)

1	**Riot Control.** A crowd (1d6 * 1d6 * 100 people) from the Prospects has gathered up in the MegaPlaza to protest their squalid living conditions. Only one in ten is armed, and only one in a hundred has a firearm. A clever cop might pick up some professional agitators in strategic areas of the crowd.
2	**Bomb Alert.** An anonymous call claims that an infiltrator has managed to put a bomb in a Peace Officer Corps precinct building, and that it will blow up in thirty minutes. The POC must evacuate everyone, cordon off the area and search the building for the bomb. When (or if) it blows up, it is discovered that most of the damage was focused on the precinct's archives.
3	**Murder Investigation.** One of Marshal Terri Chen's most trusted and popular lieutenants has been discovered burned and dead in the Prospects. Some overzealous cops are leading a brutal investigation to find out who did it.
4	**Vehicle Theft.** An armored tactical vehicle has been stolen from Paxton Arms and is heading for the Prospects. The PCs must give chase and capture the thieves alive. Who are they? Who do they work for? What were they planning to do with the vehicle?
5	**Armed Robbery.** Using a refitted Hunter Gear, a group of well-organized BRF revolutionaries have chosen to attack one of Peace River's most prestigious hospitals to steal pharmaceutical products. An anonymous tip has warned the POC, however, and they show up at the hospital before the robbers can leave.
6	**Smuggling Ring.** Following a trail of small-time smugglers, the PCs realize that the "big shots" are always one step ahead of them and always elude them at the last second. This leads the PCs to the conclusion that they must have informers within the POC — which is true. Who can they trust now?



Paxton Security ◆

At best, PaxSec is respected; at worst, it is feared throughout Peace River. Acting as secret state police with the mission of protecting Paxton Arms, PaxSec cares not so much about the city as it does about the manufacturing and administrative installations of the weapons manufacturer. PaxSec has been known to use Gestapo tactics and places itself above the law and ensures no one threatens the company which is the very reason for Peace River's existence. Members of the dreaded security force benefit from several privileges and take full advantage of the reputation they have. PaxSec and the Peace Officer Corps often find each other at odds over whose jurisdiction has precedence in several cases; PaxSec wins most of them.

Random Mission Table (roll or select one)

1	**Espionage.** The PC agents are sent to infiltrate and gather information on a BRF cell which has been exceedingly active (and not very discreet) in the Prospects. The leader of the cell, however, is counting on this and is hoping to capture PaxSec agents to learn more details about Paxton's security procedures.
2	**Anti-Terrorism.** A BRF cell has been leading increasingly audacious raids against peripheral Paxton installations. As a result, PaxSec has assigned more security forces to those locations, leaving other, more vital areas slightly less protected. The PCs may discover this and try to figure out where the terrorists will strike next.
3	**Internal Politics.** President Gerald Simosa is not without enemies. Fortunately, HEO Milani DuBeau-Slovenski is hounding them out, using PaxSec to learn who they are and what they are up to. The current focus of her attentions is Chief Financial Director Fidel Jacobi and his protectionist coalition, who are encouraging agitation and sabotage to have Simosa voted out of office.
4	**Sabotage.** Some processing plants vital to Paxton Arms have been malfunctioning far too much during the last few weeks, and PaxSec must investigate the matter. Behind it all, a presumably deceased Peace Officer now working for Fidel Jacobi is pulling strings with an agenda all his own.
5	**Security Breach.** An exceedingly discreet branch of PaxSec, Intelligence often performs internal checks to ensure no one infiltrates the security service. Suddenly, vital information is leaking out and a rapid investigation points directly to the Player Characters. Why them? Are they getting too close for comfort to someone with power?
6	**Black Ops.** A subdivision of Operations working closely with Intelligence, Black Ops employs specially trained agents to perform extremely difficult, discreet or delicate tasks. Members of the squad can be combat vehicle pilots, demolition experts, martial arts masters or infiltrators *extraordinaires*. Their job: perform the impossible.



8.1.2 - Civilian Campaigns



While being part of the militia offers several adventure possibilities and requires the less work — especially for an episodic campaign — the greatest roleplaying rewards undoubtedly lie with civilian adventuring. This section contains options for characters who want to be part of some kind of formal or recognized organization, but several other possibilities give GMs and Players many opportunities.

For instance, the Player Characters could be simple members of the drug smuggling rings that plague the underground of Peace River. Several adventures could focus on the usual difficulties of smuggling drugs under the nose of the various authorities, or trying to get paid from other smugglers in the chain who are not all that reliable, or to elude thugs sent by a drug lord to collect some missed payment, or any other complication which the Gamemaster deems typical.

Just as the Players think they're settling into a comfortable routine, something goes awfully wrong. They could be set up for a false delivery to a Peace Officer, or they could lay their hands by mistake (or is it truly an accident) on some extremely valuable message or item, or they could stumble upon the scene of a particularly heinous crime and be arrested by the police for interrogation — GM's call. After that, their existence is thrust into chaos and they must use their every resource to ensure their survival. Has someone betrayed them? Was the item delivered into their hands by mistake or was it on purpose? Were they supposed to be the victims of the murder they discovered? Who is behind it all? What does he (or she) want? Is there anyone on their side, or are they simply the pawns of chess players whose face they will never see?

Another interesting possibility is that of the private investigator hired to find a missing person or some stolen item. While this requires a more consistent storyline, it also provides the most satisfaction in the long run. The Players represent a reputable firm which guarantees success, but for a price. The first few cases should be fairly simple and straightforward, just challenging enough to make Players aware of the resources they have at their disposal. Then, they are hired by the wife of a recently deceased executive who believes her husband was murdered. PaxSec has declared the case closed, but a connection in the POC has hinted at some irregularities in the case and she wants the Players to find out the truth. But what if PaxSec had a secret that it didn't want to get out?

◆ Peace River News (PRN)

Peace River News is one of the most prestigious and liberal information network in Peace River. Privately owned by Yahmin DeBraise, the grandson of a Republican politician who left the south to have the freedom of speech, PRN has one and one mission only: to find out the truth and expose it, whatever it is, whatever the consequences. To that effect, the network hires the best and most objective reporters from all over the world. That, hopefully, could include a group of Player Characters.



Random Mission Table (roll or select one)

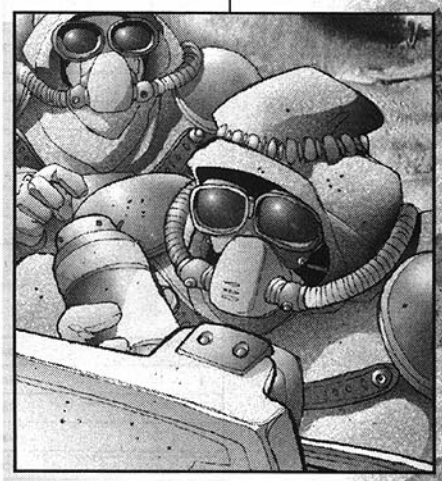
1	**Murder Cover Up.** In the Prospects, the death of an officer has led to a somewhat brutal investigation. It seems, however, that the Peace Officers constantly refuse to talk to the media about the event or anything related to it. Is this a cover up? Does Marshal Chen know? Why can't anyone find out what happened to the body of the dead officer afer it was discovered?
2	**Corruption Among the Peace Officers.** A reliable source hints to one of the PCs that "Lieutenant Alfonzo Pratt, recently deceased, may have been involved in corrupt activities. Proof is available in a highly guarded location, and here's how to get in." Is this true or is it a setup to get rid of reporters who are getting too close to the truth?
3	**Conspiracy Theory.** An anonymous man claiming to be an archaeologist says he's uncovered proof in the Badlands that Stoneheads serve a purpose which... which he can't discuss over the vidphone. He sets up an appointment at a later time, but never shows up. Instead, PaxSec agents are waiting there to interrogate the reporters at length.
4	**Battle Report.** There's a terrorist attack in the slums of the Prospects, and the reporters happen to be in the vicinity (investigating something completely unrelated) when the fight breaks out. They decide to stick with the terrorist and tell their side of the story. This is not going to sit well with Paxton Administration, however. Are they ready to face the consequences?
5	**City Beat.** The reporters go around the city and take the pulse of the citizens. The MegaPlaza is the ideal spot to start because people from all levels come here. When a Prospector gets thrown out of a high class restaurant for not wearing the right clothes, other Prospectors step in and things get ugly. In the middle of it all, the reporters are expected to do their job — and survive the riot.
6	**Political Visitor.** An ambassador from Port Arthur is visiting Peace River to try and establish more positive relationships with Paxton Arms. At least that's the official version. He is also here to keep in touch with some BRF sympathizers in Peace River and see if Port Arthur can offer some support to help destabilize Paxton Arms. Can the reporters find out about it and expose him?

Badlands Revolutionary Front (BRF) ◆

Not everyone wants to play investigators or servants of the law. There are Players and Gamemasters who just prefer the simple joy of blowing up heads and supply depots (not necessarily in that order), and the Badlands Revolutionary Front offers wonderful career opportunities to those people. Guns, bombs and body armor are all part of the standard equipment of BRF members. Brains are optional, but a welcome extra — sometimes. The Player Characters can form their own little cell working under the orders of one of Sundra Gabriel's lieutenants (not her directly). They get their weekly mission, handle it like pros and move on to the next objective. This requires the least amount of preparation from a Gamemaster who is pressed for time. The style can be very episodic, with little continuity linking the adventures, and heavily action oriented.

Random Mission Table (roll or select one)

1	**Blow Supply Depot. The objective is simple: there's the supply depot. Bypass security (or kill them), plant the explosives in the determined location, get out (that's optional) and watch the fireworks. If you get captured, we don't know you, you don't know us (which is true). Good luck.**
2	**Sabotage Plant. This requires discretion. Getting in is difficult, but here are the security codes and the patrol schedules. Sneak in, get to this control panel and cut the blue and green wires (but not the red, it triggers an alarm). Make sure you get out without getting noticed, or else Paxton will know something's up. This should really mess up their production schedule.**
3	**Acquire Explosives. We need more explosives, but PaxSec and the POC are tagging all our usual suppliers. They're getting too close. We need new contacts. Find some, buy the explosives and call us to set up a meeting point. Oh, and if you get caught, you're on your own.**
4	**Recruit Sympathizers. We're going to give you a lot more work in the weeks to come, so make sure you have enough people to handle the extra load. Get out there, there are hundreds of dissatisfied customers in the Prospects who'll be glad to give you a hand. And beware of undercover PaxSec agents or cops.**
5	**Gather Information. We're planning a raid on this Paxton installation, but we're not 100% sure of their security network. Go in discreetly and find out their surveillance routes and schedules. Do not, I repeat do NOT do anything to arouse suspicion, or they'll suspect something and will double security.**
6	**Steal Vehicle. We're going to need an escape vehicle — more specifically, an APC — for an upcoming hit and run on a Paxton building. Here's where you can find it. If you steal it discreetly, they won't know it's gone before tomorrow, and by then it won't make a difference. If you make too much noise when you steal it, it could compromize our operation. Be careful.**



Random Tables - 8.1.3

Using random tables is a quick and easy way to make up a scenario or to at least trigger a cascade of ideas that can eventually become a complete story. The Gamemaster may roll or select any of the options that he feels are appropriate for his story from any of the tables below, or roll and get a totally random result which he can then adapt to his current storyline.

Plot Complication Table (roll or choose one)

	Who*	What	Where	When	How
1	Contact	Informs	Safe House	Soon	Direct Approach
2	Enemy	Steals From	Over Phone	Always	Subterfuge
3	Friend	Helps	Public Area	Yesterday	Bribery
4	Reporter	Arrests	Private Home	Tomorrow	Careful Planning
5	Officer	Investigates	PCs' HQ	Unknown	Dumb Luck
6	Criminal	Betrays	Police Station	Currently	Clever Manipulation

* "Who" should be rolled before and after rolling for "What" whenever appropriate.

Identity Table (roll or select one)

	1-3	4-5	6
1	Bureaucrat	Municipal Advisor	Diplomat
2	Field Scientist	Lab Scientist	Researcher
3	Civilian Pilot	Military Pilot	Test Pilot
4	Badlands Guide	Urban Guide	Exotic Locations Guide
5	Private Eye	Police Investigator	Corporate Security
6	Petty Thief	Criminal	Murderer/Traitor

Personality Table [roll or select one]

	1-2 Positive Traits	3-4 Neutral Traits	5-6 Negative Traits
1	Honorable	Silent	Greedy
2	Pious	Selfish	Treacherous
3	Generous	Materialistic	Brutal
4	Driven	Grim	Flippant
5	Optimistic	Curious	Sadistic
6	Respectful	Loquacious	Manipulative

Mission Table [roll or select one]

	Activity	1-3	4-5	6
1	Investigating...	a missing person	a theft	a crime
2	Pursuing...	a friend	a criminal	an enemy/nemesis
3	Committing...	brutality	theft	murder
4	Smuggling...	drugs	weapons	people/criminals
5	Trading...	common items	luxury goods	information
6	Escorting...	civilian(s)	military personnel	ranking officials

Infiltration Table [roll or select one]

	Outside	Inside	Object	Encounter
1	Garden	Living Room/Lobby	Computer	Worker/Maintenance
2	Backyard	Bedroom/Restroom	Safe	Director/Resident
3	Garage	Corridor (1d6 doors)	Various Furniture	Mobile Personnel*
4	Storage Shed	Study/Meeting Room	Desk	Perimeter Defense*
5	Balcony	Kitchen/Dining Room	Audio/Video Equip.	Locked Door*
6	Gazebo	Work Area	Tools/Weapons	Stranger/Prisoner

* See Security System Table below.

Security System Table [roll or select one]

	1-3 Perimeter Defense	4-5 Locks	6 Mobile Personnel
1	Fence (* vs 3)	Basic Lock († vs 4)	Sentry (‡ vs 5)
2	Barbed Fence (* vs 4)	Lock († vs 5)	Dawg (‡ vs 6)
3	Electrical Fence (* vs 4, § vs 3)	Good Lock († vs 6)	Guard Dawg (‡ vs 7)
4	Electronic Fence (* vs 4, § vs 5)	Complex Lock († vs 7)	Random Patrols (‡ vs 1d6+3)
5	Laser Grid (* vs 5, § vs 6)	Electronic Lock (§ vs 6)	Organized Security (‡ vs 8)
6	Motion Sensors (* vs 7)	Retinal Scan (§ vs 8 w/spec. eq.)	Elite Security (‡ vs 9)

* Athletics, † Mechanics, ‡ Stealth, § Electronics

Prize Table [roll or select one]

1	Technological Bauble
2	Vital Information
3	Piece of Land
4	Weapon
5	Money (1d6 * 1d6 * 1d6 * 100 marks/dinars)
6	Scientific Discovery

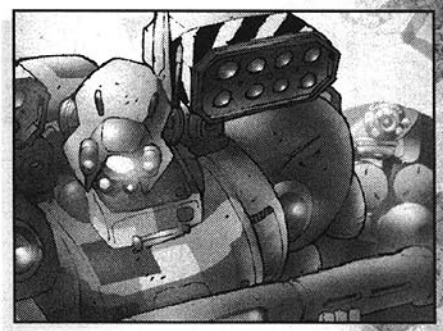
TACTICAL SCENARIO GENERATOR - 8.2

The Scenario Generator is a set of tables and guidelines enabling the rapid creation of scenarios for stand-alone tactical combat. They have been designed so that the participation of a Gamemaster is not required for play. By either selecting the scenario's elements (or rolling them randomly), a large number of tactical scenarios can be easily generated. Some additional work may be required to tie together the various elements, but it is much faster and easier than having to design the whole scenario from scratch.

Both Players receive a number of mission objectives that have to be fulfilled in order to win the battle. The opponent is trying to prevent the other from achieving his mission while at the same time fulfilling his own objectives. Enemy mission objectives normally remain secret, unless resources are allocated to find out what they are.

Step 1: Preparing the Scenario - 8.2.1

The scenario's characteristics will be determined later on. First though, a Threat Value point total must be decided upon according to the time available to play the game (see the table below). A time limit to the game can also be decided upon, though one will most likely be generated for the scenario. Forces will be chosen for both sides using this point total. For a more challenging and interesting game, however, there are specialized options further down.



In order to facilitate the preparation process, it might be useful if both sides (or all sides, if there are more than two) agreed on which vehicles they can use for the scenario and have all the miniatures and record sheets ready. If the scenario involves newcomers to the game, it might be preferable to only use the vehicles included in this rulebook so they can become familiar with the basic machines. Other restrictions could be based on a maximum Threat Value, Pilot Level or Availability Number. Ideally, a Rules Specialist should be designated between all the Players to look up any rule in the book and to make objective judgment calls on the rules in case of dispute.

Suggested Point Total

TV Points per Side	Battle	Approximate Time
2000	Patrol	1 hr
4000	Skirmish	2-3 hrs
8000	Raid	3-4 hrs
12000	Minor Battle	5-6 hrs
20000	Major Battle	8+ hrs

Bidding

The general Threat Value for the battle is chosen depending on the space and time available to play out the battle. Bidding allows additional variations on the theme, and forces players to become better tacticians through skillful use of the available resources.

The participants start the bidding with one of them (selected by tossing a coin or rolling a dice) makes a bid: "I'll try this scenario with only 1,700 points in TV instead of the full 2,000. " The process goes clockwise, with everyone trying to outbid his predecessor. When all the Players agree that one of them has gone lower than they are willing to go, the process starts again between the remaining Players, who cannot have a lower TV than the "winner" of the last bidding. The process is repeated until only one Player is left, who will take the basic TV. Bids should be made in increments of 100 points for the sake of simplicity.

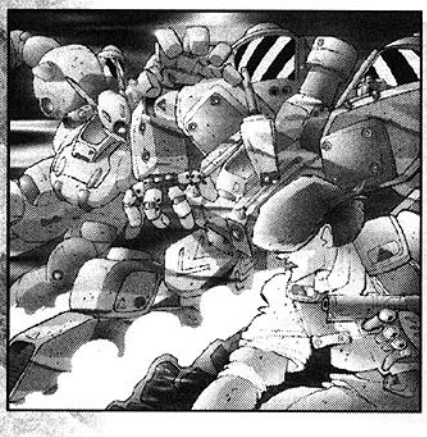
Going for Glory

One side may voluntarily chose to lower its available Threat Value total in order to gain more Victory Points. The gain in VPs is directly proportional to the reduction in force: divide the VP total by the fraction. For example, if a Player elects to use a force equal to only 75% of his opponent's Threat value point total, his total VPs for the game will be worth 133% (100 divided by 0.75).

Subplots Galore

Subplots are complications that hinder the fighting abilities of an armed force (see Step 4 for more details). Normally, a single subplot is rolled for both sides. By lowering its available Threat Value, one side may force extra Subplots onto the enemy. For each slice of 10% the initial TV is reduced by, one additional Subplot is rolled. In other words, if a player who has 1,500 points in TV and wants to purchase two additional subplots, he will lose two slices of (10% x 1,500 =) 150 points (a total of 300 points), leaving him with a final TV of 1,200 points. (If the Subplot requires something to be bought, such as a minefield, this is where the TV comes from.)

8.2.2 - Step 2: Mission Design



Very few military actions are of the "kill them all" sort. When forces are engaged in an operation, it is always for very specific reasons, which may or may not be related to actual body count. The type of mission indicates the specific objective(s) that need to be fulfilled in order to win the scenario.

The main Mission Design table is divided into three columns. A die roll on the first column defines the type of mission: the task that must be fulfilled in order to win. Another die is then rolled to indicate the specific objective of that mission: the object or target of the task already decided upon. Both are explained in more detail further along in the text. Finally, a time limit is assigned for the completion of the task.

The Mission Design table provides only the bare bones of the scenario. It is up to the Players to further flesh it out by meshing elements from the world of Heavy Gear into it. For example, a mission rolled as "Capture, ECM, Random" could be interpreted as follow: "the enemy has deployed a heavy ECM cover in the valley. We need to know their operating frequencies so that we can effectively counter them. You must capture the enemy's ECM vehicle so we can download the information from it. Hurry up, though: once the enemy is aware of your presence, reinforcements will be sent and you will be cut off if you have not retreated by the time they arrive."

Mission Design Table

1d6	Type	Objective	Time Limit
1	Capture	All forces	None
2	Defend	Communications	None
3	Destroy	ECM	Random
4	Destroy	Object	Random Increasing
5	Disable	Terrain	Objective
6	Provide	Vehicle	Objective

Mission Types



Capture:	The enemy has something you want. It might be a physical object, like a vehicle or a terrain feature, or it might be a more abstract condition (control of the communication airwaves, for example). It must be held (i.e. only friendly vehicle within 200 meters) for at least three rounds or until the end of the game, if a time limit is present.
Defend:	The enemy wants something you have. It might be a physical object, like a vehicle or a terrain feature, or it might be a more abstract condition (control of the communication airwaves, for example). It must be held (i.e. only friendly vehicle within 200 meters) for at least three rounds or until the end of the game, if a time limit is present.
Destroy:	The objective, whatever its actual nature, must be denied to the enemy. It must be destroyed before the end of the game.
Disable:	The objective, whatever its actual nature, must be denied to the enemy. It must be disabled (no movement, no action of any kind) before the end of the game.
Provide:	The objective must be provided to the rest of the armed forces of your side. It might be an actual item, in which case it has to be delivered beyond the enemy line. Or it might be a condition, such as ECM cover. If the latter, it must be provided for at least three rounds or until the end of the game, if a time limit is present.

◆ Mission Objectives

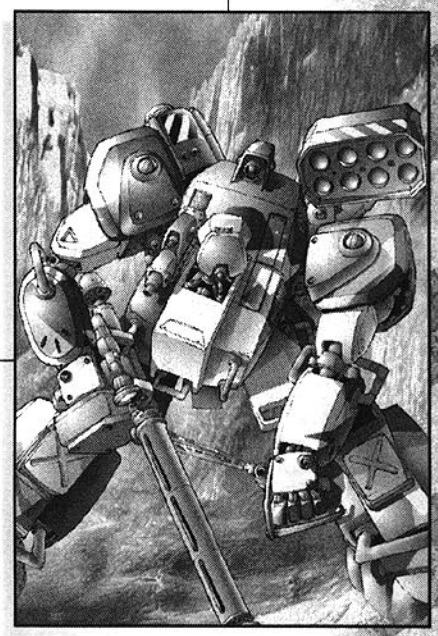
The Mission Objectives have been generalized for simplicity. Each category is meant to suggest a broad number of options that can be selected to fit a particular scenario. While some are fairly straightforward ("All Forces," for example), others lend themselves to more than one choice. For example, Communications might cover a dedicated command vehicle, or perhaps the communication center of the enemy firebase that sits in the middle of the board. It could also mean the relay tower that is sitting on top of Hill 832.

How the Objective fits into the mission profile will vary depending on the Mission Type. If the mission type is an offensive, such as Capture, Destroy or Disable, then the Objective means the enemy forces. For example, "Destroy All Forces" means that all enemy units have to be put out of commission, somehow. If the Mission Type is more defensive in nature, such as Defend or Provide, then it means the friendly forces. For example, "Provide Terrain" would mean that a clear access to a certain terrain feature must be kept open.

Missions normally have just one Objective, but ambitious Players may want to create more complex scenarios that have secondary objectives, perhaps worth less Victory Points.

Mission Objectives

All forces:	All units present on the table for that side. Regardless of the mission type and the task(s) involved, all units are equally affected.
Communications:	This means that clear communication channels must be available to friendly forces or denied to the enemy. Clear communications are available if at least one vehicle is able to use its Communication system.
ECM:	This means that ECM cover must be available to friendly forces or denied to the enemy. ECM cover is available if at least one vehicle is able to use its ECM system.
Object:	An object is considered vital by headquarters. It is probably something small that can be picked up and carried by a Gear or an infantryman.
Terrain:	A terrain feature (50 by 50 meter zone, or one hex) is considered vital by headquarters. It may be a high ground, or perhaps it is the entrance to a subterranean access tunnel.
Vehicle:	One of the vehicles is considered vital by headquarters. It might be a prototype, or it is piloted by someone important.



Time Limits

None:	The game ends when the Players have no more time to play, or one of the forces in presence is completely destroyed (or retire from the field).
Random:	The game proceeds normally for five rounds. A die is then rolled to know the number of rounds remaining before the end of the game.
Random Inc.:	The game proceeds normally for five rounds. A die is then rolled versus a Threshold that starts at 1 but increases by one every round. If the die roll does not exceed the Threshold, only one more round is played before the scenario ends.
Objective:	Once one side has completed its scenario objectives, only one more round is played before the scenario ends.

Location

Location is where the battle will take place. A hex map with the most representative terrain is chosen or drawn, or miniature terrain is placed on the table. Regardless of the type of game — hex or miniature — who will do the actual board set-up will depend on which side assigned the most resources to scouting (see Scouting, further on, for more detail).

The following tables randomly assign a certain type of battlefield to each scenario. Due to the limited page count and the huge number of possible setups, only the general look of the battlefield is suggested. The numbers found in the table on the next page are provided as guidelines, not hard and fast requirements. As long as the terrain is laid out in a logical, believable manner and looks like what it is supposed to be (no desert with half the board as jungle, for example), then the minimum requirements are met. For more variety, the battlefield can be further divided into several equally sized sub-zones, each of which will receive a different terrain type.

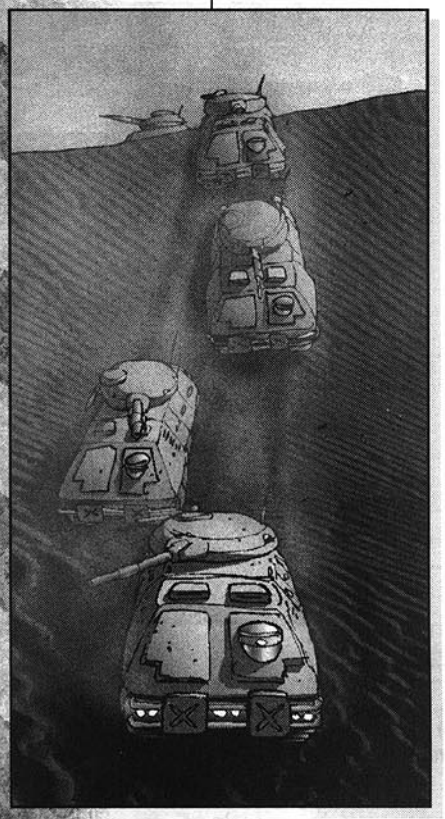
Players should make sure there is plenty of cover and hiding places, even on the flattest of desert. This is especially true of skirmish scale game, where even individual rocks can be modeled. It is important to avoid choking the battlefield with too much obstructing terrain, however — the troops will have to move through it, and any cover may well become the enemy's if the battle takes an unsuspected turn.

Location Table

1-2	Northern Hemisphere
3-4	Badlands
5-6	Southern Hemisphere

Terrain Table

1d6	North	Badlands	South
1	Broken Ground	Desert	Broken Ground
2	Mountains	Desert	Mountains
3	Woodland	Broken Ground	Woodland
4	Jungle	Mountains	Jungle
5	Polar	White Desert	Swamp
6	Urban	Urban	Urban



Terrain Description Table

Desert:	Although they are constitued of a multitude of different terrain types, the Badlands still feature quite a lot of empty and dusty flat deserts. Desert battleground has at least 50% of the playing surface made up of Clear or Sand terrain.
Broken Ground:	In the transition between the flat deserts of the equatorial Badlands and the rocky mountains and steamy jungles of the hemispheres, lie savannahs and hilly terrains that bear reasemblances to both. Broken Ground battlefields have at least 50% of the playing surface made up of Rough hexes; many feature at least a one level elevation change.
Mountains:	For a time, Terra Nova was very geologically active — the large mountain ranges that dot the planet are proof of this. Mountain battlefields have at least 75% of the playing surface made up of Rough terrain. Alternatively, it may be composed of any type of terrain provided there are at least three different elevation levels.
Woodland:	Not all Terranovan forests are densely packed steamy jungles. In many places the trees grow far enough from one another to allow the existence of a flourishing vegetation floor. These forests have at least 50% of the playing surface made up of Woodland terrain.
Jungle:	The hot and humid climates of the lower basins of the southern hemisphere have allowed huge rainforests to prosper. The dense vegetation and the high humidity wreck havoc with sensors, making combat a lethal close range affair. The battleground is designated as a Jungle when at least 50% of the playing surface is made up of Jungle terrain. Really dense forests (75% of the surface is made up of Woodland terrain), such as can be found in the North, can also be considered jungles.
Swamp:	In some regions of the planet, water from the MacAllen network seeps to the surface and helps develop a swamp ecology. The battleground is a Swamp when at least 50% of the playing surface is made up of Swamp terrain. Zones with 75% Water hexes also count as a Swamp (the water zones are shallow pools or a river delta).
Polar:	Because of its position in the Helios system, Terra Nova features very few locations that can be truly refered to as polar. They do exist, but combat there is quite unlikely because there is simply nothing to fight over. Polar battleground have at least 50% of the playing surfacemade up of Snow or Ice terrain.
White Desert:	White sand is one of the most dangerous substances on the planet — few will willingly fight nearby its corrosive influence. White Deserts have at least 25% of their surface covered by White Sand, or 50% by White Sand Rough terrain.
Urban:	Battles rarely occur within the heavily fortified walls of a city-state and are much more likely in the crowded streets of neighboring towns and villages. This type of battleground is composed of at least 50% of Urban or Dense Urban terrain (in any proportion, not including Roads or Bridges).

External Conditions

External Conditions is a catch-all category that cover various weather effects and the time of day, both of which may affect the course of the battle and the performances of the units involved. Only one External Condition is rolled for the entire scenario, and it applies throughout the game for everyone.

The conditions described in the table on the next page are fairly generic and should provide enough complication for the entire scenario. It is possible to have more than one condition in effect at the time (such as a Night battle under Heavy Rain) but the combined bookkeeping and complexity may prove more trouble than it is worth. Some of the conditions are also mutually exclusive — the battle cannot be fought under both Daylight and Night conditions, unless part of the board is considered to be underground. Using more than two conditions at the same time is probably too complex.

Ambitious Players may want to build a complex scenario where the External Conditions are *modified* as the battle moves along. For example, the battle could be fought as the day comes to a close, with conditions changing from Daylight to Dusk in the middle of the fight. Or a tempest could suddenly move across the battlefield, changing one third of the board every round into a Sandstorm environment. This requires a bit more bookkeeping than usual and is more complex to play, but results in very unpredictable (and enjoyable) battles — especially if the changes are triggered randomly!

External Condition Table

1d6	North	Badlands	South
1	Daylight	Daylight	Daylight
2	Daylight	Daylight	Daylight
3	Dawn/Dusk	Dawn/Dusk	Dawn/Dusk
4	Night	Night	Night
5	Rain	Sandstorm	Fog
6	Winds	Winds	Heavy Rain

External Condition Table

Daylight:	The battle occurs under normal conditions.
Dawn/Dusk:	The battle occurs litterally between night and day. The scenario is treated as being a normal day scenario, but with all Detection ratings being reduced by one (they cannot go lower than the Night rating, though).
Fog:	The entire battlefield is covered with a rolling fog that makes visual identification nearly impossible. Each full three hexes of fog count as one point of Obscurement for detection purposes (but not weapon fire).
Heavy Rain:	The battle takes place under heavy rain. Each full ten hexes of terrain, regarless of its type, count as one point of Obscurement.
Night:	The battle takes place at night, with all the associated night combat rules being in effect (see page 159).
Sandstorm:	The battle takes place during a violent storm, with all the associated rules being in effect (see page 159).
Rain:	The battle takes place under a light rain. Each full twenty hexes of terrain, regardless of its type, count as one point of Obscurement.
Winds:	Heavy winds blanket the battlefield, lifting dust clouds and making air support very difficult. All energy weapons loose an additional point of Damage Multiplier per Range Band due to the dust. Neither players can count on air support.



Step 3: Assign Priorities - 8.2.3

Each Player has five points to secretly distribute between Scouting, Troops and Support. Scouting is used to determine the strength of the enemy, his position and his intentions. Troops are the actual fighting force: Gears, combat vehicles and infantry. Support represents the elements that, although not present on the immediate battlefield, can affect it: air support, artillery and intelligence work.

Scouting

Scouting represents the resources that are used to recon the terrain ahead. It might be a satellite observation, a report from a forward scout or an on-site unit, but the result is the same. The points that were secretly assigned to Scouting by each Player are revealed and compared. The Player with the highest total wins an advantage. The difference between Scouting Points is noted as the Scouting Advantage Margin.

Scouting Table

Scouting Advantage	Effect
0	No effect. One randomly determined Player sets up the playing field; the other may choose his home edge.
1	Minor Advantage: the Player may choose between setting up the playing field or choosing his home edge.
2	Major Advantage: the Player sets up the playing field and chooses his home edge.
3	Ambush: in addition to the major advantage above, the Player automatically wins the initiative for the first round.
4	Total Ambush: in addition to the major advantage above, the Player may hide his units anywhere on his half of the board, noting their positions on a sheet of paper.
5	Perfect Intelligence: in addition to the total ambush advantage above, the Player knows the enemy's mission type, objective and time limit.

Troops

The total Threat Value points available to purchase units for the game have already been decided in the first step. The points assigned to Troops by each player are revealed and compared. The player with the highest total wins an advantage. The difference between Troop Points is noted as the Troop Advantage Margin. The opponents' total TV is reduced by an amount equal to the Troop Advantage Margin times 10% of the original TV. For example, if Player A assigns 2 points to Troops and Player B assigns 4 points, the Troop Advantage Margin is equal to 2. The forces of Player A are reduced by (2 x 10% =) 20%. He will be able to spend a number of TV points equal to only 80% of the agreed-upon Threat Value total.

Support

Support are options that can be bought just before the scenario to help the Player. They are normally written down and concealed from the opponent, unless they manage to learn about them (see Intelligence, further on). The points assigned to Support by each Player are revealed. Each side may buy support up to an amount equal to the Support Points times 10% of the TV total. For example, if Player A assigns 2 points to Support, he will get a number of TV points equal to (2 x 10% =) 20% of the battle's agreed-upon Threat Value total.

Support Options Table

Air Support:	Aircraft can be called to provide ground support for beleaguered combat units. They are generally more precise than an artillery barrage but run the chance of being shot down before they can complete their attack. For more detailed air support rules, consult the Tactical Air Support sourcebook. All air support operations take place during Step 4 of the combat round. Because of their great speed, aircraft enter and exit the game surface in the same round, traveling in a straight line along a row of hexes. Any target within two hexes of this trajectory may be attacked by the plane's weapon(s); all attacks are made at Short range. The number in parenthesis indicates how many attacks may be made using the weapon indicated. A level 2 crew is assumed, but Players may buy higher levels of Skill by multiplying the air support cost by the Crew Level Multiplier (see page 127). Air assets may also be used to intercept enemy planes before they can attack: each plane has been assigned a certain number of dice for interception and defense. These are not Skills, merely a gross generalization of the capabilities of each type of plane. The dice are rolled and compared. A Margin of Success between 1 and 3 means the plane has been driven off, but may attempt another attack next round. A Margin of Success of 4 or more means the plane has been destroyed. Aircraft may attempt any number of interceptions, but must fly back to base after a successful one. Likewise, they must return to base after they have expended their weapon stock. Aircraft do not return to the battlefield after going back to base.
Artillery Barrages:	Artillery barrages are massive attacks made by off-board artillery pieces or even space ships in low orbit. The actual nature of the support battery matters little to the immediate battlefield — only the end effect counts. Artillery barrages are bought salvoes by salvoes, and cannot account for more than a quarter of the available Threat Value. For more detailed fire support rules, consult the Tactical Field Support sourcebook. Artillery barrages are called by a spotter unit (Player's choice), who can call fire missions at any time by spending one action. No other personnel may request artillery support. Only specific hexes, terrain features or buildings can be targeted by artillery fire, never individual combat units. The spotter must have a clear Line-of-Sight to the target. A Leadership Skill roll modified by the Communication system is made against a Threshold of 5. Artillery fire will arrive on the same round if the roll is successful. If the Leadership roll is failed, the request is not heard or simply misunderstood, but the next attempt is at +1, provided it is made the round immediately after. All artillery fire take place during Step 4. The barrages have an area effect to reflect the large number of incoming projectiles. Two dice are rolled versus a Threshold of 6. If the dice roll is equal to or higher than the Threshold, the fire mission lands right in the targeted hex. If the die roll is failed or fumbled, the shot deviates by a number of hexes equal to the Margin of Failure. The attacker rolls one die for direction (assign numbers to hex sides). Damage is per normal weapon fire and is applied immediately. The number rolled on the two dice is used as the Threshold to beat for defense. For defense arc purposes, the attack comes from the firer's home edge. If the attack fails, the weapon still cause damage equal to its basic Damage Multiplier to everything in its area of effect (this is an exception to the standard area effect rules explained on page 144 and applies only to artillery barrages).
Intelligence:	Information gathering is a major part of warfare. By knowing what the opposing forces are up to, countermeasures can be more effectively designed to foil the enemy plans. It is assumed that both sides have access to fairly complete intelligence reports before the start of the scenario. Sometimes, though, the system does not come through and there are differences in the preparedness level of the forces in presence. Intelligence resources can be used to buy dice rerolls, representing the increased level of preparation of the friendly forces. Die rerolls can be used at any time, and cost the equivalent of 1% of the Threat Value total each. When dice are rerolled, however, the second result stands, even if it was worse than the first one. Intelligence assets can also force the other Player to reveal either his mission type, mission objective or time limit. They may also be used to reveal the type of support bought for the game. Every 5% of the total Threat Value assigned to this purpose forces the opponent to reveal one of the above.

Air Support

Type	Attack	Interception	Defense	TV Cost
Fighter	LAC (2)	2d6+2	1d6	200
Fighter-Bomber	AGM (2)	2d6	2d6	1000
Bomber	ATM (4)	N/A	2d6	2000

Artillery Barrages

Type	Dam	Acc	Special	TV Cost
Light Salvo	x12	0	AE0	50 ea
Medium Salvo	x18	0	AE1	200 ea
Heavy Salvo	x22	0	AE2	500 ea

Intelligence

Dice Reroll	1% of the Threat Value total each
Intelligence Asset	5% of the Threat Value total per item revealed

Step 4: Subplots - 8.2.4

Subplots are what makes a scenario interesting. They are complications that have to be taken into account when formulating battle plans. When purchasing Subplots, beneficial ones are applied to the buyer and the negative ones to the enemy.

Subplot Generator Table

1d6	Cinematic	Military	Unforeseen Events
1	Coordinated	Bad Intelligence	Bystanders
2	Coward	Corrupted Supplies	Friendly Fire
3	Vendetta	Leftover Ammo	MacAllen Collapse
4	The Hero	Low Priority	MacAllen Network
5	Love Shall Prevail	Malfunctions	Phantom Echoes
6	Traitor	Minefield	Tempest

Cinematic Subplots

Coordinated:	Link two friendly units. When they attack the same target, they each get a +1 on their attack roll.
Coward:	A random enemy unit falls back as soon as it is damaged. If someone with the Leadership Skill is within Comm range, he may attempt to rally the fleeing unit: the Threshold is 4.
Vendetta:	A random enemy unit hates a random friendly unit. The enemy must match speeds (Combat or Top) and attack it continuously until one of the two is destroyed.
The Hero:	A random friendly unit is piloted by a young hero. He gets one reroll per round. The second roll stands.
Love Shall Prevail:	A random enemy unit is in love with an friendly unit. It will not fire on the object of its affections under any circumstance.
Traitor:	One of the enemy works for your side. At any point during the game, the weakest unit (in TV modified by the pilot's level) is transferred to your control and remains thus for the remainder of the game.



Military Subplots

Bad Intelligence:	Once setup is finished, you may relocate up to a quarter of your forces on the playing surface.
Corrupted Supplies:	One enemy vehicle starts the game with a random Light Damage result from bad maintenance (disregard Crew results).
Leftover Ammo:	One random unit has been supplied with leftover ammunition. One die is rolled every round, immediatly after the unit's first attack: on a 4 or more, all attacks that round are duds, including the one just rolled.
Low priority:	The mission objectives are not that important to the enemy commander, and his troopers know it. The opponent applies a -2 penalty to all Leadership rolls.
Malfunctions:	One random enemy vehicle is experiencing weapon malfunctions. One action is required to clear the weapon after each Fumble.
Minefield:	An old forgotten minefield is located somewhere on the board. The Player gets a standard minefield (see page 158) and may place it anywhere in the middle of the playing surface.

Unforeseen Events Subplots

Bystanders:	A group of civilians have unwittingly wandered into the battle zone. Depending where the battle takes place, they can be impoverished nomads, or perhaps even lost tourists. They are treated as an unarmed, unqualified infantry unit, moving in a random direction every round. A penalty of one VP is deducted for every civilian killed.
Friendly Fire:	A plane, back from a mission with spare ammunition, is looking to dump it on anything resembling a target. A fighter-bomber makes an attack run centered on a random enemy unit. Any target within the attack corridor, friend or foe, is at risk.
MacAllen Collapse:	A section of the underground river network has been weakened recently, and the heavy vehicles trampling on it have completed the job. One die's worth of hexes, placed in a line, drop down one level under a random enemy vehicle.
MacAllen Tunnel:	There are tunnels nearby. You can select the entrance at any point (put a token on the opening, which anyone can now use) and move in a straight line underground until you determine an exit point (which also needs a token).
Phantom Echoes:	Depending on where the battle takes place, the phantom echoes can be mirages, swamp gases or even large animals, but they attract their share of attacks. One die is rolled after every attack: on a 5 or more, the attack hits a phantom rather than the intended target.
Tempest:	A sudden change in the atmospheric conditions heralds the formation of a tempest (see page 159 for rules). This subplot may occur only in the Badlands.

8.3 - INTEGRATED CAMPAIGNS



One of the great strengths of the **Silhouette** game system is that the game mechanics for roleplaying and tactical wargaming are based on the same basic principles and thus work together seamlessly. In fact only a change of scale separates the two — a requirement for playability — and even this is easily bridged (see *6.5.2 Integration with the Tactical System*, p. 118). It is natural for **Heavy Gear** Players to want to use both game scales in their campaigns.

Tactical gaming and roleplaying, however, are two different game forms and some thought needs to be given to a few considerations before creating a fully integrated campaign. In a roleplaying-based integrated campaign, the tactical system is used to run vehicular combats and is an important part of the game experience, but the main focus should remain about telling a story based around the Player Characters. In a tactically based campaign, on the other hand, roleplaying is used to provide a background that links various tactical encounters and expand on the options available to tactical Players. The same background can also be used to generate new scenarios. The focus remains playing tactical battles, however, and achieving a military victory.

8.3.1 - Roleplaying-Based Campaigns

In general, creating an integrated campaign focused on roleplaying is no different than creating a straight roleplaying campaign. Gamemasters should keep a few things in mind, however. Most importantly, the campaign should be action based. If tactical combat is going to be an important part of game play, there should be a good reason for it. The Player Characters should have access to military technology as well, preferably Gears. The archetypal example is a military campaign in which the PCs are Gear pilots. Other possible PC groups include smugglers, rovers, police officers (with specially modified Gears) or rebels. Because combat is an important part of an integrated campaign, it should also advance the story. Use combats to introduce new villains and to accomplish key objectives; do not throw PCs into one pointless battle after the other (unless you mean for them to rebel, of course).

Everyone participating in an integrated campaign should also realize that death is a real possibility. The tactical system is fast and deadly and sooner or later Player Characters are going to die. Encourage the Players to mark these deaths, perhaps by roleplaying a funeral or by centering stories on recovering remains or getting revenge on the killer. Players could also sketch out fall-back character who are used as NPCs until they are needed to replace a fallen soldier at which point their full stats are chosen. This makes the "new recruit" already familiar and helps encourage continuity.

◆ Setting Up Tactical Scenarios

In a roleplaying-based campaign, the story is the thing. Concepts such as Threat Value balance can be bent a little. Almost always, the Player Characters will all be on one side of a combat, with the Gamemaster controlling the opposition. This allows the Gamemaster to create much more complex scenarios with hidden units, changing orders, an overwhelming enemy or other complications. Missions to recover lost plans, find a weak spot in enemy defenses or simply patrol a ruined city can be just as exciting (even more so) than a straight search-and-destroy operation.

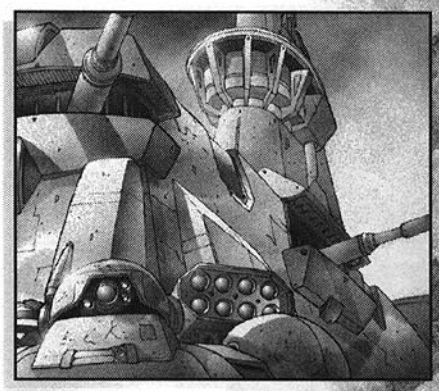
Gamemasters should be careful, however, not to go overboard with complications. Players participate in an integrated campaign because they enjoy the tactical system and too many complications may take away the thrill of fighting a tactical battle. Sending PCs into an ambush by vastly superior forces may be dramatic, but unless there's a way for them to get out of it, they'll all likely end up dead and the story will be over.

◆ Characters in Combat

Character Attributes and Skills transfer directly between the roleplaying and tactical systems, so there is very little to worry about in terms of game mechanics when the PCs enter tactical combat. The only added level of complexity is transferring crew injuries (see *Tactical/RPG Crew Injuries*, p. 118 for full guidelines). Gamemasters should remember, however, that roleplayers can and will make use of all their resources in combat, not only traditional combat skills. PCs may taunt the enemy into making an error through the comm system or keep morale high by talking green pilots through combat. The Gamemaster should reward these types of initiatives. Let the villains make mistakes even if the tactical rules don't force them to, and take morale into account (keep in mind WIL and PSY Attributes).

It is perfectly possible to have one or more PCs without a walking tank at their fingertips. In roleplaying situations, this is rarely a problem, but in tactical combat that character may have little to do. The **Silhouette** system is fast, but a tactical encounter of any complexity will still take an hour or more to play. Players will not want to do nothing during this time, so give them roles in the combat. The best solution is to design scenarios where the non-combatants PCs can have a role. If the objective is to recover stolen computer files, the hacker PC may drive to the enemy bunker to download the file while the Gear pilot PCs protect him. Another option is to give the Players other characters to control during the combat. If the PCs are aided by allied forces, allow the non-combatant Players to control them. They could also control some of the enemy forces, taking some of the pressure off the Gamemaster.

Tactically Based Campaigns - 8.3.2



By injecting some of the tools of roleplaying into a tactical campaign, **Heavy Gear** Players can create a much richer strategic experience. While Players alone can create tactical scenarios using the generator (see p. 169), the addition of a Gamemaster and Player Characters allows for greater complexity on and off the battlefield and the creation of a real campaign. The presence of a Gamemaster will also allow situations and scenarios that are not normally possible (or just harder to do), such as ambushes and secret betrayals.

Unlike in a roleplaying-centered campaign, however, the Player Characters do not form a unit *per se*. Rather they are the overall commanders of the forces confronting each other. This helps explain the power the Players themselves wield over the various units that fight under their command, and also ensure that the Player Characters are more likely to survive for the entire length of the campaign. If the PCs are sent into the field regardless, the Players should be ready to spend plenty of Emergency Dice (see page 115). The presence of actual characters on the field generally have beneficial effects on the game play — Players stop thinking of their units as little tin fighters and more in term of actual flesh and blood soldiers in fighting vehicles.

Complex Battlefield ◆

The most obvious advantage to having a Gamemaster in a tactical scenario is that he can control a whole series of factors that will make for a more exciting battle. The Gamemaster will set up the scenario itself, giving objectives and assign guidelines for forces (the Players should actually choose the forces, however). GMs can use the scenario generator for inspiration of various mission profiles and special situations, but they should feel free to introduce more personal complications. The weather can change spontaneously, new forces can arrive on the scene, mission objectives can change. One of the most powerful tools for the Gamemaster is neutral forces. By introducing units under his direct control, the GM can force the tactical Players to change their strategies and adapt to a new battlefield. What happens if both sides are sent to eliminate a nest of rovers? Will they fight it out for who should proceed, or join forces? The Gamemaster can also add hidden units, set up ambushes or minefields and all kinds of dangers without making Players aware of them, (see *6.5.2 Integration with the Tactical System*, p. 118, for more details on these systems).

Command Decisions ◆

The addition of true roleplaying will further enrich the tactical campaign. Each tactical Player should create a full character who will be the overall commander of the forces clashing. Generally, this will be a Colonel (North) or Commandant (South) in command of a regiment, but other ranks and positions are possible based on the campaign premise. Between tactical scenarios, the Gamemaster can run quick roleplaying sessions in which each Player can set out his strategy and goals. At its most basic level this involves taking each Player aside and presenting him with the strategic situation and the resources available and ask for his next move. Levels of complexity can be added by allowing them to gather intelligence from spies or satellite imagery, gain resources from high command (new units, air strikes, etc.). The relationship with high command and other units should be roleplayed, and Tactics, Bureaucracy and Leadership rolls should be made to obtain resources. Make opposed rolls between competing Player Characters when they try to guess each other's tactics or in other similar situations.

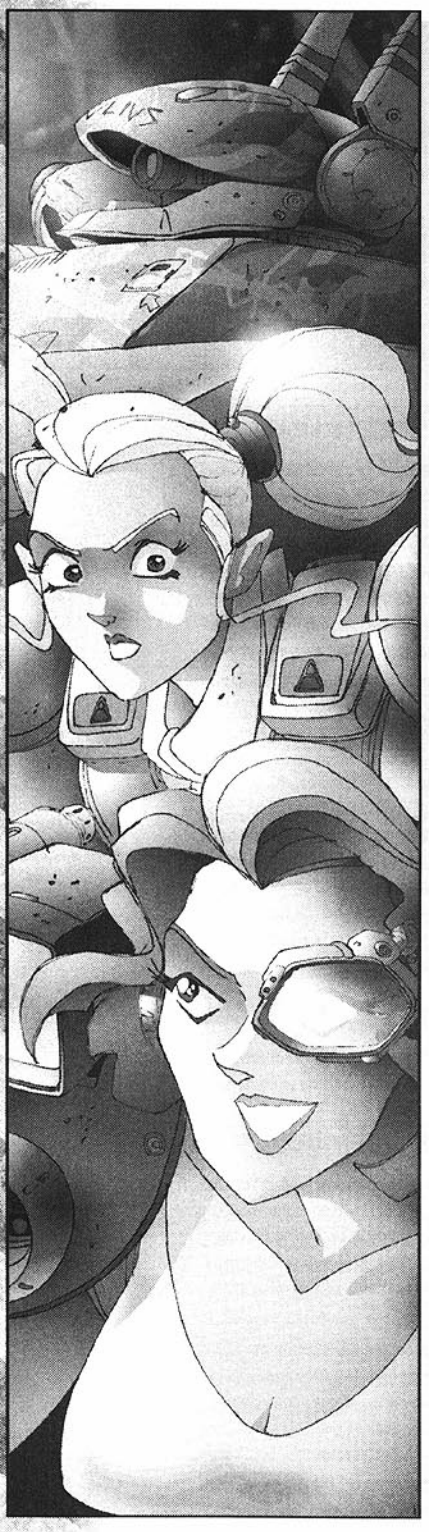
Gamemasters can also create subplots for each PC, such as a morale problem in a specific unit, or political opponents in high command. These should not be crippling problems (unless they are equally crippling to both sides) but they should add to the tactical situation. In a scenario, the troublesome unit could balk at commands or be targeted by the enemy, for example.

Dynamic Scenario Linkage ◆

Because a Gamemaster can take into account battlefield results and command decisions, he can create a truly dynamic and dramatic campaign. Instead of agreeing on a series of linked scenarios as in a Player-only campaign, in this case Players can portray commanders in a series of battles that evolve with events. The Gamemaster becomes responsible for creating (often in cooperation with the Players) the overall battle conditions (is it a long assault into enemy territory, a battle over a key Badlands resource, a duel between mighty landships?) and then establishes how the battle will evolve. The GM needs only to define what resources are available to the PCs overall and the opening situation, and then create scenarios as things progress.

The first scenario should set the pace and the following scenarios should evolve from its outcome and the command decisions of the two Players. If the first scenario is a Southern raid on a Northern outpost and ends with the attackers being repelled, the GM should have a roleplaying session to see what the commanders' reactions will be. The Northern commander might decide to send out scout parties to find enemy positions, while the Southern Player decides to call for an air strike on the Northern base to weaken the defenses. The next two scenarios might then be a Northern recon of a Southern encampment, and a second Southern attack in the ruins of a Northern base. The Gamemaster can add other events to further guide the campaign, such as rovers raiding the ruined base for supplies or a spy bringing secret files to the Northern commander.

RUMOR MILL



"So how was your date with Lussian?" Katja Sez asked as she removed the omnicamera covering off of Miranda Petite's Spitting Cobra fire support Gear.

"It was not a date!" The young pilot was standing on the tech bay's ferroconcrete floor, looking up at Katja while she worked on a mobile lift platform. "I don't date fellow soldiers. Ever."

"Of course not." Katja smiled to herself. Miranda's crush on fellow ace Lussian Salban was so obvious that everyone on base knew about it — except for Miranda and Lussian, of course. She was so cute.

Katja changed a circuit inside the omnicamera system that had been damaged by a stray autocannon shot and replaced the lens. She patted the armored casing of the sensor head where Miranda had scrawled "Julius" — her nickname for the machine. Unlike most other pilots in the MILICIA's Special Intervention Unit, Miranda actually cared about her Gear. Maybe that's why Katja liked her so much.

"So," she called down as she worked, "I hear tell he took you out for a romantic dinner. Roasted hopper was it?"

Miranda and Lussian had spent two days and nights in the Badlands hunting a bandit ring. They had lived off military rations — less than appealing food.

"What? Listen Katja I don't care what you heard, nothing happened. How could you even think that I would do anything with that guy?"

Katja lowered the lift down to the level of the Spit's torso and popped the cockpit hatch. "I don't know, Miranda. Maybe it was Lyle telling me he found you two snuggled up in a tent when he came to pick you out of the desert." Katja almost suppressed a laugh; almost. "He said you looked adorable."

"What? I'm going to kill him, for Gropius' sake!" Miranda was really fuming now. "We were conserving body heat. It's not my fault the heater in my Gear failed. Don't you know anything about desert survival?"

Katja checked the diagnostic readout in the cockpit before answering. "Not as much as you, bunny."

"That's it, Sez!" Miranda's girlish face was flush with consternation and locked in a serious grimace, but her bright green pig-tails made her less than intimidating. "Just because you're older than I am doesn't mean you can treat me like this. Everyone on base knows you're looking for an officer to hitch up with, so don't go displacing your little immature notions on me. I'm here because it's my duty, not to meet guys. Unlike some people. Do you understand me, Sous-Caporal?"

"Yes, Sergent." Katja struggled to keep a straight face. "Julius is all fixed. But—"

"What is it now?"

"The heater is working just fine and the NNet log doesn't show any malfunction. Are you sure you two really *needed* to share a tent?"

Miranda just stood there for a second, blinking is stupefaction. She tried to answer but all she could manage was a hesitant mumble. Before she made matters worse, she turned and left. Her pig-tails bopped up and down with every angry, embarrassed step.

Katja sat down and laughed to her heart's content; the bay resonated with her hysterics. She had to fight to regain her composure when she heard the main door open again. It was Lussian coming in to look at his Iguana. She caught him smiling toward Miranda's Gear before he noticed her. This was going to be a *lot* of fun.

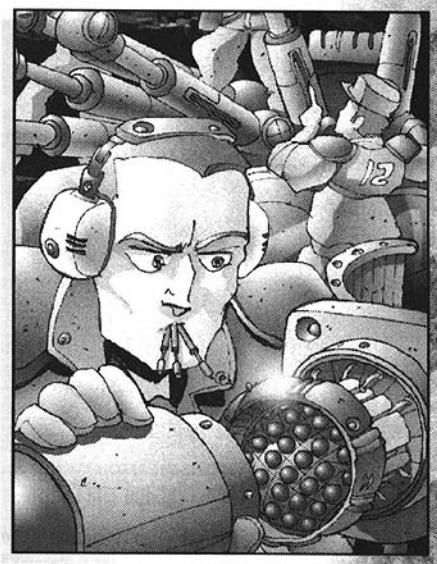
TECHNOLOGY AND TACTICS - 9.1

The first centuries of the third millennium brought forth incredible advances in all of the major scientific fields. Computers were faster, material sturdier, weapons deadlier. However, the numerous armed conflicts of the third and fourth millenniums demonstrated that although high tech equipment often turned the tide of war, victory lay with the side that could afford to exhaust its enemy's capacity to fight and hold onto conquered territories. This caused a general stabilization of the level of technology used in wars, with new developments made horizontally, in already known fields instead of emerging new ones.

If one side could afford to field ten tanks for the price of one of their enemy's design, it did not matter if the tanks were slightly inferior: they would overwhelm the enemy by sheer numbers as long as they were reasonably well designed and, most of all, well used. Another consideration was the ease of building cheap weapons able to defeat multi-million dollar vehicles in one shot, such as the infamous infantry hand-held "tank-killer" missile launchers.

With the advent of interplanetary conflicts, logistics became a supply officer's nightmare. More than once, military forces had to use whatever was available to them instead of the advanced tools and equipment designed and produced in faraway locations.

One last important factor in the stabilization of the technology of war was a vehicle's ease of maintenance. A point was reached where a multi-million dollar weapon could fail because of a grain of dust in one critical circuit. Designs gradually reverted to simplified, modular forms that could withstand a lot of punishment, required minimal maintenance and could be used continuously without breaking down all the time.



Weapon Technology

Vehicle-mounted weaponry is predominantly projectile based. Not only is it efficient and simple to build and maintain, it can take an enormous amount of punishment before breaking down thanks to the advanced materials used in its construction. High tech weapons such as lasers, electromagnetic railguns and particle accelerators are not considered advanced anymore, but the denomination has stuck. These weapons are rarely carried by ground units because their large energy and maintenance requirements prevent their efficient use by field units. Space-borne units are a different matter altogether — advanced weaponry being far more effective in space.

Modern weapons can use a variety of sophisticated ammunition ranging from guided shells to self-propelled rockets. They are also capable of firing simpler ammunition to facilitate resupply in the field.

Defensive Technology

Over the centuries, a variety of material has been used to protect a soldier and his equipment from enemy fire. With the power of today's weapons, nothing less than an advanced composite layered armor material will do. Composite armor, however, while very advanced, is also costly and hard to repair. That is why many noncombatant vehicles such as supply trucks are armored with simple rolled armor-grade molecular steel, which, while not as strong, is far easier to manufacture and repair.

Most vehicles are completely without armor; any weapon hit will most likely directly affect their structure and cause damage. The next step is armor-grade steel, a high quality steel alloy rolled and tempered for maximum resistance. This is the basic material used in weapon penetration tests. Front-line combat units are most likely to be equipped with the best armor composite material. The density and weight of these composites vary immensely, as do their capacities. Some are treated for resilience, others add ceramic layers for heat resistance. Modern vehicular armor is only a few centimeters thick and is very light considering the protection it can offer.

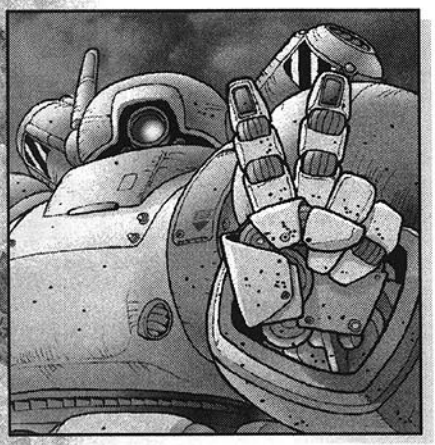
Aerial Warfare

Aircraft are relatively uncommon on Terra Nova, simply because the weather is unpredictable and dangerous. Short flights between polar locations are fine, but voyages across the Badlands pit aircraft against strong heat-generated convection winds, not to mention the occasional tempest which is sure to bring down a plane. Ground and sub-orbital travel is safer and more efficient. The vehicles most often seen by grunts on the ground are the support and transport vehicles. Choppers and hoppers (vectored thrust aerodynes) are used for close support and anti-vehicular duties.

Naval Warfare

Naval warfare is practically nonexistent on Terra Nova. All water bodies are small and landlocked, which means that boats are practically useless for attacking the enemy. Both the CNCS and the AST maintain a small fleet of naval hovercraft, but they exist mostly for civil patrol duty.

9.2 - HEAVY GEARS



Heavy Gears are one of the most significant advances in the field of military technology in the past millennium. Although combat walkers were used as far back as the early third millennium, they were always cumbersome and too easily targetted enough to survive the high tech battlefield, relegating them to support and engineering duties. This changed with the development of the Heavy Gear.

The Battle of Pioneer of TN 1669, during which the Northern Lights Confederacy and Western Frontier Protectorate tried to put an end to expansionism on the part of the United Mercantile Federation, saw the birth of the combat walker on Terra Nova. Heavy Gears (often called Gears or HGs for short) have participated in every major conflict on the planet since then. They played an especially critical role in the War of the Alliance, when combined Terranovan forces defeated the invading Colonial Expeditionary Force from Earth. Tacticians point out, however, that Gears still depend on support from infantry, heavy armor, artillery and air support — they are not invincible super-weapons.

The Gear is actually a compromise between an infantryman's flexibility and an armored vehicle's resilience and firepower. It is, in effect, a one-man IFV (Infantry Fighting Vehicle) which protects the soldier and allows him to carry far more payload and armor than an ordinary soldier. Mass-produced, Gears are cheap enough to form a major part of the modern army. They are extensively covered in the first volumes of the **Vehicle Compendiums** series (**North 1** and **South 1**) and in the **Technical Manual.**

◆ Cockpit and Controls

All Gears can carry one man in a cockpit located in the torso. Because of the space required by the machine's internal mechanisms, all Gear cockpits are renowned for their cramped conditions, some even putting limitations on the size of the pilot. A sturdy seat, reminiscent of the ones found in airplanes, occupies the center of the chest cavity. The space under and behind the seat is used for electronic systems, which leaves no room for an ejection mechanism.

The configuration of the instruments depends on the designers of the machine. All are equipped with two joysticks and two foot pedals, but buttons and readouts vary immensely, even between variants of the same model. The joysticks are fairly complex, sporting several thumb switches as well as finger-activated triggers. Combinations of switch, trigger and stick movements are converted into body motion routines called Macromoves (or simply "Macros") by the CPU, much like a combat video game. Depending on the complexity of the Gear model and its agility, the joystick can be laden with gadgets and additional controls of all sort.

Early Gear designs had holographic screens and HUD to display battle information. Newer models use Virtual Reality technology instead. With special laser-crystal screens mounted inside a slightly enlarged helmet, the VR system relays information treated by the CPU and its visual sub-processor to the pilot. For all intents and purposes, the trooper can see as if the cockpit were open to the outside. Relevant tactical and battle readouts are superimposed over the landscape by order of priority. Small movement indicators and ID tags enable the pilot to keep track of many targets and can even identify mission objectives. Ranges are indicated beside items, although this option can be modified or deactivated to reduce the visual clutter.

◆ Central Processing Unit

The "brain" of the Gear is the Central Processing Unit, or CPU for short. It is a small, semi-transparent cube (15 cm^3) filled with an intricate molecule-sized neural network. This network is so complex it cannot be repaired if damaged and must be replaced by a new unit. It is encased in a special shockproof polymer or composite case which is normally installed under the pilot seat. It can be easily removed by reaching under the seat and releasing the connections and is always the first piece of equipment salvaged when a Gear is destroyed or damaged beyond repair.

The CPU's neural network is able to learn and establish new connections within itself. This allows non-linear logic processing, as new parallel paths are created to handle computing tasks. This ability for "fuzzy," or open-ended, logic makes the CPU much better at handling the complex body motions of the humanoid Gear it controls than other "standard" neural network/computers. A standard Gear CPU is not self-aware, although it often gives the illusion that it is.

◆ Sensor System

Gears carry a variety of sensor systems to allow the CPU to relate to its environment and help the pilot in battle. Since Gears are supposed to be inexpensive and easy to maintain, most designs have only a minimal sensor package. The primary sensor system is a small cluster of digital omnicameras, often placed together in what could pass as the Gear's head. Most models use only one main camera, relying on laser rangefinders and "dumb" stereoscopic cameras for range and depth measurements.

The information so gathered is first processed by the CPU's visual sub-processor, colloquially called "ViSup," "Eyebrain," "Vision Chip" or a multitude of other slang terms depending on the technician in charge. The CPU then combines this information with that from the other sensory systems and uses it all to maintain the Gear's balance and perform the action required by the pilot.

Powerplant

Most Gears use an advanced, very compact, internal combustion engine called a V-engine. Based on designs created at the University of Colorado in the late years of the twentieth century, the V-engine (so named because of its shape) is a twin drive, air-cooled, highly efficient powerplant with minimal moving parts.

The core of the V-engine is a support axle made out of high-strength alloy steel. It is truly only a bent bar of metal and is the strongest part of the engine. Two combustion chambers are slipped over this support axle. These chambers, thanks to their peculiar internal shape, serve as piston housing, distributor cap, lubrication system, and cooling fan — all in one. The engine configuration thus provides two drive shafts, each delivering equal horsepower. The end result is a fairly compact engine which is rugged, easy to manufacture, and easy to repair. The V-engine's ability to run on a variety of fuels (as long as the fuel employed is gaseous or liquid and is reasonably combustible) and its small number of moving parts make it perfectly suited for Gears.

A few rare Gears models are powered by electrical engines fed by a bank of ambient-temperature superconductive coils. However, the high cost of such a system and its inherent limitations makes it unpopular except in specialized stealth units or as a backup system. The short operation range is also a problem which has yet to be solved.

Transmission

Transmission is a catch-all term covering the various pistons and motors that move the machine around. All Gears use a combination of hydraulic and electrical power to move their limbs. Hydraulic systems can generate linear movement through the use of pistons and torsion movement through a modified circular piston called a rotor. Rotors can have a finite or infinite angular travel and can reverse the movement simply by inverting the fluid supply. Gears use both types of actuators.

The hydraulic system is fed by one main pump connected to the engine through a computer-controlled gearbox to maximize efficiency. The second drive shaft of the engine is used for an electrical generator that powers booster pumps placed in the lower body. Since the pump and the generator extend above the shoulders of the Gear, they are heavily armored. Valves, overflow reservoirs and heat exchangers are also part of the circuit and are attached to the basic frame of the Gear. The fluid used to transmit the motive power is a highly advanced polymer compound which is much better than oil for transmitting load. It is distributed throughout the Gear's body by feed lines made of duraplast, a composite plastic that can contain high pressures.

Secondary Movement System

Many Gears have more than one transmission system. This Secondary Movement System, or SMS for short, usually takes the form of wheels or treads placed under the feet of the machine. Although the basic concept may sound ridiculous, one cannot deny the immense increase in speed and efficiency, not to mention versatility, this bring to the Heavy Gear weapon system.

Most often, the wheels (or treads) use small electric motors powered by a generator attached to one of the V-engine's drive shafts. Special software built into the CPU changes the equilibrium equations to handle high speed "skating" motions. This function can be retrofitted, but is usually less efficient than a built-in software. Because of the low ground clearance of the wheels, the SMS is only useful on flat, hard ground like packed sand or concrete. Some SMS have larger wheels which can be used over broken terrain, but the price of this increased versatility is a bigger, thus more vulnerable, movement system.

Weapons

Gears are rarely designed with built-in weaponry. Its humanoid shape, complete with grasping manipulators, makes the Gear a very versatile tool which can support a variety of offensive systems. Nonetheless, it is an accepted practice to standardize a Gear's armament for ease of maintenance, going as far as altering the unit's identification code to reflect its current payload.

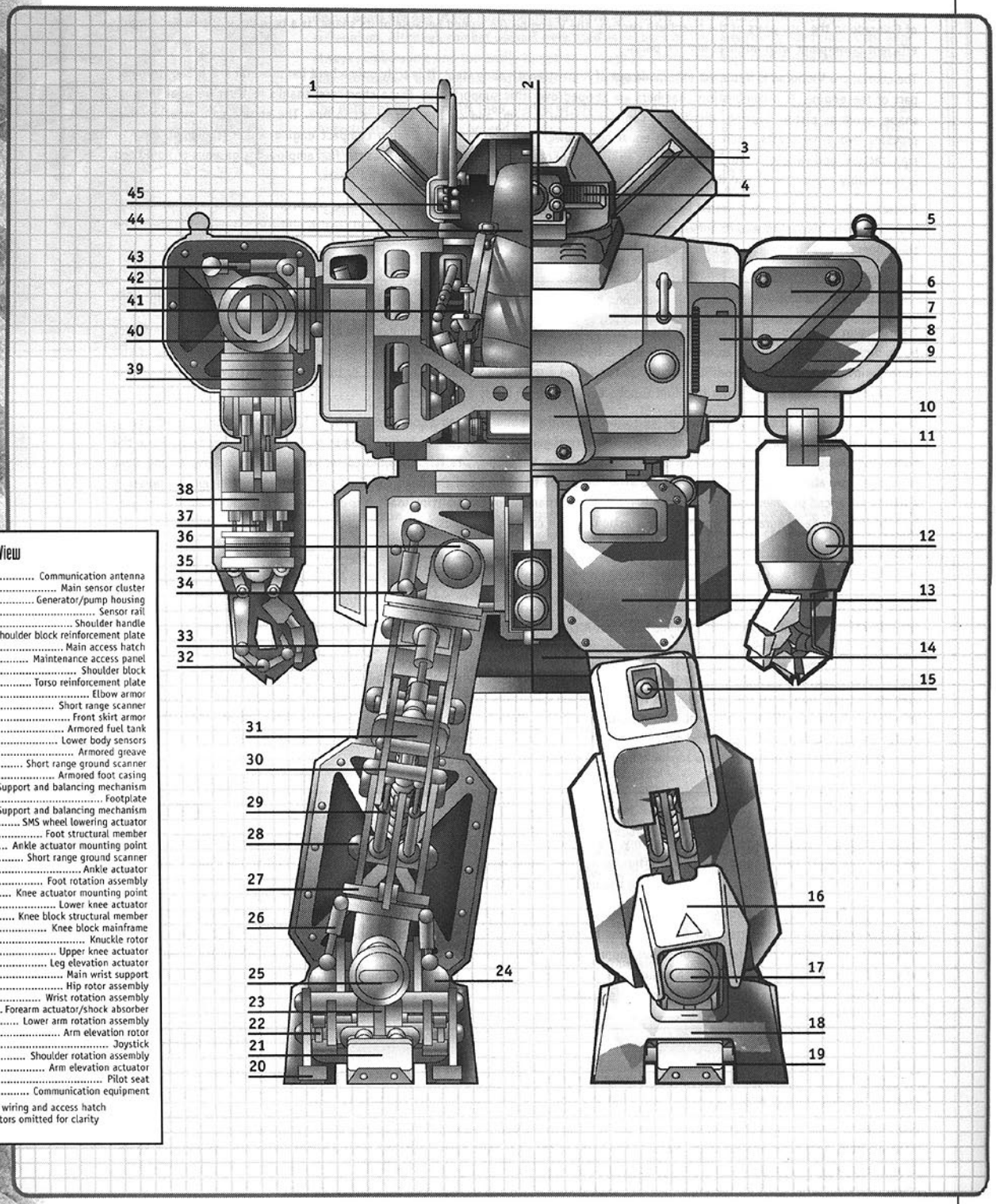
The typical Gear armament consists of one main weapon, usually hand-held in a rifle or pistol-like form. Rapid-firing, self-loading projectile weapons are preferred. All Gears possess hardpoints on various parts of their body to accept additional equipment and armament. This often takes the form of either support items (smoke launchers, ECM generators, etc.) or a limited use, hard hitting weapon for a one-shot-kill capacity such as an unguided rocket pack. This equipment can be simply bolted on, with control and power wiring being routed either through the armor or alongside it.

Armor

The average Gear carries several centimeters of composite armor. This affords them the same general level of protection as an armored infantry fighting vehicle, which is more or less what the Gear is: a one-man Infantry Fighting Vehicle.

Gears use the same composite armor as all other war vehicles in the 62nd Century. Unfortunately, their humanoid shape, so versatile and maneuverable, here plays against them. Because the limbs of the Gear must have flexibility, mobile armor plates are unavoidable. Some clearance is necessary, meaning that one cannot just heap on plates or simply add on thickness. All this reduces the potential stopping power of the material used for the armor, leaving weak points which can be exploited by a skilled gunner.

Hunter Cutaway

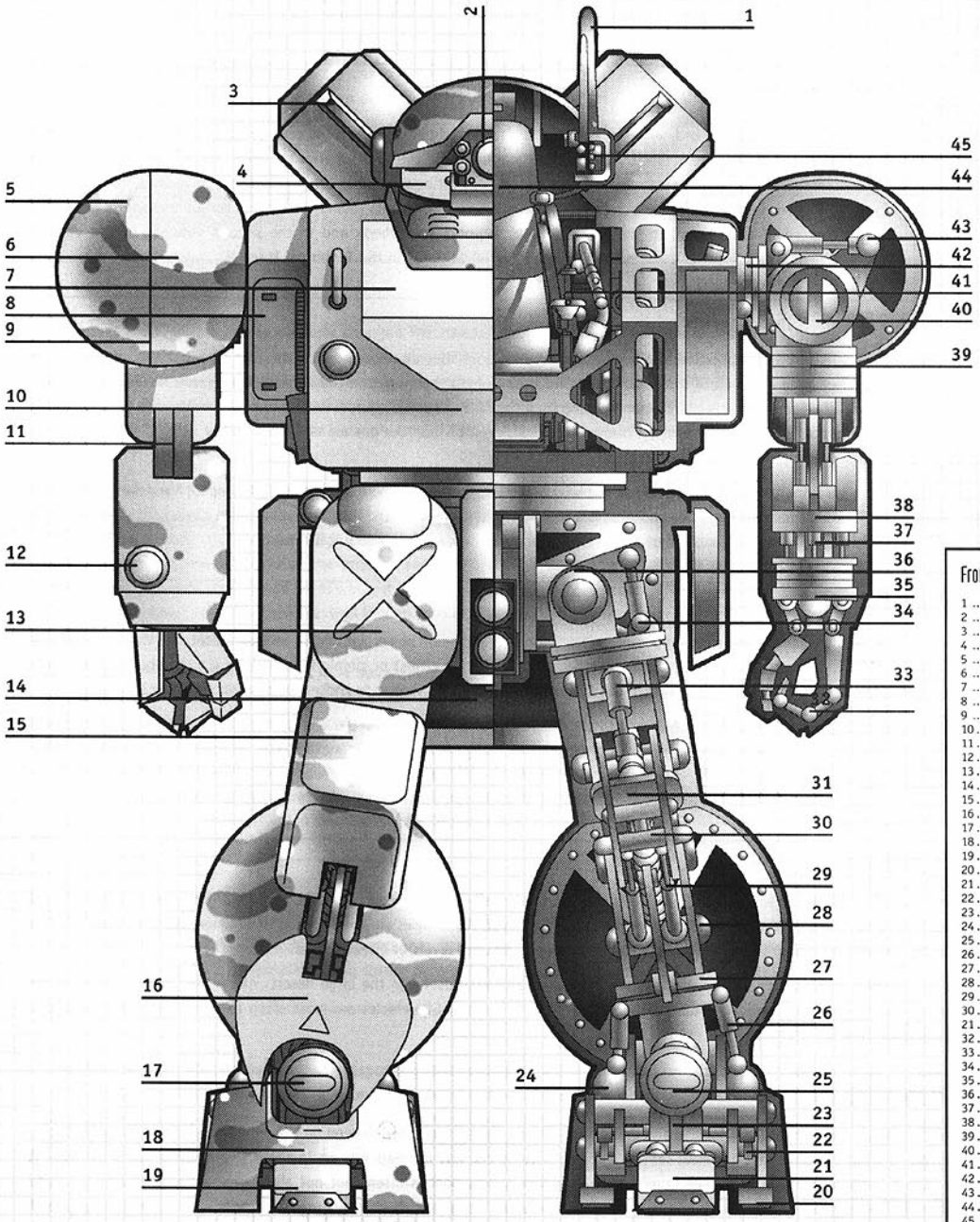


Front View

1 ..... Communication antenna
2 ..... Main sensor cluster
3 ..... Generator/pump housing
4 ..... Sensor rail
5 ..... Shoulder handle
6 ... Shoulder block reinforcement plate
7 ..... Main access hatch
8 ..... Maintenance access panel
9 ..... Shoulder block
10 ..... Torso reinforcement plate
11 ..... Elbow armor
12 ..... Short range scanner
13 ..... Front skirt armor
14 ..... Armored fuel tank
15 ..... Lower body sensors
16 ..... Armored greave
17 ..... Short range ground scanner
18 ..... Armored foot casing
19 ... Support and balancing mechanism
20 ..... Footplate
21 ... Support and balancing mechanism
22 ..... SMS wheel lowering actuator
23 ..... Foot structural member
24 ..... Ankle actuator mounting point
25 ..... Short range ground scanner
26 ..... Ankle actuator
27 ..... Foot rotation assembly
28 ..... Knee actuator mounting point
29 ..... Lower knee actuator
30 ..... Knee block structural member
21 ..... Knee block mainframe
32 ..... Knuckle rotor
33 ..... Upper knee actuator
34 ..... Leg elevation actuator
35 ..... Main wrist support
36 ..... Hip rotor assembly
37 ..... Wrist rotation assembly
38 ..... Forearm actuator/shock absorber
39 ..... Lower arm rotation assembly
40 ..... Arm elevation rotor
41 ..... Joystick
42 ..... Shoulder rotation assembly
43 ..... Arm elevation actuator
44 ..... Pilot seat
45 ..... Communication equipment

Note: wiring and access hatch actuators omitted for clarity

Jäger Cutaway



Front View

1 ..... Communication antenna
2 ..... Main sensor cluster
3 ..... Generator/pump housing
4 ..... Sensor rail
5 ..... External shoulder armor plating
6 ..... Internal shoulder armor plating
7 ..... Main access hatch
8 ..... Maintenance access panel
9 ..... Shoulder armor joint
10 ..... Torso reinforcement plate
11 ..... Elbow armor
12 ..... Short range scanner
13 ..... Front skirt armor
14 ..... Armored fuel tank
15 ..... Lower body sensors
16 ..... Armored greave
17 ..... Short range ground scanner
18 ..... Armored foot casing
19 ... Support and balancing mechanism
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42 ..... Shoulder rotation assembly
43 ..... Arm elevation actuator
44 ..... Pilot seat
45 ..... Communication equipment

Note: wiring and access hatch actuators omitted for clarity

9.3 - CONVENTIONAL VEHICLES

The vehicles used by the Terranovans range from extremely primitive internal combustion buggies for farm transport right up to slick computer-driven polymer-skinned interceptors. Despite the ready availability of highly advanced vehicle types such as walkers (both Gears and striders) and fusion-powered spacecraft, it is often simpler (and cheaper) to rely on conventional vehicles for more mundane tasks. Certain functions are also simply better fulfilled by systems that have been known and used for millennia, such as the armored tread system of battle tanks.

9.3.1 - Ground Vehicles

Conventional ground vehicles, either tracked, wheeled, or hover, are still widely used in the 62nd century. They are cheaper, sturdier and easier to maintain than the complex walker mechanisms. Unfortunately, while they are superior on open terrain, they fare poorly on broken or difficult ground. This has led to a specialization of sorts: conventional vehicles are widely used for assault, transport and support duty while the walkers are used either as powerful, highly mobile infantry units (Gears), or broken terrain transports (striders). Ground vehicles are covered in more detail in the **Tactical Field Support** sourcebook and in the second volumes of the **Vehicle Compendium** series (**North 2** and **South 2**). There are also a few technical notes in the **Technical Manual.**

◆ Cockpits and Sensors

Most vehicles do not feature the sophisticated VR setup of Gears because they do not need it. Either the crew has the means to look directly outside or they have a complete computer generated HUD to help them operate the vehicle. Most tanks have a holographic display which is actually easier to use and less cumbersome than the Gear-mounted equipment. Sensory information is acquired using small sensor pods mounted on the turret or main body. In general, even civilian designs are equipped with a least of minimal sensor suite for safety purposes (night driving, for example).

The internal design vary enormously from vehicle to vehicle. Some are spacious, others are extremely cramped. Unless the vehicle is open-topped, the combat chamber of all Terranovan vehicles is airtight to prevent the intrusion of harmful gases and other airborne particles. Most vehicles make do with a basic overpressure system, not bothering to add full life support.

◆ Powerplant

Vehicles are powered by a variety of means depending on their function. Common powerplant types include diesel, gas turbine, V-engine and electric. Most civilian vehicles are powered by electric motors (in large cities) or simple fuel engines (in the countryside) while military ones rely most often on advanced ceramic gas turbines and V-engines similar to those mounted on Gears and striders.

Hybrid setups are also in use. Two or more powerplants of different types are mounted in the vehicle in order to gain the advantages of both. For example, a gas turbine may be used to generate the electricity required by the motors that actually drive the wheels. This allows the turbine to run at the most efficient regime at all time for the best possible fuel consumption, while the electrical banks can be recharged for a variety of means. The end result is a vehicle that can run on almost any power source or fuel available.

◆ Transmission

The great majority of fighting vehicles on Terra Nova are mounted on all-terrain wheels or treads. Though an extensive system of road is in place, Terra Nova is still very much an untamed planet, and off-road capabilities are not a luxury. In addition, many tracked vehicles are also capable of running on their road wheels alone, though at reduced levels of effectiveness.

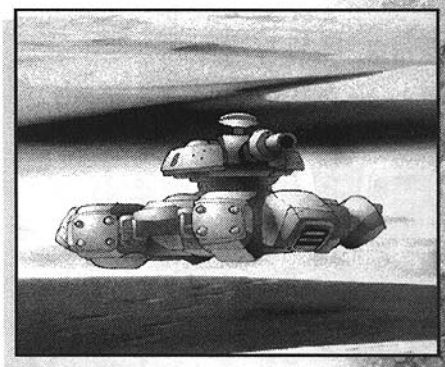
Ground effect vehicles (GEV) are also in use, but are more rare. Although useful in the large deserts of the Badlands, they have the unfortunate tendency to kick up lots of dust and thus are hard to conceal. GE vehicles are most often used for quick transportation between border towns.

◆ Weapons and Armor

Vehicles can carry a large variety of offensive and defensive systems. The systems used depend on the vehicle's origin and intended role. For example, a scout car will boast powerful sensors but very little in the way of weaponry, while a MBT (Main Battle Tank) will almost always have a large caliber gun or missile launcher. The weapon complement is often (but not always) based around a single large weapon system (the "primary") and back-up armament for unexpected situations. Most front-line combat units also carry some type of light laser armament (or other high accuracy weapon) for anti-aircraft defense, reducing the reliance on dedicated AA assets and the importance of air superiority.

Ground vehicles generally rely more on armor than any other type of defense. Armor configurations may vary from simple plates of steel bolted onto the sides to a layered composite shell with ablative panels. Only a few vehicles carry active defensive measures, such as anti-missile systems.

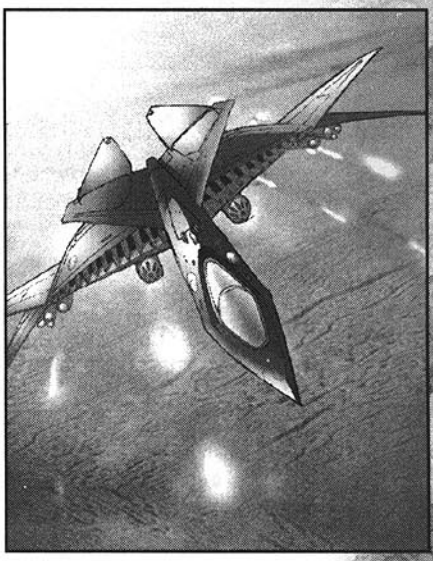
Hovertanks



Hovertanks are a special breed: a hybrid between a conventional tank, a ground effect vehicle and a VTOL. When Earth attempted to invade Terra Nova in TN 1913, the military forces of Terra Nova were confronted to them for the first time. Early reports from scouts led Terranovan generals to think that Earth had mastered the science of anti-gravity during the many years of separation. The confusion was easy to understand since they saw tanks without treads dropping out of aircraft and shuttles and floating to the ground. Fortunately for the defenders, this was not the case.

The hovertanks were Earth's answer to the unknown conditions they would face on the colony planets. A standard tank chassis is mounted on powerful turbofans, similar to those used in VTOL vehicles. The thrust produced is channeled through articulated nozzles, allowing a maneuverability not found on normal ground effect vehicles. Although the engines are powerful enough to physically lift the tank, the machine usually rides on a cushion of air created underneath its body by ground effect, using the extra power only to "jump" obstacles. Highly mobile and powerfully armed, they proved a dangerous (if outnumbered) adversary to the Terranovan defenders.

Aircraft - 9.3.2



The development of aircraft completely changed the rules previously acquired over millennia of ground warfare. Armies no longer had to smash through enemy fortifications, they could simply land troops behind the front. Likewise, cities were now a preferred target as bombers flew high above defensive positions to rain death upon the civilian population. Air superiority was of paramount importance, and new types of aircraft were constantly being designed to meet the technological advances of neighboring countries.

The advent of powerful yet practical energy weapons, such as the battlefield laser, brought an effective end to the concept of "air superiority." If a target could be seen, it could be hit at the speed of light, and no aircraft could carry enough armor to be able to survive long enough to be effective. Although stealth systems alleviated the problem somewhat, the concept of air superiority rapidly declined over the centuries, to the point where it would be called simply "air support." Most military flyers are now slow, yet agile, vehicles, well hidden from enemy sensors by flying low to the ground or using complex stealth devices.

Long-range aircraft are uncommon on Terra Nova, simply because the weather is often unpredictable and dangerous. Short flights between cities in close proximity are common, but long voyages, especially across the Badlands, pit aircraft against strong heat-generated convection winds, not to mention the occasional tempest. In general, ground travel is safer and much more efficient, and is thus preferred. Support and transport aircraft are those most often seen by grunts on the ground. Choppers and hoppers (vectored thrust aerodynes) are used for close support and anti-vehicular duties. Aircraft are covered in more detail in the **Tactical Air Support** sourcebook.

Cockpits and Sensors

Aircraft crew generally have the means to look directly outside or they have a complete computer generated HUD to help them operate the vehicle. Most combat aircraft have a holographic display that superimposes the flight information on the pilot's field of vision. Sensory information is acquired using small sensor pods mounted on the wings and main body.

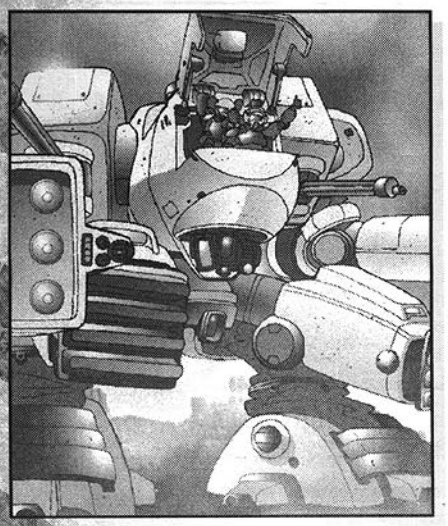
Powerplant and Transmission

Aircraft are powered by a variety of means depending on their type and intended function. The high efficiency ceramic turbines and jet engines used by military flyers burn a potent fuel generated by complex chemical synthesis. These sophisticated engines are also capable of burning more conventional fuel such as petroleum derivatives, though at reduced efficiency and with smoke emissions. Some rare civilian aircraft use electric powerplants to drive large propellers.

Weapons and Armor

Aircraft can carry a large variety of offensive and defensive systems, the nature of which depends entirely on the vehicle's origin and intended role. Most military flyers carry a complement of versatile missiles that can be used both against ground and air targets. Many aircraft also have centerline-mounted rapid-fire cannons or lasers as backup weaponry, and additional direct fire weapons can also be mounted in modular pods. Aircraft rarely rely on armor for protection, though reinforced composite plates are often added to ground support flyers. Speed and maneuverability are much more efficient from a mass standpoint.

9.4 - Striders



"Strider" is the catch-all term used to designate non-humanoid weapon platforms that use legs for locomotion. The term is, of course, derived from the striding motion of the machine's legs. While related to them both in form and technology, striders are more specialized units than Gears and lack their versatility. They carry more payload since they are usually bigger, but this has the unfortunate side-effect of making them easier to spot. Their size also precludes any kind of advanced maneuvering.

Striders have two to six legs and are equipped with large foot plates. This enables them to carry a heavier payload since there is more surface area to ensure stability and to distribute the weight onto the ground. A few smaller models have only two legs, but the enlarged feet are retained, often with articulated claws. Arms and manipulators are rarely used, and weapons are generally mounted on hull hardpoints and turrets.

Striders come into their own on rough terrain because their walker systems allow them to go where many traditional tanks and armored vehicles cannot. During the War of the Alliance, this allowed the Terranovan defenders to bring artillery support into the mountains of the Badlands. In the South, amphibious striders are used in jungles and swamps. Some striders, like the Southern Naga, feature a secondary wheeled movement system, but this is a rare feature.

Striders are covered in more detail in the **Tactical Field Support** sourcebook and in the first volumes of the **Vehicle Compendium** series (**North 1** and **South 1**). A few technical notes and sketches can also be found in the **Technical Manual.**

◆ Cockpits and Sensors

Smaller striders have helicopter-type cockpits, with the crewmen placed one behind the other. Larger models are closer to tanks with a central crew compartment and several hatches for access. Otherwise, the rest of the equipment is very similar to that found in the cockpit of Gears. Often, large screens are used instead of the expensive VR helmet apparatus.

As might be expected, the sensor system is slightly more sophisticated, with better radar and long-range communication capabilities available than for the average Gear. Striders are sometimes used as battle coordinators or artillery vehicles, and the electronics carried varies with the design and the intended mission profile.

◆ Powerplant

A larger version of the V-engine has been developed for bigger vehicles, and it is used for striders as well. Sometimes, several V-engines are hooked together to provide increased power and redundancy. Diesel engines are also a viable alternative, as are high capacity batteries (though this greatly limits the deployment range). Some striders use gas turbines to drive turbo-alternators that provide energy to the various pumps and drive systems distributed throughout the strider's frame.

Secondary engines are often used in the lower body or limbs to provide additional power to the booster pumps located there. These secondary engines are generally electrical and powered by banks of superconducting batteries which are recharged from the vehicle's main powerplant during lulls in the fighting.

◆ Transmission

Striders use the same general transmission system as their smaller walker brethren. The internal layout of the actuators is slightly different because the ranges of movement are not quite the same. The moment arms are slightly longer and multi-jointed articulations are often a necessity. The structure itself is thicker and more massive in order to handle the stress caused by the weight of the machine and the significant impact of each footstep.

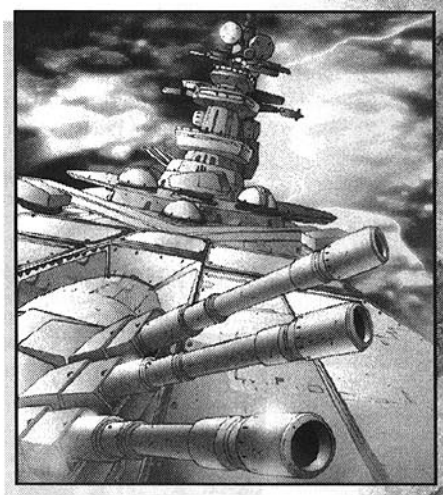
Actuators are larger and more powerful versions of the ones used in construction machinery. They are a clever compromise between raw power and operating speed, providing just the right mix for optimal movement.

◆ Weapons and Armor

Because they are inherently more stable platforms than Gears, striders are able to carry heavier weapons and armor. Striders are commonly used as artillery carriers in densely wooded or broken regions where a tracked or wheeled carrier would quickly bog down. Long range missiles, mortars and other ballistic weapons jut from shoulder, arm and back hardpoints.

Antipersonnel weaponry is a must on any strider. Their bulk and slow speed make them ideal targets for marauding infantry units. Likewise, most of their weapons are long-range in order to avoid close range confrontations with other units. Assault striders are an exception to this: these specialized units feature awesome armor and short range weapons and are used for close environment fighting.

LANDSHIPS - 9.5



Terranovan landships are quite a sight to behold. They form the planet's wet navy equivalent, because they are best described as land-going ships, bristling with weapons. Using a combination of magnetic repulsion and ground effect technologies, these behemoths glide above the sandy surface of the Badlands, patrolling them as they would oceans. Whereas rapid troop movements and raids are normally made via sub-orbital transports, landships provide not only long range transport capabilities but a support base right at the front line for more extended operations.

Landships are extremely costly to build and each league can field only a limited number of ships. Several were lost to orbital bombardment during the early days of the War of the Alliance. Moreover, their maintenance costs, sheer bulk and slow speed prevent them from being used in any military operation but border defense and full frontal war.

During a conflict (be it a war of a major punitive campaign), landships are deployed in fleets. These group together one or more capital ships (carriers or heavy cruisers) along with a variety of escort vessels (destroyers, corvettes, escort carriers, etc.). These fleets are a sight to behold and can usually punch through almost any defense.

Landships will be covered in more details in a future sourcebook. The **New Breed: Battle Before the Storm** campaign sourcebook also offers much information on life aboard landships as well as stats and deck plans for two of them.

Cockpits and Sensors

Landships do not have cockpits, but bridges. The internal layout is very similar to the naval surface vessels of Earth's past, with navigation, sensor, weapon and command crew stations all grouped together in an armored conning tower. Many landships also feature an observation deck equipped with long range sensors and telescopes. It is usually located high in the conning tower, just underneath the tree-like structure of the main antenna array.

Each crew station is equipped with holographic array and customizable control panels for maximum operational efficiency. With the proper command code authorization, one crew station can take over any of the others for improved redundancy. The commanding officer sits on a raised chair overlooking the bridge. From this position, he can override any of the crew stations or transfer key functions to other stations.

Powerplant

Most large landships are built around one or more fusion generators, as their magnetic repulsor coils and immense turbines require an enormous amount of power to move them about. While they require a lot of maintenance, fusion plants more than make up for it in raw power for speed and energy weaponry.

Smaller landships, however, sometimes must rely on conventional engines as their size may preclude installing a bulky, complex fusion plant. Landcorvettes gulp down large amounts of fuel just to stay aloft, and cannot reach the same operational altitude as larger fusion-powered vessels. This greatly reduces their operating range as they are often tied to a fixed supply base.

Transmission

Landships have large hoverfans and ground effect vortex generators hidden under their armored hull. These only provide extra power for motion and suspension, however, as most of the lifting is accomplished by "repulsor" arrays (nicknamed "skis" by the crew) which use the planet's magnetic properties to raise the vessel off the ground. These repulsors, which are largely based on the particle accelerators and field generators of the Tannhauser FTL drive, are heavily shielded and computer-controlled to prevent them from interfering with the ship's internal systems and crew. Huge turbines and air ducts serve as directional thrusters and are used to steer the ship.

Weapons and Armor

Most of a landship's armament is made up of large projectile weapons and missile racks. Weapons capable of indirect fire are preferred as they allow the landship to support its ground unit without itself coming under fire. Only the smaller corvettes, which typically go into the thick of the fighting, are equipped with powerful direct fire armament such as railguns and particle accelerators. Almost all landship weapons are mounted in armored turrets to ensure a maximum field of fire.

Landships are massively armored, especially along their lower hull. This is done to protect the fans and lift generators underneath. The destruction of these systems would not be critical, as the ship is normally barely floating above the ground, but it would completely immobilize it — not a good thing in modern warfare.

9.6 - THE VEHICLE RECORD SHEET

Each vehicle has an appropriate record sheet that details the necessary statistics for game play. These sheets allow clear tally of performance levels and other important information. The information directly related to the game breaks into six major parts. General Specifications shows the Threat Value, Size and Cost. Threat Value subscores are listed in the vehicle description itself. Crew Data shows the number of crew required to run the vehicle and the action(s) they provide. System Data shows movement-related information (such as movement type(s), speed(s), maneuverability and general endurance), electronic systems and armor. The Weapons section lists the offensive systems available to the crew. The Perks section shows the various specialized systems carried by the vehicle, such as manipulator arms or ECM devices. The section immediately following, Flaws, likewise list any shortcomings in the vehicle's construction (intended or otherwise).

This book contains pre-filled vehicle sheets for the most common Gears and striders on Terra Nova. The **Tactical Air Support**, **Tactical Field Support** and the **Vehicle Compendiums** series all contain statistics for many more vehicles, along with the explanations required to use their new weapons, Perks and Flaws on the battlefield.



Record Sheet Components

- *The large space at left normally shows a picture of the vehicle.*
- *The column next to the picture is used to mark off lost Armor. Light Damage results destroy one box and Heavy Damage results, two> See page 145.*
- *The personal information, relevant Skills and Attribute bonuses for the vehicle's crew can be written in the right-hand, topmost section for easy reference. See page 126.*
- *If a vehicle with multiple crewmen loses some crew, the new crew total and new number of bonus actions can be written just underneath. See page 120.*
- *This long series of boxes under the Crew boxes is used to mark adjusted totals and other damage results after a vehicle is hit. Adjusted movement speeds, Maneuverability, Fire Control, electronic ratings and damage Thresholds can be written here. Destroyed Perks and weapons can also be checked in this column.*
- *The Light Damage, Heavy Damage and Overkill Thresholds of the vehicle are inscribed justunder the System box for easy reference. See page 145.*
- *The mid-sheet table lists all the weapons that can used by the vehicle. CODE shows what the weapon is. FIRE ARC shows the direction in which the weapon can fire; S/M/L/E are the Range bands; ACC is the Accuracy; DAM is the Damage Multiplier; QTY is the number of weapons carried; ROF is the Rate of Fire. SPECIAL shows any special characteristic the weapon might have. See page 127.*
- *The column just right of the weapon list shows the full ammo load of each of the vehicle's weapons and provides a box to note how much ammunition is left.*
- *The table under the weapon list shows the special features present on the vehicle. When possible, a short description of the game effects is listed as well. A check in the AUX column means the feature is an Auxiliary System. See page 189.*
- *This box lists all the disadvantages of the vehicle along with their ratings (if appropriate) and a brief explanation of their game effects (if possible). See page 195.*
- *This box lists any unintentional design flaws that made their way into a model, along with their ratings and game effects.*

9.6.1 - Using the Record Sheet

The Vehicle Record Sheet was designed to be easy to use during play and provides boxes to mark off damage and changes to various systems. Each vehicle in play should have its own sheet.

In a roleplaying game in which the Players have their own vehicles, they should all have their own record sheet that will serve as a companion to the character sheet. Relevant Skills and Attribute bonuses should be transferred to the appropriate boxes on the vehicle sheet to save time during vehicle combat. If a character has a Specialization in one of the Skills, the extra +1 should be factored in to the bonus on the vehicle sheet to avoid flipping from one sheet to the next in combat.

PERKS AND FLAWS - 9.7

Many vehicles have special features or unfortunate defects, such as additional armor plates, ejection systems or cargo bays, that are not covered by the vehicle's primary tactical and strategic statistics. These extra features are represented by Perks and Flaws.

Perks - 9.7.1

Many Perks are primarily intended for background and roleplaying purposes and do not have significant tactical effects on the vehicle's overall combat performance. Perks with the designation (AUX) are defined as auxiliary systems for damage purposes. Perks with the designation (R) have a rating. This rating is listed next to the Perk on the data sheet.

ADVANCED CONTROLS

The vehicle has a very advanced, user-friendly control interface. It automatically categorizes and prioritizes the information provided by the sensors and can also suggest alternative courses of action. Its great ease of use allows the vehicle crew to react faster to the situation around them. Advanced Controls allow the vehicle one extra action each combat round, as long as there is at least one crewmember aboard.

AIRDROPPABLE

The vehicle can be equipped with a parachute or an equivalent device that allows it to be dropped from high or low altitude onto a battlefield. This has limited application in a pure tactical scenario, but it allows for some interesting roleplaying and integrated game opportunities, such as units dropping in unannounced. The **Tactical Air Support** manual contains detailed parachuting rules.

AMMO/FUEL CONTAINMENT SYSTEM

The vehicle's ammunition and fuel bays are reinforced and equipped with blast-control panels and foamed self-sealing internal surfaces. The Perk completely absorbs the effects of the first hit when an "Ammo/Fuel Hit" result is obtained on the Fire Control Damage Table. The Perk is then destroyed and is checked off the vehicle sheet. The Perk's effect can be restored by a normal repair if a technician works on the vehicle after combat.

AMMO STORAGE

The vehicle is equipped to store some or all of its spare ammunition clips in an armored compartment to protect them against damage. If there is no Manipulator Arm or ammo-reloading Tool Arm mounted on the vehicle, the crew must reload the weapon manually, at a rate of one shot per action. The clips are not counted as an AUX systems and can only be destroyed when actually in the weapon.

AMPHIBIOUS

The vehicle is adapted for occasional water travel such as river crossings and amphibious assaults. The lower hull is made water-proof, and inflatable skirts are sometimes added along with an underwater propulsion system. In the tactical game, the vehicle may travel across Water and Deep Water hexes, paying MP according to its normal movement type (not as a naval vessel). In the roleplaying game, the vehicle is amphibious, but is not intended for extended aquatic activity. This Perk does not grant the vehicle Submarine movement and is only found on Walkers and Ground vehicles.

AUX AQUATIC SENSORS

The vehicle is equipped with various underwater sensors such as sonars, magnetic anomaly detectors and specialized cameras. These allow the vehicle to use its sensors effectively underwater. Vehicles with this Perk do not suffer Obscurement effects from Water and Deep Water terrain. A vehicle may be equipped with aquatic sensors in addition to its normal sensors, or it may be equipped exclusively with aquatic sensors. Vehicles with only aquatic sensors use the sensor range that would have been used by their "normal sensors," if they had any. Vehicles with both specify the range of both types of sensors.

Aquatic sensors must normally be immersed in water to function. In tactical terms, the vehicle only ignores the Obscurement effects of water while in water itself. Some vehicles, often aircraft, have aquatic sensors that do not need to be immersed in water to function. However, they must be within a minimum distance (specified in the stats) from the body of water they wish to scan.

R ARTIFICIAL INTELLIGENCE

The vehicle is capable of independent action and decision making. The Perk counts as one crewmember. No live crew is required. The rating of the AI is used as the Skill level of the "crew." AIs are not truly intelligent; they lack personality and flexibility. They also lack the rapid learning ability of more advanced neural nets, but are better at independent action because of their extensive data banks and expert systems. Artificial Intelligence is not affected by "Crew" hits.

AUDIO SYSTEM — AUX

The vehicle has an audio system, similar in function to a car stereo. The audio system can serve as a radio receiver or play back standard data disks. It also includes large speakers capable of high decibel output. This system has no tactical game effect, but offers numerous roleplaying opportunities.

AUTOMATION — R

This Perk substitutes mechanical and electronic systems for real crewmembers. The rating of the system is equal to the number of crewmembers the Perk simulates. The vehicle must have at least one live crewmember or the Artificial Intelligence Perk.

AUTOPILOT — AUX

Autopilots are devices that can take over piloting tasks. They can keep the vehicle going in a straight line, avoid large obstacles and steer the vehicle towards a pre-specified location. In tactical terms, an Autopilot is very limited. It can be used to keep a vehicle moving in a straight line or performing 60° (one hex-facing) turns. Autopilots cannot fire any weapons or dodge attacks. They can, however, be used to ram large targets as a level 1 pilot without endangering the crew (they just exit the vehicle beforehand).

BACKUP COMMUNICATIONS SYSTEM

The vehicle may ignore communications system damage effects of the first "Auxiliary System Hit" on the Systems Damage Table. All non-communication Auxiliary systems take normal damage effects. The Perk's effect can be restored by a normal repair if a technician works on the vehicle after combat.

BACKUP FIRE CONTROL

The vehicle may ignore the first "Fire Control Destroyed" result on the Fire Control Damage Table. The Perk's effect can be restored by a normal repair if a technician works on the vehicle after combat.

BACKUP LIFE SUPPORT

The vehicle has backup life support systems that allow the vehicle to continue providing life support functions long after the primary system has been disabled. In game terms, the vehicle continues to have life support even if the vehicle has all of its auxiliary systems destroyed. The vehicle must already have a life support system (see Life Support, p. 192) to take this Perk.

BACKUP SENSORS

The vehicle may ignore the sensor damage effects of the first "Auxiliary System Hit" on the Systems Damage Table. All non-sensor Auxiliary systems take normal damage effects. The Perk's effect can be restored by a normal repair if a technician works on the vehicle.

BATTLE ARM — R

The vehicle has a rudimentary arm to carry and orient weapons or other pieces of equipment. While battle arms are not nimble at all, they can lift an object (provided it has been attached to the arm) whose Size score is equal to or lower than the arm's rating. No matter the rating of a battle arm, a vehicle cannot lift an item whose size is greater than twice its own size. If a vehicle has multiple arms, it can use these together to increase its lifting ability. Half the ratings of the weaker arms is added to the full rating of the strongest arm to determine the lifting strength of multiple arms.

Battle arms can be designed to punch opponents: they then end in a reinforced battering ram or other brawling weapon. This attack type has a Damage Multiplier equal to the rating of the arm.

CARGO BAY

A cargo bay is a large hollow place within the vehicle to put miscellaneous material. They are rated in terms of their volume in cubic meters. The intended type of content of each cargo bay is always specified: solid, liquid or gaseous. Cargo bays are enclosed within the vehicle. Open-topped bays are also possible, but material carried in such a bay is counted as an AUX system for damage purposes.

It is important to note that the cargo space bought represents only the actual space dedicated inside or on the hull of the vehicle, not an increase in the power of the engine. Thus, the cargo's weight counts as "towed" material for game purposes. Stored vehicles are assumed to occupy a volume roughly equal to (Size/2 + 1) cubed, rounded up.

CREW ACCOMMODATIONS

The vehicle has proper sleeping quarters for its crew. Two quality levels of crew accommodations are available. Military grade crew accommodations are spartan in design and provide little privacy or comfort. Luxury accommodations, on the other hand, include private sleeping quarters and personal hygiene facilities. A vehicle with numerous crew accommodations of either type also includes a few common rooms such as galleys and lounges. Luxury common rooms are obviously more numerous and more elegant.

EASY TO MODIFY

The vehicle is designed to be easily modified or repaired (standardized parts, modular aspects). Add +2 to all technical Skill rolls to modify and repair the vehicle.

AUX — EJECTION SYSTEM

The vehicle is equipped with an ejection system to give the crew a chance to escape if the vehicle suffers an Overkill damage result. See the Ejection rules (page 148) for more details. This Perk also covers survival equipment such as lifeboats on marine vehicles.

AUX R — ECM

Electronic CounterMeasures (ECM) are devices used to jam sensors and communication systems: low-energy lasers to blind optical sensors, electronic noisemakers, radar pulse emitters to disrupt the readings of other units, etc. Using ECM to jam requires one action per roll. An Electronic Warfare Skill test is rolled, adding the ECM's rating as a modifier. Unless the roll fumbles, the result of this roll is the Threshold of all enemy Communication or Sensor tests (both use the EW Skill) within the vehicle's ECM range. The jammed Sensors and Communications must pass this test each round just to be functional. ECM range is identical to the vehicle's base Sensor Range.

AUX R — ECCM

Electronic Counter-CounterMeasures (ECCM) are devices used to block jamming systems or punch through their effects. They include direct link systems, laser reflectors, signal correctors and many other systems. Using ECCM to prevent jamming requires one action. Roll an Electronics Warfare Skill test, adding the ECCM rating as a modifier. Unless the roll Fumbles, the result of this roll is the Threshold of ECM action tests (uses EW Skill) within the vehicle's ECCM range. The blocked jammers must pass this test each round just to be functional. ECCM range is identical to the vehicle's Sensor Range.

EMERGENCY MEDICAL

A vehicle with this Perk includes features like instant casts for broken limbs and stimulant/pain-killer injections to prevent loss of consciousness. This Perk prevents the first "Crew Stunned" result on the Systems Damage table. In roleplaying terms, the vehicle will prevent the character from losing consciousness. In addition, the equipment will prevent wound degeneration for up to one full day.

FIRE RESISTANT

The vehicle is made of fire-resistant materials and provides adequate heat protection for the crew. In game terms, the Intensity of any flame attacks against the vehicle is halved.

AUX — GEOLOGICAL SENSOR

The vehicle's sensors are specially designed to perform geological surveys. This has no tactical application, but it is useful in roleplaying scenarios. Geological sensors are common features on many of the vehicles used in the Badlands.

HAYWIRE RESISTANT

The vehicle is specially designed to shrug off massive electrical discharges through isolated, redundant circuitry and a grounded structure. On Light Damage results, the second damage roll produced by Haywire effect weapons (particle accelerators and haywire grenades, for example) is ignored. On Heavy Damage results, the second damage roll is treated as a Light Damage roll.

R — HEAT-RESISTANT ARMOR

The vehicle's armor is designed to deflect and dissipate the intense energy delivered by High Energy Anti-Tank weapons like shaped-charge warheads or lasers. Its special ceramic coating and the layers of material within the structure either disrupt the shape-charge effect or vaporize to diffuse and reflect a beam striking it. The HEAT resistance rating is added to the vehicle's Base Armor when the vehicle is attacked by HEAT-based weapons (see listing below). This Perk has no effect versus weapons that are not HEAT-based.

HEAT Effect

HEAT-based	Not HEAT-based
Bazooka	Cannon
Mortar	Railgun
Rockets/Grenade	Rifle (infantry)
Missile	Punch and Kick
Laser	Ramming
Particle Beam	Melee Weapon

HIGH TOWING CAPABILITY

The vehicle is equipped with a high torque, heavy duty powerplant and a rugged transmission. Its towing capacity is doubled or tripled, depending on the design (see *Towing*, page 159).

IMPROVED OFF-ROAD ABILITY

The vehicle is designed to handle rough or rugged terrain even better than standard military grade vehicles. Ground vehicles have large wheels/treads with a very flexible suspension, walkers have large or clawed feet, hovercraft have flexible armored airskirts, etc. In tactical game terms, the vehicle pays one less MP for any terrain type that requires more than one MP to cross. For instance, a ground vehicle with Improved Off-Road Ability would pay 3 MPs instead of 4 MPs when crossing Swamp hexes, but would still pay 1 MP (the minimum movement cost) per Clear or Sand hex.

IMPROVED REAR DEFENSE

The vehicle has a well-defended rear arc. It either has a superior armor design which protects the normally weak rear areas (note that this does not mean armor has been added in this location, merely that it is better used), or additional sensor systems to warn against rear attacks. In game terms, this reduces the defense roll penalties from rear and rear flank attack by 1. In other words, the rear flank arc of defense has no negative modifier and the rear arc of defense modifier is -1.

HOSTILE ENVIRONMENT PROTECTION

The vehicle is specially designed for prolonged exposure to some hostile environmental conditions without detrimental effects. The following Perks also protect the crew. Pick one or more of the following options:

Desert: the vehicle can withstand extended exposure to desert conditions without needing special maintenance to avoid sand build-up. This Perk includes air filters, modified heat exchangers and cloth coverings on delicate mechanisms. It also includes a tiny air conditioning unit in the cockpit.

Extreme Heat: the vehicle is designed to withstand exposure to scorching temperatures, often well into the hundreds of degrees Celsius, without taking severe damage to its systems or crew. If combined with the Fire Resistance Perk, the vehicle is effectively immune to incendiary attack.

Extreme Cold: the vehicle is designed to endure freezing cold temperatures, such as those found at arctic and antarctic poles, without freezing up or otherwise breaking down. This Perk also protects the crew.

High Pressure: the vehicle is designed to endure the great pressures of locations like ocean depths and the upper layers of gas giants without being crushed like an egg. A variant of this Perk (Extreme Pressure) allows the vehicle to endure even the most extreme pressures, such as those found in the deepest of oceans or deep within gas giants.

Underwater: the vehicle can withstand full submersion in water and other fluids. The hull is entirely water-proof down to about 50 meters, and hatches and other crew accommodations reflect this. Note that Life Support is not included in this Perk. The High Pressure Perk is required to dive any deeper than 50 meters. Submarines automatically possess the Underwater Perk at no cost.

JUMP JETS — AUX A

The vehicle is equipped with short-burn jump rockets, often liquid-fuel thrusters or solid cartridge boosters. These jets allow the vehicle to "leap" over a short distance, but they do not allow true flight. The maximum distance of the jump must be specified. Jumping vehicles may clear obstacles whose elevation does not surpass one-half its total jumping distance. Jumping requires one action and replaces the vehicle's normal movement. Jumping occurs during the vehicle's movement phase, despite requiring an action.

LABORATORIES — A

Some large vehicles are equipped with proper laboratories. Each Laboratory is dedicated towards one particular Skill or Specialization. Laboratories are rated on their quality (minimum of 0). This quality rating is added as a modifier to any tests using the Lab's Skill.

LIFE SUPPORT — AUX

Life Support systems provide the vehicle's crew with a sealed and controlled milieu, protecting them from hostile environments such as vacuum, underwater and poisonous atmospheres. If this system is destroyed while the vehicle is in a hostile environment, all crew members immediately become casualties, eliminating the vehicle from combat.

The limited form of life support includes contingencies for breathing and limited nutritional and excretory needs for up to a week. The full version of life support includes complete air recycling, proper waste disposal, hygiene and nutritional facilities.

LOUDSPEAKERS — AUX

The vehicle is equipped with external loudspeakers. These can be used for sirens, audio systems, communication gear, or other audio equipment. Loudspeakers are only useful in the roleplaying game.

MICROLABS

Microlabs are elaborate workbenches equipped with devices and sensors that are specialized for one task, such as toxin detection or electronic repairs. Microlabs have no tactical application, but they can be invaluable in roleplaying games.

R

MANIPULATOR ARM

The vehicle has an arm that can pick up and manipulate objects. For example, hand-held weapons can be dropped and picked up at will. The arm can lift an object whose Size score is equal to the arm's rating. No matter what the rating of a manipulator arm, a vehicle cannot lift an item whose size is greater than twice its own size. If a vehicle has multiple arms, it can use these together to increase its lifting ability. Half the ratings of the weaker arms is added to the full rating of the strongest arm to determine the lifting strength of multiple arms.

Manipulator arms can be reinforced to punch opponents. This attack type has a Damage Multiplier equal to the rating of the arm.

AUX

MINING EQUIPMENT

The vehicle is adapted to perform mining functions. Light duty Mining Equipment is designed for survey and prospecting work, while heavy duty equipment is intended for commercial mining operations. Some mining equipment can attack opponents in melee combat. This attack type has a Damage Multiplier equal to x3 for light Mining Equipment, x10 for the heavy. Light duty equipment has poor Accuracy (-1) and heavy duty equipment has very poor Accuracy (-2).

PASSENGER ACCOMMODATIONS

The vehicle is equipped to carry passengers for extended periods, i.e. it has proper sleeping quarters for its passengers. Military grade Passenger Accommodations (intended for marines and other ship troops) are spartan in design and provide little privacy or comfort. Luxury accommodations include private sleeping quarters, a small private lounge, and personal hygiene facilities. A vehicle with numerous Passenger Accommodations of either type also includes a few common rooms such as galleys and lounges. Luxury accommodations provide more common rooms and are often rich to the point of decadence.

PASSENGER SEATING

The vehicle has extra seats for passengers. The passengers do not confer any extra actions to the vehicle, nor can they control it. Passengers cannot use the vehicle crew's ejection system (if any); they normally have their own.

R

REINFORCED ARMOR

The vehicle has one or more facings (arcs of attack) with better armor than the rest of the vehicle. Four possible arcs can be reinforced: front, rear, right rear flank and left rear flank. When the vehicle is hit on a reinforced facing, the Perk's rating is added to the Base Armor of the vehicle.

REINFORCED CHASSIS

The frame of the vehicle is designed to absorb considerable punishment. The vehicle may ignore the first "Structure Hit" on the Systems Damage Table, but then loses this Perk. The Perk's effect can be restored by a normal repair if a technician works on the vehicle.

REINFORCED CREW COMPARTMENT

The crew compartment is layered with additional armor and fitted with crash-absorbing material. The vehicle may ignore the first "Crew Hit" on the Systems Damage Table, but then loses this Perk. The Perk's effect can be restored by a normal repair if a technician works on the vehicle after combat.

R

REINFORCED LOCATION ARMOR

One of the vehicle's locations has better armor than the rest of the vehicle. When the vehicle is hit in the reinforced location (a specific result on the System Damage Table), the rating of this Perk is added to the Base Armor before determining the final level of damage.

AUX

SEARCHLIGHT

The vehicle has a powerful front-mounted lighting system, such as banks of headlights or a large spotlight. At night, treat the vehicle's FF firing arc as if it were in daylight, up to the searchlight's maximum range.

RUGGED MOVEMENT SYSTEMS

The vehicle may ignore the first "Movement Hit" on the Systems Damage Table, but then loses this Perk. This protection is due to the inherent strength of the drive system's design or to built-in redundancy. This Perk's effect can be restored by a normal repair if a technician works on the vehicle after combat.

SATELLITE UPLINK — AUX

The vehicle has a specialized add-on to its communication system that allows it to patch into man-made satellites when the vehicle is on a planet, in atmosphere, or in orbit around a planet. Most often, this equipment includes a collapsible dish antenna.

SHIELDED WEAPONS

The vehicle's weaponry is sheathed in plates of armor. The first "-1 to a Single Weapon," or "-2 to a Single Weapon," or "-1 to All Weapons," or "Single Weapon Destroyed" result on the Fire Control Damage Table may be ignored. The Perk is then destroyed. Its effect can be restored by a normal repair if a technician works on the vehicle.

SICK BAY

Some large vehicles have an infirmary or sick bay. These facilities have no value in the tactical game, but in the roleplaying game they are considered to be constant medical aid for healing purposes. Sick Bays are rated by their maximum number of patients.

SNIPER SYSTEMS

Sniper systems are additional targeting systems that make weapons more accurate at long range. In game terms, Sniper Systems add a +1 modifier to the attack roll at Long and Extreme ranges.

STEALTH — AUX R

Stealth systems are features that make a vehicle difficult to detect with sensors: heat baffles, radar-absorbing skin, silent systems, etc. In tactical game terms, Stealth systems add their rating to the vehicle's Concealment when opponents try to use sensors to detect it. Stealth systems have no effect on visual detection. See Stealth, page 136.

TARGET DESIGNATOR — AUX

Target Designators are used to lock-on Guided weapons. To do so, the vehicle "attacks" using the designator as the weapon. Its Base Range is equal to its rating (doubled for each successive range band, as normal). It has +0 Accuracy — not modified by Fire Control — and does no damage. A successful attack "paints" the target for incoming Guided munitions. The target remains designated until the end of the round. Designators are not affected by ECM.

TOOL ARM — R

The vehicle has an arm with a specialized tool attachment, such as an earthmoving scoop or a cargo handling claw. While a tool arm is not as nimble as a manipulator arm, it can lift an object whose Size score is equal to the arm's rating. No matter what the rating of a tool arm, a vehicle cannot lift an item whose size is greater than twice its own size. If a vehicle has multiple arms, it can use these together to increase its lifting ability. Half the ratings of the weaker arms is added to the full rating of the strongest arm to determine the lifting strength of multiple arms. Some tool arms can punch opponents. This attack type has a DM equal to the rating of the arm.

VEHICLE BAY

The vehicle has a vehicle bay for storing another, smaller vehicle. There are also facilities to maintain and refuel such vehicles (the main difference between a cargo bay and a vehicle bay). Carried vehicles spend one entire round disembarking from the carrier, during which time they may fire but not move.

Vehicle Bays are rated in terms of the type of vehicle carried and the maximum weight they can hold. Each vehicle is considered as massing the maximum weight of its Size category. For example, a Size 10 bay holds up to 30 tons of vehicles: that can be 375 Size 1 vehicles, three Size 7 vehicles or one Size 9 and one Size 6 vehicles, and so on. The type of vehicle must be specified during construction, i.e. a bay designed to house assault boats cannot house tanks or jet fighters.

WEAPON LINK

This Perks allows multiple weapons to be linked to one fire control mechanism. Only one action is required to fire the linked weapons. The link's Accuracy and Base Range are equal to the worst Accuracy and Range among the link's weapons. Each weapon attacks separately, but as soon as one weapon misses all the other weapons not yet rolled for automatically miss (but still use their ammunition).

When a link is fired, all of the weapons in the link fire. However, the individual weapons that make up the link may still be fired individually. Weapons sometimes are part of more than one link.

WIDE ANGLE SEARCHLIGHT — AUX

The vehicle has a high-power, Wide Angle Searchlight. These are often mounted on the sides or rear of a vehicle. At night, the vehicle's F (or Rt, L, or Rr, depending on where the searchlight is mounted) firing arc is treated as if it were in daylight, up to the searchlight's maximum range.

Flaws - 9.7.2

Flaws are the opposite of Perks. Flaws represent defects in the vehicle. Sometimes these defects are planned into the vehicle as a cost cutting measure, at other times the defects are the result of design or production errors.

ANNOYANCE

Annoyance includes weird noises, bad smells, false alarm signals, a cramped cockpit, etc. This Flaw has no tactical effect, but is interesting for roleplaying purposes. It also serves to individualize the various vehicle designs.

R DEFECTIVE ACTIVE SENSORS

The vehicle's active Sensor system has a tendency to go on the blink in a random manner. Defective Active Sensors are rated from 1 to 5. In combat, one die is rolled just before attempting to obtain an active sensor line of sight. If the roll is equal to or less than the Defective Active Sensor rating, the Flaw's rating is applied as a negative modifier to the sensor test.

R DEFECTIVE FIRE CONTROL

The vehicle's Fire Control system has a tendency to go on the blink in a random manner. Defective Fire Control is rated from 1 to 5. In combat, one die is rolled just before firing. If the roll is equal to or less than the Defective Fire Control rating, then apply the Flaw's rating as a negative modifier to the attack.

EXPOSED AUXILIARY SYSTEMS

The vehicle's Auxiliary Systems have little protection from combat damage. Whenever an Auxiliary Systems effect is rolled on the Systems Damage Table, the damage becomes one stage worse (i.e. no damage as Light Damage, Light as Heavy, Heavy Damage as Overkill on Auxiliary Systems only — destroys all Auxiliary Systems).

EXPOSED FIRE CONTROL SYSTEMS

The vehicle's Fire Control mechanisms (gun sights, sensors, actuators) are inadequately protected. A +1 modifier is applied when rolling for damage on the Fire Control Damage Table.

EXPOSED CREW COMPARTMENT

The vehicle's crew compartment offers little or no protection. Whenever a Crew effect is rolled on the Systems Damage Table, treat it as if the damage was one stage worse (i.e. no damage as Light Damage, Light as Heavy, Heavy Damage as Overkill on crew only — all crew instantly killed).

EXPOSED MOVEMENT SYSTEM

The vehicle's movement systems have little protection from combat damage. Whenever a movement-related effect is rolled on the Systems Damage Table, treat it as if the damage were one stage worse (i.e. no damage as Light Damage, Light as Heavy, Heavy Damage as Overkill on Movement only, disabling all movement modes).

EXTREME OVERHEATING

The vehicle is prone to overheating in a highly dangerous manner. The vehicle will automatically suffer a Light Damage effect if it does any of the following for two combat rounds in a row: move and fire a weapon, fire three or more weapons, use jump jets. If it does any of these actions for three combat rounds in a row, the vehicle will suffer a Heavy Damage effect.

FRAGILE CHASSIS

The vehicle's chassis is overly fragile and is prone to damage. This might be planned as part of a crash protection system, or the weight of the vehicle is too great for the frame, weakening it, or it might just be a bad design. A +1 modifier is applied when rolling on the Structural Damage Table.

HAZARDOUS AMMO/FUEL STORAGE

The vehicle's fuel tanks and/or ammunition bays are poorly designed. They are either placed in a prominent place, lightly armored, or both. The vehicle adds +2 to Ammo/Fuel hit rolls when the "Ammo/Fuel Hit" result is obtained on the Fire Control Damage Table.

HIGHLY FLAMMABLE

The vehicle incorporates or is built with flammable materials, or is extremely susceptible to excessive heat. Treat all incendiary attacks against the vehicle as if their Intensity were doubled.

INEFFICIENT CONTROLS

The vehicle's control mechanisms are poorly organized, causing the crew to waste precious time in high stress situations. Reduce the number of crew actions by one. If, because of casualties, the crew drops to one man, disregard this Flaw.

LARGE SENSOR PROFILE R

A design feature makes the vehicle highly visible to sensors: a tall structure, a high infrared signature, noisy machinery or a significant radar trace. The Flaw's rating is subtracted from the vehicle's Concealment versus sensors.

NO COMMUNICATION

The vehicle is not equipped with any form of communication system. It cannot stay in contact with teammates and cannot act as a forward observer for indirect fire. It may not benefit from Command Points.

NO SENSORS

The vehicle has no built-in electronic sensors of any kind and may only detect opponents visually. The vehicle is likely to have a clear canopy or an exposed crew compartment. This Flaw requires the presence of at least one human crewmember for the vehicle to function.

OVERHEATING

The vehicle is prone to overheating in a dangerous manner. The vehicle will automatically suffer a Light Damage effect if it does any of the following for three combat rounds in a row: move and fire a weapon, fire three or more weapons, or use jump jets.

POOR OFF-ROAD ABILITY

All ground vehicles are given a certain amount of innate off-road ability in the rules but some lack the rugged suspension required for proper all terrain performance. Whenever entering terrain that costs two or more MP (not including elevation changes), the MP cost of the hex is increased by one. The vehicle may ignore this penalty and move at the normal MP cost, but the crew must make a Piloting roll for each hex against a Threshold equal to 4 + the hex's MP cost. If failed, the vehicle suffers Light Movement damage or is stuck for 1d6 rounds. If the Piloting roll is Fumbled, the vehicle suffers Heavy Movement damage or is stuck permanently and must be towed out.

POOR TOWING CAPABILITY

The vehicle's powerplant is too small for the vehicle's size, or its transmission system is not up to the task of towing and overheats all the time. The vehicle's towing capacity is halved.

RANDOM SHUTDOWN R

Whenever strained (each round of combat where it moved or every 15 minutes of moving at Top Speed), the vehicle must roll two dice to avoid shutting down (no movement or action) for a number of combat rounds equal to the roll of one die. The Threshold is equal to one plus the rating of this Flaw.

SENSOR DEPENDENT

The vehicle does not allow the pilot a clear visual image of his vehicle's surroundings. In tactical game terms, the vehicle must use passive sensors or active sensors to detect anything. If they are destroyed, the vehicle is running completely blind.

UNSTABLE

The vehicle is somewhat hard to control at high speed, either because it is badly designed or just top heavy. A -1 modifier is applied to all Piloting Skill rolls at Top Speed or in terrain with a MP cost greater than one.

VULNERABLE TO HAYWIRE EFFECTS

The vehicle is highly vulnerable to electrical attacks. Fragile circuitry and ungrounded systems are prone to excessive damage. Haywire weapons get three damage rolls instead of their normal two.

WEAK FACING

The vehicle has a weak facing (arc of defense). This may be due to incomplete armor coverage, shoddy design, or plain bad material. When the vehicle is attacked on that side, its effective Base Armor is halved.

WEAK POINT R

The vehicle has a weak point in the armor covering one of its locations. When this specific system/location is *aimed for* and successfully hit, the Base Armor is reduced by the rating of this Flaw before applying damage.

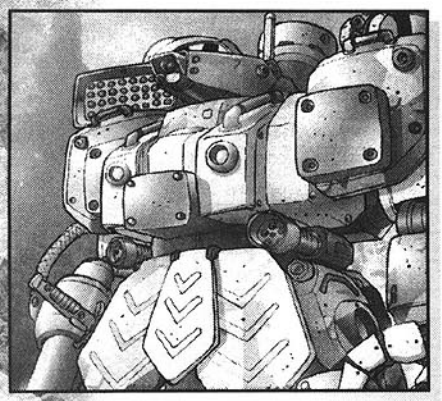
Heavy Gear Vehicle Weapon List

Name	Code	Range	Dam.	Acc.	RoF	Min. Size	Special
AP Grenade Launcher	APGL	1/2/4/8	x3	-1	0	2	Anti-Inf., Indirect Fire, AE=0
Anti-Personnel Mortar	APM	2/4/8/16	x4	0	0	3	Anti-Inf., Ind. Fire, AE=0, Min Rg 2
Deployable Pack Gun	DPG	2/4/8/16	x8	-1	+2	3	Disposable
Fragmentation Cannon	FGC	1/2/4/8	x14	0	0	5	Anti-Inf., Frag Ammo
Heavy Autocannon	HAC	3/6/12/24	x12	0	+1	5	-
Heavy Field Gun	HFG	8/16/32/64	x28	0	0	10	Indirect Fire
Heavy Grenade Launcher	HGL	2/4/8/16	x20	-1	+1	5	Indirect Fire
Heavy Guided Mortar	HGM	5/10/20/40	x20	-1	0	5	Guided, Ind. Fire, Min Range 5
Heavy Machine Gun	HMG	1/2/4/8	x4	0	+3	3	Anti-Inf.
Light Autocannon	LAC	2/4/8/16	x8	0	+2	4	-
Light Field Gun	LFG	5/10/20/40	x22	0	0	8	Indirect Fire
Light Grenade Launcher	LGL	1/2/4/8	x15	-1	+2	0	Indirect Fire
Light Guided Mortar	LGM	3/6/12/24	x15	-1	0	4	Guided, Ind. Fire, Min Range 3
Light Machine Gun	LMG	1/2/4/8	x3	0	+4	3	Anti-Inf.
Medium Autocannon	MAC	3/6/12/24	x10	0	+1	4	-
Snub Cannon	SC	1/2/4/8	x28	-1	0	6	-
Anti-Tank Missile	ATM	3/6/12/24	x25	+1	0	6	Guided, Indirect Fire
Heavy AT Missile	HATM	5/10/20/40	x30	+1	0	9	Guided, Indirect Fire
Heavy Rocket Pack/24	HRP/24	3/6/12/24	x20	-1	+3	5	Indirect Fire
Heavy Rocket Pack/48	HRP/48	3/6/12/24	x20	-1	+4	5	Indirect Fire
Inc. Rocket Pack/10	IRP/10	1/2/4/8	x13	-1	+1	4	Indirect Fire, Slow Burn Incendiary
Inc. Rocket Pack/20	IRP/20	1/2/4/8	x13	-1	+2	4	Indirect Fire, Slow Burn Incendiary
Inc. Rocket Pack/30	IRP/30	1/2/4/8	x13	-1	+3	4	Indirect Fire, Slow Burn Incendiary
Light Rocket Pack/8	LRP/8	1/2/4/8	x12	-1	+1	3	Indirect Fire
Light Rocket Pack/16	LRP/16	1/2/4/8	x12	-1	+2	3	Indirect Fire
Light Rocket Pack/24	LRP/24	1/2/4/8	x12	-1	+3	3	Indirect Fire
Light Rocket Pack/32	LRP/32	1/2/4/8	x12	-1	+4	3	Indirect Fire
Med. Rocket Pack/9	MRP/9	2/4/8/16	x18	-1	+1	4	Indirect Fire
Med. Rocket Pack/18	MRP/18	2/4/8/16	x18	-1	+3	4	Indirect Fire
Med. Rocket Pack/36	MRP/36	2/4/8/16	x18	-1	+4	4	Indirect Fire
Chassis Reinforcement	CR	0/0/0/0	+1	0	0	n/a	Physical Attack Only
Hand Grenade (1)	HG	0/0/0/0	x15	-1	0	2	Anti-Infantry
Heavy Bazooka	HBZK	2/4/8/16	x25	0	0	5	-
Heavy Laser Cannon	HLC	5/10/20/40	x20	+1	0	5	-3 Dam. per RB.
Heavy Particle Accelerator	HPA	3/6/12/24	x15	+1	0	8	-1 Dam. per RB., Haywire
Heavy Railgun	HRG	10/20/40/80	x35	0	0	12	-
Light Bazooka	LBZK	2/4/8/16	x15	0	0	4	-
Light Laser Cannon	LLC	5/10/20/40	x16	+1	0	5	-2 Dam. per RB.
Light Particle Accelerator	LPA	2/4/8/16	x10	+1	0	6	-1 Dam. per RB., Haywire
Light Railgun	LRG	5/10/20/40	x14	0	+2	7	-
Medium Bazooka	MBZK	2/4/8/16	x20	0	0	4	-
Rapid-Fire Bazooka	RFB	1/2/4/8	x14	0	+2	4	-
Sniper Laser Cannon	SLC	5/10/20/40	x12	+1	0	14	-1 Dam. per RB
Vibroblade	VB	0/0/0/0	x8	0	0	3	Physical Attack Only

Specific vs. Generic Weapons

The vehicular weapons listed in the table above and described in the following pages are not specific weapon brands, but general classes of weapons. Each class has countless models in the field, all with comparable battlefield performance. This simplification is intentional and helps streamline the tactical game — Players will quickly learn the characteristics of the major weapons in play and not need to constantly consult the weapons chart. This standardization also reflects a real process on Terra Nova. The dominant role of Paxton Arms in weapons manufacturing has led to a high degree of standardization among its clients: including the armies of the North and South.

9.8 - VEHICULAR WEAPONS



The following is a survey of several common vehicle-mounted weapon systems. This list provides a fairly significant selection, but not a complete catalog of every weapon in existence. The weapons listed are simply those commonly found amongst the armies of Terra Nova.

These weapons are quite diverse and fulfill a variety of battlefield functions. The most common are cannons, tried and true weapons that throw one or more projectiles at a target. Perhaps the most common cannon is the autocannon, used by almost all Gears in the same way an infantry trooper uses an assault rifle. Unguided rockets are also in wide usage on Gears and other vehicles to provide anti-armor power. More sophisticated weapons are also present on the battlefield, although in far smaller numbers. Guided missiles and mortars deliver high-explosive warheads with frightening accuracy, while laser weapons can hit small targets at a great distance.

Some vehicles use even more sophisticated weapons. Particle Accelerators fire beams of atomic particles along ionized trails, burning out electronic systems with great efficiency. Railguns fire projectiles with great speed an accuracy, making them effective armor-killers. Close combat weapons exist on the opposite technological scale.

9.8.1 - Weapon Terms

The basic capabilities of a weapon system are expressed in five terms: Damage Multiplier, Effective Range, Rate of Fire, Accuracy, and Minimum Size. These values apply to virtually all weapons (those with an ROF of 0 do not have an ROF listed on the Vehicle Record Sheet) and define the general performance of the weapon. These basic attributes can be modified by the weapon's Characteristics (see below), but provide all the information necessary to define simple weapons like a rifle or autocannon.

◆ Damage Multiplier

The damage code of the weapon. It must be noted that the effectiveness of Damage Multipliers increases exponentially: a x2 weapon is four times as efficient as a x1 weapon, not just twice as efficient. Relative penetration of armor-grade steel alloy, in millimeters, is also listed in each weapon's description.

◆ Effective Range

This is the limit of the weapon's effective combat range. All weapons can shoot further (out to as much as five times their listed maximum range, depending on the weapon type), but modern battlefield conditions prevent any effective hit at more than Extreme range. Weapons with range 0 are considered to be melee weapons and are only useful in close combat (Point Blank range only).

◆ Rate of Fire [ROF]

The weapon's rate of fire. Weapons with a Rate of Fire of +1 or better can deliver a large volume of fire in a short time, improving coverage and/or accuracy. Ammo consumption increases dramatically in weapons capable of burst fire.

◆ Accuracy

A weapon with normal accuracy has a score of 0. High quality systems have positive values while inaccurate systems have negative scores. The Accuracy rating reflects the quality of the targeting system, the length of the barrel, the nature of the weapon and many other characteristics.

◆ Minimum Size

This is the minimum Size score a vehicle must be to carry the weapon. The weapon's mass, recoil and/or energy requirement are all factored into this. This may increase depending on the amount of ammunition carried.

9.8.2 - Special Characteristics

The following Special Characteristics help to further define the use and function of a weapon. They are what make a guided missile different from a laser or a flamer (in game terms). In most cases, these Characteristics provide extra abilities or bonuses (such as a Guided weapon's ability to hit targets painted with a Target Designator), but some Characteristics provide limitations on the weapon's performance. These characteristics are listed (in abbreviated form) in the "Special" column of the Vehicle Sheet and Weapons Table.

Anti-Infantry

The weapon or warhead is specially designed to attack infantry or other man-sized targets. Anti-infantry weapons can be swung around very fast and their tracking system can register fainter readings than normal weapons. These weapons do not suffer the normal -2 modifier incurred when attacking infantry.

Area Effect

The weapon explodes or otherwise causes damage to a widespread area (see Area Effect Weapons in the Tactical Combat section). The number is the radius in hexes (AE0 means the weapon affects only one complete hex). Like all tactical weapon ranges, Area of Effect radiuses should be multiplied by 50 to get the radius in meters for integration in a roleplaying game.

Fragmentation

Fragmentation ammunition, often known as shotgun rounds, fires multiple small projectiles (most often flechettes) instead of a single large warhead. The Frag Cannon is currently the only weapon that can use such ammunition. If the ammunition is used, the attacker adds a +1 modifier to his attack roll, halves the Damage Multiplier, and adds +2 to the weapon's effective ROF. However, the weapon cannot walk its fire or saturate an area unless it has +1 or better ROF without the fragmentation ammunition.

Guided

Guided weapons have the ability to seek a target and correct their course in mid-attack. Lasers and other beam weapons cannot be from this category because it is impossible for them to adjust their attack after they have fired. Missiles, rockets and bombs are often such weapons. Some cannons, mortars and railguns also fire guided projectiles.

Guided weapons have all the benefits of indirect fire weapons. In addition, they gain a +2 modifier on their attack roll versus targets that have been "tagged" by an allied target designator (see *Perks and Flaws*, page 179) within communication range. Indirect guided attacks versus targets marked by a target designator do not need additional forward observers — they only need to successfully mark the target.

Haywire

The weapon's attack causes an electrical discharge. This discharge courses through its target, often causing multiple systems to fail. In tactical terms, the weapon gets two rolls on the Systems Damage Table when it scores Light or Heavy Damage on an opponent. In roleplaying terms (if one of the damage locations is Crew, for example), the weapon causes an electrical attack with an Intensity equal to its Damage Multiplier plus its Margin of Success.

Incendiary

Incendiary weapons are intended to ignite and burn their targets. Incendiary weapons do not do damage normally. Instead, they cause a fire whose Intensity rating is equal to the weapon's Damage Multiplier plus the attack's Margin of Success. Incendiary weapons come in two types: quick-burn and slow-burn. The effects of quick-burn weapons are only felt during the combat round in which they are used. On the other hand, slow-burn weapons cause the target to suffer the same fire effects for a number of combat rounds equal to the Margin of Success of their attack.

Indirect Fire

The weapon has the ability to perform indirect fire, that is, fire in a high arcing trajectory above obscuring material. Indirect fire rules are described in the Tactical Combat section (see *Indirect Fire*, p. 142).

Minimum Range

The weapon is unable to fire at a target that is too near to it. This often happens with mortars and long-range artillery pieces which have an arcing trajectory or warheads that have to arm themselves. In game terms, the weapon cannot be used to attack targets whose range is less than the weapon's minimum range.

Minus Damage per Range Band

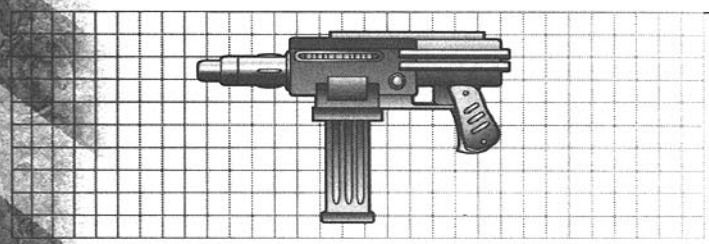
The weapon loses power over distance due to atmospheric interactions. This phenomenon is negligible for projectile weapons at combat ranges but both lasers and particle accelerators are very susceptible to it. The listed damage is valid for Point Blank and Short ranges only; the Damage Multiplier drops by the specified amount for each range band after this.

9.8.3 - Cannons, Rockets and Missiles

Cannons, rockets and missiles have now been around for millennia, and are the most common Terranovan weapons because they are rugged and simple. Rockets consist of a high-explosive, shaped charge propelled by a rocket motor. Missiles are rockets equipped with guidance systems that allow them to hit a target identified by laser designation or other means. Because of their guidance systems, missiles are more expensive than most other weapons of these classes.

Cannons include any weapon that can accelerate one or more projectiles using a chemical explosion. They are rugged, adaptable and effective, and for these reasons have been used by the military for the past few millennium. Their basic design has not changed much over the centuries, but they are lighter and more efficient than before.

Cannons can take a variety of forms, from single barrel guns to rotating multi-barrel "gatling-type" weapons. Most modern cannons include an autoloader and/or a belt-feeder mechanism, or are clip-fed for easy reloading.

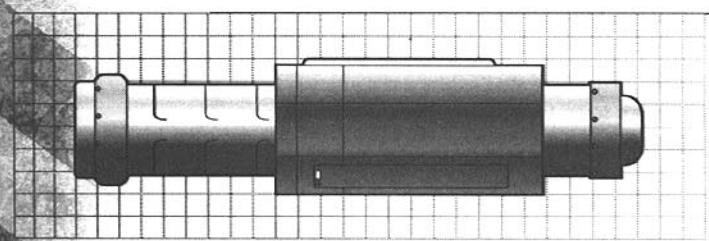


Light Machinegun

Purpose:	**Anti-Infantry**
Effective Range:	**400 m**
Penetration:	**15 mm**
Accuracy:	**average**
Mode of Fire:	**burst**
Usual Ammo Load:	**800-5000 shells**

The Light Machinegun is a small caliber, rapid-fire cannon used mostly for anti-personnel purposes. It has a lower damage potential than other vehicle-mounted weapons, but has a vastly increased rate of fire. This makes Light Machineguns expensive to field (rapid wear of the barrel(s), high ammo cost, etc.).

The 7.7mm Territorial Arms MGU-77 Minigun is a typical Light Machinegun used by the Spitting Cobra Gear. Infantrymen have learned to fear this gun as "the Death Buzzer" because of the high pitched sound it makes when fired.

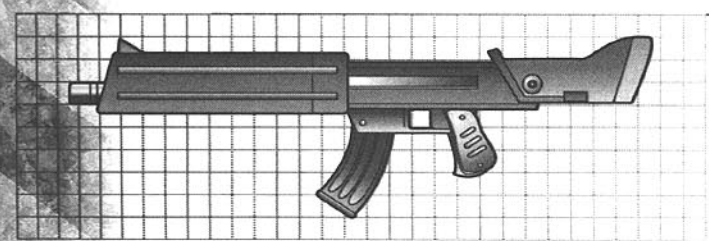


Heavy Machinegun

Purpose:	**Anti-Infantry**
Effective Range:	**400 m**
Penetration:	**18 mm**
Accuracy:	**average**
Mode of Fire:	**burst**
Usual Ammo Load:	**400-3000 shells**

The Heavy Machinegun is a bigger machinegun with a larger caliber. This allows it to cause more damage, but at the cost of a slightly lower rate of fire. HMGs are also sturdier than LMG.

A typical HMG is the 10mm NORTHCO GU-10 Gatling Unit, the main anti-personnel weapon of the Grizzly Gear. It is a rare design in that it is fixed on the left side of the Gear's body, just under its ammo bin.



Light Autocannon

Purpose:	**Anti-Gear/Anti-Infantry**
Effective Range:	**800 m**
Penetration:	**65 mm**
Accuracy:	**average**
Mode of Fire:	**burst**
Usual Ammo Load:	**60 shells**

Light Autocannons are popular weapons because they are rugged, simple to design and inexpensive to field. Most come in the form of a Gear-sized rifle which uses clip or belt-fed ammunition. They are mounted in the turret and hull of several armored vehicles as secondary weapons.

The 25mm Riley M222 Autocannon is one of the most reliable vehicular weapons ever produced. It is used by almost all Hunter-class Gears and has been the basis for several Gear weapon designs. The southern Jäger trooper Gear uses a practically identical weapon made by Paxton Arms.

Medium Autocannon

Purpose:	Anti-Gear
Effective Range:	1200 m
Penetration:	105 mm
Accuracy:	average
Mode of Fire:	burst
Usual Ammo Load:	50 shells

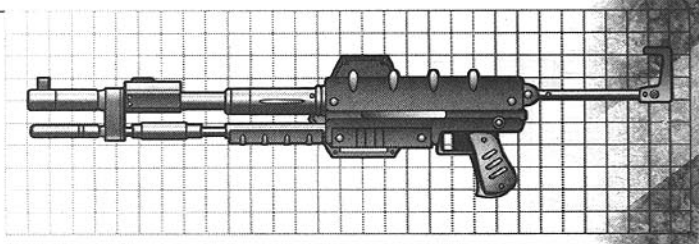


Medium Autocannons are the next most popular Gear weapons. Caliber and barrel length are both increased at the cost of the high rate of fire, resulting in a higher damage and range.

The 30mm Paxton MR25 Machinecannon is standard issue for the Black Mamba Gear. The Jaguar's main weapon, formerly a smaller autocannon, has been upgraded to a similar weapon.

Heavy Autocannon

Purpose:	Anti-Gear
Effective Range:	1200 m
Penetration:	150 mm
Accuracy:	average
Mode of Fire:	burst
Usual Ammo Load:	30 shells

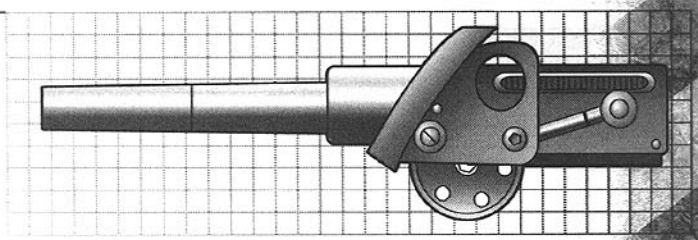


A large rapid-loading automatic cannon, the Heavy Autocannon is often the main armament of light tanks and the heavier Gear models. Most of the weapon's mass is taken up by the barrel (or barrels, as many heavy autocannons follow a gatling-like setup) and the large autoloading system. Although most of the handheld Gear versions are clip fed, heavy autocannons are generally belt fed.

The 40mm Riley M225 and its counterpart, the Paxton MR60 Autocannon, are heavy autocannon rifles designed to be carried as main armament by the large Gear models such as the Grizzly or the Spitting Cobra.

Light Field Gun

Purpose:	Anti-Armor
Effective Range:	2000 m
Penetration:	490 mm
Accuracy:	average
Mode of Fire:	single shot
Usual Ammo Load:	50 shells

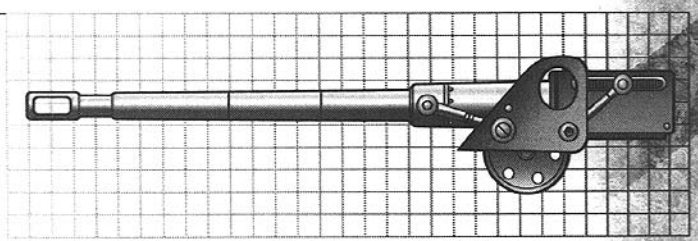


Unlike autocannons, field guns do not have any rapid-fire capacity. They make up for it with a longer range and higher hitting power. Most use Advanced Hyper-Kinetic Penetrator (AHKP) technology, with a secondary burn stage and molecular-aligned shaped alloy tips.

The 90mm Rucker Group LAU-44 is a self-loading cannon mounted in the turret of some of the Hun light tank variants. The gun has good penetration and accuracy considering the short length of its barrel.

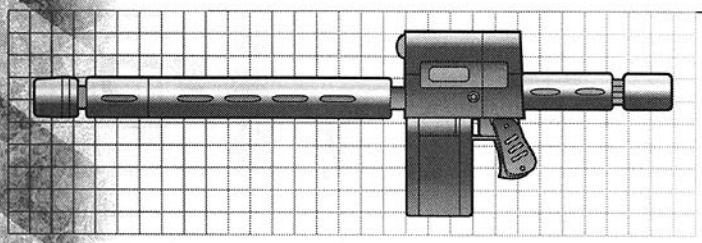
Heavy Field Gun

Purpose:	Anti-Armor
Effective Range:	3200 m
Penetration:	800 mm
Accuracy:	average
Mode of Fire:	single shot
Usual Ammo Load:	40 shells



The Heavy Field Gun is a large gun capable of crippling or destroying an armored target in one shot. It is much too heavy to be carried by Gears and often constitutes the main armament of battle tanks. Heavy Field Guns use some of the most powerful types of gel propellants, sometimes relying on binary liquid compound injection for primary projectile acceleration.

The 140mm Ebirus Co. MAGISTER II Cannon is the main weapon of the main battle tanks used by the forces of the Southern Republic. It is a rugged, reliable cannon with good performance.

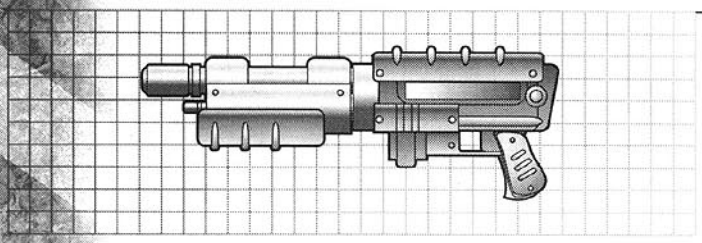


Snub Cannon

Purpose:	Anti-Armor/Anti-Infantry
Effective Range:	400 m
Penetration:	1000 mm
Accuracy:	poor
Mode of Fire:	single shot
Usual Ammo Load:	3 shells

The Snub Cannon is a heavy auto-loading cannon with a smooth bore and a short or medium barrel. It is mostly used for demolition and tank-hunting purposes. Its stubby ammo can transfer massive amounts of kinetic energy at short range, butwith little accuracy.

The 106mm Paxton LGPC "Little Joe" Snub Cannon is commonly assigned to one Gear in a squad. This gunner Gear provides the team with hard hitting, if slightly inaccurate, firepower.

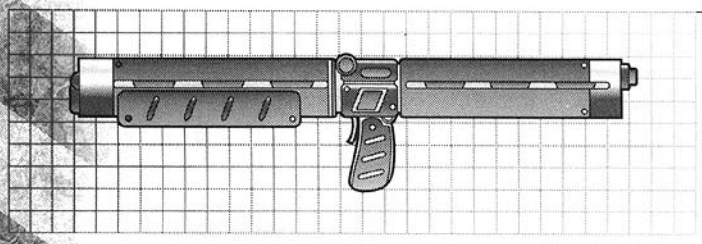


Fragmentation Cannon

Purpose:	Anti-Infantry/Anti-Gear
Effective Range:	400 m
Penetration:	50 mm
Accuracy:	good
Mode of Fire:	single shot
Usual Ammo Load:	16 shells

The Fragmentation Cannon is a cousin of the Snub Cannon. Its main function is to provide highly accurate firepower at close quarters; the gun usually fires fragmentation ammunition to increase the chance of a solid hit.

The 45mm Territorial Arms SG20 Fragmentation Cannon is a Gear-sized shotgun which was first designed for the Water Viper Gear. The weapon is well designed and deadly. It fires a special ceramic "Buckshot" ammunition which is very effective.

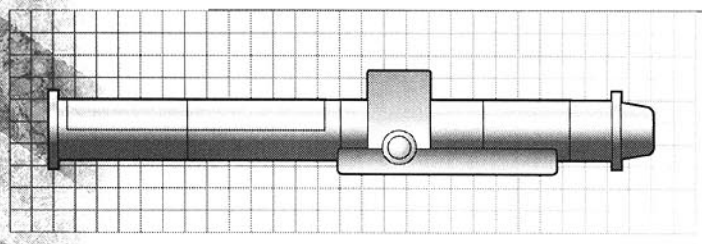


Disposable Pack Gun

Purpose:	Anti-Gear
Effective Range:	800 m
Penetration:	65 mm
Accuracy:	poor
Mode of Fire:	burst
Usual Ammo Load:	30 shells

A Disposable Pack Gun is a polymer auto-loading weapon that can be stored on the hip plates or the backpack of the Gear. It is similar to a light autocannon in its general performance profile, but with a lower accuracy due to its shortened barrel. In its folded ("packed") position, it takes very little space. Once empty, the gun is generally discarded and a new one used.

The 25mm Riley M25 "Pack Gun" Disposable Rifle is a standard scout Gear weapon. However, it is so versatile that many other units carry one for backup firepower. Several versions of the Grizzly carry one folded under their left arm or on their left hip armor plate.



Anti-Personnel Mortar

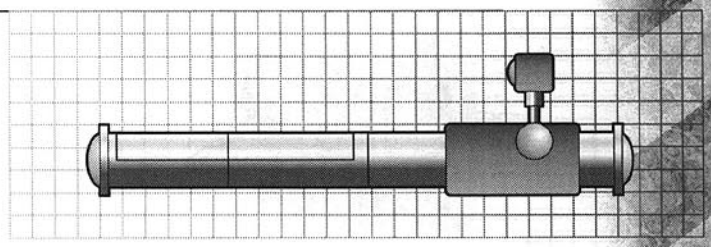
Purpose:	Anti-Infantry
Effective Range:	800 m
Penetration:	15 mm
Accuracy:	average
Mode of Fire:	single shot
Usual Ammo Load:	9 shells

The Anti-Personnel Mortar is a small caliber mortar for use against opposing infantry units. Its indirect fire capability and explosive charge are very effective for this task, allowing a vehicle to clear a path without endangering itself too much. The blast usually covers a radius of nearly 25 meters.

The 50mm NORTHCO MR-3 Mortar is a simple mortar unit which was specifically designed to get rid of enemy infantry units in cover. It is cheap and easily made. Each mortar is factory loaded and discarded once empty.

Light Guided Mortar

Purpose:	**Anti-Armor**
Effective Range:	**1200 m**
Penetration:	**225 mm**
Accuracy:	**average**
Mode of Fire:	**single shot**
Usual Ammo Load:	**12 shells**

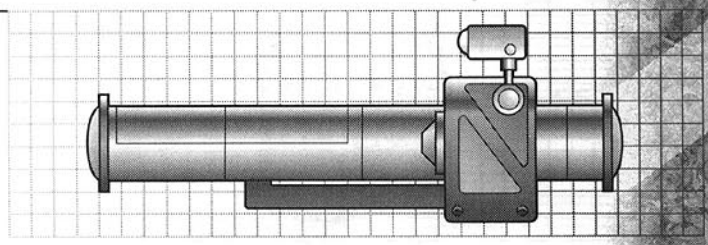


The Light Guided Mortar is a low-velocity cannon that lobs its warheads in an arcing overhead trajectory. The warheads have some limited control over their flight path through small fins that extend from the back of the shell once it clears the barrel. Using the laser seeker sensor in their tip, the projectiles can be directed to a target illuminated by a friendly spotting unit with a target designator.

The 60mm Riley GM-60L Mortar is a rugged, dependable weapon which is used on many support vehicles. Although its accuracy is poor if the shells are not laser guided to the target, its high penetration makes the Light Guided Mortar a favorite weapon of many pilots.

Heavy Guided Mortar

Purpose:	**Anti-Armor**
Effective Range:	**2000 m**
Penetration:	**400 mm**
Accuracy:	**average**
Mode of Fire:	**single shot**
Usual Ammo Load:	**6 shells**

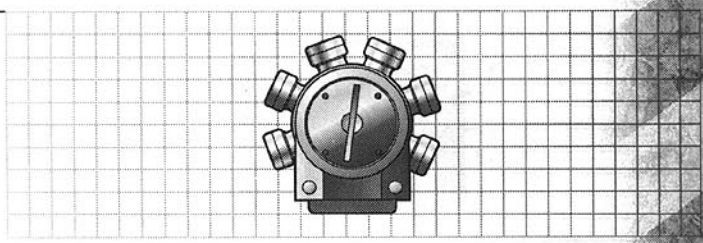


The HGM is a heavy vehicle-mounted mortar designed for range and offensive power. Its shells are guided to their target by an allied target designator, vastly increasing the probability of a hit.

The 102mm NORTHCO FSGM has been designed specifically to be mounted on the back of the Grizzly. The mortar fires shells which are small missiles guided by a tight beam laser transmission to their target. The FSGM is very useful for attacking well-defended positions.

Anti-Personnel Grenade Launcher

Purpose:	**Anti-Infantry**
Effective Range:	**400 m**
Penetration:	**9 mm**
Accuracy:	**poor**
Mode of Fire:	**single shot**
Usual Ammo Load:	**6 grenades**

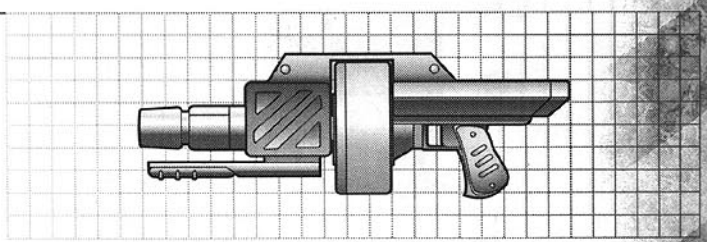


Also translated as All Purpose Grenade Launcher, the APGL is a generic code for short range, small payload, low-velocity cannons. They are mostly used to launch anti-personnel grenades (hence the designation), but can be loaded with any of the small grenade types (smoke, gas, etc.). Their standard anti-personnel load covers an area nearly 25 meters in radius with deadly shrapnel.

The 44mm Dimaean MK IV is a small grenade launcher built in a barrel-like configuration. Each grenade has its own launch tube and propellant cartridge which spin the unit when fired to place a new barrel in firing position.

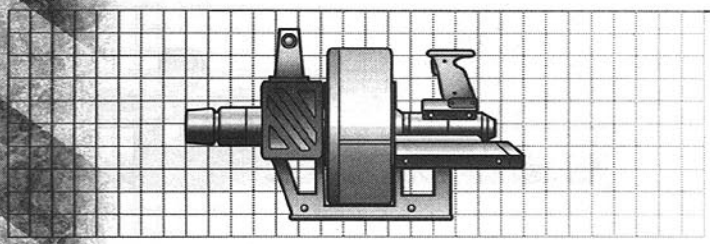
Light Grenade Launcher

Purpose:	**Anti-Infantry/Anti-Vehicle**
Effective Range:	**400 m**
Penetration:	**225 mm**
Accuracy:	**poor**
Mode of Fire:	**burst**
Usual Ammo Load:	**20 grenades**



The Light Grenade Launcher fills the battlefield gap between the direct-fire autocannons and field guns and the indirect fire guided mortars. Although not very accurate, the weapon offers good firepower. It is also very versatile since it can fire a variety of grenades.

The 60mm direct-fire Grenade Launcher made by Ankerson Works (a subsidiary of Northco) is a fully automatic grenade rifle designed to be handheld by most Heavy Gears. It stores the grenades in a drum-shaped ammo clip which is quick to replace and reload.

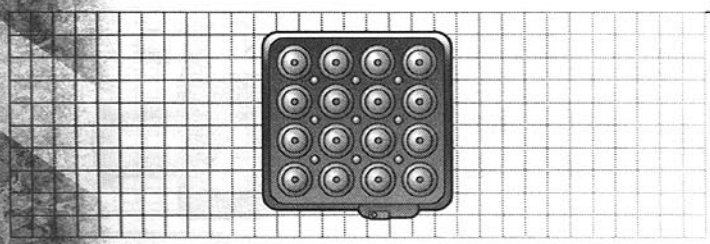


Heavy Grenade Launcher

Purpose:	Anti-Vehicle
Effective Range:	800 m
Penetration:	400 mm
Accuracy:	poor
Mode of Fire:	burst
Usual Ammo Load:	12 grenades

A larger version of the Light Grenade Launcher, this weapon packs a considerable punch and a good rate of fire at the cost of accuracy. The Heavy Grenade Launcher can also propel its grenades much further than its smaller brother. The grenades used can be of several different types. Unfortunately, because of the grenades' large size, the ammunition capacity is often quite small.

A large weapon, the 70mm LK-70 Heavy Grenade Launcher offers the triple advantage of good rate of fire, long range and high firepower. The autofire capacity is very effective in laying down a curtain of fire. As with other grenade launchers, ammunition capacity is low.

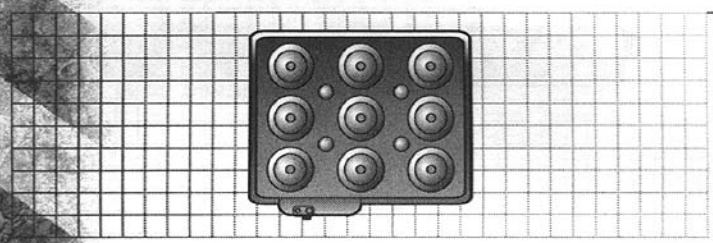


Light Rocket Packs

Purpose:	Anti-Vehicle
Effective Range:	400 m
Penetration:	140 mm
Accuracy:	poor
Mode of Fire:	burst
Usual Ammo Load:	8, 16, 24 or 32 rockets

Light Rocket Packs are loaded with little more than explosive charges sitting on top of a rocket motor. A small chip controls the fins, allowing minimal flight control. They are not very accurate, but make up for it by saturating the target area.

The 52mm Paxton RP-109 "Pepperbox" is standard equipment on many front line and scout Gear models. It is not very accurate or powerful, but the large number of rockets in the pack allows for rapid covering fire.

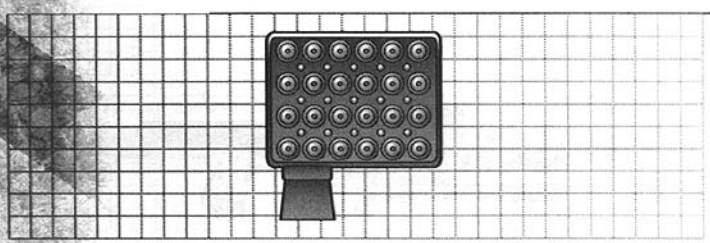


Medium Rocket Packs

Purpose:	Anti-Armor
Effective Range:	400 m
Penetration:	325 mm
Accuracy:	poor
Mode of Fire:	burst
Usual Ammo Load:	9, 18 or 36 rockets

Medium Rocket Packs are very similar to LR packs. They simply use larger rockets, which allows each projectile to carry a bigger warhead and more fuel for as longer range.

The 71mm Territorial Arms Vesper-A MRP is commonly seen as a secondary weapon on the shoulder hardpoints of many Gears. It is cheap and rugged and provides extra firepower at crucial moments.



Heavy Rocket Packs

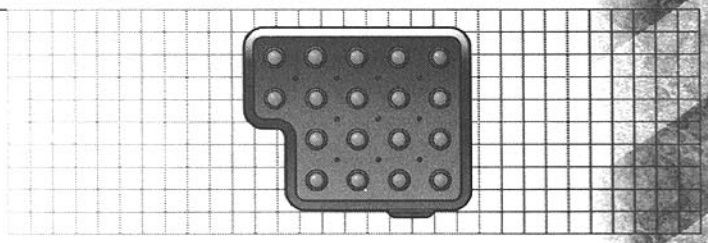
Purpose:	Anti-Armor
Effective Range:	1200 m
Penetration:	400 mm
Accuracy:	poor
Mode of Fire:	burst
Usual Ammo Load:	24 or 48 rockets

Heavy Rocket Packs use some of the largest unguided rockets on the battlefield. They are most often used for fire support and area saturation. The weapon occupies most of the back of the vehicle on which it is mounted and is fired overhead in an arcing trajectory.

The 82mm Territorial Arms SCRP Heavy Rocket Pack is a common support weapon. Its simple design and high rate of fire have made it extremely popular with commanders and pilots alike. Because of the SCRP abbreviation and the weapon's massive damage potential, enemy troops often call this weapon the "Scrapper."

Incendiary Rocket Packs

Purpose:	**Anti-Gear/Scorched Earth**
Effective Range:	**400 m**
Penetration:	**170 mm**
Accuracy:	**poor**
Mode of Fire:	**burst**
Usual Ammo Load:	**10, 20 or 30 rockets**

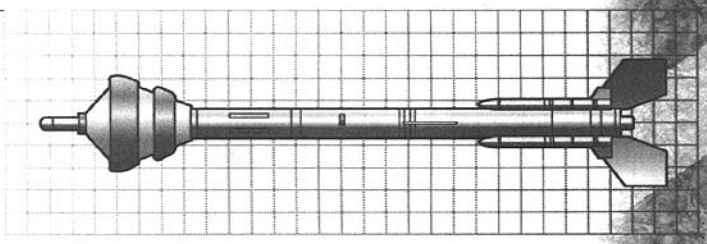


The Incendiary Rockets are similar to the Light Rockets but carry an incendiary warhead (most often a white phosphorous/napalm type chemical gel). They are mostly used for mass destruction.

The 59mm Paxton RP-114 "Chilibox" is a nasty weapon. Its rockets are equipped with chemical warheads that spray the target with a burning compound that sticks and keeps on burning for several minutes.

Anti-Tank Missile

Purpose:	**Anti-Armor**
Effective Range:	**1200 to 2000 m**
Penetration:	**625 to 900 mm**
Accuracy:	**good**
Mode of Fire:	**single**
Usual Ammo Load:	**1 missile**



The name Anti-Tank Missile covers a variety of anti-vehicular guided missiles. The majority of ATM designs are wire-guided through a very thin optic fiber, but a few are laser or radio guided. The ATM comes in many shapes. If a launcher can accommodate more than one missile, the notation is ATM/# where # is the number of missiles in the launcher. One missile can be launched per action. A heavier, larger version of the missile also exists. It has a similar flight performance but carries a more destructive warhead and has more fuel.

The DiMaean RAVEN Missile System is the main armament of the Klemm light tank used by the Northern Lights Confederacy. The RAVENs are mounted in a turret-like housing, three per side.

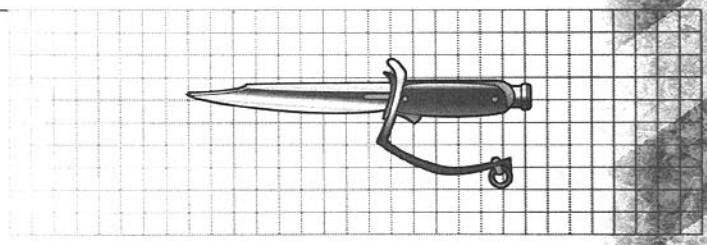
Close Combat Weapons - 9.8.4

The development of humanoid fighting vehicles has led to the creation of several new weapons designed for use in close combat between vehicles. In most cases these are simple adaptations of infantry weapons to a larger scale, be it melee weapons like the vibroknife of hand-grenades.

These weapons are almost entirely reserved for Gears because they depend on the presence of manipulator arms to handle and a humanoid structure to actually participate in close combat. Some tanks and other vehicles do feature specially adapted versions of these weapons, however. A logging tractor might have a powerful vibroblade appendage to cut through foliage, although it would not resemble the large knife of a Gear vibroblade.

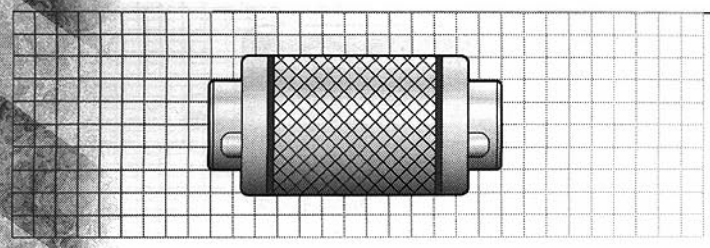
Vibroblade

Purpose:	**Close-Combat Anti-Vehicle**
Effective Range:	**point blank**
Penetration:	**65 mm**
Accuracy:	**average**
Mode of Fire:	**N/A**
Usual Ammo Load:	**N/A**



The vibroblade is a hard alloy or ceramite Gear-sized knife equipped with a small sonic generator in the hilt. The high frequency vibrations cause the blade to vibrate at high speed for improved damage. The energy pack for the generator is switched on only about 5 seconds before use, increasing the endurance of the built-in power pack. Many Gears carry such weapons in a multitude of forms and styles such as hatchets and machetes.

The Rucker Group VU-11 Vibromachete is the standard close-combat weapon for the Southern Black Mamba Gear. Although slightly longer than the standard vibroknife carried by other Gears, it has similar battlefield capabilities. Its added length only comes into play when the Gear uses it to cut through dense jungle foliage, hence the machete appellation.

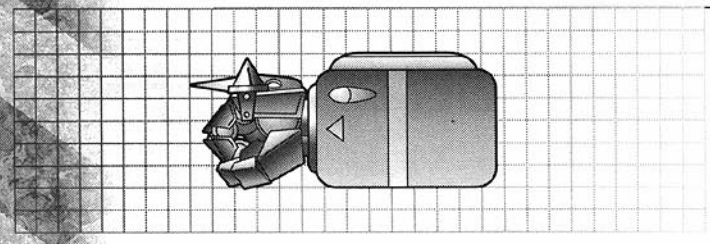


Hand Grenade

Purpose:	Demolition, Anti-Infantry
Effective Range:	20 to 50 m
Penetration:	225 mm
Accuracy:	poor
Mode of Fire:	single shot
Usual Ammo Load:	1 grenade (often carried in 3- or 6-packs)

This is quite simply a Gear-sized hand grenade. Many Gears carry a few of them in case they run into unexpected trouble or to use as flexible demolition charges. The warhead is powerful enough to actually damage armored targets, and can be useful in a variety of combat situations. Some grenades are fin stabilized for additional throwing accuracy.

The Paxton M-2A hand grenade is a standard-issue weapon for most Northern Gears, including the Cheetah scout model and Hunter and Jaguar troopers. Like most Gear grenades, the M-2A consists of a shaped charge designed to punch through an armored target, surrounded by shrapnel to take out infantry in the immediate area.



Chassis Reinforcement

Purpose:	Close-Combat Anti-Vehicle
Effective Range:	point blank
Penetration:	varies
Accuracy:	average
Mode of Fire:	n/a
Usual Ammo Load:	n/a

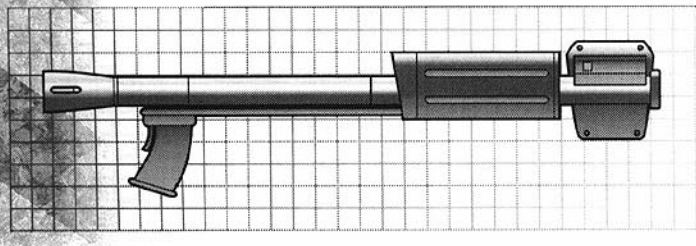
The Chassis Reinforcement is a simple welded plate of alloy designed to cause additional damage in physical combat. Gears are the vehicle type that use them the most, since their humanoid form enables them to deliver particularly effective physical blows, but other vehicles use them as well in the form of bumper plates and the like. They add +1 to the DM of a successful physical attack.

There are no standard models for chassis reinforcement, but most field technicians use a combination of forearm spikes and additional armor plating to increase a Gear's ability to punch or kick. This is a common modification made in the field, usually requested by pilots who got into close combat with enemy machines. Duelists and other hotshot pilots often have custom reinforcements, with characteristic spike arrangements.

9.8.5 - Bazookas

Bazookas are heavy rocket cannons. They are used for hard-hitting firepower and one-shot-one-kill capability in combat situations. The main drawback of bazookas is their poor ammunition capacity.

Bazookas are generally used by Gears on heavy assault missions, because they can be used to punch through tanks and striders with decent accuracy. They do have relatively short ranges, however, which explains why most tanks use guided missiles or field guns as their main anti-armor weapons. Mounted on a fast Gear, however, a bazooka can be deadly.



Light Bazooka

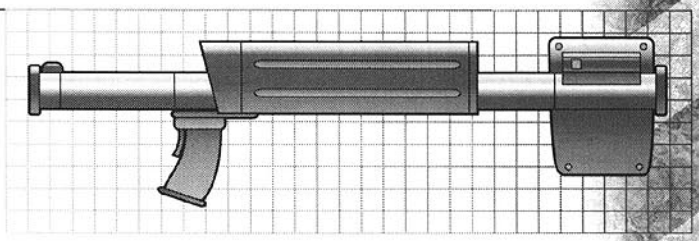
Purpose:	Anti-Armor/Anti-Gear
Effective Range:	800 m
Penetration:	250 mm
Accuracy:	average
Mode of Fire:	single shot
Usual Ammo Load:	5 rockets

The Light Bazooka is a recoilless rocket cannon which is commonly used by Gears for dependable, hard striking firepower. Although a bit large, the Light Bazooka is a good compromise between weight and firepower. The rockets are usually loaded in clips that can be rapidly exchanged for reloading. The projectiles are typically short, the primary ejection charge being stored separately within the main body of the bazooka itself.

The SureFire-60 Recoilless Cannon is a sturdy weapon which was designed especially for Gears. It fires tiny dart-shaped rockets which are propelled by a two-stage solid propellant motor. A small charge ejects the rocket out of the barrel, and the rocket ignites its propellant 50 meters downrange to boost it for another 150 meters.

Medium Bazooka

Purpose:	Anti-Armor/Anti-Gear
Effective Range:	800 m
Penetration:	450 mm
Accuracy:	average
Mode of Fire:	single shot
Usual Ammo Load:	3 rockets

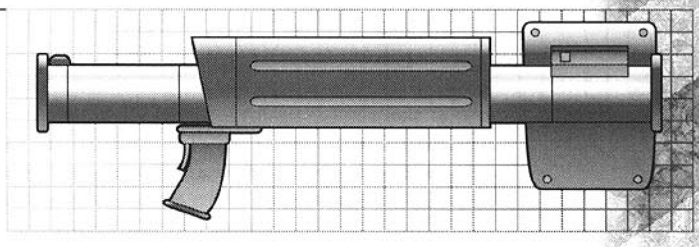


The Medium Bazooka is a larger model of recoilless cannon which can cause great amounts of damage to a target. The rockets are contained within a detachable magazine which can be quickly replaced by a fresh one; Gears often carry several additional ammo packs for this weapon. Like the Light Bazooka, a separate charge ejects the rocket from the barrel, the motor igniting nearly 60 meters from the muzzle to prevent any damage to the firing unit.

The Riley B-300 and Territorial Arms LRB-17 are two classic examples of a medium-sized bazooka which can be carried as the main weapon of a Gear on a strike mission. Both rely on clipped ammunition for ease of reloading and a steady rate of fire. Most experienced Gear pilots can change a clip in under ten seconds.

Heavy Bazooka

Purpose:	Anti-Armor/Anti-Gear
Effective Range:	800 m
Penetration:	625 mm
Accuracy:	average
Mode of Fire:	single shot
Usual Ammo Load:	3 rockets

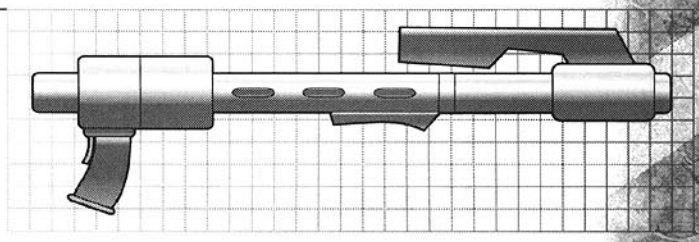


The largest recoilless cannon available on the battlefield, the Heavy Bazooka is so large and unwieldy that only assault Gears and front-line combat vehicles can carry it. Although it has a shorter range, the bazooka's damage is comparable to an ATM's.

The Territorial Arms LRB-30 has been described as "one darn big gun" by the soldiers using it. The LRB-30 uses rockets which are practically anti-tank missiles with the guidance system removed, making ammunition cheap and easy to come by.

Rapid-Fire Bazooka

Purpose:	Anti-Gear
Effective Range:	400 m
Penetration:	200 mm
Accuracy:	average
Mode of Fire:	burst
Usual Ammo Load:	30 rockets



Take a standard infantry rocket launcher; make it bigger, tougher, and fully automatic; give it a good-sized clip, and you get a good description of the Rapid-Fire Bazooka. This rocket cannon is especially deadly when used in burst fire mode.

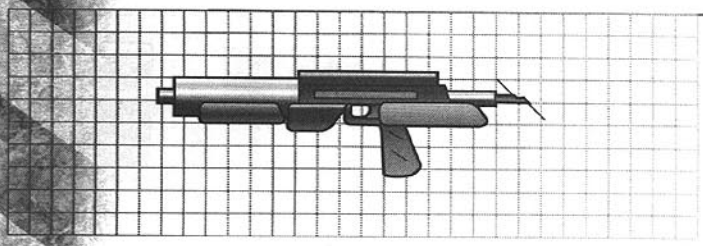
The Paxton RFL-2 "Soothsayer" Rapid-Fire Bazooka uses the same ammo as the common Paxton infantryman's rocket launcher, so ammunition is easy to come by. It is light and compact and thus often carried by light Gear designs.

Laser Weaponry - 9.8.6

Laser is an acronym for Light Amplification by Stimulated Emission of Radiation. This type of weapon fires a beam of coherent energy, generally light, in the near-visible frequency range using millennia-old High Energy Laser (HEL) techniques.

Almost all battlefield lasers are cumbersome, specialized weapons whose efficiency is impaired by the presence of atmospheric dust and water vapor. Their main advantage is their high accuracy: there is no lead time, and an acquired target is quite simply a dead target. This makes lasers prefered anti-aircraft weapon.

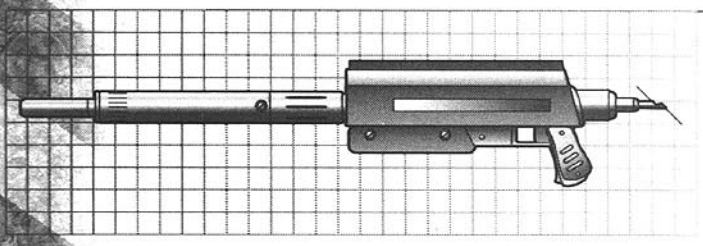
Because of its limitations and expense, laser weaponry is generally only employed in two capacities: for commando operations and as anti-aircraft weapons. In the former situation, lasers provide stealth Gears with sniper capabilities that make them extremely deadly. In the latter function, lasers provide effective AA coverage for most main battle tanks and some light tanks.



Sniper Laser Cannon

Purpose:	Anti-Vehicle Sniper
Effective Range:	2000 m
Penetration:	145mm (up to 250 m range)
Accuracy:	good
Mode of Fire:	single
Usual Energy Charge:	20 shots

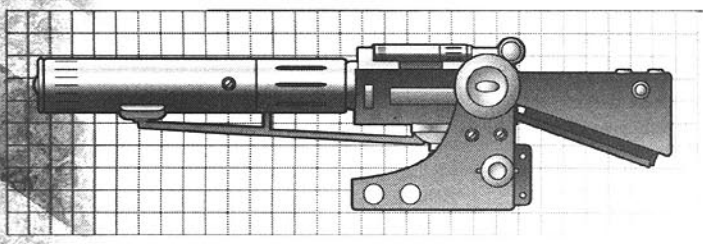
The Sniper Laser is an energy cannon which is designed for long range performance: efficient power converter, slow beam dispersion, superior focusing lenses. Although the weapon is an energy hog — each superconducting loop powering it can only hold enough juice for a few shots — it is extremely efficient for sniper operations because of its range and high penetration.



Light Laser Cannon

Purpose:	Anti-Vehicle
Effective Range:	2000 m
Penetration:	196 mm (up to 250 m range)
Accuracy:	good
Mode of Fire:	single
Usual Energy Charge:	15 shots

A larger version of the common Sniper Laser, the Light Laser Cannon delivers more raw energy to the target. Atmospheric attenuation and beam dispersion drops the damage fairly rapidly over distance, but the gun's high accuracy and (almost) line of sight range makes it useful for a variety of tasks. It shares a laser's tendency for high energy consumption.



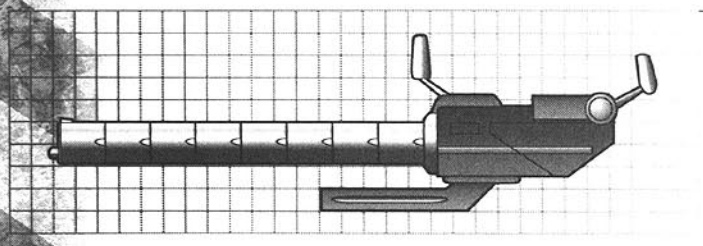
Heavy Laser Cannon

Purpose:	Anti-Vehicle
Effective Range:	2000 m
Penetration:	400 mm (up to 250 m range)
Accuracy:	good
Mode of Fire:	single
Usual Energy Charge:	10 shots

The largest vehicle-mounted battlefield laser, the Heavy Laser Cannon is popular for its high punch and lack of recoil. Although powerful, the HLC is nonetheless greatly limited by beam attenuation, which diminishes the damage over long distances.

9.8.7 - Magnetic Acceleration Cannons

This class of weapon uses a system of electromagnets to launch projectiles at an extremely high velocity. This reduces lead time and flattens trajectories, improving accuracy. The shells are small chunks of shaped composite or plastic with a metal "skirt" to grip the magnetic field. Railguns and mass-drivers are power-hungry and include dedicated capacitor banks to feed them; even then, the number of shots is limited by the energy they contain. The actual ammunition is not a problem since the individual shells are so small.



Light Railgun

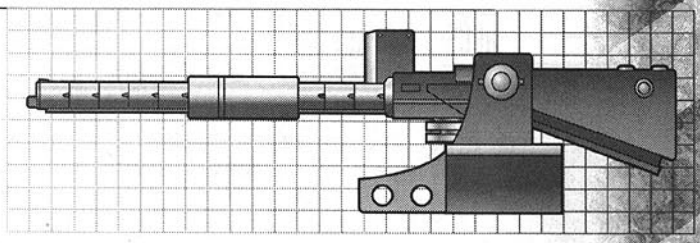
Purpose:	Anti-Tank
Effective Range:	2000 m
Penetration:	200 mm
Accuracy:	average
Mode of Fire:	burst
Usual Energy Charge:	60 shots

The Light Railgun uses magnetic accelerator technology to propel one or more lightweight projectiles to fantastic speed, causing an awesome amount of damage to the target. The Light Railgun's open bore and rapid capacitor recycling allow a machinegun-like rate of fire.

The 3mm Westfellow Technologies LOKI is a standard Light Railgun. It is found on some light tank designs and in the hands of some of the largest "Strike" type Gears. Westfellow's engineers managed to reduce the weapon's length while keeping performance intact.

Heavy Railgun

Purpose:	**Anti-Armor**
Effective Range:	**4000 m**
Penetration:	**1225 mm**
Accuracy:	**average**
Mode of Fire:	**single shot**
Usual Energy Charge:	**24 shots**



The Heavy Railgun is one of the most monstrous weapons available on the modern battlefield. Magnetic acceleration sends a hypersonic slug straight through any armored target, most often killing it. The large energy requirement of the gun limits its rate of fire as well as its ammunition capacity, ammunition in this case being the capacitor energy banks.

The 10mm Westfellow Technologies THOR is one of the rare advanced weapons seen on the battlefield. It is the main weapon of the Northern Lights Confederacy's Aller main battle tank. The gun has a separate engine to recharge its super-conducting capacitors.

Particle Accelerators - 9.8.8

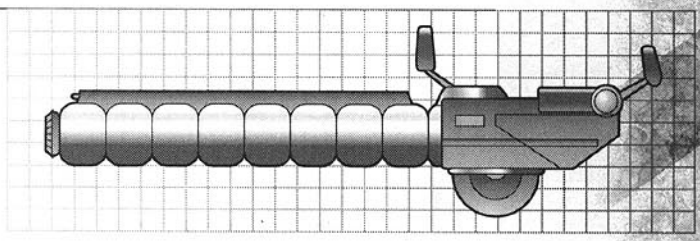
This class of weapon emits beams of atomic particles at velocities near the speed of light. Particle accelerators require large amounts of energy in order to function and are not very efficient in an atmosphere.

Particle accelerators cause damage through both impact and electronic disruption. Most are equipped with an integral "leading" laser system to "burn" an ionized path to the target, but they still lose energy and hitting power over long distances through beam diffusion and atmospheric interactions.

Particle accelerators have become infamous on Terra Nova as the weapons of choice of the Colonial Expeditionary Force. The CEF's deadly hovertanks used these weapons as their main armament with devastating effect in the early days of the war. It was only Terranovan tenacity and the sheer number of defending troops that bogged down the relentless invasion before it was too late.

Light Particle Accelerator

Purpose:	**Anti-Vehicle**
Effective Range:	**400 m**
Penetration:	**100 mm (+ electrical damage)**
Accuracy:	**good**
Mode of Fire:	**single shot**
Usual Energy Charge:	**20 shots**

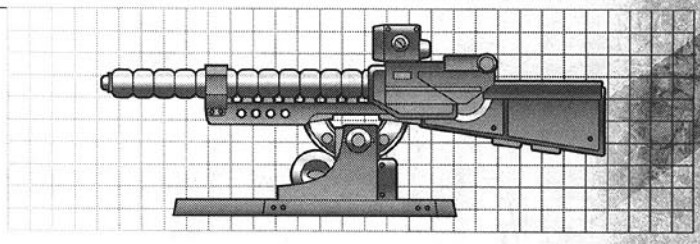


The Light Particle Accelerator is small enough to be carried by the largest Gear models. It is thus the most common weapon of this type seen on the battlefield. Although the weapon itself is heavy and cumbersome and does not cause much damage when compared to a conventional weapon, its electronic disruption effects are a boon to salvage-minded commanders.

The experimental Northco XPA-001 particle accelerator is the main weapon of the Kodiak, the CNCS' largest and most impressive Gear. The XPA-001 remains a limited production item today and was very much a prototype during the War of the Alliance. Northco hopes to market it as a mass-produced weapon at some point in the future.

Heavy Particle Accelerator

Purpose:	**Anti-Vehicle**
Effective Range:	**800 m**
Penetration:	**225 mm (+ electrical damage)**
Accuracy:	**good**
Mode of Fire:	**single shot**
Usual Energy Charge:	**15 shots**



The Heavy Particle Accelerator is the largest particle weapon carried by land vehicles. It has a range comparable to many projectile weapons and its massive electrical discharge can sometimes burn out everything aboard an enemy vehicle in one shot — including the crew. Most current models of HPA are based upon the energy weapons salvaged from wrecked Earth hovertanks.

The particle accelerator carried by the CEF's HT-68 heavy assault hovertanks were frightening effective weapons and Terranovan engineers have yet to fully reproduce their capabilities. Only the Korps of Port Arthur have authentic CEF HPA technology, and even they are rumored to now be using downgraded models because of maintenance problems.

HACS-01LG-SCT CHEETAH

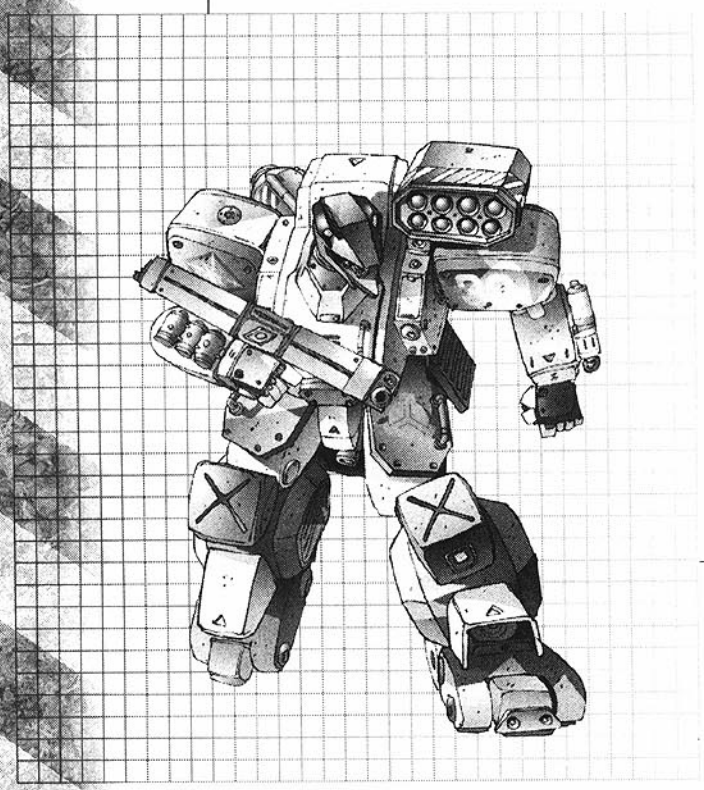
The Cheetah scout Gear was the first machine to announce the technological superiority of the North in the early part of the twentieth century. Designed to surpass the speed and maneuverability of previous scout and reconnaissance Gears such as the Bobcat and Ferret, the Cheetah used cutting edge technology on a frame similar to the Northco Hunter. The new machine's almost fully humanoid design allowed it to be used in a variety of specialized combat roles, including assaults that were previously off limits to the combat-shy Bobcat and Ferret. The Cheetah is nonetheless lightly armored, but it relies on outstanding speed and superb maneuverability to give it a defensive edge. Speed is not always an appropriate defense, however, and the scout Gear is still often deployed with heavier Gears when undertaking combat missions. Attempts to increase armor strength have thus far been largely unsuccessful. The Gear is equipped with a variety of hardpoints including a series of waist-level attachments for deployable pack-guns to supplement any shoulder-mounted weaponry. The standard armament consists of a single pack gun, a RP-109 Pepperbox missile pod, grenades and a vibroknife.

Service Record

The attempted invasion of Terra Nova by the Colonial Expeditionary Force in TN 1913 provided the Cheetah with ample opportunity to prove its worth in battle. Although few combat vehicles could match the combination of speed and firepower presented by the CEF's deadly hovertanks, the Cheetah was able to hold its own. Combat-capable scout units gave many Northern forces a critical edge when facing the initial drive of the Earth forces into the United Mercantile Federation and the border territories of the Western Frontier Protectorate. As the command of all Northern forces was centralized, the Cheetah came into much wider distribution and many units were transferred to the Mercantile and Western theaters. The war also saw the development of a many variants. Since the end of the war, the Cheetah has secured its place as the premier scout unit among almost all Northern forces, but is most widely used by the Northern Guard forces stationed in the Badlands. The Guard's elite 7th Gear Regiment — the Cat's Paws — use a great number of Cheetahs and swear by its strengths. The Paws' prestige ensures that Cheetah orders remain high.

Game Statistics

Threat Value:	625	Offensive:	380	Defensive:	800	Miscellaneous:	696	Lemon Dice:	3



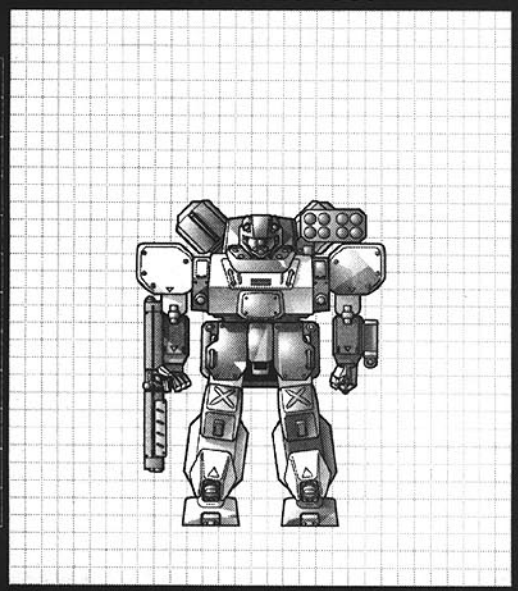
Vehicle Specifications

Code name:	Cheetah
Production code:	HACS-01LG-SCT
Production Type:	Mass Production
Cost:	468,750 marks
Manufacturer:	Shaian Mechanics
Use:	scout/recon Gear
Height:	4.1 meters
Width:	3.3 meters
Average armor thickness:	20 mm
Armor material:	durasheet w/alloy
Standard operational weight:	5230 kg
Primary Movement Mode:	Walk (65 kph)
Secondary Movement Mode:	Ground (91.6 kph)
Deployment Range:	600 km
Sensor Range:	100 hexes/5 km
Communication Range:	500 hexes/25 km
Powerplant:	S-V820S V-Engine
Horsepower:	425 hp

Weapon Payload

Name	Ammunition Payload
M25 Pack Gun	30 shells
RP-109 Pepperbox	24 rockets
M-2A Hand Grenade	4 grenades
HW-VB-1 Vibroknife	-

CHEETAH HACS-01LG-SCT



ARMOR DAMAGE

0 ☐☐☐☐☐ ☐☐☐☐☐

10 ☐☐☐☐☐ ☐☐☐☐☐

20 ☐☐☐☐☐ ☐☐☐☐☐

30 ☐☐☐☐☐ ☐☐☐☐☐

40 ☐☐☐☐☐ ☐☐☐☐☐

CREW INFORMATION

- PILOT NAME:
- RANK:
- SQUADRON:
- AFFILIATION:

PILOT (LV/AT): ☐☐ GUNNERY (LV/AT): ☐☐ ELEC. WAR. (LV/AT): ☐☐

CREW DATA

VEHICLE CREW

• CREW:	1
• BONUS ACTIONS:	0

CREW DAMAGE

VEHICLE CREW

☐ CREW •

☐ BONUS ACTIONS •

SYSTEMS DATA

MOVEMENT

• PRIMARY COMBAT SPD:	W	6
• PRIMARY TOP SPD:	W	11
• SECONDARY COMBAT SPD:	G	8
• SECONDARY TOP SPD:	G	15
• MANEUVER:		+2
• DEPLOYMENT RANGE:		600

ELECTRONICS

• SENSORS:	+2	5
• COMMUNICATION:	+1	25
• FIRE CONTROL:		0

ARMOR

• LIGHT DAMAGE:	10
• HEAVY DAMAGE:	20
• OVERKILL:	30

SYSTEMS DAMAGE

MOVEMENT

☐ COMBAT SPD •

☐ TOP SPD •

☐ COMBAT SPD •

☐ TOP SPD •

☐ MANEUVER •

☐ FUEL SPENT •

ELECTRONICS

☐ SENSORS •

☐ COMM •

☐ FIRE CONTROL •

ARMOR

☐ LIGHT DAMAGE •

☐ HEAVY DAMAGE •

☐ OVERKILL •

GENERAL SPECIFICATIONS

• THREAT VALUE: 625 • SIZE: 6 • COST: 468,750 marks

WEAPONS

NAME	CODE	FIRE ARC	S	M	L	EX	Acc	Dam	Qty	ROF	Special
M25 Pack Gun	DPG	Forward	2	4	8	16	-1	x8	1	+2	Disposable
RP-109 Pepperbox	LRP/24	Forward	1	2	4	8	-1	x12	1	+3	Indirect Fire
M-2A Grenade	HG	Forward	0	0	0	0	-1	x15	-	0	Anti-Infantry
HW-VB1 Vibroknife	VB	Forward	0	0	0	0	0	x8	1	0	Physical Attack

AMMO

FULL	LEFT
30	
24	
4	
-	

WEAPONS

☐ WEAPON 01 •

☐ WEAPON 02 •

☐ WEAPON 03 •

☐ WEAPON 04 •

WEAPON 05 •

WEAPON 06 •

WEAPON 07 •

WEAPON 08 •

WEAPON 09 •

WEAPON 10 •

PERKS

NAME	RATING	GAME EFFECT	AUX
ECM	3	Offensive electronic warfare equipment	Yes
Hostile Environment Protection	-	Desert	
Manipulator Arm x 2	6	Can punch	
Target Designator	2	Target guided weapons	Yes

PERKS

☐ PERK 01 •

☐ PERK 02 •

☐ PERK 03 •

☐ PERK 04 •

PERK 05 •

PERK 06 •

PERK 07 •

PERK 08 •

PERK 09 •

PERK 10 •

PERK 11 •

FLAWS

NAME	RATING	GAME EFFECT
Annoyance	-	Cramped cockpit, max. pilot Build is 0

DEFECTS

NAME	RATING	GAME EFFECT
None	-	-

HEAVY GEAR

HACS-01MG-MP HUNTER

The Hunter was the first exclusively military walker machine on Terra Nova and remains among the most commonly seen Gear designs in active military service. Its greatest strength has always been its versatility and simplicity of design. Created when there were no scout/recon or fire-support Gears, the Hunter had to manage all by itself or in conjunction with more traditional armored or infantry forces. Although a great challenge to create, the Hunter was designed to be relatively easy to maintain and upgrade, allowing it to remain in service for decades without being refit. The simplicity of design has also meant a proliferation of specialized variants designed to excel at specific combat tasks. The standard Hunter (actually the Mark II, introduced in TN 1852) remain in wide usage, however, even in the face of more advanced machines. The standard armament of the Hunter reflects its generalized military duty. A Riley M222 autocannon rifle and a RP-109 Pepperbox act as the primary weapons, providing a good combination of firepower, range and limited indirect fire capabilities. A Mark IV anti-personnel grenade launcher provides additional defense against infantry, while several Gear-scale M-2A hand grenades and a vibroknife allow the Hunter to enter close combat.

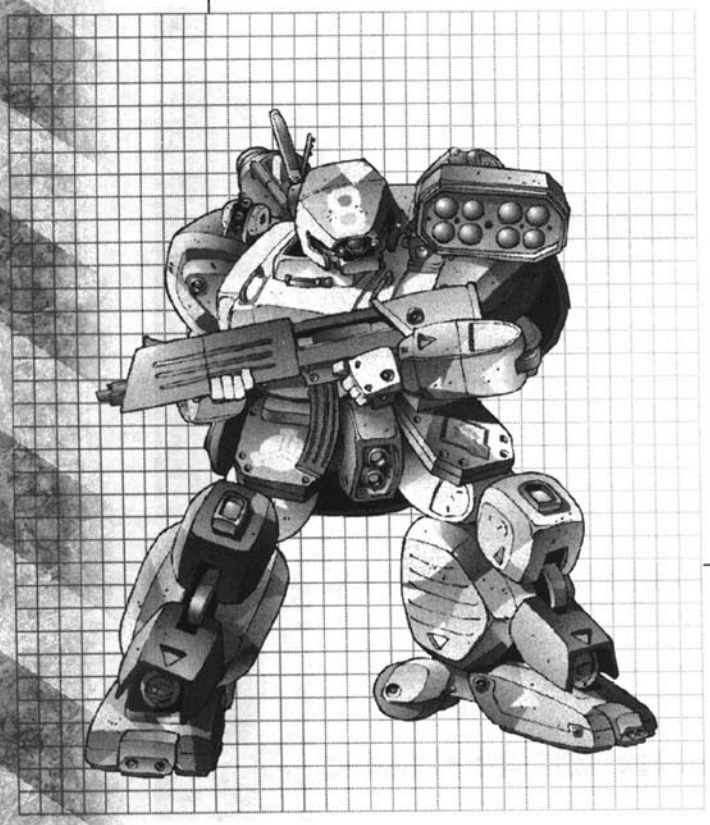
◆ Service Record

The Hunter has seen more action than any other Northern combat Gear. First deployed during border conflicts between the expansionist United Mercantile Federation and the other major Northern leagues, the Hunter encountered its Southern counterpart (the Jäger) during the Merchant War of TN 1686 to 1688. The devastating battles of St. Vincent's War were also fought by the Hunter and the wide-scale warfare saw the machine begin to spread into the Badlands. The Gear was modernized and renamed the Hunter Mark II in the TN 1850s during another period of intense North-South conflict. The hard times of the War of the Alliance proved the endurance of the Hunter, because expensive spare parts and complex repair procedures limited the availability and service of more sophisticated machines. Northco is currently examining the possibility of creating a Hunter Mark III.

Game Statistics

Threat Value:	380	Offensive Score:	450	Defensive Score:	298	Miscellaneous Score:	392	Lemon Dice:	3

Vehicle Specifications

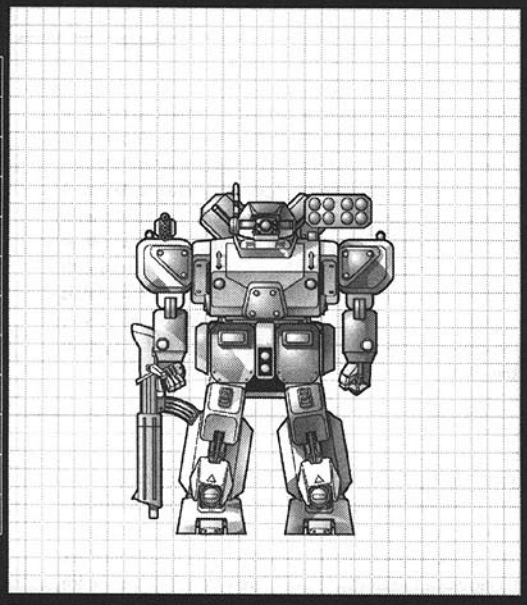


Code Name:	Hunter (Mark II)
Production Code:	HACS-01MG-MP
Production Type:	Mass Production
Cost:	221,590 marks
Manufacturer:	Northco
Use:	trooper Gear
Height:	4.3 meters
Width:	3.0 meters
Average Armor Thickness:	45 mm
Armor Material:	durasheet w/alloy
Standard Operational Weight:	6627 kg
Primary Movement Mode:	Walk (42 kph)
Secondary Movement Mode:	Ground (72 kph)
Deployment Range:	500 km
Sensor Range:	40 hexes/2 km
Communication Range:	200 hexes/10 km
Powerplant:	S-V950A V-Engine
Horsepower:	450 Hp

Weapon Payload

Name	Ammunition Payload
M222 Autocannon rifle	60 rounds
RP-109 Pepperbox	24 rockets
MK IV Grenade Launcher	6 grenades
M-2A Hand Grenade	3 grenades
HW-VB1 Vibroknife	-

HUNTER HACS-01MG-MP



ARMOR DAMAGE

0 | 10 | 20 | 30 | 40

CREW INFORMATION

- PILOT NAME:
- RANK:
- SQUADRON:
- AFFILIATION:

PILOT (LV/AT): GUNNERY (LV/AT): ELEC. WAR. (LV/AT):

CREW DATA

VEHICLE CREW

• CREW:	1
• BONUS ACTIONS:	0

CREW DAMAGE

VEHICLE CREW

CREW •
BONUS ACTIONS •

SYSTEMS DATA

MOVEMENT

• PRIMARY COMBAT SPD:	W	4
• PRIMARY TOP SPD:	W	7
• SECONDARY COMBAT SPD:	G	6
• SECONDARY TOP SPD:	G	12
• MANEUVER:		0
• DEPLOYMENT RANGE:		500

ELECTRONICS

• SENSORS:	0	2
• COMMUNICATION:	0	10
• FIRE CONTROL:		0

ARMOR

• LIGHT DAMAGE:	15
• HEAVY DAMAGE:	30
• OVERKILL:	45

SYSTEMS DAMAGE

MOVEMENT

COMBAT SPD •
TOP SPD •
COMBAT SPD •
TOP SPD •
MANEUVER •
FUEL SPENT •

ELECTRONICS

SENSORS •
COMM •
FIRE CONTROL •

ARMOR

LIGHT DAMAGE •
HEAVY DAMAGE •
OVERKILL •

GENERAL SPECIFICATIONS

• THREAT VALUE: 380 • SIZE: 6 • COST: 221,590 marks

WEAPONS

NAME	CODE	FIRE ARC	S	M	L	EX	Acc	Dam	Qty	ROF	Special
M222 Autocannon	LAC	Forward	2	4	8	16	0	x8	1	+2	-
RP-109 Pepperbox Rocket Pod	LRP/24	Forward	1	2	4	8	-1	x12	1	+3	Indirect Fire
MK IV Grenade Launcher	APGL	Fixed F.	1	2	4	8	-1	x3	1	0	Anti-I, IF, AE=0
M-2A Hand Grenade	HG	Forward	0	0	0	0	-1	x15	-	0	Anti-Infantry
HW-VB1 Vibroknife	VB	Forward	0	0	0	0	0	x8	1	0	Physical Attack

AMMO

FULL	LEFT
60	
24	
6	
3	
-	

WEAPONS

WEAPON 01 •
WEAPON 02 •
WEAPON 03 •
WEAPON 04 •
WEAPON 05 •
WEAPON 06 •
WEAPON 07 •
WEAPON 08 •
WEAPON 09 •
WEAPON 10 •

PERKS

NAME	RATING	GAME EFFECT	AUX
Easy to Modify	-	+2 to Repair and Modify rolls	
Hostile Environment Protection	-	Desert	
Manipulator Arm x 2	6	Can Punch	

PERKS

PERK 01 •
PERK 02 •
PERK 03 •
PERK 04 •
PERK 05 •
PERK 06 •
PERK 07 •
PERK 08 •
PERK 09 •
PERK 10 •
PERK 11 •

FLAWS

NAME	RATING	GAME EFFECT
None	-	-

DEFECTS

NAME	RATING	GAME EFFECT
None	-	-

HEAVY GEAR

HACS-02MG-MPS JAGUAR

The most advanced commando/general purpose Gear in the Northern armed forces, the Jaguar was developed as a possible successor of the Hunter. The armament of the new Gear was kept very similar to that of the Hunter, although the main direct fire weapon became the heavier Riley MR25 machinecannon rifle. A new second-generation IHADS control interface and a more precise targeting system allowed a generalized improvement in fire-control. Actuator systems were improved as well using a new and more powerful actuator design. A more powerful communications array also allowed the Jaguar to function under mild ECM jamming and to be used as a command unit. The Jaguar also benefited from the introduction of a new S-V1110 V-Engine that could produce 620 horsepower and allowed it to outpace any Gear in its class. New armor materials, still using the durasheet composite standard to Northern Gears but reinforced with steel alloy sub-plates and chassis struts made the Jaguar more resistant to damage from shock and weapon fire. The reinforced chassis of the Jaguar also made possible a built-in airdropping capability for every production model. To ensure that each Jaguar can survive multiple drops with ease, its legs are reinforced. The only real drawback of the Jaguar design is the interface for the new IHADS system: bulkier than the old Hunter-inspired system, it leaves little headroom for the pilot.

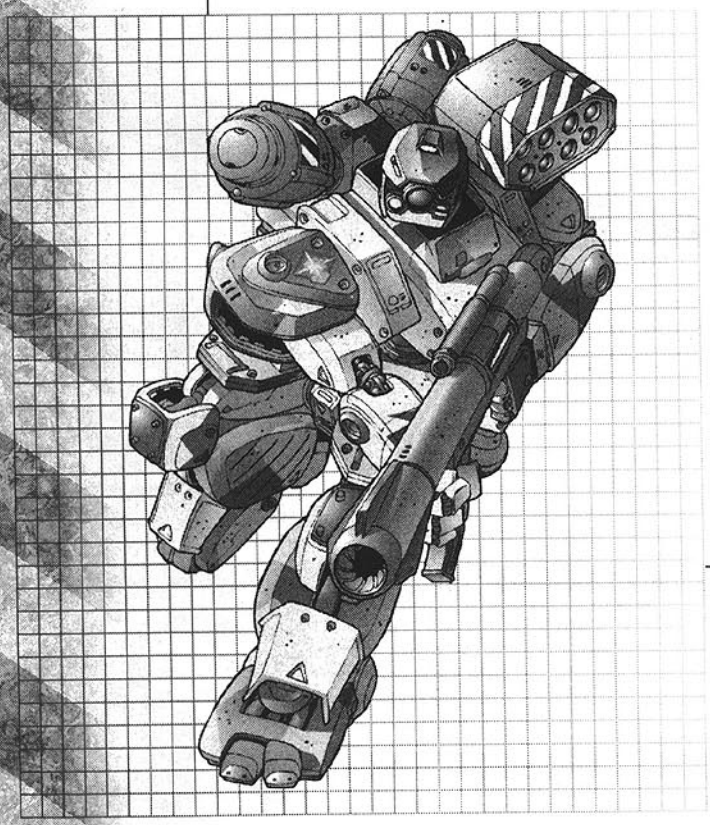
Service Record

The Jaguar entered full production just in time to take part in the fight against the Earth invasion. They first swelled the ranks of the Northern armies and, once a rapid agreement had been reached, were sent south to answer the need for high-technology commando Gears in Southern forces. The Jaguar saw action across the planet as a commando, a trooper, a command unit, an anti-armor unit and a makeshift airdroppable fire-support Gear. It also (unfortunately for its pilots) jump-started Southern Gear development and inspired the deadly Black Mamba. The Jaguar has yet to replace the Hunter because of its higher cost and increased complexity, but with every cycle it enters service in more and more units and some consider it only a matter of time before it becomes the lead Gear of all Northern forces.

Game Statistics

Threat Value:	628	Offensive Score:	1064	Defensive Score:	552	Miscellaneous Score:	268	Lemon Dice:	3

Vehicle Specifications

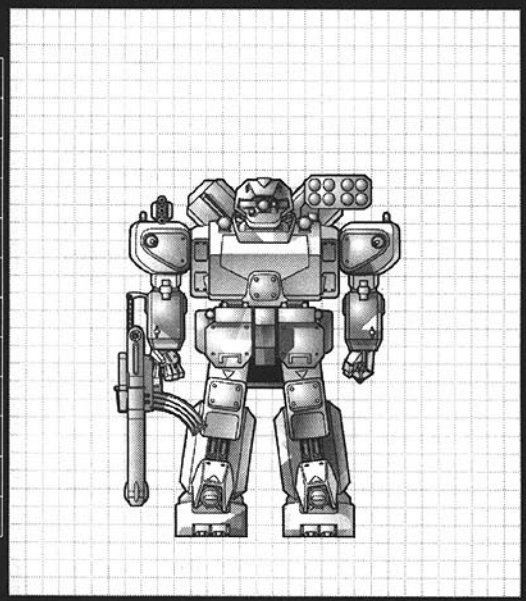


Code Name:	Jaguar
Production Code:	HACS-02MG-MPS
Production Type:	Mass Production
Cost:	471,750 marks
Manufacturer:	Northco
Use:	general purpose Heavy Gear
Height:	4.6 meters
Width:	3.4 meters
Average Armor Thickness:	51 mm
Armor Material:	durasheet w/alloy and ceramic
Standard Operational Weight:	7123 kg
Primary Movement Mode:	Walk (53 kph)
Secondary Movement Mode:	Ground (81 kph)
Deployment Range:	550 km
Sensor Range:	60 hexes/3 km
Communication Range:	300 hexes/15 km
Powerplant:	S-V1110 V-Engine
Horsepower:	620 Hp

Weapon Payload

Name	Ammunition Payload
MR25 Machinecannon rifle	40 rounds
RP-111 Pepperbox II	32 rockets
MK IV Grenade Launcher	6 grenades
M-2A Hand Grenade	3 grenades
HW-VB1 Vibroknife	-

JAGUAR HACS-02MG-MPS



ARMOR DAMAGE

0 | 10 | 20 | 30 | 40

CREW INFORMATION

- PILOT NAME:
- RANK:
- SQUADRON:
- AFFILIATION:

PILOT (LV/AT): GUNNERY (LV/AT): ELEC. WAR. (LV/AT):

CREW DATA

VEHICLE CREW

• CREW:	1
• BONUS ACTIONS:	0

CREW DAMAGE

VEHICLE CREW

CREW •
BONUS ACTIONS •

SYSTEMS DATA

MOVEMENT

• PRIMARY COMBAT SPD:	W	5
• PRIMARY TOP SPD:	W	9
• SECONDARY COMBAT SPD:	G	7
• SECONDARY TOP SPD:	G	13
• MANEUVER:		+1
• DEPLOYMENT RANGE:		550

ELECTRONICS

• SENSORS:	0	3
• COMMUNICATION:	+1	15
• FIRE CONTROL:		+1

ARMOR

• LIGHT DAMAGE:	16
• HEAVY DAMAGE:	32
• OVERKILL:	48

SYSTEMS DAMAGE

MOVEMENT

COMBAT SPD •
TOP SPD •
COMBAT SPD •
TOP SPD •
MANEUVER •
FUEL SPENT •

ELECTRONICS

SENSORS •
COMM •
FIRE CONTROL •

ARMOR

LIGHT DAMAGE •
HEAVY DAMAGE •
OVERKILL •

GENERAL SPECIFICATIONS

• THREAT VALUE: 628 • SIZE: 6 • COST: 471,000 marks

WEAPONS

NAME	CODE	FIRE ARC	S	M	L	EX	Acc	Dam	Qty	ROF	Special
MR25 Autocannon	MAC	Forward	3	6	12	24	0	x10	1	+1	-
RP-111 Pepperbox II	LRP/32	Forward	1	2	4	8	-1	x12	1	+4	Indirect Fire
MK IV G Launcher	APGL	Fixed F.	1	2	4	8	-1	x3	1	0	AI, IF, AE0
M-2A Hand Grenade	HG	Forward	0	0	0	0	-1	x15	1	0	Anti-Infantry
HW-VB1 Vibroknife	VB	Forward	0	0	0	0	0	x8	1	0	-

AMMO

FULL	LEFT
40	
32	
6	
3	
-	

WEAPONS

WEAPON 01 •
WEAPON 02 •
WEAPON 03 •
WEAPON 04 •
WEAPON 05 •
WEAPON 06 •
WEAPON 07 •
WEAPON 08 •
WEAPON 09 •
WEAPON 10 •

PERKS

NAME	RATING	GAME EFFECT	AUX
Airdroppable	-	Can be airdropped	
Hostile Environment Protection	-	Desert	
Manipulator Arm x2	6	Can punch	

PERKS

PERK 01 •
PERK 02 •
PERK 03 •
PERK 04 •
PERK 05 •
PERK 06 •
PERK 07 •
PERK 08 •
PERK 09 •
PERK 10 •
PERK 11 •

FLAWS

NAME	RATING	GAME EFFECT
Annoyance	-	Cramped Head Space

DEFECTS

NAME	RATING	GAME EFFECT
None	-	-

HEAVY GEAR

HACS-02HG-MPS GRIZZLY

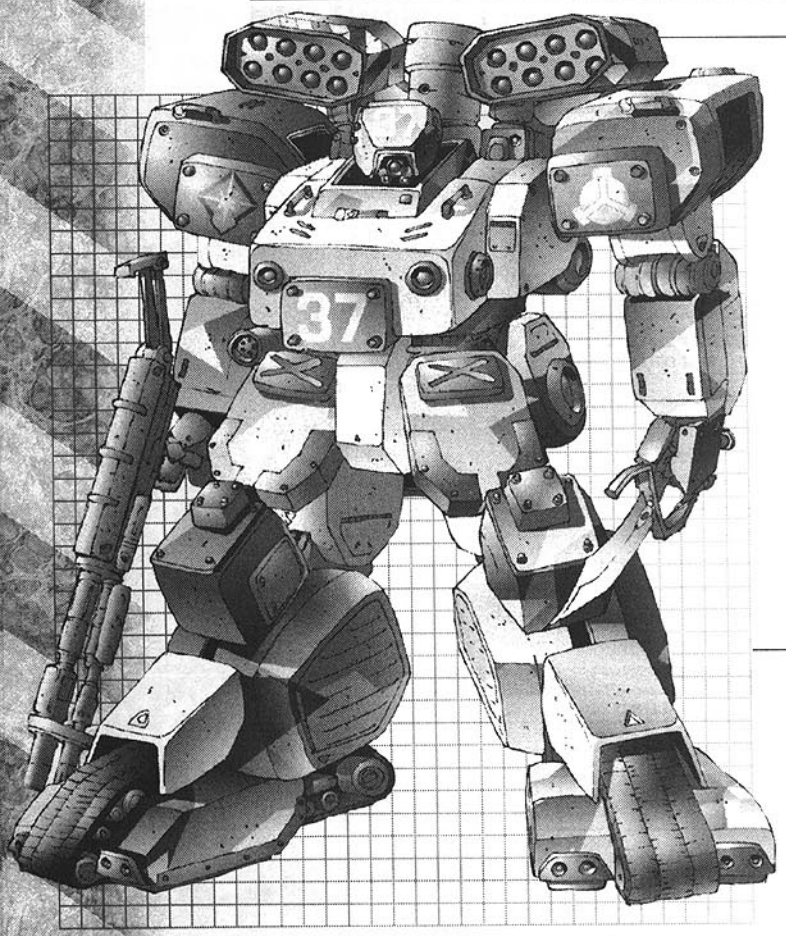
The Grizzly heavy fire support Gear has been a mainstay of the Northern armies since its introduction in the TN 1870s. The basic armament of the Grizzly is based on that of the older Bear, featuring a Riley M225 heavy autocannon supplemented by twin GH-8 rocket pods. The Grizzly also carries a TD-76 mortar unit, capable of lobbing guided high-explosive shells up to two kilometers. This long-range guided weaponry makes the Grizzly extremely dangerous when paired with a forward observing unit using a laser designator — such as a Cheetah or Ferret scout/recon Gears. The Grizzly's S-V2200Z engine performs well, but the Gear remains slow and lumbering compared to other units. To provide point defense, the Grizzly was equipped with a GU-10 gatling machinegun. The Grizzly is also usually deployed with lighter machines as defensive escorts. The standard tactical deployment remains in mixed companies, using squadrons of Grizzlies in secondary positions, with strike squadrons moving forward and including at least one forward observing unit to relay coordinates and laser targeting data to the Grizzlies. The successful use of the Grizzly has led to the progressive decommissioning of the Bear.

Service Record

The Grizzly has proved its worth repeatedly over the sixty cycles of its existence. An expensive machine to produce, the Grizzly only slowly replaced the Bear. It first saw action in a Northern Guard campaign to suppress a particularly vicious Wounded Knee smuggling ring in the TN 1880s and was responsible for a stunning number of kills. The Grizzly was also involved in a fair number of skirmishes with Southern MILICIA troops in the Badlands. The true test, however, was the War of the Alliance. Faced with the fast armor of Colonial Expeditionary Force hovertanks, the Grizzly proved effective in combat, especially when deployed with forward observing units to "tag" hovertanks with laser designators. Since the war, the Grizzly has continued to serve with distinction across the Northern hemisphere. The TN 1920s saw an especially wide distribution of Grizzlies as the Northern Guard replaced most of its Bears with it.

Game Statistics

Threat Value:	888	Offensive:	2175	Defensive:	255	Miscellaneous:	236	Lemon Dice:	3



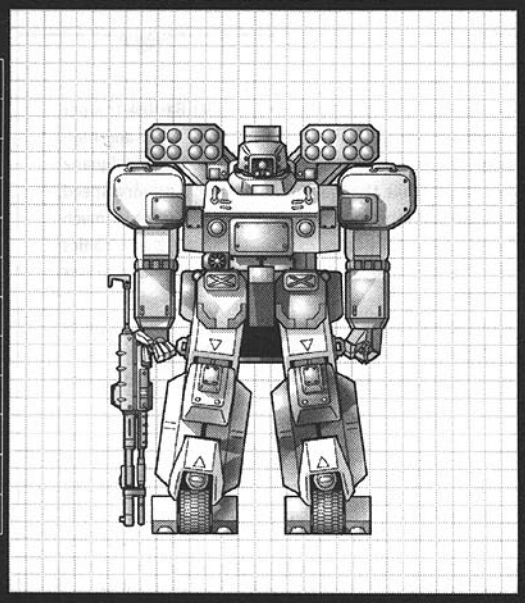
Vehicle Specifications

Code Name:	Grizzly
Production Code:	HACS-02HG-MPS
Production Type:	Mass Production
Cost:	634,286 marks
Manufacturer:	Northco/Shaian Mechanics
Use:	close fire support Heavy Gear
Height:	5.1 meters
Width:	3.8 meters
Average Armor Thickness:	70 mm
Armor Material:	durasheet w/alloy and ceramic
Standard Operational Weight:	9210 kg
Primary Movement Mode:	Walk (38 kph)
Secondary Movement Mode:	Ground (65 kph)
Deployment Range:	400 km
Sensor Range:	40 hexes/2 km
Communication Range:	200 hexes/10 km
Powerplant:	S-V2200Z V-Engine
Horsepower:	956 Hp

Weapon Payload

Name	Ammunition Payload
M225 Heavy Autocannon	30 shells
2 x GH-8 Rocket Pods	18 rockets each
GU-10 Gatling	300 rounds
M25 Pack Gun	30 rounds
TD-76 Mortar Unit	12 shells
HW-VB1 Vibroknife	-

GRIZZLY HACS-02HG-MPS



ARMOR DAMAGE

0 | 10 | 20 | 30 | 40

CREW INFORMATION

- PILOT NAME:
- RANK:
- SQUADRON:
- AFFILIATION:

PILOT (LV/AT): GUNNERY (LV/AT): ELEC. WAR. (LV/AT):

CREW DATA

VEHICLE CREW

• CREW:	1
• BONUS ACTIONS:	0

CREW DAMAGE

VEHICLE CREW

CREW •
BONUS ACTIONS •

SYSTEMS DATA

MOVEMENT

• PRIMARY COMBAT SPD:	W	3
• PRIMARY TOP SPD:	W	6
• SECONDARY COMBAT SPD:	G	6
• SECONDARY TOP SPD:	G	11
• MANEUVER:		-1
• DEPLOYMENT RANGE:		400

ELECTRONICS

• SENSORS:	O	2
• COMMUNICATION:	O	10
• FIRE CONTROL:		0

ARMOR

• LIGHT DAMAGE:	18
• HEAVY DAMAGE:	36
• OVERKILL:	54

SYSTEMS DAMAGE

MOVEMENT

COMBAT SPD •
TOP SPD •
COMBAT SPD •
TOP SPD •
MANEUVER •
FUEL SPENT •

ELECTRONICS

SENSORS •
COMM •
FIRE CONTROL •

ARMOR

LIGHT DAMAGE •
HEAVY DAMAGE •
OVERKILL •

GENERAL SPECIFICATIONS

• THREAT VALUE: 888 • SIZE: 7 • COST: 634,286 marks

WEAPONS

NAME	CODE	FIRE ARC	S	M	L	EX	Acc	Dam	Qty	ROF	Special
M225 Autocannon	HAC	Forward	3	6	12	24	0	x12	1	+1	-
GH-8 Rocket Pod	MRP/18	Forward	2	4	8	16	-1	x18	1	+3	Indirect Fire
GH-8 Rocket Pod	MRP/18	Forward	2	4	8	16	-1	x18	1	+3	Indirect Fire
GU-10 Gatling	HMG	Fixed F.	1	2	4	8	0	x4	1	+3	Anti-Infantry
M25 Pack Gun	DPG	Forward	2	4	8	16	-1	x8	1	+2	Disposable
TD-76 Mortar	HGM	Forward	5	10	20	40	-1	x20	1	0	Guided, MR5
HW-VB1 Vibroknife	VB	Forward	0	0	0	0	0	x8	1	0	Physical Attack

AMMO

FULL	LEFT
30	
18	
18	
300	
30	
12	
-	

WEAPONS

WEAPON 01 •
WEAPON 02 •
WEAPON 03 •
WEAPON 04 •
WEAPON 05 •
WEAPON 06 •
WEAPON 07 •
WEAPON 08 •
WEAPON 09 •
WEAPON 10 •

PERKS

NAME	RATING	GAME EFFECT	AUX
High Towing Capacity (Double)	-	Can tow twice its own weight	
Hostile Environment Protection	-	Desert	
Manipulator Arm x 2	7	Can Punch	
Reinforced Armor	2	Add to Base Armor rating of Front arc	

PERKS

PERK 01 •
PERK 02 •
PERK 03 •
PERK 04 •
PERK 05 •
PERK 06 •
PERK 07 •
PERK 08 •
PERK 09 •
PERK 10 •
PERK 11 •

FLAWS

NAME	RATING	GAME EFFECT
Large Sensor Profile	1	Subtract from concealment

DEFECTS

NAME	RATING	GAME EFFECT
None	-	-

HEAVY GEAR

OACS-01L/SC IGUANA

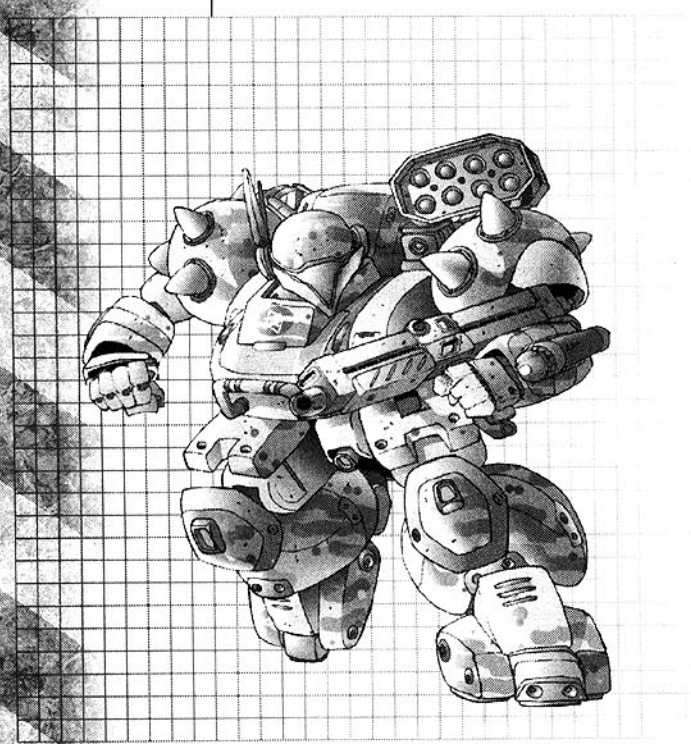
The basic scout and reconnaissance Gear of the Southern armies, the Iguana was designed to replace the older Basilisk trooper Gears that had been pressed into these duties in the past. Unlike the Northern Cheetah, which features light armor and high maneuverability, the Iguana had to be effective as a light general-purpose trooper as well as a scout model. The Iguana manages to couple speed and armor as few other machines have been able to do. While the Iguana can achieve a running speed of 52 kph, a rolling one of over 84 kph and an impressive degree of maneuverability, it nonetheless carries almost as much armored protection as the Jäger trooper Gear. The Iguana also features a top-of-the-line Obelisk MERIT 1000 electronics package, designed especially for the model. The Obelisk package provides long-range, precision sensor and communications equipment, supplemented by a battlefield electronic counter-measures (ECM) suite. The Iguana's main direct fire weapon is a simple MPGU-22 pack gun, supplemented by a Vogel-7 rocket pod and a simple vibroknife. The Iguana's weapons load is lighter than the Basilisk's or the Jäger's, but maintains a close approximation of their firepower. In line with its duties as a forward observer unit, the Iguana is also equipped with an arm-mounted Elite-15 laser target designator, allowing it to lead guided munitions to their targets.

◆ Service Record

Since its introduction in TN 1879, the Iguana has been a very successful design. Appreciated by its pilots for its combination of speed and armored protection, the "Iggy" can be found in all but the most disfavored of front-line units. The Iguana is so popular that Territorial Arms, in order to meet requirements, has subcontracted out much of the production to Skavara Heavy Industries. Over its career, the Iguana has proven itself an adept light trooper/commando machine as well, and is in use by elite forces in this function. Indeed, the speed of the machine, combined with its offensive and defensive capabilities, make it almost ideal for close-quarters rapid strike operations against lightly armored targets. The Iguana has also spawned a family of variants, many of which build on its strength as a commando unit.

Game Statistics

Threat Value:	584	Offensive:	336	Defensive:	464	Miscellaneous:	950	Lemon Dice:	3



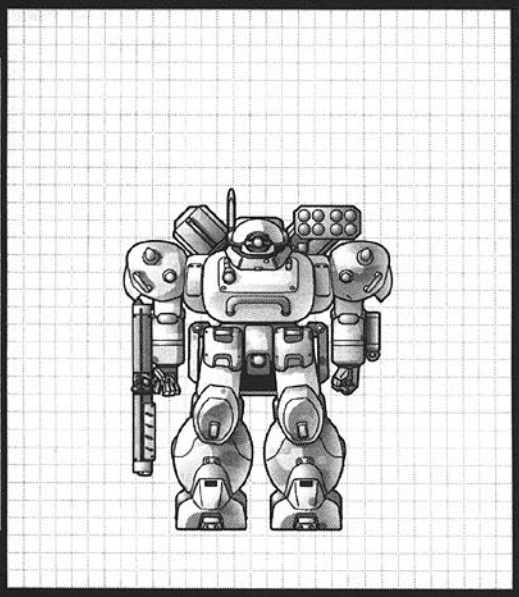
Vehicle Specifications

Code Name:	Iguana
Production code:	OACS-01L/SC
Production type:	Mass Production
Cost:	389,333 dinars
Manufacturer:	Territorial Arms/Skavara Heavy Industries
Use:	scout/recon Gear
Height:	4.1 meters
Width:	3.4 meters
Average armor thickness:	40 mm
Armor material:	armoplast w/alloy
Standard operational weight:	5100 kg
Primary Movement Mode:	Walk (52 kph)
Secondary Movement Mode:	Ground (84.2 kph)
Deployment Range:	700 km
Sensor Range:	80 hexes/4 km
Communication Range:	600 hexes/30 km
Powerplant:	WV-750TC/B V-engine
Horsepower:	360 Hp

Weapon Payload

Name	Ammunition Payload
MPGU-22 Pack Gun	30 shells
Vogel-7 Rocket Pod	24 rockets
VU-11 Vibromachete	-

IGUANA OACS-01L/SC



ARMOR DAMAGE

0 | 10 | 20 | 30 | 40

CREW INFORMATION

- PILOT NAME:
- RANK:
- SQUADRON:
- AFFILIATION:

PILOT (LV/AT): GUNNERY (LV/AT): ELEC. WAR. (LV/AT):

CREW DATA

VEHICLE CREW

• CREW:	1
• BONUS ACTIONS:	0

CREW DAMAGE

VEHICLE CREW

CREW •
BONUS ACTIONS •

SYSTEMS DATA

MOVEMENT

• PRIMARY COMBAT SPD:	W	5
• PRIMARY TOP SPD:	W	9
• SECONDARY COMBAT SPD:	G	7
• SECONDARY TOP SPD:	G	14
• MANEUVER:		+1
• DEPLOYMENT RANGE:		700

ELECTRONICS

• SENSORS:	+1	4
• COMMUNICATION:	+2	30
• FIRE CONTROL:		0

ARMOR

• LIGHT DAMAGE:	14
• HEAVY DAMAGE:	28
• OVERKILL:	42

SYSTEMS DAMAGE

MOVEMENT

COMBAT SPD •
TOP SPD •
COMBAT SPD •
TOP SPD •
MANEUVER •
FUEL SPENT •

ELECTRONICS

SENSORS •
COMM •
FIRE CONTROL •

ARMOR

LIGHT DAMAGE •
HEAVY DAMAGE •
OVERKILL •

GENERAL SPECIFICATIONS

• THREAT VALUE: 584 • SIZE: 6 • COST: 389,333 dinars

WEAPONS

NAME	CODE	FIRE ARC	S	M	L	EX	Acc	Dam	Qty	ROF	Special
MGPU-22 Pack Gun	DPG	Forward	2	4	8	16	-1	x8	1	+2	Disposable
Vogel-7 Rocket Pod	LRP/24	Forward	1	2	4	8	-1	x12	1	+3	Indirect Fire
VU-11 Vibromachete	VB	Forward	0	0	0	0	0	x8	1	0	-

AMMO

FULL	LEFT
30	
24	
-	

WEAPONS

WEAPON 01 •
WEAPON 02 •
WEAPON 03 •
WEAPON 04 •
WEAPON 05 •
WEAPON 06 •
WEAPON 07 •
WEAPON 08 •
WEAPON 09 •
WEAPON 10 •

PERKS

NAME	RATING	GAME EFFECT	AUX
Backup Sensors	-	Absorbs first "Sensor" hit	
ECM	2	Offensive Electronic Warfare equipment	Yes
Hostile Environment Protection	-	Desert	
Manipulator Arm x2	6	Can punch	
Target Designator	3	Used to target guided weapons	Yes

PERKS

PERK 01 •
PERK 02 •
PERK 03 •
PERK 04 •
PERK 05 •
PERK 06 •
PERK 07 •
PERK 08 •
PERK 09 •
PERK 10 •
PERK 11 •

FLAWS

NAME	RATING	GAME EFFECT
Annoyance	-	Cramped cockpit; max. pilot Build is 0

DEFECTS

NAME	RATING	GAME EFFECT
None	-	-

HEAVY GEAR

OACS-01M/SU JÄGER

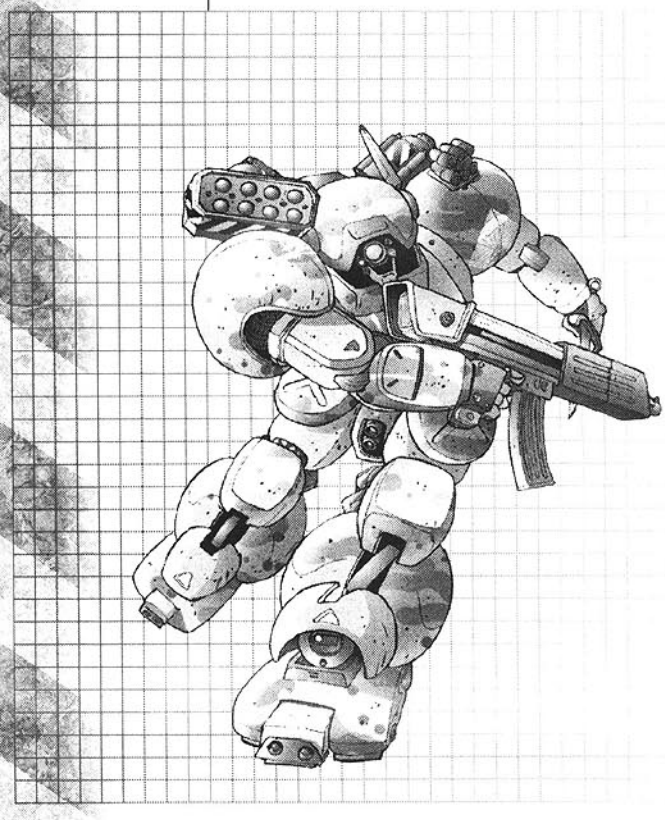
The oldest and most basic of the Gears fielded by Southern forces, the Jäger started its existence as a shameless copy of the United Mercantile Federation's Hunter. Over the years, the two "cousins" have remained signposts of military competition between the poles and are locked in an arms race of their own. Indeed, with every minor adjustment made to the Hunter, Southern engineers are ordered to make a matching change in the Jäger, and vice versa. The most evident example of this came in the TN 1850s when the Jäger was overhauled into its "Alpha" configuration, leading to a similar redesign of the Hunter, which was dubbed the Mark II. The Jäger's weaponry is a nearly identical match to that of the Northern Hunter. The main armament is a PR-25 autocannon supplemented by a Vogel-6 rocket pod. An HLB-16 grenade launcher provides anti-infantry defense, while hand grenades and an HHVB-3 vibroknife provide close-combat punch. The internal systems of the Jäger were originally designed by the engineers of the Republican Army's Anthropomorphic Battle Vehicle Center and were purchased outright by Territorial Arms in TN 1703. The standard sensor package developed for the Alpha refit (and still in use) is a TA-StarSight integrated omnicamera system featuring automatic target tracking, layered light amplification and thermographics as well as picture-in-picture zoom and identification overlay.

◆ Service Record

The Jäger has seen action in the Southern War that subjugated the vassal-states of the AST, in the Merchant war against the UMF, in St.-Vincent's War against the CNCS and in any number of border conflicts and Badlands skirmishes. It has faced competition from newer machines over its two-and-a-half centuries of existence, but none of the machines that have been designed to supplant it have been able to match its simplicity and ease of production, guaranteeing that the Jäger will outlast most of its so-called replacements. The durability of the Jäger was proven during the dark cycles of the War of the Alliance when Southern production facilities were crippled by orbital bombing. It proved far more efficient to use the remaining factories to produce large numbers of Jägers.

Game Statistics

Threat Value:	380	Offensive:	450	Defensive:	298	Miscellaneous:	392	Lemon Dice:	3



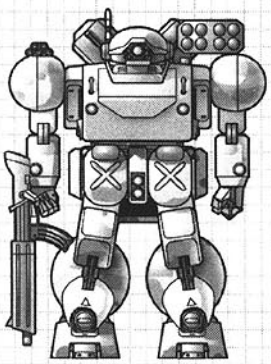
Vehicle Specifications

Code Name:	Jäger (Alpha)
Production code:	OACS-01M/SU
Production type:	Mass Production
Cost:	221,667 dinars
Manufacturer:	Territorial Arms
Use:	general purpose Gear
Height:	4.3 meters
Width:	3.0 meters
Average armor thickness:	45 mm
Armor material:	armoplast w/alloy
Standard operational weight:	6637 kg
Primary Movement Mode:	Walk (41 kph)
Secondary Movement Mode:	Ground (74 kph)
Deployment Range:	500 km
Sensor Range:	40 hexes/2 km
Communication Range:	200 hexes/10 km
Powerplant:	WV-950A V-engine
Horsepower:	450 Hp

Weapon Payload

Name	Ammunition Payload
PR-25 Autocannon Rifle	60 rounds
Vogel-6 Rocket Pod	24 rockets
HLB-16 AP Grenade Launcher	6 grenades
HG-2 Hand Grenade	3 grenades
HHVB-3 Vibroblade	-

JÄGER OACS-01M/SU



ARMOR DAMAGE

0 | 10 | 20 | 30 | 40

CREW INFORMATION

- PILOT NAME:
- RANK:
- SQUADRON:
- AFFILIATION:

PILOT (LV/AT): GUNNERY (LV/AT): ELEC. WAR. (LV/AT):

CREW DATA

VEHICLE CREW

• CREW:	1
• BONUS ACTIONS:	0

CREW DAMAGE

VEHICLE CREW

CREW •
BONUS ACTIONS •

SYSTEMS DATA

MOVEMENT

• PRIMARY COMBAT SPD:	W	4
• PRIMARY TOP SPD:	W	7
• SECONDARY COMBAT SPD:	G	6
• SECONDARY TOP SPD:	G	12
• MANEUVER:		0
• DEPLOYMENT RANGE:		500

ELECTRONICS

• SENSORS:	0	2
• COMMUNICATION:	0	10
• FIRE CONTROL:		0

ARMOR

• LIGHT DAMAGE:	15
• HEAVY DAMAGE:	30
• OVERKILL:	45

SYSTEMS DAMAGE

MOVEMENT

COMBAT SPD •
TOP SPD •
COMBAT SPD •
TOP SPD •
MANEUVER •
FUEL SPENT •

ELECTRONICS

SENSORS •
COMM •
FIRE CONTROL •

ARMOR

LIGHT DAMAGE •
HEAVY DAMAGE •
OVERKILL •

GENERAL SPECIFICATIONS

• THREAT VALUE: 380 • SIZE: 6 • COST: 221,667 dinars

WEAPONS

NAME	CODE	FIRE ARC	S	M	L	EX	Acc	Dam	Qty	ROF	Special
PR-25 Autocannon	LAC	Forward	2	4	8	16	0	x8	1	+2	-
Vogel-6 Rocket Pod	LRP/24	Forward	1	2	4	8	-1	x12	1	+3	Indirect Fire
HLB-16 AP G Launcher	APGL	Fixed F.	1	2	4	8	-1	x3	1	0	AI, IF, AE0
HG-2 Hand Grenade	HG	Forward	0	0	0	0	-1	x15	1	0	Anti-Infantry
HHVB-3 Vibroblade	VB	Forward	0	0	0	0	0	x8	1	0	-

AMMO

FULL	LEFT
60	
24	
6	
3	
-	

WEAPONS

WEAPON 01 •
WEAPON 02 •
WEAPON 03 •
WEAPON 04 •
WEAPON 05 •
WEAPON 06 •
WEAPON 07 •
WEAPON 08 •
WEAPON 09 •
WEAPON 10 •

PERKS

NAME	RATING	GAME EFFECT	AUX
Easy to Modify	-	+2 on Repair and Modify rolls	
Hostile Environment Protection	-	Desert	
Manipulator Arm x2	6	Can punch	

PERKS

PERK 01 •
PERK 02 •
PERK 03 •
PERK 04 •
PERK 05 •
PERK 06 •
PERK 07 •
PERK 08 •
PERK 09 •
PERK 10 •
PERK 11 •

FLAWS

NAME	RATING	GAME EFFECT
None	-	-

DEFECTS

NAME	RATING	GAME EFFECT
None	-	-

HEAVY GEAR

OACS-05M/SU BLACK MAMBA

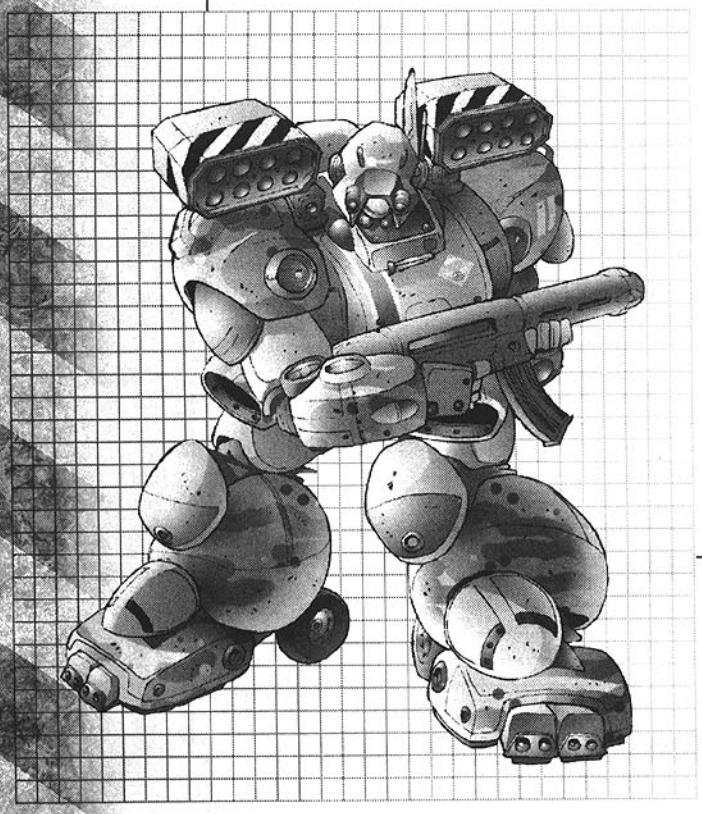
The current cutting edge in Southern Gear design, the Black Mamba is a relatively recent model that has nonetheless had a serious impact on the Terranovan military scene. Contracted to surpass the Northco Jaguar, the designers at Territorial Arms were not satisfied with copying their Northern counterparts and produced a machine that could stand on its own. Using lessons learned from the older Desert Viper and Sidewinder Gears, TA developed a whole new concept. The design incorporates a carbon composite in the Mamba's internal frame to reduce weight and increase flexibility, making paratrooper operations possible. The reduced weight also enables the Gear to achieve high speed and improved maneuverability. To maintain dense armor on most of the machine, the designers reduced the plating on the WV-930TC V-engine and the thickness of the armor on the rear of the Mamba's legs. An advanced Obelisk Electronics sensor suite and communications package, a newly updated virtual reality control system and an automated piloting computer complete the basic package of the Black Mamba. Offensive power comes in the form of a PR-55 autocannon and a Vogel-8 rocket pod, while forward and rear mounted GL-01 grenade launchers assure anti-infantry cover. Three HG-C4 hand grenades provide close range punch, along with a VU-11 vibromachete, which can also cut through dense jungle vegetation.

◆ Service Record

The first Black Mambas came off the Territorial Arms factory in TN 1911. Damage to the assembly lines cut production during the early cycles of the War of the Alliance, but since then distribution has followed standard Southern policy with the lion's share of the new models going to the Southern Republican Army, a lesser number to the MILICIA and very few to the peacekeeping/local defense forces of the Republic's vassal states. The units that have received it, however, have given the Black Mamba rave reviews. A truly advanced machine, it has proven suitable for a wide variety of mission profiles, most especially commando operations. Despite complaints about the reduced rear armor, only a few variants have incorporated makeshift solutions to the problem.

Game Statistics

Threat Value:	671	Offensive:	1100	Defensive:	618	Miscellaneous:	295	Lemon Dice:	3



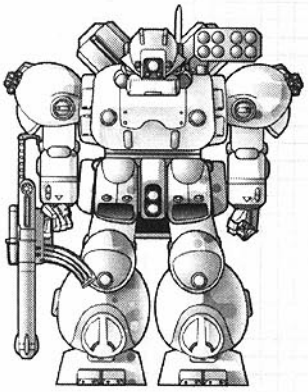
Vehicle Specifications

Code name:	Black Mamba
Production code:	OACS-05M/SU
Production type:	Mass Production
Cost:	503,250 dinars
Manufacturer:	Territorial Arms
Use:	soldat use Gear
Height:	4.6 meters
Width:	3.5 meters
Average armor thickness:	56 mm
Armor material:	armoplast w/composite
Standard operational weight:	6230 kg
Primary Movement Mode:	Walk (55.4 kph)
Secondary Movement Mode:	Ground (84 kph)
Deployment Range:	500 km
Sensor Range:	60 hexes/3 km
Communication Range:	240 hexes/12 km
Powerplant:	WV-930TC V-engine
Horsepower:	630 Hp

Weapon Payload

Name	Ammunition Payload
PR-55 Autocannon	40 rounds
Vogel-8 Rocket Pod	32 rockets
2 x GL-01 Grenade Launcher	6 grenades each
HG-C4 Hand Grenades	3 grenades
VU-11 Vibromachete	-

BLACK MAMBA OACS-05M/SU



6
5
4
3
2
1
0

ARMOR DAMAGE

0
10
20
30
40

CREW INFORMATION

- PILOT NAME:
- RANK:
- SQUADRON:
- AFFILIATION:

PILOT (LV/AT): GUNNERY (LV/AT): ELEC. WAR. (LV/AT):

CREW DATA

VEHICLE CREW

• CREW:	1
• BONUS ACTIONS:	0

CREW DAMAGE

VEHICLE CREW

CREW •
BONUS ACTIONS •

SYSTEMS DATA

MOVEMENT

• PRIMARY COMBAT SPD:	W	5
• PRIMARY TOP SPD:	W	9
• SECONDARY COMBAT SPD:	G	7
• SECONDARY TOP SPD:	G	14
• MANEUVER:		+1
• DEPLOYMENT RANGE:		500

ELECTRONICS

• SENSORS:	+1	3
• COMMUNICATION:	+1	12
• FIRE CONTROL:		+1

ARMOR

• LIGHT DAMAGE:	17
• HEAVY DAMAGE:	34
• OVERKILL:	51

SYSTEMS DAMAGE

MOVEMENT

COMBAT SPD •
TOP SPD •
COMBAT SPD •
TOP SPD •
MANEUVER •
FUEL SPENT •

ELECTRONICS

SENSORS •
COMM •
FIRE CONTROL •

ARMOR

LIGHT DAMAGE •
HEAVY DAMAGE •
OVERKILL •

GENERAL SPECIFICATIONS

• THREAT VALUE: 671 • SIZE: 6 • COST: 503,250 dinars

WEAPONS

NAME	CODE	FIRE ARC	S	M	L	EX	Acc	Dam	Qty	ROF	Special
PR-55 Autocannon	MAC	Forward	3	6	12	24	0	x10	1	+1	-
Vogel-8 Rocket Pod	LRP/32	Forward	1	2	4	8	-1	x12	1	+4	Indirect Fire
GL-01 Grenade Launcher	APGL	Fixed F.	1	2	4	8	-1	x3	1	0	AI, IF, AE0
GL-01 Grenade Launcher	APGL	Fixed Rear	1	2	4	8	-1	x3	1	0	AI, IF, AE0
HG-C4 Hand Grenade	HG	Forward	0	0	0	0	-1	x15	1	0	Anti-Infantry
VU-11 Vibromachete	VB	Forward	0	0	0	0	0	x8	1	0	-

AMMO

FULL	LEFT
40	
32	
6	
6	
3	
-	

WEAPONS

WEAPON 01 •
WEAPON 02 •
WEAPON 03 •
WEAPON 04 •
WEAPON 05 •
WEAPON 06 •
WEAPON 07 •
WEAPON 08 •
WEAPON 09 •
WEAPON 10 •

PERKS

NAME	RATING	GAME EFFECT	AUX
Airdroppable	-	Can be airdropped	
Autopilot	-	Acts as Level 1 Pilot	
Hostile Environment Protection	-	Desert	
Manipulator Arm x2	6	Can punch	

PERKS

PERK 01 •
PERK 02 •
PERK 03 •
PERK 04 •
PERK 05 •
PERK 06 •
PERK 07 •
PERK 08 •
PERK 09 •
PERK 10 •
PERK 11 •

FLAWS

NAME	RATING	GAME EFFECT
Weak Facing	-	Rear

DEFECTS

NAME	RATING	GAME EFFECT
None	-	-

HEAVY GEAR

OACS-01H/SU SPITTING COBRA

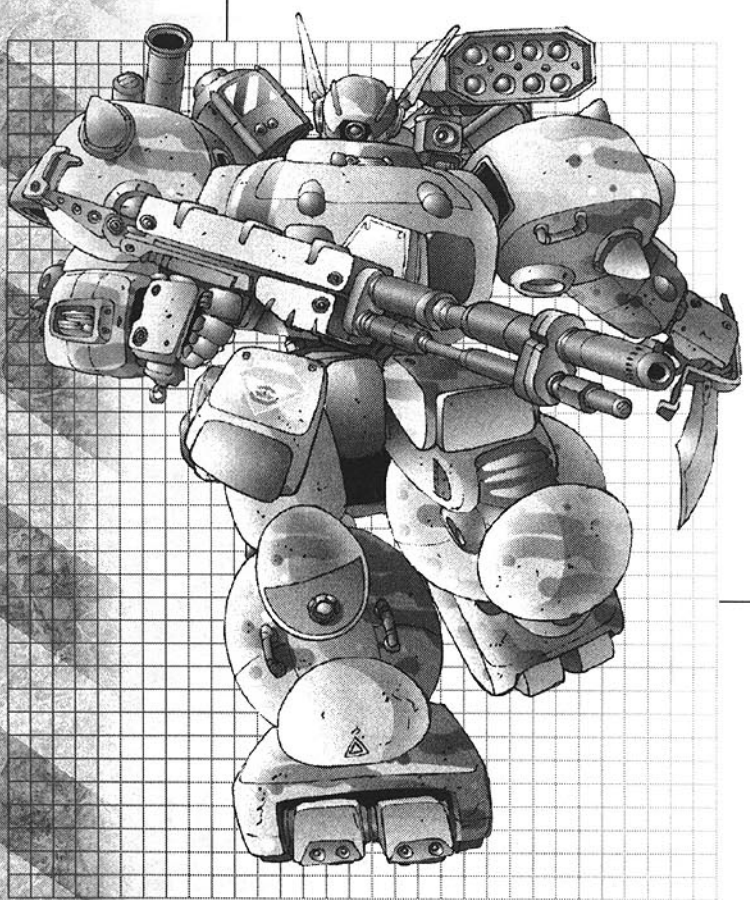
The Spitting Cobra is the heaviest mass-produced Gear chassis currently in service with the Southern MILICIA and Republican Army. Designed to fill the operational role of a heavy weapons platform, the Spit (as its crews invariably call it) is designed to wield devastating medium to long-range firepower on the modern battlefield. The Spitting Cobra's main fire-support weapon is a massive SCRP-98 back-mounted rocket pod. More precise is the secondary fire-support weapon, a shoulder-mounted Vogel-H series guided mortar. Although less powerful than the SCRP-98 rockets, the Vogel-H fires guided munitions, allowing the Spitting Cobra to make full use of laser-designator data provided by forward observers such as infantry or scout Gears. Short to medium-range firepower is provided by weapons more typical of a general purpose Gear: a MR60 autocannon and a shoulder-mounted FSRP-36 rocket pod. Close defense capabilities are provided by a MGU-77 minigun fixed to the Cobra's upper torso, allowing the Gear to fend off marauding infantry. Territorial Arms built the Spit with pilot safety in mind: it features a heavily armored cockpit, allowing the Gear to shrug off many attacks.

Service Record

The Spitting Cobra has performed very well since its introduction in the TN 1880s, and by the time of the War of the Alliance, many of the units facing the initial Colonial Expeditionary Force assaults on the South could field Cobras. As the superiority of the CEF's combination of speed and armor became obvious, many commanders pressed Cobras into assault and anti-armor units, roles in which they performed well, but that resulted in heavy losses in the early days of the war. The Spitting Cobra became a valuable commodity after these initial losses and the crippling of Southern production facilities, but was nevertheless involved in many critical wartime battles. In the postwar period, the Spit has continued to perform well and has inspired a series of useful variants.

Game Statistics

Threat Value:	818	Offensive:	1961	Defensive:	327	Miscellaneous:	167	Lemon Dice:	3



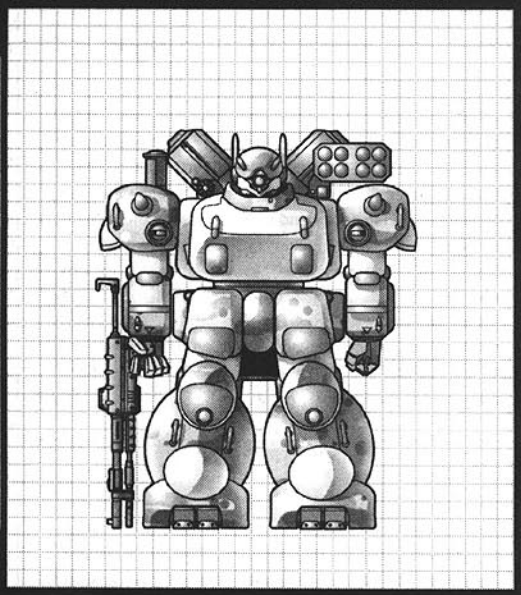
Vehicle Specifications

Code Name:	Spitting Cobra
Production code:	OACS-01H/SU
Production type:	Mass Production
Cost:	525,857 dinars
Manufacturer:	Territorial Arms
Use:	fire-support Gear
Height:	5.0 meters
Width:	4.0 meters
Average armor thickness:	90 mm
Armor material:	armoplast w/alloy and ceramic
Standard operational weight:	8990 kg
Primary Movement Mode:	Walk (35 kph)
Secondary Movement Mode:	Ground (62 kph)
Deployment Range:	400 km
Sensor Range:	40 hexes/2 km
Communication Range:	200 hexes/10 km
Powerplant:	WV-1500TC/A V-engine
Horsepower:	940 Hp

Weapon Payload

Name	Ammunition Payload
MR60 autocannon	30 rounds
FSRP-36 rocket pod	18 rockets
SCRP-98 rocket pod	48 rockets
MGU-77 minigun	400 rounds
Vogel-H series mortar	10 shells
HG-2 hand grenade	6 grenades
VU-11 vibromachete	-

SPITTING COBRA OACS-01H/SU



ARMOR DAMAGE

0 | 10 | 20 | 30 | 40

CREW INFORMATION

- PILOT NAME:
- RANK:
- SQUADRON:
- AFFILIATION:

PILOT (LV/AT): GUNNERY (LV/AT): ELEC. WAR. (LV/AT):

CREW DATA

VEHICLE CREW

• CREW:	1
• BONUS ACTIONS:	0

CREW DAMAGE

VEHICLE CREW

CREW •
BONUS ACTIONS •

SYSTEMS DATA

MOVEMENT

• PRIMARY COMBAT SPD:	W	3
• PRIMARY TOP SPD:	W	6
• SECONDARY COMBAT SPD:	G	5
• SECONDARY TOP SPD:	G	10
• MANEUVER:		-1
• DEPLOYMENT RANGE:		400

ELECTRONICS

• SENSORS:	0	2
• COMMUNICATION:	0	10
• FIRE CONTROL:		0

ARMOR

• LIGHT DAMAGE:	21
• HEAVY DAMAGE:	42
• OVERKILL:	63

SYSTEMS DAMAGE

MOVEMENT

COMBAT SPD •
TOP SPD •
COMBAT SPD •
TOP SPD •
MANEUVER •
FUEL SPENT •

ELECTRONICS

SENSORS •
COMM •
FIRE CONTROL •

ARMOR

LIGHT DAMAGE •
HEAVY DAMAGE •
OVERKILL •

GENERAL SPECIFICATIONS

• THREAT VALUE: 818 • SIZE: 7 • COST: 525,857 dinars

WEAPONS

NAME	CODE	FIRE ARC	S	M	L	EX	Acc	Dam	Qty	ROF	Special
MR60 Autocannon	HAC	Forward	3	6	12	24	0	x12	1	=1	-
FSRP-36 Rocket Pod	MRP/18	Forward	2	4	8	16	-1	X18	1	+3	Indirect Fire
SCRP-98 Rocket Pod	HRP/48	Forward	3	6	12	24	-1	x20	1	+4	Indirect Fire
MGU-77 Minigun	LMG	Fixed F.	1	2	4	8	0	x3	1	+4	Anti-Infantry
Vogel-H Mortar	LGM	Forward	3	6	12	24	-1	x15	1	0	Guided, MR3
HG-2 Hand Grenade	HG	Forward	0	0	0	0	-1	x15	1	0	Anti-Infantry
VU-11 Vibromachete	VB	Forward	0	0	0	0	0	x8	1	0	-

AMMO

FULL	LEFT
30	
18	
48	
400	
10	
6	
-	

WEAPONS

WEAPON 01 •
WEAPON 02 •
WEAPON 03 •
WEAPON 04 •
WEAPON 05 •
WEAPON 06 •
WEAPON 07 •
WEAPON 08 •
WEAPON 09 •
WEAPON 10 •

PERKS

NAME	RATING	GAME EFFECT	AUX
Hostile Environment Protection	-	Desert	
Manipulator Arm x2	7	Can punch	
Reinforced Crew Compartment	-	Absorbs first "Crew" hit	

PERKS

PERK 01 •
PERK 02 •
PERK 03 •
PERK 04 •
PERK 05 •
PERK 06 •
PERK 07 •
PERK 08 •
PERK 09 •
PERK 10 •
PERK 11 •

FLAWS

NAME	RATING	GAME EFFECT
Large Sensor Profile	1	Subtract from Concealment

DEFECTS

NAME	RATING	GAME EFFECT
None	-	-

HEAVY GEAR

WACS-01FS-AST Mammoth

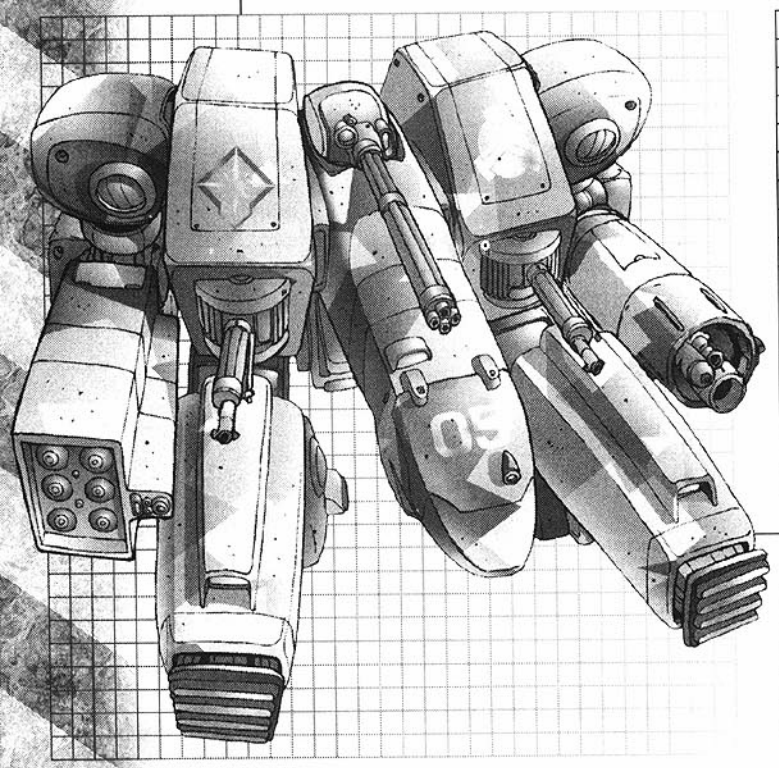
The Mammoth is the most common strider unit used by the forces of the CNCS. There are two crewmen (one pilot and one system operator/gunner) who sit in a tandem configuration similar to the layout of a helicopter gunship. The Mammoth is sturdy and well armored, featuring heavy durasheet plates supplemented by additional ceramite layers designed to redirect shaped-charge ammunition and to burn off or deflect laser-fire. The armored casing of the crew compartment is broken only by very small vision slits (and even they are usually protected by reinforced shutters) forcing the crew to depend on the vehicle's AFLIC sensor pod for information. The weapon systems of the Mammoth are based on a mixed heavy-assault and fire-support mission profile. The primary fire-support weaponry is a Fireball-II guided missile launcher located in the right battle arm. The launcher carries a load of eight anti-tank missiles and features a side-mounted laser targeting device. This combination allows the Mammoth to paint its own targets for the Fireball missiles or to accept such information from a friendly forward observer. The left arm houses a devastating SB-90 Assault Gun with a 20-shot drum magazine. Light anti-armor capability is assured by a turreted GU-20 autocannon, while close defense and anti-infantry needs are met by a pair of KJ-16 miniguns capable of filling the air in front of the Mammoth with a sheet of small-caliber fire. Ammunition for both of these weapon system is stored within an armored compartment located at the rear of the vehicle.

◇ Service Record

The Mammoth began as a Norlight design and was used by the Norlight Armed Forces almost exclusively until TN 1855. Art that time, the Northern Guard decided to adopt the new weapons system after a NAF task force successfully suppressed a bandit army being raised outside Timmins. Since then the Mammoth has been a mainstay of almost all Northern Guard armored regiments. Like all Terranovan combat vehicles, the Mammoth was pressed into service during the War of the Alliance. The strider proved itself effective against hovertank columns when used in conjunction with fast moving scout units using target designators, or when it could take advantage of terrain. When fighting the fast-moving CEF hovertanks on open ground, however, the lumbering Mammoths fared poorly because they were consistently outmaneuvered by their enemies.

Game Statistics

Threat Value:	1500	Offensive:	3393	Defensive:	313	Miscellaneous:	794	Lemon Dice:	3



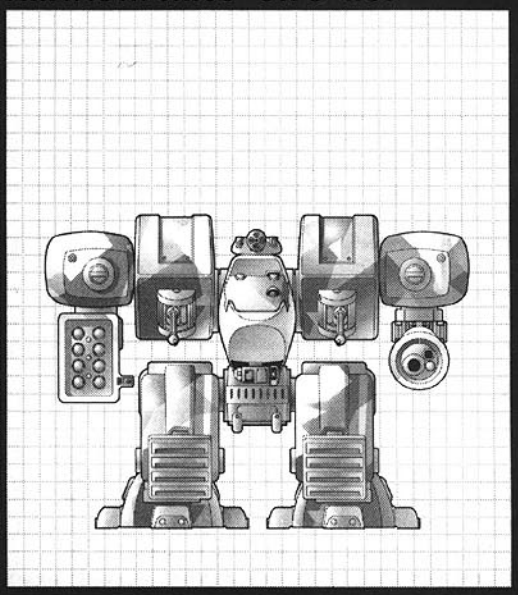
Vehicle Specifications

Code Name:	Mammoth
Production Code:	WACS-01FS-AST
Production Type:	Limited Production
Cost:	3,666,667 marks
Manufacturer:	Hartmore Motor Company
Use:	fire support/assault strider
Height:	6.8 meters
Width:	9.2 meters
Average Armor Thickness:	145 mm
Armor Material:	durasheet w/ceramic
Standard Operational Weight:	21,880 kg
Primary Movement Mode:	Walk (31 kph)
Deployment Range:	320 km
Sensor Range:	60 hexes/3 km
Communication Range:	240 hexes/12 km
Powerplant:	S-V2700T V-engine x 2, ceramic IC x 1
Horsepower:	1200 Hp x 2, 200 Hp x 1

Weapon Payload

Name	Ammunition Payload
GU-20 Autocannon	200 rounds
2 x KJ-16 Minigun	800 rounds each
Fireball II Launcher	8 missiles
SB-90 Assault Gun	20 shells

MAMMOTH WACS-01FS-AST



ARMOR DAMAGE

0 | 10 | 20 | 30 | 40

CREW INFORMATION

- PILOT NAME:
- RANK:
- SQUADRON:
- AFFILIATION:

PILOT (LV/AT): GUNNERY (LV/AT): ELEC. WAR. (LV/AT):

CREW DATA

VEHICLE CREW

• CREW:	2
• BONUS ACTIONS:	1

CREW DAMAGE

VEHICLE CREW

CREW •
BONUS ACTIONS •

SYSTEMS DATA

MOVEMENT

• PRIMARY COMBAT SPD:	W	3
• PRIMARY TOP SPD:	W	5
• SECONDARY COMBAT SPD:		-
• SECONDARY TOP SPD:		-
• MANEUVER:		-2
• DEPLOYMENT RANGE:		320

ELECTRONICS

• SENSORS:	+1	3
• COMMUNICATION:	0	12
• FIRE CONTROL:		0

ARMOR

• LIGHT DAMAGE:	25
• HEAVY DAMAGE:	50
• OVERKILL:	75

SYSTEMS DAMAGE

MOVEMENT

COMBAT SPD •
TOP SPD •
COMBAT SPD •
TOP SPD •
MANEUVER •
FUEL SPENT •

ELECTRONICS

SENSORS •
COMM •
FIRE CONTROL •

ARMOR

LIGHT DAMAGE •
HEAVY DAMAGE •
OVERKILL •

GENERAL SPECIFICATIONS

• THREAT VALUE: 1500 • SIZE: 9 • COST: 3,666,667 marks

WEAPONS

NAME	CODE	FIRE ARC	S	M	L	EX	Acc	Dam	Qty	ROF	Special
GU-20 Autocannon	MAC	Turret	3	6	12	24	0	x10	1	+1	-
Fireball II Launcher	ATM	Forward	3	6	12	24	+1	x25	1	0	Guided
KJ-16 Minigun	LMG	Fixed F.	1	2	4	8	0	x3	1	+4	Anti-Infantry
KJ-16 Minigun	LMG	Fixed F.	1	2	4	8	0	x3	1	+4	Anti-Infantry
SB-90 Assault Gun	SC	Forward	1	2	4	8	-1	x28	1	0	-

AMMO

FULL	LEFT
200	
8	
600	
600	
20	

WEAPONS

WEAPON 01 •
WEAPON 02 •
WEAPON 03 •
WEAPON 04 •
WEAPON 05 •
WEAPON 06 •
WEAPON 07 •
WEAPON 08 •
WEAPON 09 •
WEAPON 10 •

PERKS

NAME	RATING	GAME EFFECT	AUX
Ammo/Fuel Containment System	-	-2 from "Ammo/Fuel" hit rolls	
Backup Sensors	-	Absorbs first "Sensor" hit	
Battle Arm x2	9	Can punch	
HEAT-resistant armor	5	Add to Armor against HEAT attacks	
Hostile Environment Protection	-	Desert	
Improved Off-Road Ability	-	-1 MP in hexes w/ costs greater than 1; min. cost is 1	
Limited Life Support	-	Provides support for up to a week	Yes
Reinforced Armor	2	Front	
Target Designator	1	Designate targets for guided weapons	Yes

PERKS

PERK 01 •
PERK 02 •
PERK 03 •
PERK 04 •
PERK 05 •
PERK 06 •
PERK 07 •
PERK 08 •
PERK 09 •
PERK 10 •
PERK 11 •

FLAWS

NAME	RATING	GAME EFFECT
Annoyance	-	Continual lurching movement when walking
Annoyance	-	Stale smell in life support system
Large Sensor Profile	2	Subtract from Concealment
Sensor Dependent	-	Must rely on sensors in combat

DEFECTS

NAME	RATING	GAME EFFECT
None	-	-

HEAVY GEAR

OWCS-01AS NAGA

The Naga is a high firepower, rapid intervention unit designed to exploit breakthroughs in the enemy line and lend medium range heavy support to friendly units in trouble. The Naga is fast enough and carries enough armor to get to the hot zone in time to relieve beleaguered friendlies, and its powerful anti-tank missiles ensure that at least eight of the enemy vehicles will likely not survive the battle. The Naga is crewed by two persons, with the pilot/commander in the back and the gunner/system operator in the front, just above the autocannon mounts. The higher position of the pilot gives him a better view of his surroundings. The Naga is surprisingly maneuverable for a walker of its size. Like a smaller Gear, it can use foot and leg-mounted wheels to move about faster than it can walk. Its legs have been designed to fold backward underneath the main chassis, turning the unit into a slightly squatter "urban tank." Three tiny arms bear sensor pods, allowing the Naga to look over corners and walls without exposing itself to return attacks. Its weapon systems are centered around the Pilum guided missile launchers placed on each shoulder. These can receive targetting information from friendly designators. A single chin-mounted, twin-barrel rotating autocannon, belt-fed from a large, armored drum mounted underneath the torso, is available for use against soft and lightly armored targets.

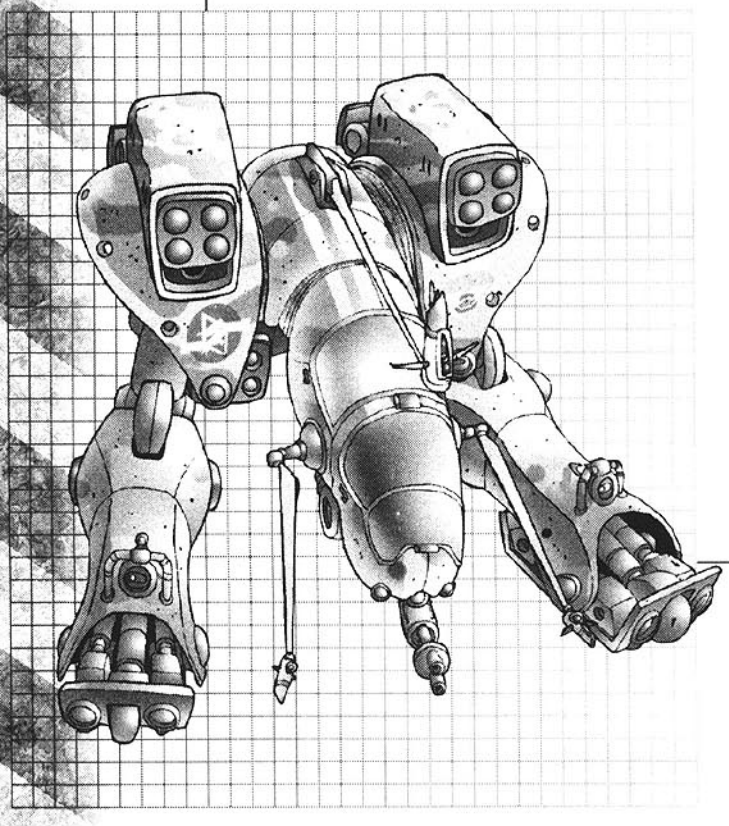
◆ Service Record

The Naga is the main strider unit of the Republican forces, and is the basis for many current specialized vehicles. It is not very strongly armored for its size, and as such is rarely seen locked in close combat. The most common Naga tactic is to team it up with a squad of Gears, at least one of which can designate for the strider's anti-tank missiles. The strider then relies on its mobility and sensor booms to escape the attention of enemy units while using its missiles to eliminate as many opponents as possible. Once its missile bins run dry, the Naga speeds to base for resupplying. The Naga is currently in service in all Southern forces, though each army has its own specific variants featuring locally-produced components, but similar performance.

Game Statistics

Threat Value:	1645	Offensive:	4490	Defensive:	301	Miscellaneous:	144	Lemon Dice:	3

Vehicle Specifications

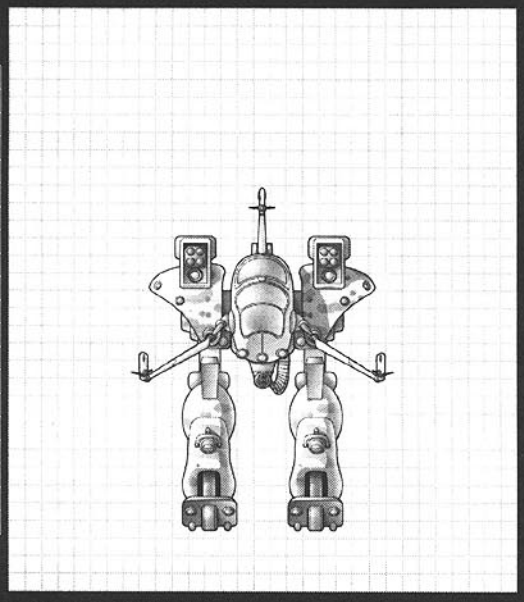


Code Name:	Naga
Production code:	OWCS-01AS
Production type:	Mass Production
Cost:	1,233,750 dinars
Manufacturer:	Republican Heavy Industries
Use:	rapid deployment assault strider
Height:	6.4 meters (7.1 meters w/sensors)
Width:	4.7 meters (5.2 w/sensors)
Average armor thickness:	106 mm
Armor material:	armoplast w/alloy webbing
Standard operational weight:	15,340 kg
Primary Movement Mode:	Walk (42 kph)
Secondary Movement Mode:	Ground (72 kph)
Deployment Range:	400 km
Sensor Range:	80 hexes/4 km
Communication Range:	240 hexes/12 km
Powerplant:	gas turbine x 2
Horsepower:	910 Hp x 2

Weapon Payload

Name	Ammunition Payload
MT-30 Autocannon Rifle	200 rounds
Pilum-VI Missile Launcher	4 missiles
Pilum-VI Missile Launcher	4 missiles

NAGA OWCS-01AS



ARMOR DAMAGE

0 10 20 30 40

CREW INFORMATION

- PILOT NAME:
- RANK:
- SQUADRON:
- AFFILIATION:

PILOT (LV/AT): GUNNERY (LV/AT): ELEC. WAR. (LV/AT):

CREW DATA

VEHICLE CREW

• CREW:	2
• BONUS ACTIONS:	1

CREW DAMAGE

VEHICLE CREW

CREW •
BONUS ACTIONS •

SYSTEMS DATA

MOVEMENT

• PRIMARY COMBAT SPD:	W	4
• PRIMARY TOP SPD:	W	7
• SECONDARY COMBAT SPD:	G	6
• SECONDARY TOP SPD:	G	12
• MANEUVER:		-2
• DEPLOYMENT RANGE:		400

ELECTRONICS

• SENSORS:	O	4
• COMMUNICATION:	O	12
• FIRE CONTROL:		0

ARMOR

• LIGHT DAMAGE:	23
• HEAVY DAMAGE:	46
• OVERKILL:	69

SYSTEMS DAMAGE

MOVEMENT

COMBAT SPD •
TOP SPD •
COMBAT SPD •
TOP SPD •
MANEUVER •
FUEL SPENT •

ELECTRONICS

SENSORS •
COMM •
FIRE CONTROL •

ARMOR

LIGHT DAMAGE •
HEAVY DAMAGE •
OVERKILL •

GENERAL SPECIFICATIONS

• THREAT VALUE: 1645 • SIZE: 8 • COST: 1,233,750 dinars

WEAPONS

NAME	CODE	FIRE ARC	S	M	L	EX	Acc	Dam	Qty	ROF	Special
MT-30 Autocannon	MAC	Forward	3	6	12	24	0	x10	1	+1	-
Pilum-VI Missile	ATM	Forward	3	6	12	24	+1	x25	1	0	Guided
Pilum-VI Missile	ATM	Forward	3	6	12	24	+1	x25	1	0	Guided

AMMO

FULL	LEFT
200	
4	
4	

WEAPONS

WEAPON 01 •
WEAPON 02 •
WEAPON 03 •
WEAPON 04 •
WEAPON 05 •
WEAPON 06 •
WEAPON 07 •
WEAPON 08 •
WEAPON 09 •
WEAPON 10 •

PERKS

NAME	RATING	GAME EFFECT	AUX
HEAT-resistant Armor	2	Add to Base Armor vs. HEAT attacks	
Hostile Environment Protection	-	Desert	
Target Designator	1	Designate targets for guided weapons	Yes
Tool Arm x 3	1	Cannot punch; sensor pods	

PERKS

PERK 01 •
PERK 02 •
PERK 03 •
PERK 04 •
PERK 05 •
PERK 06 •
PERK 07 •
PERK 08 •
PERK 09 •
PERK 10 •
PERK 11 •

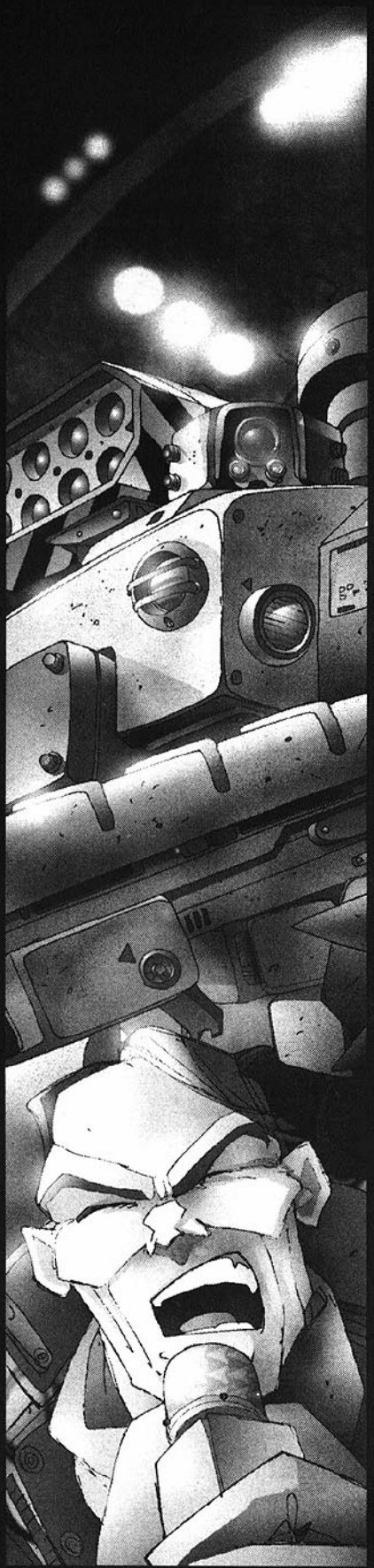
FLAWS

NAME	RATING	GAME EFFECT
Large Sensor Profile	1	Subtract from Concealment

DEFECTS

NAME	RATING	GAME EFFECT
None	-	-

HEAVY GEAR



TYPICAL DIFFICULTY THRESHOLDS

1	Moronic
2	Routine
3	Easy
4	Moderate
5	Challenging
6	Difficult
7	Very Difficult
8	Extremely Difficult
10	Near Impossible
12+	Pray for Divine Intervention

ATTACKER'S MODIFIERS

• Range			
Point blank range (≤3m)	+1	Long range	-2
Short range	+0	Extreme range	-3
Medium range	-1		

• Attacker Movement			
Stationary	0	Jogging	-2
Walking	-1	Running	-3

• Intoxication	
Mildly intoxicated	-1
Moderately intoxicated	-2
Heavily intoxicated	-3

• Lighting			
Area is poorly lit	-1	Area is barely light	-3
Area is very poorly lit	-2	Area is completely dark	-4

• Aiming	
Per round of aiming (max bonus equal to skill level)	+1
Aiming at specific location, except head	-2
Aiming at head	-3

• Weapon Accuracy Modifier
Varies according to weapon used

DEFENDER'S MODIFIERS

• Defender Movement	
Stationary	-1
Walking	+0
Jogging	+1
Running or sprinting	+2
Dodging (cumulative with movement)	+2

• Cover	
Under light cover	+1
Completely hidden by light cover	+2
Under heavy cover	+3
Completely hidden by heavy cover	Automatic success

• Intoxication	
Mildly intoxicated	-1
Moderately intoxicated	-2
Heavily intoxicated	-3

HEAVY GEAR

MOVEMENT SPEEDS

Sprinting Speed* = 25 + 5 x (Fitness + Athletics skill)
Running Speed = 2/3 Sprinting Speed
Jogging Speed = 1/2 Sprinting Speed
Walking Speed = 1/3 Sprinting Speed
*All speeds are expressed in meters/round.

FIRE INTENSITY

Intensity	Source of Flame
1	candle, lighter, or match
2	gas light, oil lamp, kindling
3	torch, gas range
5	campfire, bunsen burner, flare, acetylene torch
7	bonfire, napalm, incendiary grenade
10	inferno, chemical fire
20	periphery of nuclear strike*, fuel-air grenade
100	near a nuclear strike*, reactor meltdown*
1000	ground zero of a nuclear strike*

* The following are only ratings of heat intensity from nuclear attacks and do not include the concussive and radiation effects of these terrifying weapons.

SAMPLE FLAMMABILITY RATINGS

Flammability	Object Type
1	propane, natural gas, hydrogen gas, methane
3	gasoline
4	paper, pitch, crude oil
6	normal clothing, rugs, upholstered furniture
7	dry firewood
8	hair, fur
9	fresh cut or treated wood, most plastics, leather
12	magnesium flares
15	fire retarding clothing
50-200	most "non-flammable" objects like steel and concrete

SAMPLE ELECTRICAL INTENSITIES

Intensity	Electrical Source
1	licking a 9 volt battery (ouch!)
3	car battery
5	110 volt domestic current (North America)
7	220 volt domestic current (Europe)
10	local power lines, industrial lines
20	power mains
25	minor lightning strike
50	large lightning discharges
100	hydroelectric dam generator

SKILL IMPROVEMENT COSTS

Level	Simple	Complex
1	1*	2
2	4	8
3	9	18
4	16	32
5	25	50
6	36	72
7	49	98
8	64	128

*All costs are listed in XPs.

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THE COMBAT ROUND

[Step Zero:	Set-up Phase]
Step One:	Declaration Phase
Step Two:	Initiative Phase
Step Three:	Activation Phase
Step Four:	Miscellaneous Events Phase

Repeat Steps One to Four until each combat group has had the opportunity to move and act. A combat group may only move and act once per combat round. If one player no longer has any combat groups left to use, he skips his phases until the end of the combat round.

ACTIONS EXAMPLE

Among possible combat actions:

- fire one weapon
- fire one set of linked weapons
- embark/disembark one (1) crewman
- perform a physical attack (ramming, kicking, punching, etc...)
- activate an auxiliary system (ECM, active sensors, communication, etc...)

TERRAIN COSTS

Terrain Type	Walker MP	Ground MP	Hover MP	Obscurement
Clear	1	1	1	-
Rough	1	2	1	-
Sand	2	2	1	-
Woodland	1	2	2	1
Jungle	2	3	3	2
Swamp	3	4	1	1
Water	2*	3*	1	2**
Deep Water	2*	3*	1	4**
Urban†	2	1	2	1
Dense Urban†	3	2	3	2
+1 elevation	add 2	add 2	add 4	-
-1 elevation	add 1	-	-	-

* Only amphibious walkers and ground vehicles may enter Water hexes. Other walkers and ground vehicles will flood and automatically be put out of action if they enter a Water hex. Amphibious vehicles cannot enter or exit water while moving at top speed.

** Water only produces Obscurement if the defender is in a Water hex and is not a hovercraft. Only affects normal sensors; vehicles with the Aquatic Sensors Perk do not suffer any obscurement effects from Water or Deep Water terrain.
†Damage Point Capacity: 80 per HEX for Urban, 100 for Dense Urban.

DETECTION THRESHOLD MODIFIERS

Applied to attacker's Electronic Warfare skill roll

• Sensor Bonus	variable, by default 0

Applied to defender's Concealment Threshold

• Stealth Bonus	variable, by default 0
• Movement Penalty	-1 per hex moved by target
• Combat Penalty	-1 per weapon fired by target

ATTACK ROLL

Roll **Gunnery** skill/attribute plus these modifiers:

• Fire Control

The Fire Control rating of the vehicle

• Weapon Accuracy

The Accuracy rating of the weapon

• Range

Point Blank	+1	Long	-2
Short	+0	Extreme	-3
Medium	-1		

• Attacker's Movement

Stationary	+2	Combat Speed	+0
Half Combat Speed or less	+1	Top Speed	-3

• Minus the Obscurement Total

DEFENSE ROLL

Roll **Piloting** skill plus these modifiers:

• Maneuver

The Maneuver rating of the vehicle

• Defender's Movement

Hexes Moved	Defense Mdf.	Hexes Moved	Defense Mdf.
0	-3	7-9	+1
1-2	-2	10-19	+2
3-4	-1	20-99	+3
5-6	+0	100-999	+4

• Arc of Attack

Attack is from Front	-0	Attack is from Rear	-2
Attack is from Rear Flank	-1		

DAMAGE VS ARMOR

Damage to armor	Outcome	What happens
Dama. < Base Arm.	No Effect	Nothing; armor is merely scratched
Dam. = or > Base Arm.	Light Dam.	-1 Armor; Roll on Syst. Damage Table
Dam. = or > Base Arm. x 2	Heavy Dam.	-2 Armor; Roll on Syst. Damage Table
Dam. = or > Base Arm. x 3	Overkill	Vehicle Destroyed

FIRE ARCS

F	forward (180 degrees)
FF	fixed forward (120 degrees, one hex ahead)
Rt	right (180 degrees)
L	left (180 degrees)
Rr	rear (180 degrees)
T	turreted (360 degrees)

INFANTRY ROF

Min. Number of Troopers w/Weapon	ROF bonus
1	0
2	+1
4	+2
8	+3

SYSTEMS DAMAGE

Damaged System	LIGHT DAM.	Heavy DAM.
1 Fire Control	SubTable A	Roll on SubTable A and add +1
2 Structure	SubTable B	Roll on SubTable B and add +1
3 Crew	Crew stunned*	10% casualties, min 1.
4 Movement	-1 MP	1/2 remaining MP (round down) & -2 maneuver
5 Auxilliary Syst.	-1 to 1d6 Aux. Systems	1d6 Auxilliary systems destroyed
6 Roll Twice on this table		

*-1 action for 1 round

SUBTABLE A: FIRE CONTROL DAMAGE

1	-1 to a single Weapon
2	-2 to a single Weapon
3	-1 to all Weapons
4	Single Weapon destroyed
5	Fire Control system destroyed (-5 to attacks)
6	Roll Twice on this table
7	Ammunition/Fuel Hit — roll 1 die:
1-3	Ammo Storage and Fuel Tank Ruptured (vehicle cannot more or fire weapons)
4-6	Chain Reaction! Ammo and Fuel Explodes! (Vehicle Destroyed and Crew Killed)

SUBTABLE B: STRUCTURAL DAMAGE

1	-1 MP
2	1/2 remaining MP (round down)
3	-1 to Maneuver
4	-2 to Maneuver
5	Power transfer failure; No movement
6	Catastrophic crew compartment failure, 75% casualties, minimum 1
7	Complete structural failure; vehicle is destroyed, but crew survives

TACTICAL SYSTEM FUMBLE EFFECTS

Situation	Fumble Effect
Initiative	lose automatically; if both fumble, reroll
Attack	miss automatically
Defense	hit automatically unless attack also fumbles; for damage purposes treat roll as 0
Active Sensors	fail to achieve LOS automatically
High Speed 180° turn	crash; take Light (1-4) or Heavy (5-6) damage

RAMMING

Ramming Direction	Impact Speed
Head On	Attacker Speed + Defender Speed
Side	(Attacker Speed + Defender Speed)/2 (round up)
Rear	Attacker Speed - Defender Speed

IMPACT SPEED MODIFIERS

Impact Speed	Damage Modifier
1-2	-2
3-4	-1
5-6	+0
7-9	+1
10-19	+2
20-99	+3
100-999	+4

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HEAVY GEAR

ALTITUDE LOSS TABLE (AIR WAR)

# of Rounds	Drop
1	18
2	32
3	36
4+	36

# of Rounds is the number of rounds the aircraft has remained stalled.

Drop is the maximum possible number of 250m altitude levels lost during the round. The maximum total altitude loss is 36 levels per round.

AIR WAR IMPACT SPEED MODIFIERS

Impact Speed	Damage Modifier
0	-2
1	0
2	+1
3	+2
4-19	+3
20-199	+4
200+	+5

ALTITUDE LOSS TABLE (DOGFIGHTING)

# of Rounds	Drop
1	4
2	10
3	18
4	24
5	32
6+	36

***# of Rounds** is the # of rounds the aircraft has stalled.*

***Drop** is the number of 50 m altitude levels lost during the turn. Maximum number of altitude levels lost in one turn is 36.*

TURN RADIUS CONTROL TABLE (DOGFIGHTING)

Turn Radius	Piloting	FIT	Requires Action?
Safe	–	–	No
3/4 of Safe	4	–	No
2/3 of Safe	5	4	Yes
1/2 of Safe	7	6	Yes

*Use the **Turn Radius** row that is equal to or lower than the tightness of the current turn. Use the corresponding values for Combat and Top speed, as explained in the text.*

***Piloting** gives the threshold against which the pilot must test his Aircraft Pilot skill.*

***FIT** gives the threshold against which the pilot must make his Fitness roll.*

***Requires Action?** dictates if the maneuver requires an action from the pilot.*

AIRCRAFT CONTROL LOSS TABLE (AIR WAR)

Die roll	Effect
1	Nothing more than a good scare. (Pilot loses 1 action.)
2	Aircraft Sideslips, as per maneuver. Roll randomly for left or right.
3	Aircraft Skids (turns one hexside, but keeps going in the same direction) for a number of hexes equal to the roll of one die. Roll randomly for left or right if necessary. If the aircraft runs out of MPs during the skid, it must make them up by beginning the next movement phase with the remainder of the skid.
4	Aircraft suffers Light Structural Damage.
5	Aircraft loses a number of altitude levels equal to the roll of one die.
6-7	Aircraft Stalls.
8-9	Aircraft suffers Light Structural Damage and Stalls.
10	Aircraft suffers Heavy Structural Damage.
11	Aircraft Suffers Heavy Structural Damage and Stalls.
12+	Aircraft falls into an uncontrollable spin. It suffers Heavy Structural Damage and will plummet to the ground and crash unless the pilot makes a Piloting roll vs. a threshold of 10.

BOMBING DISTANCE TABLE (AIR WAR)

Speed / Alt.	1	2	3	4	5	6-7	8-10	11-15	16-20	21-30	31+
1	0	0	0	0	1	1	1	1	1	1	1
2	0	1	1	1	1	1	2	2	2	3	3
3	1	1	1	1	2	2	2	3	3	4	4
4	1	1	2	2	2	2	3	4	4	5	6
5	1	2	2	2	3	3	4	4	5	6	7
6-7	2	2	3	3	3	4	5	6	7	8	9
8-10	2	3	4	4	5	5	6	8	9	11	13
11-15	3	4	5	6	7	8	9	11	13	15	18
16-20	4	6	7	8	9	11	13	15	18	21	25
21-30	6	8	10	12	13	15	18	21	25	29	35
31+	8	12	14	16	18	21	25	30	35	41	49
Delay	0	0	0	0	0	0	0	0	1	1	2

***Speed** is equal to the number of (horizontal) hexes the aircraft moved in the preceding round.*

***Alt.** is the aircraft's altitude level (in 250 m hexes).*

***Delay** is the delay in combat rounds before the attack is actually resolved.*

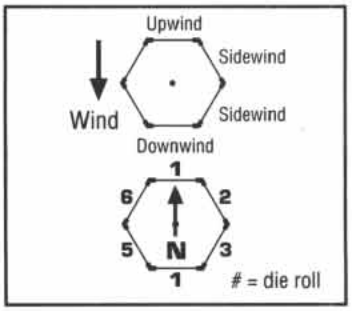
BOMBING DISTANCE TABLE (DOGFIGHTING)

Altitude	1	2	3	4	5	6-7	8-10	11-15	16-20	21-30	31+
Delay	0	0	0	1	1	1	1	2	2	2	3

***Altitude** is the aircraft's altitude level (in 50m increments).*

***Delay** is the delay in combat rounds before the attack is actually resolved.*

RANDOM WIND DIRECTION (OPTIONAL RULE)



RANDOM WIND FORCE TABLE (OPTIONAL RULE)

Die Roll	Wind Force
1-3	No wind
4	Wind Force One
5	Wind Force Two
6	Wind Force Three

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AIRCRAFT MAXIMUM SPEED TABLE

Aircraft Type	Combat Speed	Top Speed	Stall Speed
Light Commercial Plane	15	30	7
Civilian Jet Plane			
Size 1-15	25	50	12
Size 16+	22	44	10
Military Planes			
Air Superiority Fighter	40	80	16
Fighter-Bomber	33	66	14
Large Bomber	21	42	9
Troop Transport	19	38	6
VTOL Fighter	23	46	0
Attack Helicopter	7	14	0
Recon Helicopter	6	12	0
Medium-Lift Helicopter	5	10	0
Hopper	7	14	0
Lighter-than-air	3	6	0

These values are the maximum speed possible for new designs, unless the model is a prototype.

TYPICAL AIRCRAFT MANEUVER SCORES

Aircraft Type	Maneuver Score
Aerobatics aircraft	+2
VTOL plane	+1
Light propeller plane	+1
Air Superiority Fighter	0
Fighter-Bomber	-1
Medium Bomber	-2
Troop Transport	-3
Large Bomber	-4
Recon Helicopter	+2
Hopper	+2 to -1
Attack Helicopter	+1
Medium-lift Helicopter	0
Troop Transport Helicopter	-1
Lighter-than-air	-5

Calculate Turn Radii for both Air War and Dogfighting scales, unless it is a VTOL aircraft (i.e. a Stall Speed of 0).

AIRCRAFT WEAPON LIST

Name	Code	Rating	Range	DM	Acc.	RoF	Ammo	Min. Size	Special
Light AA Cannon	LAAC	121	2/4/8/16	x8	0	+6	0.28	4	–
Medium AA Cannon	MAAC	176	3/6/12/24	x10	0	+4	0.51	4	–
Heavy AA Cannon	HAAC	230	3/6/12/24	x12	0	+3	0.68	5	–
Anti-Gear Missile	AGM	756	3/6/12/24	x15	+1	0	15.12	4	Guided
Anti-Aircraft Missile	AAM	2066	8/16/32/64	x10	+1	0	8.30	7	Guided, Min. Range 10
Airburst Missile	ABM	508	3/6/12/24	x10	0	0	2.00	6	AE=1
Light Bomb Rack	LB	135	0/0/0/0	x10	-2	3	0.05	4	Guided, AE=0
Medium Bomb Rack	MB	257	0/0/0/0	x15	-2	2	0.11	5	Guided, AE=0
Heavy Bomb Rack	HB	841	0/0/0/0	x20	-2	1	0.20	7	Guided, AE=1
Fuel-Air Bomb Rack	FAB	2758	0/0/0/0	x35	-1	0	11.00	11	AE=2, Slow Burn
Cluster Bomb Rack	CB	369	0/0/0/0	x8	0	2	0.06	6	AE=2
Hvy Cluster Bomb Rack	HCB	884	0/0/0/0	x10	0	1	0.10	8	AE=3

CREW AND ACTIONS

Min. Crew Size	Additional Actions	Total Actions
1	0	1
2	1	2
4	2	3
8	3	4
16	4	5
32	5	6
64	6	7
128	7	8
256	8	9
512	9	10

A vehicle's crew can get more actions by penalizing **all** their action test rolls by one (1) for each additional action taken. For example, a single crewman could fire twice, with a -1 on both attacks, or three times with a -2 on all attacks. These additional actions **must** be declared at the beginning of a round, in Step One.

MOVEMENT MODIFIERS

Stationary	+2
Half Combat Speed or less	+1
Combat Speed	+0
Top Speed	-3

TARGET SPEED MODIFIERS

Hexes Moved	Defense Modifier
0	-3
1-2	-2
3-4	-1
5-6	+0
7-9	+1
10-19	+2
20-99	+3
100-999	+4

RANGE MODIFIERS

Point Blank	Special range (same hex)	+1
Short	(from 1 hex to base range)	0
Medium	(from prev. to **two** times base range)	-1
Long	(from prev. to **four** times base range)	-2
Extreme	(from prev. to **eight** times base range)	-3

DEFENSE ARC MODIFIERS

If attack is in the defender's Front	0
If attack is from defender's Rear Flank	-1
If attack is from defender's Rear	-2

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CHARACTER SHEET

A

PICTURE

PERSONAL INDENTIFICATION

NAME:	
PROFESSION:	
RANK:	
NATIONALITY:	
UNIT:	

DESCRIPTION

ATTRIBUTES

AGI	APP	BLD	CRE	FIT
INF	KNO	PER	PSY	WIL

SECONDARY TRAITS

STR	HEA	STA	UD	AD

PHYSICAL STATUS

INJURY	SCORE	ARMOR	PENALTY	#
FLESH WOUND			-1	
DEEP WOUND			-2	
INSTANT DEATH			DEAD	

SKILLS

NAME	CPLX	LVL	+/-	NAME	CPLX	LVL	+/-

WEAPONS

NAME	ACC	DAM	RANGE	AMMO	ROF

EQUIPMENT

SYSTEM SHOCK

HEAVY GEAR

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HEAVY GEAR

UNIT INFORMATION

UNIT NAME:		
QUALITY:		
ARMOR:	ENCUMBRANCE:	STAMINA:
ARMOR POINT:	DAMAGE POINT:	

WEAPONS

STANDARD WEAPON:	ACC	DMG	RANGE				ROF
			S	M	L	EX	
HEAVY WEAPON:	ACC	DMG	RANGE				ROF
			S	M	L	EX	

DAMAGE TRACK

#	WEAPON	DAMAGE POINTS
1	STD/HVY	
2	STD/HVY	
3	STD/HVY	
4	STD/HVY	
5	STD/HVY	
6	STD/HVY	
7	STD/HVY	
8	STD/HVY	
9	STD/HVY	
10	STD/HVY	

HEAVY GEAR

UNIT INFORMATION

UNIT NAME:		
QUALITY:		
ARMOR:	ENCUMBRANCE:	STAMINA:
ARMOR POINT:	DAMAGE POINT:	

WEAPONS

STANDARD WEAPON:	ACC	DMG	RANGE				ROF
			S	M	L	EX	
HEAVY WEAPON:	ACC	DMG	RANGE				ROF
			S	M	L	EX	

DAMAGE TRACK

#	WEAPON	DAMAGE POINTS
1	STD/HVY	
2	STD/HVY	
3	STD/HVY	
4	STD/HVY	
5	STD/HVY	
6	STD/HVY	
7	STD/HVY	
8	STD/HVY	
9	STD/HVY	
10	STD/HVY	

HEAVY GEAR

UNIT INFORMATION

UNIT NAME:		
QUALITY:		
ARMOR:	ENCUMBRANCE:	STAMINA:
ARMOR POINT:	DAMAGE POINT:	

WEAPONS

STANDARD WEAPON:	ACC	DMG	RANGE				ROF
			S	M	L	EX	
HEAVY WEAPON:	ACC	DMG	RANGE				ROF
			S	M	L	EX	

DAMAGE TRACK

#	WEAPON	DAMAGE POINTS
1	STD/HVY	
2	STD/HVY	
3	STD/HVY	
4	STD/HVY	
5	STD/HVY	
6	STD/HVY	
7	STD/HVY	
8	STD/HVY	
9	STD/HVY	
10	STD/HVY	

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VEHICLE RECORD SHEET

NAME:

6 5 4 3 2 1 0

ARMOR DAMAGE

10 20 30 40 50

SYSTEMS DATA

VEHICLE SPECIFICATIONS
- SIZE:
- CREW:
- BONUS ACTIONS:

CREW SKILLS
- PILOT (LVL/ATTR):
- GUNNERY (LVL/ATTR):

MOVEMENT
- PRIMARY COMBAT SPD:
- PRIMARY TOP SPD:
- SECONDARY COMBAT SPD:
- SECONDARY TOP SPD:
- MANEUVER:

ELECTRONICS
- SENSORS:
- COMMUNICATION:
- FIRE CONTROL:

ARMOR
- LIGHT DAMAGE:
- HEAVY DAMAGE:
- OVERKILL:

SYSTEMS DAMAGE

VEHICLE
- CREW •
- BONUS ACTIONS •

MOVEMENT
- COMBAT SPD •
- TOP SPD •
- COMBAT SPD •
- TOP SPD •
- MANEUVER •

ELECTRONICS
- SENSORS •
- COMM •
- FIRE CONTROL •

ARMOR
- LIGHT DAMAGE •
- HEAVY DAMAGE •
- OVERKILL •

WEAPONS

NAME	CODE	FIRE ARC	S	M	L	EX	Acc	Dam	Qty	Special

AMMO

FULL	LEFT

WEAPONS
- WEAPON 01 •
- WEAPON 02 •
- WEAPON 03 •
- WEAPON 04 •
- WEAPON 05 •
- WEAPON 06 •
- WEAPON 07 •
- WEAPON 08 •
- WEAPON 09 •
- WEAPON 10 •

PERKS

NAME	RATING	GAME EFFECT	AUX

PERKS
- PERK 01 •
- PERK 02 •
- PERK 03 •
- PERK 04 •
- PERK 05 •
- PERK 06 •
- PERK 07 •
- PERK 08 •
- PERK 09 •
- PERK 10 •
- PERK 11 •

FLAWS

NAME	RATING	GAME EFFECT

DEFECTS

NAME	RATING	GAME EFFECT

HEAVY GEAR

AIRCRAFT DESIGN SHEET

1) OFFENSIVE SCORE

◆ Weapons with FF arc = Weapon Threat Rating x 0.6		
◆ Weapons with T arc = Weapon Threat Rating x 1.8		
Total Weapon Rating of All Weapons		
Ammo		
Offensive Multiplier		

TARGETING MULTIPLIER	
Fire Control Score	Multiplier
5	700
4	120
3	24
2	6
1	2
0	1
-1	0.5
-2	0.333
-3	0.25
-4	0.2
-5	0.167

Offensive Score = Targeting Multiplier* x Offensive Multiplier =	

2) DEFENCE SCORE

◆ (Armor Rating) squared		
◆ (fastest movement speed in kph - (Stall Speed x 3) ÷ 25) cubed		
◆ (sum of speeds of all other movement types in kph ÷ 6) squared		
Defense Multiplier		

MANEUVER MULTIPLIER	
Maneuver Score	Multiplier
10	5500000
9	550000
8	60000
7	7500
6	1000
5	180
4	36
3	9
2	3
1	1.5
0	1
-1	0.667
-2	0.5
-3	0.4
-4	0.333
-5	0.286
-6	0.25
-7	0.222
-8	0.2
-9	0.182
-10	0.167

Defensive Score = Maneuver Multiplier* x Defense Multiplier =	

3) MISCELLANEOUS SCORE

(Total Actions granted by Crew) cubed	
(Communication Range in km ÷ 10) cubed	
(Sensor Range in km ÷ 2) cubed	
(Deployment Range in km ÷ 50) squared	
(Sensor Score + Communications Score + Perk/Flaw Threat Point Total) squared	
Miscellaneous Score	

4) THREAT VALUE AND CHARACTERISTICS

Threat Value = (Off. Score + Def. Score + Misc. Score) ÷ 3	
Default Size = Cube Root (Final Threat Value)	

If the Default Size of the aircraft is calculated at less than one-fifth of the Armor Rating, raise the Default Size to one-fifth (round up) of the Armor Rating. The Default cannot be more than ten times the Armor Rating.

Default Cost = 1000 x (final Threat Value)	
Actual Size (choose) =	

The aircraft may be as large as twice the Default Size score or as small as one-fifth the Default Size score.
The Size can be no greater than twice the vehicle's Armor Rating.

Pre-Prod. Cost Def. Cost x (Def. Size ÷ Actual Size)	
Production Type:	
Model Dice	
Individual Dice:	
Final Cost Pre-Production Cost x Production Cost	

SKETCH

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SILCORE CHARACTER SHEET

A

PICTURE

PERSONAL INDENTIFICATION

NAME:	
PROFESSION:	
RANK:	
NATIONALITY:	
UNIT:	

DESCRIPTION

ATTRIBUTES

AGI	APP	BLD	CRE	FIT
INF	**KNO**	**PER**	**PSY**	**WIL**

SECONDARY TRAITS

STR	HEA	STA	UD	AD

PHYSICAL STATUS

INJURY	SCORE	ARMOR	PENALTY	#
FLESH WOUND			-1	
DEEP WOUND			-2	
INSTANT DEATH			DEAD	

SKILLS

NAME	CPLX	LVL	+/-	NAME	CPLX	LVL	+/-

WEAPONS

NAME	ACC	DAM	RANGE	AMMO	ROF

EQUIPMENT

SYSTEM SHOCK

HEAVY GEAR

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PERSONAL DATA

Name:
Race:
Occupation:
XP:
Vitality:
Wounds:
Defense:
Initiative:
Action Dice:
Base Speed:
Inspiration:
Education:

ABILITY

ABILITY	SCORE	MODIFIER
STR		
DEX		
CON		
INT		
WIS		
CHA		

ATTACKS

Melee:
Ranged:

SAVES

Fortune:
Reflex:
Will:

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SKILLS

Name	Bonus	Total	Name	Bonus	Total

WEAPON

Name	Bonus	Dam	Error	Threat

Range	Weight	Type	Size	Special Properties

WEAPON

Name	Bonus	Dam	Error	Threat

Range	Weight	Type	Size	Special Properties

EQUIPMENT

HEAVY GEAR

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