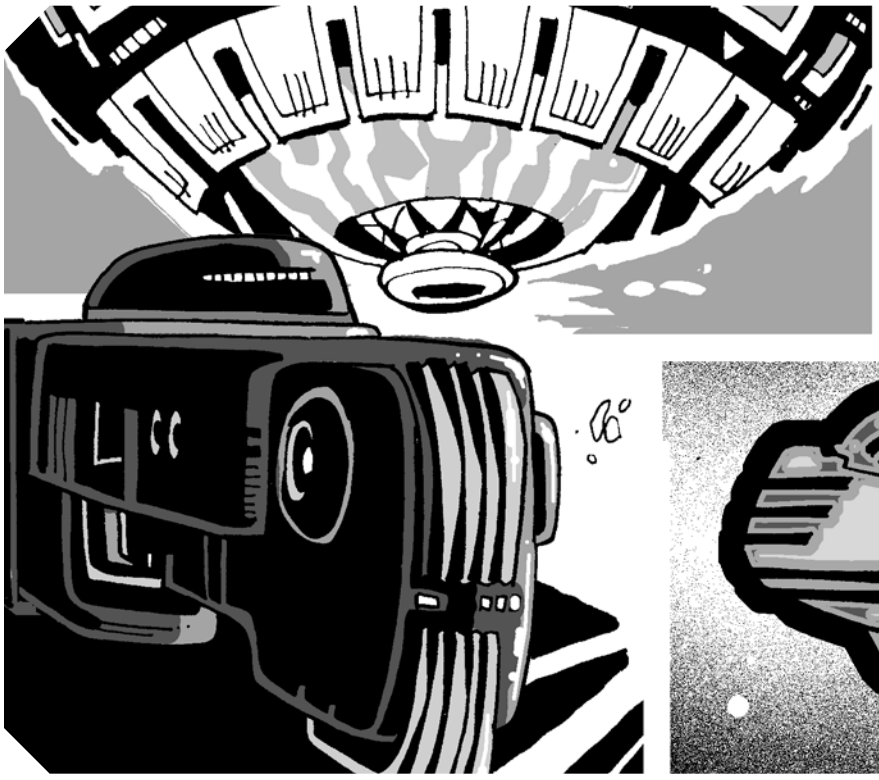
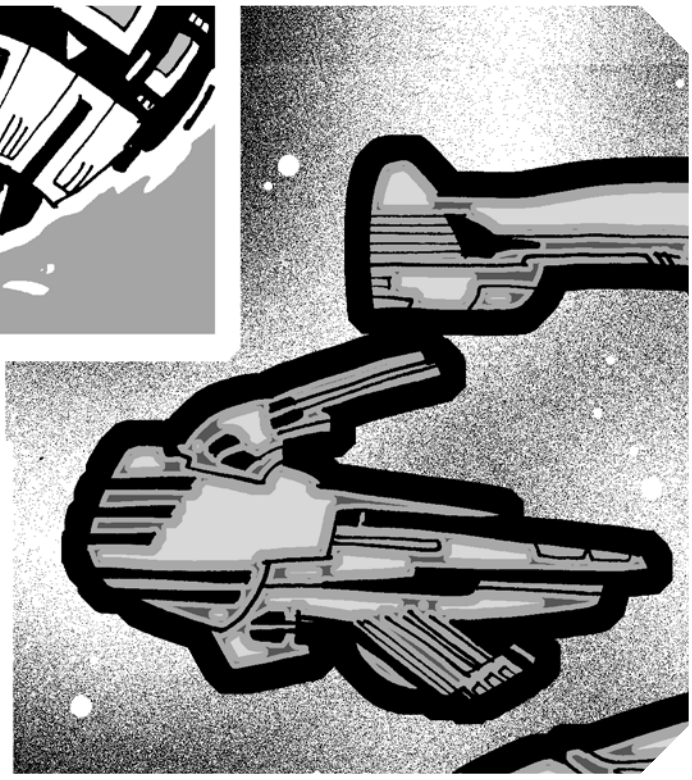
GURPS® Fourth Edition

SPACESHIPS 3

WARSHIPS AND SPACE PIRATES™





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*An e23 Sourcebook for **GURPS**®*

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Extra-special thanks to Martin Heidemann and Jon Walters, for playtest contributions above and beyond the call of duty.

Introduction

Space warships, whether commanded by military officers or swashbuckling pirates, are a defining element of space opera and indeed science fiction. Intended as a tool kit for GMs who wish to focus on this aspect of space roleplaying, this book presents a complete fleet of easily customized warships, as well as outlining how pirates and space navies might operate. For GMs and players who want more tactical options, these rules adapt the ***GURPS Spaceships*** combat system into a hex-based tactical combat game, allowing space battles to be resolved with counters or miniatures.

About the Series

GURPS Spaceships 3: Warships and Space Pirates is one of several books in the ***GURPS Spaceships*** series, which supports ***GURPS Space*** campaigns by providing GMs with ready-to-use spacecraft descriptions and rules. Each volume offers spacecraft descriptions and supplementary rules. This book doesn't cover all warships – space fighters, carriers, and troop ships are presented in a later volume.

The core book, ***GURPS Spaceships,*** is required to use this book. ***GURPS Spaceships 2: Traders, Liners, and Transports*** will be useful.

Publication History

Some of the rules for tactical space combat are derived from the space combat system written by David L. Pulver for ***GURPS Traveller*** (which was adapted in ***GURPS Traveller: Interstellar Wars).***

About the Author

David Pulver is a freelance writer and game designer based in Victoria, British Columbia. He is the co-author of the ***GURPS Basic Set,*** *Fourth Edition* and author of ***Transhuman Space, GURPS Spaceships,*** and numerous other RPGs and supplements.

The captain wants the biggest fleet in history if we're gonna end this war. The way things are shaping up out there, it looks like he just might get it.

– Commander Ivanova, ***Babylon 5***

About *GURPS*

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Bibliographies. Many of our books have extensive bibliographies, and we're putting them online – with links to let you buy the resources that interest you! Go to each book's web page and look for the "Bibliography" link.

Errata. Everyone makes mistakes, including us – but we do our best to fix our errors. Up-to-date errata pages for all ***GURPS*** releases, including this book, are available on our website – see above.

Rules and statistics in this book are specifically for the ***GURPS Basic Set,*** *Fourth Edition.* Page references that begin with B refer to that book, not this one.

Chapter One
Space Navies and Pirates

"Captain, the second Yezendi frigate has just accelerated at 3G, closing at five miles per second. He's flanking us. Six minutes until we can fire our particle beam . . . "

There was no vibration, no feeling of impact . . . but suddenly a dozen indicators on the cruiser's threat board went red.

"Sir, we've been hit!"

"Damage report, Mr. Khafaji!"

"Central hull, burn through both layers of armor – he fired his spinal laser. The #2 laser turret battery's disabled. We lost the central fuel tank and the hangar bay."

"Helm, bring us about to starboard! 1G acceleration. Engineering, get a team down to that battery! Gunnery, reload tubes one and two with antimatter missiles. Fire when ready."

Space Navies

A space navy's missions are similar to those of a wet navy. Its purposes are to protect society's ability to move through space, and deny that capability to opponents. From the least to most demanding, these goals are local space defense, space denial, space control, and power projection. The interstellar navies of economic superpowers can usually perform all types of missions, but the smaller forces of minor or non-militaristic powers only have the resources to perform local space defense and space denial.

Local Space Defense: Hindering or defeating enemy attempts at power projection. This involves fighting off or intercepting enemy spacecraft engaging in bombardment, troop landings, or smuggling. Local defense forces protect the space around a world, including valuable assets such as satellites, moon bases, orbital spaceports, and other commercial and industrial facilities. Local space defense can be attempted with a single ship or space station.

Space Denial: Threatening a rival society's ability to travel through interplanetary or interstellar space. This involves intercepting spacecraft that cross disputed borders, raiding enemy shipping, or blockading a world (or entire system).

Space Control: Protecting the transit of the society's spacecraft and the security of any commercial shipping lanes. This can involve patrolling to "show the flag" or deter enemy activity, escorting friendly vessels, or fighting battles in deep space to defeat rival navies engaged in space denial, power projection, or space control. The desire of multiple major powers to protect their traders and explorers could drive an attempt to create an interstellar or galactic civilization. Space control requires spreading forces to protect and patrol multiple potential targets and space lanes.

Power Projection: Ensuring the delivery of matter or energy to an enemy world or space facility. This involves bombarding planets, supporting troop landings, delivering agents or information, or even forcing open a closed economy. Power projection often requires spacecraft optimized for troop transport or planetary bombardment. *Effective* power projection requires achieving space control first, by defeating local space defenses. The ultimate form of power projection, and perhaps the most difficult of all military operations, is a full-scale invasion.

Peacetime Operations

Naval forces are nearly as busy in peacetime as in war. Activities that consume the attention of a space force are detailed below.

Exercises: An effective navy trains constantly, practicing varied operations in realistic scenarios. Less effective navies hold more "spit and polish" parade exercises, showcasing the regime's toys or overawing restive subjects. Some exercises are multinational, involving warships from allied powers. Many also have a political purpose, e.g., a major exercise off an enemy border to demonstrate resolve or send a political message. An announced "exercise" can also be a cover for an actual invasion!

Refit and Maintenance: Warships spend as much as a third of their time in port for repairs, rearming, refueling, major maintenance, or upgrades to new systems.

Police Patrols: These are local space defense operations to disrupt piracy, smuggling (including supplies for any terrorist or rebel groups), poaching, slave raids, unauthorized gas mining, illegal immigration or settlement, and asteroid claim jumping. The usual goal is to intercept, board, and arrest rather than destroy, and targets will often surrender or run when approached. Police patrols also perform humanitarian duties such as rescue missions, and may be responsible for enforcing safety and traffic control regulations on commercial ships. Sometimes these activities are assigned exclusively to paramilitary patrol forces.

Patrol ships often police an area beyond the reach of fixed defenses (such as space defense platforms), but within their agency's jurisdiction. Their vessels often operate near a frontier, but rarely venture beyond it. A patrol ship's "beat" can be limited to orbital space, or extend to an asteroid belt or entire system, or even several solar systems. However, a space patrol agency's responsibilities can also extend beyond the space lanes to policing frontier colonies and space stations.

Deep Space Patrols: These interplanetary or interstellar patrols form the basis of space control operations. The vessels "show the flag" to reassure friends and deter foes, and are on hand when friendly vessels or worlds call for help. Navies lacking the resources to be everywhere often send single vessels for patrols. In peacetime, deep space patrol ships may also perform some police functions, e.g., stopping suspicious ships or rendering emergency aid.

Diplomatic Missions: The transport or escort of an ambassador or other dignitary. Occasional missions into foreign territory may require ships to seal or remove certain weapons. A diplomatic mission may involve a large and powerful ship such as a battleship, or a relatively inoffensive vessel such as a frigate. A battleship may impress (or intimidate!) the other side, but its very arrival could be provocative in tense times. A small ship attracts less attention, which is useful if secret negotiations are underway.

Exploration: Space navies can also carry out deep space mapping and exploration missions. Civilian expeditionary organizations, like NASA, are historically rare, and for good reason: Why duplicate the military's capabilities?

> *The Dalek stratagem nears completion. The fleet is almost ready. You will not intervene.*
> *– Dalek,* ***Doctor Who***

Intelligence: Reconnaissance of known potential targets, both military and civilian.

Shadowing: Dedicated warships may watch and trail the vessels of rival powers. Shadowing warships may have orders to strike if war breaks out, or to keep a watchful eye while gathering intelligence on their dispositions and capabilities.

Wartime Operations

The ultimate test of any space navy is its performance in time of war. During wartime, separate paramilitary forces (such as a space patrol or survey service) are often subordinated to the navy. Of course, in some societies, the patrol, navy, and survey service may all be a single unified agency, e.g., "the galactic patrol" or "star fleet.")

Typical wartime operations include:

Convoy Escort: Protecting commercial vessels (which may be carrying military cargo) or assault ships en route.

Refugee Protection: Escorting a fleet of vessels carrying refugees to safety. This can require a long interplanetary or interstellar journey, possibly complicated by hostile pursuit. Refugee ships will sometimes be a "rag-tag" fleet from yachts to heavy freighters – possibly damaged, slow, or low on fuel. Onboard complications can include overcrowding, medical emergencies, psychological trauma, and conflicting political agendas.

Blockade: A space denial mission to strangle a rival polity's economy by intercepting or cutting off access to trading partners or resources.

Raid: A swift hit-and-run attack, involving minimal vessels, to probe enemy defenses, draw off forces for a major strike elsewhere, or capture resources or prisoners. Large-scale raids will strike strategic objectives, such as orbital installations, population centers, or military bases.

Interception: An attempt to meet and destroy (or drive off) an enemy ship, squadron, or fleet on the move. Sometimes a show of force is enough to deter intruders.

Invasion: A major attack into another power's territory, performed by assault ships carrying ground troops, and supported by warships, freighters, and tankers.

Piracy

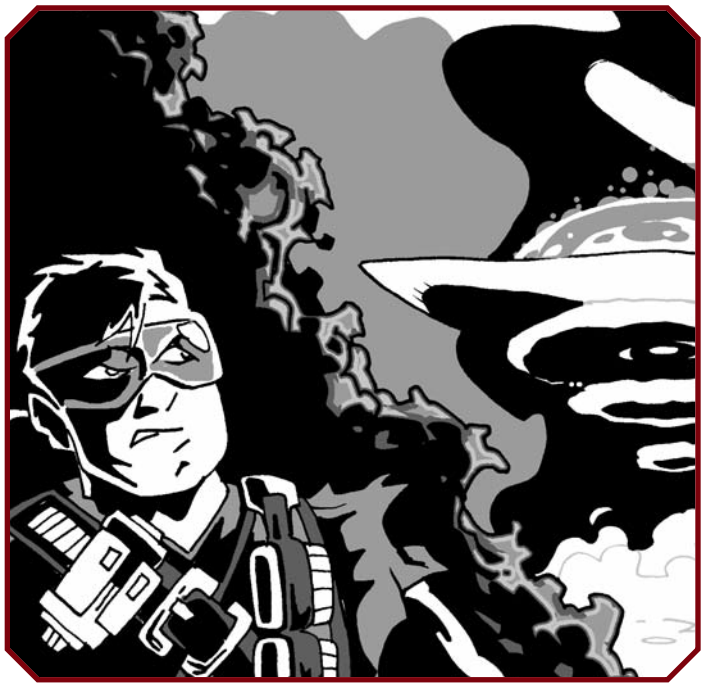
Piracy is a business, and to be attractive, economic conditions must support it. A pirate ship may be worth somewhere between $2 million to $200 million new, and probably 10% to 50% of that on the black market. Profit-motivated pirates must believe that they can steal cargoes or ships worth considerably more than this over time, or it will be easier to sell the ship on the black market and retire as millionaires!Another reason why pirates may not "go legitimate" is an existing criminal record. For example, mutineers who turned against a hated captain, or down-on-the-luck merchants who steal their own vessel after going in debt to a bank. A crew of escaped slaves (who might be robots or genetic constructs) who have taken control of their master's ship will have nowhere else to go, and may engage in piracy to free other slaves or gain revenge against their oppressors. Pirates can instead be motivated by nationalist ideology. For instance, the remnants of a defeated space navy could fight on well after their political leadership surrenders, perhaps eventually preying upon ships of both sides. Terrorists or guerrillas can use piracy as a way to strike their enemies while financing their insurgency.

Pirate Havens

The most important criteria for piracy is the existence of a pirate haven. This is a spaceport (and often an entire world or star system) that is willing to maintain, supply, and repair pirate ships, by virtue of an open policy or by asking few questions. It serves as a market for stolen goods, spaceships, and sometimes even captives.

Ideally, a pirate haven is close enough to make regular visits feasible, but strong enough (or distant enough) to withstand diplomatic, economic, and military pressure to shut down operations. Since rich, well-defended worlds usually profit more from trading with their neighbors than antagonizing them, pirate havens are rare!

A pirate haven *doesn't* have to be wealthy or strong, if there's no functioning order in the region, and no major power willing to step in. Piracy flourishes in regions of anarchy and disorder. If shipping lanes pass through failed states, it may be endemic. Suppose an ultra-tech world or star system suffers a social collapse (such as a bloody civil war). Ships no longer come to its once-thriving port . . . but shipping lanes still pass through the system. With the economy and society in chaos, local warlords or gangs make common cause with desperate spacers to use short-range space tugs, shuttles, or customs craft to prey on passing transport vessels. Against unarmed merchant vessels, even a tugboat with a small boarding party can be enough. Such "subsistence" pirates might be happy to capture loot that professional pirates would not bother with, such as a hold full of canned food.



Governments and Piracy

A few pirate ships are renegade warships, though most are armed merchant vessels. Either way, individual pirates can't hope to stand up to the determined efforts of a patrol or navy. For pirates to survive, they must be able to stay ahead of the law.

In a single solar system, radio signals can cross the distances in a few minutes to a few hours, and stealth is nearly impossible against the cool backdrop of space. Passive sensor arrays *will* detect ships (unless they have superscience cloaking devices) wherever they go. This makes it very difficult to engage in piracy longterm – captains or crews may turn pirate in hopeless circumstances, but they're unlikely to have a very long or happy life.

Piracy is easiest in close proximity to a weak interplanetary or interstellar government, such as a loose alliance or (better yet) rival competing governments. In such situations, one or more worlds may serve as a pirate haven. A loose alliance may pull together against foreign threats, but have navies reluctant to agree on internal policing, especially if members have different laws. Pirates may also be privateers, subsidized by rival governments or predatory corporations.

Another consideration is a region's red tape. Laws that prohibit armed civilian ships will give pirates trouble when docking at legitimate ports, but will also make merchants easier prey. If authorities carefully vet ship's logs, require flight plans, and so on, those same authorities may be able to use pattern analysis of attacks to track down pirates. And similarly, identity transponders will force pirates to make an effort to falsify them.

Even with these regulations, they may be slackly enforced in some regions – for example, pirates may be able to bribe local officials into overlooking an infraction.

In settings where faster-than-light stardrives exist but no reliable FTL radio, space pirates are much more viable. On the other hand, some types of star drive will make piracy very hard. For instance, if travel must pass through a limited number of connected jump points or star gates, governments can police them more effectively.

The economics of ship construction and naval budgets also affect piracy. If a government can field many squadrons of million-ton dreadnoughts, it can also afford to trade even one of these battleships for a thousand 1,000-ton frigates to police the frontier space lanes . . . keeping pirates in check and ensuring trade keeps flowing.

One way to justify *both* enormous battle fleets and pirates is extremely fast and easy interstellar travel. If a pirate has only one or two worlds to flee to after a raid, he's in trouble. But with a starship that can skip across dozens or hundreds of parsecs in a few weeks, with little or no need to refuel, and no similarly fast FTL communication, a pirate ship captain has a fair chance of eluding pursuit long enough to enjoy his ill-gotten gains!

Ill-Gotten Gains

A pirate's income usually comes from three sources:

Stolen Cargo: The basic target of pirates is cargo worth enough to be a viable source of income. It must cover repairs, fuel, and ammo for the risk the pirate takes, at least on average. If the average pirate has a fair chance of suffering several million dollars worth of damage every few missions, that must be taken into account. If most raids only net a few thousand tons of low-value goods like potatoes or furniture, a pirate might be unable to even pay for his repairs and any ordnance (such as missiles) expended fighting off patrol ships! The GM may get around this by deciding that most cargoes worth shipping across space *are* valuable! Alternatively, pirates may discover a way to identify lucrative targets, such as a spy in a merchant line or port authority that can provide them with cargo manifests. Most pirates, unless they want 50,000 tons of grain (and a target too large to hurt easily), will prefer to target smaller tramp freighters, which are more likely to carry low-volume, high-value cargoes. .

Economic Maneuvers: What if most targets *are* bulk freighters carrying commodities? One way to make a profit would be to team up with an unscrupulous merchant. First, pirate attacks interrupt a world's access to a needed commodity (such as food shipments to a non-agricultural mining colony), perhaps capturing stocks of these goods from their victims. Then the pirate's unscrupulous partner arrives safely with a hold full of those vital goods (either bought cheap elsewhere or taken from the victims). The now-desperate locals will pay enough to ensure a handsome profit for both the merchants and their shadow partner!

Captured Ships: Sometimes the most lucrative loot is the victim's ship (or any small craft it carries). If they can put a prize crew aboard, they can make off with the vessel as well as its loot! They may also use a spaceship with a sufficient hangar bay or external clamp to carry their prize away. Pirates who do cripple their prey must make a judgment call: Do they have the skill and time to jury-rig repairs before the authorities arrive?

Ransoms: Pirates can also take crews and passengers captive, and relatives or employers may pay for their return. Unfortunately, individual ransom negotiations for random captives may be too time consuming or risky to be profitable, and tramp freighter crews often have no resources beyond their ship, which the pirates already have. Larger merchant lines are better able to quietly ransom employees and passengers. Their insurance policies sometimes cover this expense, and there are security firms that they could retain who specialize in hostage negotiations.

If pirates *do* acquire random captives, another possibility is to sell them "on spec" to a third party who arranges the ransoms and collects the money. The biggest profits come from high-value targets: a passenger liner or private yacht that carries a billionaire, media star, leading scientist, or corporate CEO.

Pirates with good intelligence can even *plan* such raids, perhaps with an "inside man" who wishes to share the reward or dispose of a rival. Lucky kidnappers will negotiate a quick and efficient exchange without involving the authorities. On the other hand, dealing with governments is tricky – many states utterly refuse to negotiate, and may respond with an all-out effort to capture or eliminate the pirates.

Ransomed Ships: Pirates can take entire *ships* for ransom, arranging to return ship and crew in return for a payment that is enough to cover the pirates' profit margin, even if it's only a fraction of the actual value of the vessel. This is easiest with large highly automated cargo ships run by major corporations; as with ransoms, such activities might be considered a "cost of doing business" in a particular area, and handled with no fuss through brokers. A related operation is a protection racket in which tolls (in cargo or hard currency) are charged for unhindered passage. Such rackets can persist for several years until they become intolerable enough for governments (or corporate-hired mercenaries) to send in sufficient force to shut them down.

Slaves: Pirate havens can host slave markets. These might buy anyone, or look for specific qualities (race, gender, appearance, age, skills, etc.). Slave markets can be constrained by local laws – perhaps only robots, aliens, or foreigners can be enslaved. Those who are pirates due to mutiny against a harsh captain or escape from slavery may be unwilling to engage in such trade, and may even deliberately target those engaged in slaving operations.

Raiding: Pirates may also target space stations or planetary settlements. In particular, pre-industrial settlements are particularly vulnerable to slave raiding. Raiding is usually a small scale affair, such as small outposts, tiny frontier colonies, or isolated mining stations . . . but a pirate fleet, or just one ship with powerful weapons (such as nuclear missiles) might conceivably hold an entire world for ransom! Large scale raids of this sort will, of course, result in the full force of any space navies deployed against the pirates.

The Importance of Reputation

A lucky shot can ruin a pirate's profit margin, so many pirate captains prefer to intimidate their victims into surrendering without a fight.

This works best with a reputation of ruthlessness in combat, but leniency toward those who surrender. For example, a pirate known to take only cargo, spare lives, and leave ships intact, may avoid unnecessary fights. However, a reputation also creates a bigger target!

In a similar vein, some pirates prefer to attack corporate-owned freightliners rather than small tramp traders. A company captain has only his career to worry about – a tramp captain owns his own ship and possibly the cargo, and may well face financial ruin even if he survives.

On the other hand, shipping corporations have more pull with governments, and repeated attacks on major shipping routes will almost certainly trigger naval intervention. Pirates worried about the law will stick to marginal systems and the tramp traders that serve them, and hope they don't meet an especially fierce merchant!

For thousands of years, the mighty starships tore across the empty wastes of space and finally dived screaming on to the planet Earth – where, due to a terrible miscalculation of scale, the entire battle fleet was accidentally swallowed by a small dog.

– The Hitchhiker's Guide to the Galaxy

Chapter Two

Military and Paramilitary Spacecraft

This chapter describes several warships built using the ***GURPS Spaceships*** rules that are representative of common types of major combatant vessels. Since ***GURPS*** has no default interstellar background setting, only a few of the many possible combinations of spaceship systems, space drive types, and degrees of superscience can be covered. These ships are a representative mix of hard science (mostly at TL8-10) and superscience (mostly at TL10-12) vessels. Since the basic system in ***GURPS Spaceships*** is highly modular, GMs should find it fairly simple to swap out components, particular drives, and adjust their details in order to fit campaign assumptions.

Note on Computers: The abbreviation "C" is used for Complexity when referring to control station computers, e.g., a "C8 computer" is one with Complexity 8.

Battleships

Battleships are designed to win space battles. Also called dreadnoughts or capital ships, their primary role is to achieve space control – defeating an enemy space fleet, then destroying any space defense platforms. Battleships may also perform vital escort missions, e.g., to protect a force of assault ships engaged in a planetary invasion. Their heavy firepower is invaluable for planetary bombardment (although some may not have weapons that can penetrate planetary atmospheres).

Battleships are powerful enough to operate alone, and often do in peacetime, but in war are usually the flagship of a task force. Very large space navies may even have multi-battleship squadrons or fleets. When two great battle fleets meet, the outcome of an entire war might be determined by a single epic engagement . . . and the losers may end up a vast debris field that will be picked over by scavengers for decades to come!

Captains with Rank 5 or 6 command battleships. A battleship squadron or battle fleet commander is usually Rank 6 or 7, and may be a commodore or admiral. In militaristic societies, battleships are often the personal flagships (or the residence) of warlords or emperors. Sapient battleships may be godlike entities whose benevolence or malevolence shapes galactic events.

Ragnarok-Class Battleship (TL8)

Constructed in space using a 30,000-ton (SM +11) unstreamlined hull, this warship is the space equivalent of a ballistic missile submarine. It is affordable by low-tech worlds (usually ones with rival hostile powers). It orbits a few hundred thousand miles from its target planet, carrying a tremendous load of kinetic kill and nuclear weapons. When it receives an attack order, it will boost for the planet, arriving in a few hours with enough nuclear firepower to obliterate a nation. Another possible mission is more benign: It is an excellent interceptor vehicle for incoming asteroids.

Front Hull	*System*
[1]	Steel Armor (dDR 15).
[2]	Metallic Laminate Armor (dDR 30).
[3]	Habitat (78 cabins, gym, ops center, 10-bed sickbay, 500 tons cargo).*
[4]	Hangar Bay (1,000 tons capacity).*
[5]	Medium Battery (three turrets with 12cm rapid fire conventional guns).*
[6]	Tactical Array (comm/sensor 10).*
[core]	Control Room (C5 computer, comm/sensor 8, 15 control stations).*

Central Hull	*System*
[1]	Steel Armor (dDR 15).
[2]	Fuel Tank (1,500 tons of bomb pulse units with 3 mps delta-V).
[3-5]	Tertiary Batteries (each has 30 fixed mounts with 32cm missile launchers).*
[6]	Secondary Battery (10 turrets with 5cm very rapid fire conventional guns).*
Rear Hull	***System***
[1]	Metallic Laminate Armor (dDR 30).
[2-3]	Steel Armor (dDR 15 each).
[4]	External Pulsed Plasma Engine (2G acceleration).*
[5-6, core]	Fuel Tanks (each has 1,500 tons of bomb pulse units with 3 mps delta-V).

* Three workspaces per system.

The ship has spin gravity (0.3G).

The typical crew consists of 13 bridge operators (captain, executive officer, pilot, engineering officer, navigator, sensor operator, two communication officers, three missile battery gunners, and two tactical officers), 13 turret gunners, 30 technicians, one medic, and any small craft crews. Multiple crew shifts will usually be carried. The ship won't carry a landing party, but may have a security team to protect the nuclear weapons.

It is not merely cruelty that leads men to love war; it is excitement.

– Henry Ward Beecher

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL8 HIGH-PERFORMANCE SPACECRAFT												
8	*Ragnarok*-class	200	-2/5	13	2G/12 mps	30,000	1,515.6	+11	156ASV	45/15/60	0	$1.57B

Admiral-Class Battleship (TL10^)

This 30,000-ton (SM +11), unstreamlined starship is 500 feet long. It is about the same mass as a World War II battleship. The *Admiral c*lass is heavily armored and bristles with beam and missile firepower. Its powerful fusion torch engines let it boost at 1G, and it has a basic stardrive for interstellar flight. Its antimatter reactor gives it plenty of power at relatively low mass, but unfortunately leaves it vulnerable to catastrophic kills. To mitigate this, the reactor is buried deep in the heart of the vessel.

Front Hull	*System*
[1-3]	Nanocomposite Armor (dDR 70 each).
[4-5!]	Major Batteries (turrets with 10GJ UV laser).*
[6]	Fuel Tank (holds 1,500 tons hydrogen and provides 15 mps delta-V).
[core]	Control Room (C9 computer, comm/sensor 10, 15 control stations).*
Central Hull	***System***
[1-2]	Nanocomposite Armor (total dDR 140).
[3]	Fuel Tank (holds 1,500 tons hydrogen and provides 15 mps delta-V).
[4!]	Tertiary Battery (20 fixed mount 32cm missile launchers, 10 turrets with 300 MJ particle beams).*
[6]	Habitat (five luxury cabins, 150 cabins, 10-bed sickbay, two fabricator minifacs, 140 tons cargo).*
[core]	Antimatter Reactor (four Power Points).*
Rear Hull	***System***
[1-2]	Nanocomposite Armor (dDR 70).
[3!]	Major Battery (turret with 10 GJ UV laser).*
[4-5]	Fusion Torch Engines (0.5G acceleration each).*
[6!]	Stardrive Engine (FTL-1).*

* Three workspaces per system.

It has a stealth hull and spin gravity (0.3G).

The battleship's typical crew are 15 bridge operators (including the captain, executive officer, pilot, engineering officer, navigator, sensor operator, communication officer, missile gunner, and tactical officer), 43 turret gunners and 20 missile operators, 36 technicians, and one medic. Multiple crew shifts are usually carried, plus a squad of marines or security guards.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL10 LOW-PERFORMANCE SPACECRAFT												
10^	*Admiral*-class	200	-2/5	13	1G/15 mps	30,000	171	+11	310ASV	210/140/140	1×	$3.894B

Fenris-Class Robot Battleship (TL11^)

Not all warships have crews – indeed, sapient artificial intelligence (that can be trusted) makes it quite advantageous to build a vessel without occupants, since there's no need to "waste" space on habitats. Designed as an implacable instrument of destruction, the *Fenris* is just such a computer-controlled automated interstellar dreadnought. It makes up for a relatively slow stardrive with extensive long-range weaponry and heavy defenses. The major and secondary batteries are intended for use against large warships, while the tertiary batteries are designed for close defense against frigates, fighters, and missiles. It has a 300,000 ton (SM +13) hull that is about 1,000 feet long.

Front Hull	*System*
[1-3]	Diamondoid Armor (total dDR 600).
[4-5!]	Major Batteries (turret with 100 GJ X-ray laser each).
[6]	Tactical Array (comm/sensor 15).
[core]	Control Room (C11 computer, comm/sensor 13, no control stations).
Central Hull	***System***
[1-2]	Diamondoid Armor (total dDR 400).
[3!]	Secondary Battery (10 turrets with 10 GJ gravitic-focus antiparticle beams).
[4!]	Tertiary Batteries (30 turrets with 300 MJ rapid fire UV lasers).
[5!]	Stardrive Engine (FTL-1).
[6!]	Heavy Force Screen (dDR 500, or dDR 1,000 with two Power Points).
[core]	Super Fusion Reactor (four Power Points).
Rear Hull	***System***
[1-2]	Diamondoid Armor (total dDR 400).
[3]	Secondary Battery (10 fixed mount 56cm missile launchers).
[4-5!]	Super Reactionless Engines (50G acceleration each).
[6]	Super Fusion Reactor (four Power Points each).

The battleship has total automation and a stealth hull.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL11 (HIGH-PERFORMANCE SPACECRAFT)												
11^	*Fenris*-class	500	-1/5	13	100G/*c*	300,000	0	+13	0	600/400/400*	1×	$76.1485B

* Plus force screen (dDR 500, or dDR 1,000 if using two Power Points).

Empire-Class Dreadnought (TL11^)

This mighty interstellar warship has a balanced mix of speed, acceleration, defense, and firepower. It has less massive armor than lower-TL battleships, but makes up for that with a powerful force screen. Its massive spinal mount and powerful batteries of beam cannon turrets give it devastating firepower, backed up by a spacious hangar bay that can carry a virtual fleet of small craft. It can also be pressed into service as an assault ship, with enough room aboard to carry a large contingent of ground troops and their vehicles. It uses a 1,500-foot long 1,000,000-ton (SM +14) unstreamlined hull.

Front Hull	*System*
[1-2]	Hardened Diamondoid Armor (total dDR 600).
[3!]	Spinal Battery (1 TJ antiparticle beam).*
[4!]	Secondary Battery (10 turrets with 30 GJ X-ray lasers).*
[5]	Tactical Array (comm/sensor 16).*
[6]	Hangar Bay (30,000 tons capacity).*
[core]	Control Room (C12 computer, comm/sensor 14, 40 control stations).*
Central Hull	***System***
[1]	Hardened Diamondoid Armor (dDR 300).
[2]	Habitat (300 luxury cabins and 2,000 cabins with total life support, 2,750 tons cargo, 20 briefing rooms,
[2]	(Habitat continued) five gym establishments, 10 fabricator minifacs, two labs, six offices, large ops center, 100-bed hospital sickbay).*
[3!]	Tertiary Battery (30 turret mounts with 10 GJ X-ray lasers).*
[4!]	Heavy Force Screen (dDR 700 or 1,400).*
[5-6!]	Stardrive Engines (FTL-1 each).*
[core!]	Spinal Battery (central system).*
Rear Hull	***System***
[1]	Hardened Diamondoid Armor (dDR 300).
[2-3!]	Super Reactionless Engines (50G acceleration each).*
[4!]	Spinal Battery (rear system).*
[5-6]	Super Fusion Reactors (four Power Points each).*

* 100 workspaces per system.

It has artificial gravity, gravitic compensators, and a stealth hull.

The battle cruiser's typical crew consists of 40 bridge operators (including the captain, executive officer, pilot, engineering officer, navigator, sensor operator, communication officer, spinal weapon gunner, tactical officer, and all tertiary battery gunners), 10 secondary battery gunners, 1,700 technicians, 10 medics, and any small craft crew. Multiple crew shifts are often carried to provide redundancy. It also has enough room aboard to carry a force of several hundred troops.

TL	Spacecraft	dST/HP	Hnd/SR	HT	Move	LWt.	Load	SM	Occ	dDR	Range	Cost
PILOTING/TL11 HIGH-PERFORMANCE SPACECRAFT												
11^	*Empire*-class	700	-1/5	13	100G/*c*	1,000,000	33,210	+14	4,600ASV	600/300/300*	2×	$264.307B

* Hardened, plus force screen (dDR 700, or dDR 1,400 if using two Power Points).

Top air speed is 500 mph.

Adversary-Class Super Dreadnought (TL12^)

These immense vessels can concentrate enough firepower to destroy almost anything. The focused fury of its spinal mass-energy conversion beam can take on an entire war fleet or destroy a city with a single shot. Even if an opponent does get close, the *Adversary's* many tertiary batteries, defensive force screens, and glittering armor make it almost invulnerable.

Although fast by lower-TL standards, the *Adversary* is slow for a TL12 design, with a "mere" 500G acceleration. But making up for this is a large hangar bay that can carry a vast swarm of smaller escorts (or landing craft). The ship is built using a 3,000,000-ton (SM +15) unstreamlined 2,000' hull. An interesting variant is to upgrade to the cosmic power design option, producing a truly terrifying 3 PJ beam . . .

Front Hull	System
[1-2]	Hardened Exotic Laminate Armor (total dDR 1,400).
[3!]	Heavy Force Screen (dDR 1,500, or dDR 3,000 with two Power Points).*
[4]	Habitat (200 luxury cabins and 8,800 cabins with total life support, 4,000 tons cargo, 30 briefing rooms, 25 gyms, three large ops centers, 100 mini nanofacs, 20 cells, 300-bed hospital sickbay).*
[5!]	Tertiary Battery (30 turrets with 3 GJ rapid fire gamma-ray lasers).
[6!]	Spinal Battery (3 TJ conversion beam).
[core]	Control Room (C13 computer, comm/sensor 16, 60 control stations).*
Central Hull	**System**
[1-2]	Exotic Laminate Armor (total dDR 1,400).
[3]	Hangar Bay (100,000 tons).*
[4-5!]	Stardrive Engines (FTL-1 each).*
[6!]	Tertiary Battery (25 turret mounts with rapid fire 3 GJ improved antiparticle beams, five turret mounts with 30GJ tractor beams).
[core]	Spinal Battery (central system).
Rear Hull	**System**
[1-2]	Exotic Laminate Armor (total dDR 1,400).
[3!]	Subwarp Engine (500G acceleration).*
[4!]	Tertiary Battery (30 turrets with rapid fire 3 GJ gamma-ray lasers).
[5!]	Spinal Battery (rear system).
[6]	Total Conversion Reactor (five Power Points).*

* 300 workspaces per system.

The ship is equipped with artificial gravity and gravitic compensators.

Its typical crew consists of 60 bridge operators (including the captain, executive officer, pilot, engineering officer, navigator, sensor operator, communication officer, and tactical officer), 4,200 technicians, 91 gunners, 30 medics, plus any small craft crew. It has room aboard for a few thousand troops for security or to occupy the target world after the planet surrenders.

TL	Spacecraft	dST/HP	Hnd/SR	HT	Move	LWt.	Load	SM	Occ	dDR	Range	Cost
PILOTING/TL12 HIGH-PERFORMANCE SPACECRAFT												
12^	*Adversary*-class	1,000	-1/5	13	500G/*c*	3,000,000	105,808	+15	18,080ASV	1,400*	2×	$1,301.3B

* Front armor is hardened, plus dDR 1,500 force screen (dDR 3,000 if reinforced with second Power Point).

Top air speed is 5,600 mph.

Cruisers

Cruisers are large, fast space warships, equally capable of independent operations, major space battles, and planetary bombardment.

A cruiser is intermediate in size between frigates and battleships. Heavy cruisers or battle cruisers are very capable combatants, and, if a navy lacks either battleships or big carriers, may be the pride of its space fleet. Smaller cruisers are usually styled as light cruisers or destroyers, although "destroyer" may also refer to a large frigate.

Cruisers may be employed on solo missions, or lead a small task force of frigates or other vessels. Typical solo operations include showing the flag, commerce raiding or convoy escort, police actions against rebel colonies or unruly natives, strategic strikes on lightly defended worlds or stations, and transport of vital diplomatic missions. Some navies also use cruisers to explore dangerous frontier areas or for hazardous first contacts.

Cruisers often carry a platoon to company-sized unit of security specialists or marines for boarding operations and as a landing force for raids and power projection missions.

Large navies may organize 3-12 vessels into cruiser or destroyer squadrons. These may be trained to fight together, but just as often such squadrons are for administrative purposes, and ships are dispatched on their own or assigned to mixed naval task forces.

A cruiser command may be one of the most sought-after positions in a space navy, due to the opportunities for independent action and distinction. Captains are usually Rank 4-6. A squadron commander is usually Rank 5-6.

Trinity-Class Heavy Cruiser (TL9)

External pulsed plasma or "Orion" space drives permit the design of powerful high-thrust warships even at low TLs – if the designer accepts the cost and proliferation risk associated with fueling a ship with thousands of atomic bombs! This 10,000-ton (SM +10) streamlined design devotes much of its mass to weaponry and armor. While useful for interplanetary voyages (e.g., Earth to Mars in a few months) it's intended for local space operations, e.g., a battle around a planet and its moon, or control of a gas giant's satellites. The cramped interior is in zero-G when the ship is not accelerating, so any crew who are not adapted to such conditions will require drugs or exercise.

The spaceship resembles a blunt bullet, with a large pusher plate mounted behind. It uses an external nuclear pulse drive for propulsion, riding the shock wave of multiple nuclear explosions. Much of its mass is devoted to rear armor (representing the ship's pusher plate and radiation shielding). As such, a common tactical maneuver is to accelerate toward the enemy, launch a barrage of missiles, then turn to impose the plate to soak up return fire. The *Trinity* is designed to be capable of lifting off from an Earth-like planet in an emergency, but due to the environmental effects of multiple pulse bomb detonations, will usually operate from space or desolate lunar or asteroid bases.

Front Hull	*System*
[1-2]	Advanced Metallic Laminate Armor (total dDR 40).
[3]	Habitat (two luxury cabins, 40 cabins, six-bed sickbay, fabricator minifac, and 45 tons cargo).*
[4!]	Major Battery (fixed mount 3 GJ laser).*
[5]	Secondary Battery (10 fixed mounts with 32cm missile launchers).*
[6]	Hangar Bay (300 tons capacity).*
[core]	Control Room (C7 computer, comm/sensor 9, only seven control stations).*
Central Hull	***System***
[1]	Advanced Metallic Laminate Armor (dDR 20).
[2!]	Secondary Battery (four turrets with 30 MJ rapid fire lasers, two turrets with 8cm rapid fire electromagnetic guns, four turrets with 16cm conventional guns).*
[3-6]	Fuel Tanks (each with 500 tons of bomb pulse units with 4 mps delta-V).
Rear Hull	***System***
[1-3]	Advanced Metallic Laminate Armor (total dDR 60).
[4-5]	External Pulsed Plasma Engines (2G acceleration each).*
[6]	Fuel Tank (500 tons of bomb pulse units with 4 mps delta-V).
[core]	Fission Reactor (one Power Point)*.

* One workspace per system.

Typical crew consists of seven bridge operators (including the captain, pilot, engineering officer, navigator/sensor operator, missile gunner, laser gunner, and tactical officer), 10 turret gunners, nine technicians, and one medic, plus any small craft crew.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL9 HIGH-PERFORMANCE SPACECRAFT												
9	*Trinity*-class	150	-2/5	13	4G/20 mps	10,000	353.4	+10	84ASV	40/20/60	0	$576.35M

Top air speed is 5,000 mph.

Victory-Class Space Cruiser (TL10)

This heavily armored, multi-mission, interplanetary cruiser is propelled by a fusion pulse drive – more expensive to operate than the fusion rockets preferred by many merchant ships at TL10, but with superior acceleration. It uses a 10,000-ton (SM +10) unstreamlined hull that is about 300 feet long, and is equipped with spin gravity for crew comfort during long interplanetary voyages. The main armaments are a forward particle accelerator for ship killing and a missile battery for anti-ship and planetary bombardment missions. It also has a laser battery for self defense, a sizable hangar bay for small craft such as drop ships, and enough room in its habitat for a platoon of marines and their equipment.

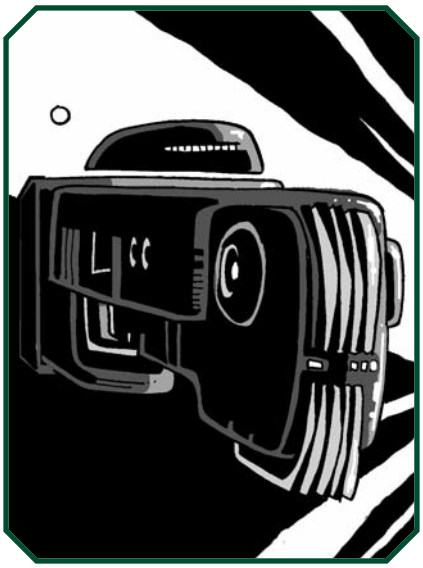
Front Hull	*System*
[1-3]	Nanocomposite Armor (total dDR 150).
[4!]	Major Battery (fixed mount 3 GJ particle beam).*
[5]	Hangar Bay (300 tons capacity).*
[6]	Habitat (two luxury cabins, 12 cabins, 13 bunkrooms, six-bed automed sickbay, briefing room, gym, minifac fabricator, 100 tons cargo).
[core]	Control Room (C9 computer, comm/sensor 10, 10 control stations).*
Central Hull	***System***
[1]	Nanocomposite Armor (dDR 50).
[2!]	Secondary Battery (10 turrets with 300 MJ lasers).*

Central Hull	*System*
[3-5]	Fuel Tanks (each with 500 tons of fuel pellets with 10 mps delta-V).
[6]	Secondary Battery (10 fixed mounts with 32cm missile launchers).*
Rear Hull	*System*
[1-2]	Nanocomposite Armor (total dDR 100).
[3-4]	Fuel Tanks (each with 500 tons of fuel pellets with 10 mps delta-V).
[5-6]	Fusion Pulse Drive Engines (0.05G acceleration each).*
[core]	Fusion Reactor (two Power Points)*.

* One workspace per system.

The cruiser has spin gravity (0.2G) and exposed radiators.

The usual crew consists 40 personnel (8 officers, 16 petty officers and 16 ratings). There are 10 bridge operators (captain, tactical officer plus two watches each comprising a pilot, engineering officer, navigator/sensor operator, and gunner),



10 turret gunners, 20 technicians in two watches, plus any small craft crew. Accommodation is two luxury cabins for captain and tactical officer, single cabins for the chief pilot and chief engineer, double cabins for other officers and petty officers plus four bunkrooms for the ratings. The vessel also has bunkrooms for a landing force of 40 space marines

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL10 HIGH-PERFORMANCE SPACECRAFT												
10	*Victory*-class	150	-2/5	13	0.1G/50 mps	10,000	407.4	+10	74ASV	150/50/100	0	$828.1M

Tsunami-Class Strike Cruiser (TL10^)

This is a fast, missile-armed warship designed for interstellar power projection. It uses an unstreamlined 10,000-ton (SM +10) hull, but it is lightly armored, relying instead on active anti-missile and electronic defenses. Rather than being built for close combat, the *Tsunami* is intended to fight a long-range space battles or bombard surface bases, and relies on its very heavy missile armament to win naval engagements or pummel a planetary target into submission.

Front Hull	*System*
[1]	Hardened Nanocomposite Armor (dDR 50).
[2]	Hangar Bay (300 tons capacity).
[3-4]	Defensive ECM.*
[5!]	Secondary Battery (eight fixed mount 32cm missile launchers, two turrets with 300 MJ UV laser).*
[6]	Tactical Array (comm/sensor 12).*
Central Hull	*System*
[1]	Nanocomposite Armor (dDR 50).
[2!]	Major Battery (turret with 30 MJ very rapid fire improved laser).*
[3]	Tertiary Battery (30 fixed mount 28cm missile launchers).*
[4]	Habitat (two luxury cabins, 25 cabins, 10 bunkrooms, six-bed sickbay, two offices, briefing room, fabricator minifac, 45 tons cargo).*
[5-6]	Fuel Tanks (each with 500 tons of hydrogen with 15 mps delta-V).
[core]	Control Room (C9 computer, comm/sensor 10, 10 control stations).*
Rear Hull	*System*
[1]	Nanocomposite Armor (dDR 50).
[2]	Fuel Tank (500 tons of hydrogen with 15 mps delta-V).
[3]	Tertiary Battery (30 fixed mount 28cm missile launchers).*
[4!]	Stardrive Engine (FTL-1).*
[5-6]	Fusion Torch Engines (0.5G acceleration each).*
[core]	Fusion Reactor (two Power Points)*.

* One workspace per system.

The typical crew are 10 bridge operators (captain, pilot, engineering officer, navigator, two sensor operators, three missile gunners, and communications officer), three beam turret gunners, 14 technicians, and one medic, along with any extra crew needed for small craft carried in the hangar. Extra shifts are often carried, sometime augmented by a platoon-sized force of marines for shore operations.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL10 HIGH-PERFORMANCE SPACECRAFT												
10^	*Tsunami*-class	150	-2/5	13	1G/45 mps	10,000	364.4	+10	94ASV	50*	1×	$1,380.5M

* Front armor is hardened.

Sword-Class Heavy Cruiser (TL11^)

This is a very fast and well-protected reactionless drive starship. It's designed almost exclusively for ship-to-ship battles, with a heavy armament of X-ray lasers and missiles, and a powerful defensive force screen. Its 30,000-ton (SM +11) streamlined hull is about 500 feet long, with good acceleration and interstellar performance. It can blast directly off from a terrestrial planet's surface, so the design does not include provision for carrying smaller craft.

Front Hull	*System*
[1-2]	Hardened Diamondoid Armor (total dDR 140).
[3!]	Major Battery (one fixed mount 10 GJ X-ray laser).*
[4]	Defensive ECM.
[5]	Multipurpose Array (comm/sensor 13).*
[6]	Habitat (five luxury cabins and 60 cabins with total life support, 10-bed automed clinic sickbay, two fabricator minifacs, briefing room, gym, lab, and 215 tons cargo).*
Central Hull	***System***
[1-2]	Hardened Diamondoid Armor (total dDR 140).
[3!]	Major Battery (with one 10 GJ X-ray laser turret).*
[4!]	Secondary Battery (with 10 very rapid fire 10MJ X-ray laser turrets).*
[5-6!]	Stardrive Engines (FTL-1 each).*
[core]	Control Room (C10 computer, comm/sensor 11, 15 control stations).*
Rear Hull	***System***
[1]	Hardened Diamondoid Armor (dDR 70).
[2-3!]	Super Reactionless Engines (50G acceleration each).*
[4!]	Heavy Force Screen (dDR 200 or dDR 400).*
[5]	Secondary Battery (10 fixed mounts with 40cm missile launchers).
[6]	Fusion Reactor (two Power Points).*
[core]	Super Fusion Reactor (four Power Points).*

* Three workspaces per system.

The ship has artificial gravity and gravitic compensators, and a stealth and dynamic chameleon hull.

The usual crew are 15 bridge operators (captain, executive officer, pilot, two engineering officers, navigator, two sensor operators, communication officer, chief gunner, four gunners, and a tactical officer), 45 technicians, one medic, and all necessary small craft pilots and flight crews. Multiple crew shifts are usually carried.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL11 HIGH-PERFORMANCE SPACECRAFT												
11^	*Sword*-class	200	0/5	13	100G/*c*	30,000	228	+11	130ASV	100/100/50*	2×	$8.487B

* Hardened, plus dDR 200 (or 400 if fully powered) force screen.

Top air speed is 25,000 mph.

Eclipse-Class Battle Cruiser (TL12^)

Built for strategic surprise strikes and commerce raiding, the *Eclipse* uses its superscience cloaking device to stalk its adversaries and unleash a devastating close-range attack. Its 30,000-ton (SM +11) unstreamlined hull is 500 feet long. The ship's primary weaponry is its powerful spinal conversion beam. While it has moderately thick (and quite sophisticated) armor, the attack cruiser relies on its force screen and cloaking device for defense. It lacks the power to operate every high-energy system at once.

Front Hull	*System*
[1-2]	Exotic Laminate Armor (total dDR 300).
[3!]	Spinal Battery (30 GJ conversion beam).*
[4]	Tactical Array (comm/sensor 14).*
[5!]	Cloaking Device.*
[6]	Defensive ECM.*
[core]	Control Room (C11 computer, comm/sensor 12, 15 control stations).*
Central Hull	***System***
[1]	Exotic Laminate Armor (dDR 150).
[2]	Habitat (10 luxury cabins, 120 cabins, 10-bed automed clinic sickbay, six teleport projectors, one replicator fabricator, 215 tons cargo).*
[3!]	Secondary Battery (10 turrets with 1 GJ particle beams).*
[4!]	Heavy Force Screen (dDR 300 or dDR 600).*
[5-6!]	Stardrive Engines (FTL-1 each).*
[core!]	Spinal Battery (central system).*
Rear Hull	***System***
[1]	Exotic Laminate Armor (dDR 150).
[2!]	Spinal Battery (rear system).*
[3-5!]	Subwarp Engines (500G acceleration each).*
[6]	Total Conversion Reactor (five Power Points).*

* Three workspaces per system.

The ship has a stealth hull, artificial gravity, and gravitic compensators.

The ship's usual crew are 15 bridge operators (captain, tactical officer/plasma gunner, pilot, engineering officer, 10 gunners, and a navigator/sensor operator), 48 technicians, and one medic, plus all necessary small craft pilots and flight crews. Extra crew shifts and a platoon-sized marine boarding party are often carried.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL12 HIGH-PERFORMANCE SPACECRAFT												
12^	*Eclipse*-class	200	0/5	13	1,500G/*c*	30,000	241	+11	260ASV	300/150/150*	2×	$9.951B

* Plus a dDR 300 force screen (dDR 600 with a second Power Point).

Top air speed is 9,700 mph.

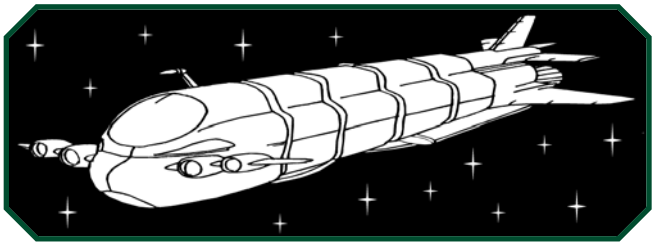
Intrepid-Class Frontier Cruiser (TL12^)

This large star cruiser is designed for frontier sector patrol and defense and deep galactic exploration missions. It might be the flagship of a scout service, or the pride of space force that lacks purpose-designed battleships.

Built with an unstreamlined 100,000-ton (SM +12) 900-foot-long hull, it is lightly armed for its size and thin-skinned (so it's a battle *cruiser* instead of a battleship), relying on a force screen for defense. However, it has plenty of FTL speed and versatile abilities, thanks to its bunk capacity, laboratories, and hangar deck. Its powerful tractor beam and teleport projectors are useful for grappling and boarding enemy vessels. Crew comfort on multi-year interstellar cruises was a design priority. The frontier cruiser is not as combat-capable as a dedicated warship, but its size, powerful frontal armament, and advanced design still make it a formidable adversary.

Front Hull	*System*
[1]	Exotic Laminate Armor (dDR 200).
[2-3!]	Major Batteries (each has a fixed mount 30 GJ disintegrator).*
[4!]	Medium Battery (three fixed mount 56cm warp missile launchers).*
[5]	Control Room (C12 computer, comm/sensor 13, only eight control stations).*
[6]	Multipurpose Array (comm/sensor 15).*
[core]	Habitat (20 luxury cabins and 200 cabins with total life support, 20-bed automed clinic sickbay, eight teleport projectors, three briefing rooms, two replicator minifacs, 10 offices, 20 labs, gym, 375 tons cargo).*
Central Hull	***System***
[1]	Exotic Laminate Armor (dDR 200).
[2!]	Heavy Force Screen (dDR 500 or 1,000).*
[3!]	Medium Battery (turret with 10 GJ tractor beam, two turrets each with 10 GJ disintegrators).
[4-6!]	Super Stardrive Engines (FTL-2 each).*
[core]	Habitat (10 luxury cabins and 50 cabins with total life support, large ops center, three offices, 20 cells, 10-bed automed clinic sickbay, rec room establishment, 10 replicator minifacs, 2,025 tons cargo).*
Rear Hull	***System***
[1]	Exotic Laminate Armor (dDR 200).
[2]	Hangar Bay (3,000 tons capacity).*
[3-4!]	Subwarp Reactionless Engines (500G acceleration each).*
[5-6!]	Antimatter Reactors (four Power Points each).*

* 10 workspaces per system.



The cruiser has artificial gravity and gravitic compensators.

Typical crew are eight bridge operators (captain, executive officer, pilot, engineering officer, navigator, gunner, science officer, communication officer, and tactical officer), three turret gunners, one teleport bay operator, 20 scientists, 170 technicians, and two medics, plus any necessary crew for the small craft. Multiple shifts are usually carried. It will also carry a platoon to company-sized force of security personnel or marines for boarding and landing parties.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL12 HIGH-PERFORMANCE SPACECRAFT												
12^	*Intrepid*-class	300	+1/5	13	1,000G/*c*	100,000	5,144	+12	640ASV	200*	6×	$37.3126B

* Plus dDR 500 force screen (dDR 1,000 if using two Power Points).

Top air speed is 7,900 mph.

Frigates and Patrol Ships

These small warships – variously called patrol ships, corvettes, or frigates – are intended for escort, scouting, and patrol operations. A spacefaring nation with no real foreign military threats, or with space demilitarized by treaty, may have patrol ships as the only armed vessels in use. A spacefaring nation with a limited military budget may also field a "frigate navy." Frigates may be operated by paramilitary agencies, mercenaries, or even well-to-do pirates, although most of the latter are mutinous ex-military vessels.

Frigates are the smallest warships that space navies like to operate independently on extended voyages. They are the workhorses of a space navy, handling a wide variety of different missions. Single frigates or small task forces are often used to show the flag at colonies too small to warrant visiting with a larger ship, or to provide "presence" by patrolling disputed or frontier regions. They also handle contingencies such as blockades and gunboat diplomacy. More typical peacetime operations include customs and safety inspections, rescue missions, and countering piracy, smuggling, hijacking, and terrorism. Most frigates carry a small boarding party (either armed crew members, patrol officers, or marines). Elite space patrol officers or troubleshooters may even be assigned personal patrol ships!

In wartime, patrol ships may protect merchant vessels, hunt pirates, and counter enemy raiders. They may also serve in task forces, adding firepower and screening other vessels from attack. In interstellar wars, they may scout enemy systems, guard minor systems, or operate in squadrons (sometimes led by a cruiser) to perform raids. If faster-than-light drives exist, the scouting role is especially important: Navies will want to know who is occupying the next solar system, and how strong their defenses are. Frigates also engage in counter-scouting operations, patrolling the fringes of a solar system, and driving off or destroying enemy scouts.

A patrol ship or frigate is often the first "independent command" of a naval officer, usually at Rank 3 for a single frigate or Rank 4 for a frigate squadron.

Anson-Class Space Patrol Ship (TL9^)

These are small paramilitary spacecraft built using a streamlined 300-ton (SM +7) hull, used by cultures who don't consider the highly radioactive drive a problem. They are designed for local-space patrols, but can make interplanetary voyages. A small external clamp allows it to tow damaged vessels and wayward satellites. It can blast straight into orbit from an Earth or Mars-sized world.

Front Hull	*System*
[1]	Metallic Laminate Armor (dDR 5).
[2!]	Major Battery (turret with 100 MJ laser).
[3]	Habitat (cabin, bunkroom).
[4]	Habitat (two sickbay beds).
[5]	Habitat (cell, five tons cargo).
[6]	Secondary Battery (two fixed 20cm missile launchers; 12 tons cargo).
[core]	Control Room (C5 computer, comm/sensor 5, three control stations).
Central Hull	***System***
[1]	Metallic Laminate Armor (dDR 5).
[2-5]	Fuel Tanks (each with 15 tons of uranium saltwater fuel with 3 mps delta-V).
[6]	External Clamp.
[core]	Engine Room (one workspace).
Rear Hull	***System***
[1]	Metallic Laminate Armor (dDR 5).
[2-3]	Fuel Tanks (each with 15 tons of uranium-saltwater fuel with 3 mps delta-V).
[4-5!]	Nuclear Saltwater Rocket Engines (2G acceleration each)
[6]	Fission Power Plant (one Power Point).

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL9 HIGH-PERFORMANCE SPACECRAFT												
9^	*Anson*-class	50	-1/5	13	4G/18 mps	300	13	+7	12ASV	5	0	$8.93M

Top air speed is 5,000 mph.

Deimos-Class Frigate (TL10)

This is a small but tough in-system warship. Using its fusion pulse drive, it can quickly accelerate to fast interplanetary velocities and respond to incidents across the solar system, while still retaining a large reaction mass reserve for tactical maneuvers. The living quarters rotate for a small amount of artificial gravity, but it is cramped aboard. It cannot takeoff or land on a planet itself, and so carries a shuttle or boarding craft. It is built using a 1,000-ton (SM +8) unstreamlined hull, and is 180 feet long.

Front Hull	*System*
[1]	Advanced Metallic Laminate Armor (dDR 15).
[2-3]	Nanocomposite Armor (total dDR 40).
[4!]	Major Battery (fixed 300 MJ improved laser).
[5]	Habitat (two cabins, two bunkrooms, one-bed automed sickbay, five tons cargo).
[6]	Hangar Bay (30 tons).
[core]	Control Room (C8 computer, comm/sensor 7, four control stations).

Central Hull	*System*
[1]	Advanced Metallic Laminate Armor (dDR 15).
[2!]	Medium Battery (three turrets with 100 MJ improved lasers).
[3-6]	Fuel Tanks (each with 50 tons fuel pellets with 10 MPS delta-V).
Rear Hull	*System*
[1]	Advanced Metallic Laminate Armor (dDR 15).
[2]	Nanocomposite Armor (dDR 20).
[3-5]	Fusion Pulse Drive (0.05G acceleration each).
[6]	Engine Room (one workspace).
[core]	Fusion Reactor (two Power Points).

It has spin gravity (0.1G) and exposed radiators.

The typical complement are four bridge crew (captain/pilot, navigator, sensor/missile operator, engineering officer), three turret gunners, and an engine room technician. A squad-sized or smaller boarding party will sometimes also be carried.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL10 LOW-PERFORMANCE SPACECRAFT												
10	*Deimos*-class	70	-2/5	13	0.15G/40 mps	1,000	36.2	+8	12ASV	55/15/35	0	$77.8M

Battle-Class Frigate (TL10^)

This interstellar warship is designed for interstellar patrol, strike, and convoy escort operations. Built with a 3,000-ton (SM +9) streamlined hull, it offers a well-balanced design whose torch drive provides enough thrust and delta-V to take off or land on an Earth-sized planet. Like many smaller warships, it has no artificial gravity, but this is less important as it can boost at 1G for fairly lengthy periods.

Front Hull	*System*
[1-2]	Nanocomposite Armor (total dDR 40).
[3]	Habitat (12 cabins, five-bed sickbay, 15 tons cargo).
[4-5]	Medium Batteries (each with three fixed mount 32cm missile launchers).
[6]	Tactical Array (comm/sensor 10).
[core]	Control Room (C8 computer, comm/sensor 8, six control stations).*
Central Hull	*System*
[1]	Nanocomposite Armor (dDR 20).
[2!]	Major Battery (1 GJ UV laser turret).
[3-4]	Fuel Tanks (each with 150 tons of hydrogen with 15 mps delta-V).
[5!]	Major Battery (1 GJ UV laser turret).
[6]	Engine Room (two workspaces).
Rear Hull	*System*
[1]	Nanocomposite Armor (dDR 20).
[2-3!]	Fusion Torch Engines (0.5G acceleration each).
[4]	Secondary Battery (10 fixed mount 28cm missile launchers).
[5!]	Stardrive Engines (FTL-1).
[6]	Defensive ECM.
[core]	Fusion Power Plant (two Power Points).

The usual complement manning the vessel are six bridge crew (captain, pilot, navigator/sensor operator, two missile gunners/sensor operators, chief engineer), a medic, two turret gunners, and two technicians. A second shift are often carried, and the ship may also be assigned a squad-sized marine boarding party.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL10 HIGH-PERFORMANCE SPACECRAFT												
10^	*Battle*-class	100	-1/5	13	1G/30 mps	3,000	17.4	+9	24ASV	40/20/20	1×	$387M

Cossack-Class Patrol Ship (TL10^)

This is a small fusion-drive patrol ship, built for high speed and acceleration, with very good sensors. The interior is very cramped, with a small cargo hold split between supplies and planetary scouting equipment. It uses a 300-ton (SM +7) streamlined hull.

Front Hull	*System*
[1]	Nanocomposite Armor (dDR 10).
[2]	Habitat (cabin, one-bed sickbay).
[3]	Habitat (cabin, five tons cargo).
[4]	Multipurpose Array (comm/sensor 8).
[5-6]	Defensive ECM.
[core]	Control Room (C7 computer, comm/sensor 6, three control stations).
Central Hull	*System*
[1]	Nanocomposite Armor (dDR 10).
[2!]	Medium Battery (two fixed mount 24cm missile launchers, one turret with 30 MJ improved laser).
[3]	Engine Room (one workspace).

Central Hull	*System*
[4-6]	Fuel Tanks (15 tons of hydrogen with 15 mps delta-V each).
Rear Hull	***System***
[1]	Nanocomposite Armor (dDR 10).
[2-4]	Fusion Torch Drives (0.5G acceleration each).
Rear Hull	***System***
[5-6!]	Stardrive Engines (FTL-1 each).
[core]	Fusion Reactor (two Power Points).

The normal complement consists of three bridge crew (a pilot/engineer, who is usually also the captain, a navigator/gunner, and a sensor/intelligence officer) and one engine room technician (sometimes stationed on the bridge).

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL10 HIGH-PERFORMANCE SPACECRAFT												
10^	*Cossack*-class	50	-1/5	13	1.5G/45 mps	300	5.4	+7	4ASV	10	2×	$46.6M

Top air speed is 3,100 mph.

Tiger-Class Frigate (TL11^)

This fast, reactionless-drive starship is intended for fleet escort, commerce raiding, long-range patrol, and fleet or convoy escort. It is built on a 3,000-ton (SM +9) streamlined hull, with beam weapons optimized for ship-to-ship combat rather than planetary bombardment. It can lift off directly from planetary surfaces.

Front Hull	*System*
[1-2]	Hardened Diamondoid Armor (total dDR 60).
[3]	Habitat (10 cabins, six-bed automed sickbay, minifac fabricator, 15 tons cargo).
[4!]	Major Battery (fixed mount 1 GJ antiparticle beam).
[5]	Tactical Array (comm/sensor 11).
[6!]	Heavy Force Screen (dDR 100 or dDR 200).
[core]	Control Room (C9 computer, comm/sensor 9, six control stations).
Central Hull	***System***
[1]	Hardened Diamondoid Armor (dDR 30).
[2-3!]	Major Battery (each has a 1 GJ X-ray laser turret).
[4-5!]	Stardrive Engines (FTL-1 each).
[6, core]	Super Fusion Reactors (four Power Points each).
Rear Hull	***System***
[1]	Hardened Diamondoid Armor (dDR 30).
[2]	Engine Room (two workspaces).
[3-5!]	Super Reactionless Engines (50G acceleration each).
[6!]	Major Battery (one turret with very rapid fire 10 MJ improved UV laser).

The frigate has artificial gravity and gravitic compensators, and also has a stealth hull and dynamic chameleon surface.

The usual crew complement consists of six bridge crew (captain, navigator, sensor operator, pilot, comm officer, engineering officer), four turret gunners, a ship's doctor, and two technician. A squad-sized boarding party is often carried.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL11 HIGH-PERFORMANCE SPACECRAFT												
11^	*Tiger*-class	100	1/5	13	150G/*c*	3,000	17	+9	20ASV	60/30/30*	2×	$825.6M

* Armor is hardened, plus dDR 100 (200 if using an extra Power Point) force screen.

Top air speed is 31,000 mph.

Vixen-Class Patrol Ship (TL11^)

This is a fast and agile armed starship, optimized for scouting missions, and capable of atmospheric and space operations. It relies on electronic countermeasures rather than armor for defense, but its cloaking device, force screen and good armor makes it a capable small combatant – it is sometimes used as an interstellar patrol ship. It's built on a 300-ton (SM +7) streamlined hull, and is 150 feet long.

Front Hull	*System*
[1-2]	Diamondoid Armor (total dDR 30).
[3]	Multipurpose Array (comm/sensor 9).
[4-6]	Defensive ECM.
[core]	Control Room (C8 computer, comm/sensor 7, only two control stations).
Central Hull	***System***
[1]	Diamondoid Armor (dDR 15).
[2]	Habitat (bunkroom, one-bed automed sickbay).
[3!]	Major Battery (turret with 100 MJ X-ray laser).
[4!]	Cloaking Device.
[5!]	Light Force Screen (dDR 50).
[6]	Engine Room (one workspace).

Rear Hull	*System*
[1-2]	Diamondoid Armor (total dDR 30)
[3-4!]	Stardrive Engines (FTL-1 each).
[5-6!]	Super Reactionless Engine (50G acceleration).
[core]	Super Fusion Reactor (four Power Points).

The ship has a stealth hull, gravitic compensators, and artificial gravity.

The ship is operated by a pilot, navigator/gunner, and engineer, and one technician.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL11 HIGH-PERFORMANCE SPACECRAFT												
11^	*Vixen*-class	50	1/5	13	100G/*c*	300	0.2	+7	4ASV	30/15/30*	2×	$72.2M

* Plus dDR 50 force screen.

Top air speed is 25,000 mph.

Seraphim-Class Frigate (TL12^)

This small but potent warship handles both system defense and deep penetration raids, and is sometimes used for special operations by interstellar patrol officers or intelligence agents. Its expensive drives, spinal gamma-ray laser, and advanced cloak and force fields make it far more effective and survivable than its size indicates. It uses a 1,000-ton (SM +8) unstreamlined hull, and is 250 feet long.

Front Hull	*System*
[1-2]	Hardened Exotic Laminate Armor (total dDR 100).
[3]	Habitat (cabin, two bunkrooms, two-bed automed sickbay, five tons cargo).
[4]	Tactical Array (comm/sensor 11).
[5!]	Spinal Battery (1 GJ gamma-ray laser).
[6]	Defensive ECM.
[core]	Control Room (C10 computer, comm/sensor 9, four control stations).
Central Hull	*System*
[1]	Exotic Laminate Armor (dDR 50).
[2!]	Medium Battery (two turrets with 10 MJ rapid fire gravitic-focus antiparticle beams, one with 100 MJ tractor beam).
[3!]	Heavy Force Screen (dDR 100 or dDR 200).
[4!]	Cloaking Device.
[5]	Total Conversion Reactor (five Power Points).
[6]	Engine Room (one workspace).
[core!]	Spinal Battery (central system).
Rear Hull	*System*
[1]	Exotic Laminate Armor (dDR 50).
[2-3!]	Stardrive Engines (FTL-1 each).
[4!]	Spinal Battery (rear system).
[5-6!]	Subwarp Drives (500G each).

The ship has gravitic compensators and artificial gravity, plus dynamic chameleon and stealth hull options.

Normal crew are a captain, pilot, comm/sensor officer, two gunners, chief engineer, and a technician.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL12 HIGH-PERFORMANCE SPACECRAFT												
12^	*Seraphim*-class	70	+2/5	12	1,000G/*c*	1,000	6	+8	10ASV	100/50/50*	2×	$350M

* Front armor is hardened, plus dDR 100 (200 if using an extra Power Point) force screen.

Top air speed is 7,900 mph.

Pirate Ships and Q-Ships

Pirate ships (including privateers) are intended to capture and loot merchant vessels. A pirate ship needs combat capability, provision for boarding other vessels, and room for storing cargo and captives. Ideally, it should also look innocuous enough to enter ports without undue attention, and be relatively inexpensive to own and operate. Many pirates are just armed merchant ships, but if safe pirate havens (pp. 5-6) are available, they sometimes receive fairly extensive modifications.

Q-ships (the name dates back to the WWI) are merchant vessels fitted with extra armament to give pirates and raiders a nasty surprise. Q-ships are usually crewed and run by navies, but some may be operated by private pirate-hunters. Q-ships have a deterrence role well out of proportion to their actual numbers – cautious pirates may head elsewhere just on reports that one is in the area. A Q-ship may be functionally identical to a pirate vessel, although often with better equipment and heavier armament, thanks to wealthy patrons.

Most pirates and Q-ships are simply patrol or scout ships used by mercenaries, renegades, or stock armed merchant vessels, sometimes with a minor upgrade in their weapons fit (see ***GURPS Spaceships 2: Traders, Liners, and Transports***). Here are two examples of converted commercial ships.

Loki-Class Corsair (TL10^)

This is a heavy freightliner with small weapon batteries replacing some of the holds and the original steel hull reinforced with internal nanocomposite panels (the resulting hybrid is assumed to be equivalent to metallic laminate armor). Built on an unstreamlined hull, the ship masses 10,000 tons (SM +10) and is about 450 feet long. It cannot lift off from an Earth-sized planet, and so must rely on orbital port facilities or shuttlecraft.

Front Hull	*System*
[1]	Metallic Laminate Armor (dDR 20).
[2]	Habitat (five cabins, two-bed automed sickbay, minifac fabricator, 255 tons cargo).*
[3-5]	Cargo Holds (500 tons capacity each).
[6]	Hangar Bay (300 tons capacity).*
Central Hull	***System***
[1]	Metallic Laminate Armor (dDR 20).
[2-5]	Cargo Hold (500 tons cargo each).
[6]	Tertiary Batteries (10 fixed-mount 28cm missile launchers and 350 tons cargo each).*
Central Hull	***System***
[core]	Control Room (C9 computer, comm/sensor 9, only six control stations).*
Rear Hull	***System***
[1]	Metallic Laminate Armor (dDR 20).
[2!]	Secondary Battery (one turret with 30 MJ rapid fire particle beam, 450 tons cargo).
[3-4]	Fuel Tanks (500 tons of hydrogen providing 15 mps delta-V each).
[5!]	Stardrive Engine (FTL-1).*
[6]	Fusion Torch Engine (0.5G acceleration).*
[core]	Fusion Reactor (de-rated to one Power Point).*

* One technician mans each system.

It has spin gravity (0.2G) and exposed radiators.

The ship's usual complement consists of four bridge crew (captain-pilot, navigator/gunner, communications operator, and a chief engineer), and eight technicians. The technicians and crew double as a boarding party.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL10 (HIGH-PERFORMANCE SPACECRAFT)												
10^	*Loki*-class	150	-3/5	13	0.5G/30 mps	10,000	4,806	+10	12ASV	20	1×	$444.5M

Renegade-Class Corsair (TL11^)

This is a more typical interstellar pirate: a modified stock freehauler, upgraded with salvaged or war-surplus weapons, a force screen, and a second maneuver drive to improve performance. However, it lacks the power to fire all weapons *and* have full thrust. It replaces cabin space with bunkrooms (and cells) to carry additional boarding crew or captives, and adds a retractable boarding clamp (probably salvaged from a tug). It uses a 1,000-ton (SM +8) streamlined hull that is 150 feet long. It can land and take off from planets.

Front Hull	*System*
[1]	Steel Armor (dDR 3).
[2-3]	Cargo Holds (50 tons capacity each).
[4!]	Secondary Battery (two turrets with 30 MJ improved UV lasers; 40 tons cargo).
[5]	Habitat (three cabins, three-bed automed sickbay).
[6]	Habitat (one cabin, three bunkrooms, minifac fabricator, one cells).
[core]	Control Room (C9 computer, comm/sensor 8, four control stations).
Central Hull	***System***
[1]	Steel Armor (dDR 3).
[2-4]	Cargo Holds (50 tons capacity each).
[5!]	Light Force Screen (dDR 70).
[6!]	Tertiary Battery (four turrets with 10 MJ improved UV lasers; 39 tons cargo).
Rear Hull	***System***
[1]	Steel Armor (dDR 3).
[2-3!]	Super Reactionless Engines (50G acceleration each).
[4-5!]	Stardrive (FTL-1 each).
[6]	Engine Room (one workspace).
[core]	Fusion Reactor (two Power Points).

Modified stock freehaulers are typical pirate ships.

The ship is equipped with artificial gravity.

The normal complement is four bridge crew (pilot-captain, navigator-gunner, and engineering officer), an engine-room technician, and a cargo master.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL11 (HIGH-PERFORMANCE SPACECRAFT)												
11^	*Renegade*-class	70	1/5	13	100G/*c*	1,000	331.4	+8	24ASV	3*	2×	$65.7M

* Plus dDR 70 force screen.

Space Defense Platforms and Monitors

Also known as SDPs, battle stations, or orbital fortresses, *space defense platforms* and *space defense monitors* are heavily armed and well-protected warships with very limited or no maneuver capability. They defend strategic locations such as jump points or planetary orbits. They are cheaper than spaceships and better armed – with little or no drives, they can devote significant mass to weapons and armor. Their disadvantage is that they can't retreat or dodge, leaving them especially vulnerable to missile strikes and ramming without defensive weapons or escorts.

They tend to fall into two sub-categories: defensive fortresses to fight off spacecraft or shoot down missiles, and bombardment platforms to attack the world below them. Bombardment platforms are common in cold wars between rival governments and in the subjugation of a world (the subjugation might even by the planet's own totalitarian government).

Sentinel-Class SDP (TL9)

This is an inexpensive satellite to protect small space stations or defend mining claims. It can also be easily disguised as a high-powered radar reconnaissance satellite. It uses its chemical rocket for station keeping or close approaches, but otherwise normally remains in its own orbit. It is armed with a single spinal mount laser powered by its nuclear reactor. It is 60 feet long (SM +6) with an unstreamlined hull.

Front Hull	*System*
[1-4]	Metallic Laminate Armor (total dDR 20).
[5!]	Spinal Battery (100 MJ laser).
[6]	Fission Reactor (one Power Point).
[core]	Control Room (C5 computer, comm/sensor 4, no control stations).
Central Hull	***System***
[1-3]	Metallic Laminate Armor (total dDR 15).
[4]	Secondary Battery (10 fixed-mount 16cm missile launchers).
[5]	Tactical Array (comm/sensor 6).
[6]	Fuel Tank (0.15 mps delta-V).
[core!]	Spinal Battery (central system).
Rear Hull	***System***
[1-2]	Metallic Laminate Armor (total dDR 10).
[3]	Chemical Rocket Engine (3G acceleration).
[4!]	Spinal Battery (rear system).
[5-6]	Fission Reactors (one Power Point each).

It has a stealth hull.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
PILOTING/TL9 HIGH-PERFORMANCE SPACECRAFT												
9	*Sentinel*-class	30	0/4	12	3G/0.15 mps	100	0	+6	0	20/15/10	0	$5.83M

Gibraltar-Class Battle Station (TL10)

This is a low-cost way to build a giant monitor: Take a small asteroid, hollow some of it out, and add drives, weapons, and electronics. The ship uses a 1,000,000-ton (SM +14) unstreamlined hull that is about 200 yards across. Nearly half the ship is nothing but rock – due to its thickness, it can take a lot of pounding! The monitor is primarily a missile ship, but has powerful beam weaponry as well, and a large hangar, which lets it double as a semi-mobile spaceport.

Front Hull	*System*
[1-3]	Stone Armor (total dDR 45).
[4!]	Secondary Battery (10 turrets with 30 GJ UV lasers).*
[5]	Habitat (1,000 cabins with total life support, plus four gyms, three other stablishments, two large ops centers, a 100-bed hospital sickbay, 10 minifac fabricators, and 18,380 tons cargo).*
[6]	Enhanced Array (comm/sensor 15).*
Central Hull	***System***
[1-3]	Stone Armor (total dDR 45).
[4-5]	Hangar Bay (60,000 tons capacity).*
[6!]	Tertiary Battery (30 turret mounts with 100 MJ very rapid fire UV lasers).*
[core]	Control Room (C 11 computer, comm/sensor 13, 40 control stations).*
Rear Hull	***System***
[1-3]	Stone Armor (total dDR 45).
[4]	Tertiary Battery (30 fixed mounts with 56cm missile launchers).*
[5]	Fuel Tank (50,000 tons hydrogen provides 0.8 mps delta-V).
[6]	Nuclear Light Bulb (0.05G acceleration).*
[core]	Fusion Reactor (two Power Points).*

* 100 workspaces per system.

It has spin gravity (1G).

The usual crew include 20 bridge officers (captain, two comm officers, executive officer, engineering officer, navigator, pilot, two sensor operators, tactical officer, 10 secondary battery gunners, missile gunner), 30 tertiary turret gunners, 1,000 technicians, 200 ops room operators, and 10 medics. Multiple shifts may be carried, along with a platoon of security guards. Additional crew will be needed to man whatever small craft are carried in the hangar.

TL	Spacecraft	dST/HP	Hnd/SR	HT	Move	LWt.	Load	SM	Occ	dDR	Range	Cost
PILOTING/TL10 LOW-PERFORMANCE SPACECRAFT												
10	*Gibraltar*-class	700	-5/5	13	0.05G/0.8 mps	1,000,000	78,580	+14	2,000ASV	45	0	$38.605B

*Now witness the firepower of this fully **armed** and **operational** battle station!*
*– The Emperor, **Star Wars: Episode VI – Return of the Jedi***

Warden-Class Battle Station (TL10)

This is a robot space platform that commands the skies over a planet. The battle station is approximately 75 feet in diameter with a 1,000-ton (SM +8) unstreamlined hull. Relying on missile batteries, it may be armed with reentry vehicles for orbital bombardment or missiles for anti-ship operations. Aside from station-keeping thrusters (included with the controls) it has no maneuver drive at all, although this is mitigated by its tough armor and extensive electronic warfare capabilities.

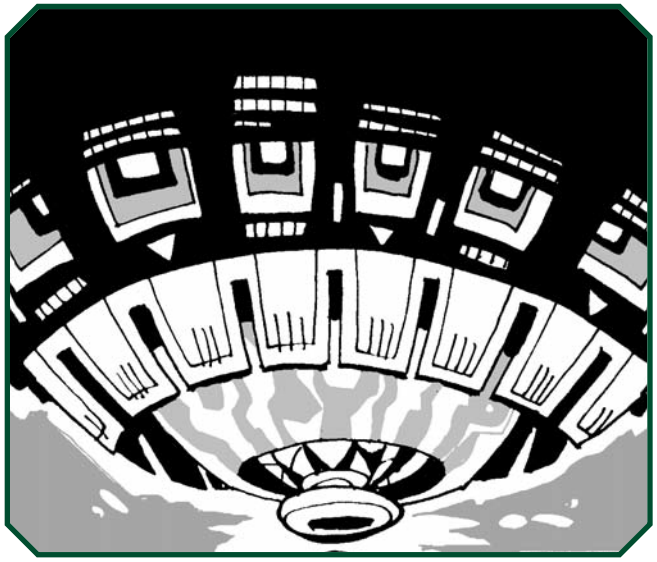
Front Hull	System
[1-3]	Nanocomposite Armor (total dDR 60).
[4-5]	Medium Batteries (each has three fixed mount 28cm missile launchers).
[6]	Defensive ECM.
Central Hull	**System**
[1-3]	Nanocomposite Armor (total dDR 60).
[4!]	Medium Battery (each has three turrets with 100 MJ UV lasers).
[5]	Tactical Array (comm/sensor 9).
[6!]	Major Battery (turret with 3 MJ very rapid fire improved laser).
[core]	Control Room (C8 computer, comm/sensor 7, no control stations).
Rear Hull	**System**
[1-3]	Nanocomposite Armor (total dDR 60).
[4-5]	Medium Battery (each has three fixed mount 28cm missile launchers).
[6]	Defensive ECM.
[core]	Fusion Power Plant (two Power Points).

The battle station has a stealth hull.

TL	Spacecraft	dST/HP	Hnd/SR	HT	Move	LWt.	Load	SM	Occ	dDR	Range	Cost
10	*Warden*-class	70	–	12	0	1,000	0	+8	0	60	0	$124.8M

Citadel-Class Orbital Fort (TL11^)

This is a spherical, manned SDP acting as a major planetary defense installation. It is well protected by armor and force screens, heavily armed, and equipped with an operations center for battle management of other defensive assets (other SDPs, ships, etc.). Its 10,000-ton (SM +10) unstreamlined hull is 150 feet in diameter.



Front Hull	System
[1-3]	Hardened Nanocomposite Armor (total dDR 150).
[4!]	Major Battery (turret with 3 GJ X-ray laser).*
[5]	Secondary Battery (10 fixed mounts with 32cm missile launchers).*
[6]	Habitat (five cabins, two cells, and 10 bunkrooms with total life support, five-bed automed sickbay, robofac minifac, ops center, a gym, and 40 tons cargo).*
[core]	Control Room (C10 computer, comm/sensor 10, 10 control stations).*
Central Hull	**System**
[1-3]	Hardened Nanocomposite Armor (total dDR 150).
[4]	Secondary Battery (10 fixed mounts with 32cm missile launchers).*
[5!]	Heavy Force Screen (dDR 150 or dDR 300).*
[6!]	Secondary Battery (10 turrets with 300 MJ improved ultraviolet lasers).*
[core]	Super Fusion Reactor (four Power Points).*

Rear Hull	*System*
[1-3]	Hardened Nanocomposite Armor (total dDR 150).
[4!]	Major Battery (3 GJ X-ray laser).*
[5]	Tactical Array (comm/sensor 12).*
[6]	Hangar Bay (300 tons capacity).*

* One workspace per system.

The fort has artificial gravity.

The usual crew is 10 bridge operators (commander, executive officer, communications officer, tactical officer, engineering officer, two sensor operators, and three gunners), a medic, a 10-person operations staff, and 11 technicians. Usually multiple crew shifts are provided for. It may have a station security team, and will need crews for any small craft carried.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
11^	*Citadel*-class	150	–	13	0	10,000	345.8	+10	58ASV	150*	0	$2.142B

* Plus dDR 150 force screen (dDR 300 if using two Power Points).

World Killers

"Doomsday machines" can destroy a planetary civilization with a single strike. In space opera, they often exemplify the ruthless power of an Evil Empire, or are ancient artifacts of vanished civilizations. Sometimes the mere report of their construction may trigger a preemptive strike . . . or their possession by all sides could result in a stable balance of terror that prevents interstellar war. Until something goes wrong, and the adventurers must stop a rogue planet destroyer.

World killers built with "hard science" technology are often unmanned. This could be for any of a number of reasons. They might be essentially one-way space missiles rather than warships. There might have been concerns that a live crew would balk at killing billions. The time required for interstellar journeys might be too long for living beings to survive. Maybe genocidal life-hating robots created them.

One way to build a doomsday machine is simply to create something like the *Adversary*-class, add the cosmic power option, and then scale its dimensions up by a factor of 1,000 (+18 SM). The resulting moon-sized warship should do the job nicely.

However, there are more cost-effective ways to wreck a planet. One of the easiest is simple kinetic energy: accelerate up to near-light speed and ram. This is trivially easy with reactionless drives (which is one reason why the pseudo-velocity option is strongly recommended if reactionless-drive warships are in regular use). It's trickier to achieve without superscience technology . . . but one example of such a ship is the *Azrael*.

Azrael-Class World Killer (TL11)

This is an example of an unmanned relativistic doomsday machine designed to destroy planets across interstellar ranges. Built with an unstreamlined 10,000-ton (SM +10) hull, it uses a fusion rocket engine with plentiful fuel tanks to accelerate to 1,800 mps (about 1% of light speed), then activates its ramscoop to accelerate to speeds in excess of 0.5*c*. The *Azrael's* primary kill mechanism is its own mass. At 0.5*c* (with 45% of its mass used up) it can impact with over 42,000,000 megatons of kinetic energy, which is in the "dinosaur killer" range – enough to devastate a planet. Missiles from its tertiary battery can also have a significant impact (about 700 megatons each at 0.5*c*) but it releases them ahead of itself to destroy secondary targets in the system – space stations, defense systems, kinetic barriers, and so on.

Front Hull	*System*
[1-2]	Diamondoid Armor (total dDR 140).
[3!]	Ramscoop*.
[4!]	Major Battery (fixed mount very rapid fire 30 MJ improved UV laser).*
[5]	Tertiary Battery (30 fixed mount 24cm missile launchers).*
[6]	Fuel Tank (500 tons of hydrogen with 252 mps delta-V).
[core]	Control Room (C11 computer, comm/sensor 11, no control stations).*
Central Hull	***System***
[1]	Diamondoid Armor (dDR 70).
[2-6]	Fuel Tank (500 tons of hydrogen with 252 mps delta-V each).
Rear Hull	***System***
[1]	Diamondoid Armor (dDR 70).
[2-3]	Fusion Rocket (0.005G acceleration each).*
[4-6]	Fuel Tank (500 tons of hydrogen with 252 mps delta-V each).
[core]	Fusion Reactor (two Power Points).

* One workspace each.

It has total automation.

TL	*Spacecraft*	*dST/HP*	*Hnd/SR*	*HT*	*Move*	*LWt.*	*Load*	*SM*	*Occ*	*dDR*	*Range*	*Cost*
11	*Azrael*-class	150	-4/5	13	0.01G/2,268 mps*	10,000	0	+10	0	140/70/70	–	$1,901.5B

* Near-*c* with ramscoop.

Chapter Three
Tactical Space Combat

This chapter is a map-based *expansion* to the basic space combat system in ***GURPS Spaceships***. The GM should be familiar with the basic rules before using them. Like the tactical combat system in the ***GURPS Basic Set,*** it covers the exceptions and special cases that arise when fighting using a hex grid battle map.

The tactical rules present an approximation of realistic Newtonian movement in space, simplified by utilizing only two dimensions and assuming thrust occurs all at once, rather than being spread out over a turn. However, they give a sense for how spacecraft may maneuver and make it easier to play out running battles and dynamic tactical situations. Nonetheless, a GM should only use these hex-based rules when all players enjoy tactically detailed space combat, as these rules require extra time to set up and play. GMs who prefer a faster and more cinematic approach should continue to use the basic combat system.

The Tactical Engagement

The GM will need to make certain additional preparations before using the tactical combat rules: dealing with scaling factors, and preparing any necessary components and statistics.

Scale

The most important decision is the time and distance scale. As with the basic combat system, these rules can be used with various time and distance scales.

Distance scale may be 10 miles/hex, 100 miles/hex, 1,000 miles/hex, or 10,000 miles/hex.

Time scale may be *20 seconds, 1 minute, 3 minutes,* or *10 minutes.*

It's not fun if ship acceleration or starting velocities lets them flash across multiple map sheets in a single turn, or if they take several turns to make a minor course change. Similarly, weapon ranges should neither dominate the entire map nor have trouble getting into combat range. Before battle begins, the GM should use the *Velocity, Thrust, and Burn Table* (p. 25) and the *Weapon Tables* (pp. 35-39) to determine which time and distance scales suit the PCs' ship and its opposition.

Tactical space combat plays most smoothly when the chosen time and distance scales result in the combatants having statistics within these ranges:

Starting velocities (below) of 0-12 hexes/turn (and ideally 0-3).

Thrust ratings (p. 25) of 1/2 to 12 (and ideally 1-6).

Burn points (p. 25), if using reaction engines, equal or greater than the thrust ratings.

Beam weapon max ranges (see *Beam Weapon Tables,* pp. 36-39) in the 3-30 hex range.

Ballistic impulses for any missiles and guns (see *Gun Ballistic Impulse Table,* p. 36) in the 0-10 range (and ideally in the 1-10 range if a primary weapons).

A mismatch can be inevitable, especially when a more advanced vessel fights a lower-TL design. If so, scale the fight around the most important vessel's performance (often that of the PCs' ship). It is still possible to play when some or all combatants have parameters outside these ranges, but it can be awkward to run. In situations where no combination of scale appears to give playable numbers, just use the basic combat system.

Starting Velocity, Thrust Rating, and Burn Points

The GM should determine vessels speeds in miles per second (relative to the nearest world) from travel decisions made before the battle begins. See the *Space Travel* chapter in ***GURPS Spaceships*** for examples. If using reaction drive ships, the GM should also know what their delta-v reserve (in mps) is at the start of the battle. With this information and each vessels' statistics, determine the following statistics for each combatant vessel.

Starting Velocity: The vessel's current velocity in hexes/turn. Convert the vessel's travel velocity into hexes per turn using the formula in the *Starting Velocity* column of the *Velocity, Thrust, and Burn Table* (p. 25).

Thrust Rating (TR): The vessel's acceleration in hexes/turn. Convert the vessel's engine acceleration to a *thrust rating* using the formula in the *Thrust Rating* column of the *Velocity, Thrust, and Burn Table*. If this result is less than 1, convert it to a fraction, e.g., Thrust Rating 0.02 would be a fractional thrust of 1/50. Spacecraft with *fractional thrust* use special rules.

Burn Points (BP): The delta-V in hexes/turn; the maximum acceleration usable before running out of fuel. Convert the vessel's current delta-V reserve to burn points using the formula in the *Burn Points* column on the *Velocity, Thrust, and Burn Table*.

Velocity, Thrust, and Burn Table

Turn Length	*Starting Velocity*	*Thrust Rating*	*Burn Points*
10-mile hexes			
20-second turn	mps × 2	G/5	current delta-V × 2
1-minute turn	mps × 6	G×2	current delta-V × 6
3-minute turn	mps × 20	G×20	current delta-V × 20
10-minute turn	mps × 60	G×200	current delta-V × 60
100-mile hexes			
20-second turn	mps × 0.2	G/50	current delta-V/5
1-minute turn	mps × 2/3	G/5	2/3 current delta-V
3-minute turn	mps × 2	G×2	current delta-V × 2
10-minute turn	mps × 6	G×20	current delta-V × 6
1,000-mile hexes			
20-second turn	mps/50	G/500	current delta-V/50
1-minute turn	mps/15	G/50	current delta-V/15
3-minute turn	mps/5	G/5	current delta-V/5
10-minute turn	mps × 2/3	G×2	2/3 current delta-V
10,000-mile hexes			
20-second turn	mps/500	G/5,000	current delta-V/500
1-minute turn	mps/150	G/500	current delta-V/150
3-minute turn	mps/50	G/50	current delta-V/50
10-minute turn	mps/15	G/5	current delta-V/15

Example: A spacecraft begins with a velocity of two miles per second and a delta-V reserve of 24 mps. It has an acceleration of 1.5G. The GM decides to use 100-mile scale and 3-minute turns. Therefore, its starting velocity is 4 hexes/turn, its thrust rating is 3, and it will have 48 burn points.

Hex Map

The GM will need to prepare a map if space combat is a possibility. Hexes should be big enough to stack a couple of counters or miniatures in it.

It's a good idea to have a map with dimensions (in hexes) at least five times the *fastest* vessel's starting velocity and/or thrust rating (or number of burn points, if that's *less* than the thrust rating).

Even so, a map is limited in size but space is effectively infinite, so fast-moving spacecraft can eventually run off the edge. The GM may want to have some extra map sheets handy to lay down in whatever direction the fight carries the combatants.

If that's not practical, another way to get extra space is to periodically displace all spacecraft counters (and all celestial bodies and other objects shown on the map) by the same number of hexes in an appropriate direction.

Stardrives in Tactical Combat

For spacecraft with stardrive engines, the GM should convert any time or distance limitations to hexes and turns before the game begins.

Example: In the GM's campaign, a ship can't safely enter or leave hyperspace within 10 planetary diameters of a world. The GM is using 100 mile hexes; the nearest planet is 8,000 miles (80 hexes) in diameter, so the safe hyperspace distance is 800 hexes. It also takes 30 minutes to plot a hyperspace course once a ship's at that distance; as the GM uses 10-minute turns, it will take three turns to do so.

Placement of Celestial Bodies

If action occurs near planets or other celestial bodies, the GM should either draw them on the map, or mark their position with counters or templates (which will make it easier to displace them). For bodies *much* larger than the chosen scale, indicate an edge of the map that represents their boundaries. Depending on the scale, it may also be necessary to calculate and mark their gravity fields. See *Celestial Bodies* (pp. 33-34).

Counters

Each spacecraft requires a *position counter* to indicate the vessel's actual present location. This can be a miniature figure, actual counter, or other marker. It must be distinguishable from other counters, with an identifiable front to indicate facing.

Spacecraft also require a *vector counter* to show their future position. This counter must also be marked to show facing and the position counter it belongs to. Its facing is *always* identical to the facing of the position counter. If the position counter changes facing, change the vector counter to show the same facing. The facing of the vector counter is used when determining the hexes into which the vessel can accelerate.

Spacecraft with guns or missile launchers will need additional position and vector counters to represent fired salvos. Each pair of counters should be assigned a number so players can record their status. Ideally there should be a couple of salvo counters for each ship's ballistic weapon battery, but if most batteries on the ship fire identical weapons and tend to launch at the same targets, far fewer may be needed.

Placement of Spacecraft Counters

The GM places friendly, neutral, and hostile spacecraft on the map, with the exception of any that have yet to be launched or are otherwise hidden.

In situations where neither side has spotted the other, use the guidelines for detection (***GURPS Spaceships***, p. 45) and for ambush and surprise (***GURPS Spaceships***, p. 48).

The distance separating opposing spacecraft will depend on the situation that led to the engagement. For example, if the PCs' pirate ship is fleeing a space station, pursued by the patrol, they will already have detected each other, and be only a few hexes apart when the fight begins. In the case of meeting engagements or interceptions, a suitable distance is the lesser of the detection range or the longest weapon range (the GM may modify this if it seems excessively short or long). For example, if one side's longest-range weapon has a 10-hex range and the other's has a 3-hex range, use 10 hexes.

If the engagement is the climax of a pursuit, place the quarry in the center of the map and the pursuers on one edge. Bear in mind that the pursuer will be unable to catch up unless his craft can reach a higher velocity, or can launch smaller craft that can do so.

The GM should ask players for all necessary information regarding their own spacecraft's position and actions before the battle. Based on this information, the GM places all spacecraft on the map. All counters must be positioned so that they are fully inside a hex, and must face one of the six hex sides.

If stations or spacecraft with low accelerations are to be important in the engagement, the GM should place them carefully to ensure they'll be involved in the action rather than left behind!

Placement of Vector Counters

The GM places each vessel's vector counter to indicate its current course and velocity. The location of a vector counter (at the start of at turn) is where the spacecraft will be at the *end* of its turn – its projected course, if it does not maneuver.

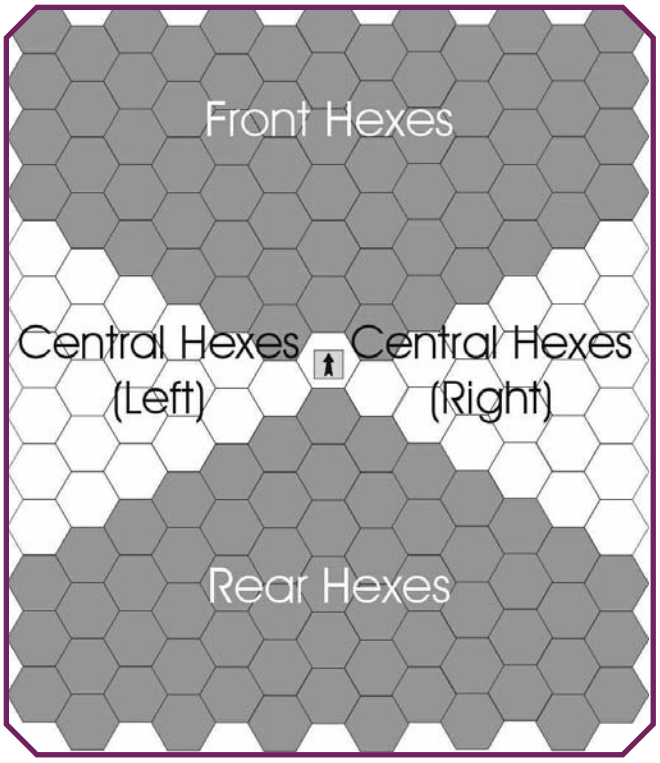
The distance from the position counter to the vector counter determines the spacecraft's velocity. Each hex of distance is a velocity of one hex/turn; see *Starting Velocity* (pp. 24-25). Thus, a stationary spacecraft has its vector counter in the same hex as its position counter, while one moving at a velocity of one hex per turn has its vector counter in an adjacent hex.

Stacking

Any number of spacecraft and vector counters can occupy the same hex, unless they are large enough to fill it. However, this would require a truly enormous craft, one of SM +21 for a 10-mile hex (increased by +6 for each 10-fold increase in hex scale).

Counters and Facing

A position counter's facing is indicated by the hex side its counter front is pointing. A vector counter *must* have the same facing as its spacecraft counter.



Facing determines the counter's front, central, and rear hexes. The counter's own hex is considered a front hex. Counters must always face hex sides (rather than hex points).

The position counter's facing determines which hull section – front, central, or rear – faces an opponent. The front hull faces anything in its own hex or its front hexes; the central hull faces anything in its central hexes; the rear hull faces anything in its rear hexes.

The vector counter's facing (identical to its spacecraft's) is used in the acceleration rules.

Action During a Turn

These rules detail changes to the *Action During a Turn* rules (***GURPS Spaceships***, p. 50-56). Unless noted otherwise, the rules in that section continue to be used.

Pre-Battle Turns

In the tactical system, skip the pre-battle turn – if the spacecraft should have ready time before they move into range, start them at a significant distance from one another! The GM must decide whether or not force fields, stasis fields, cloaking devices, or other equipment that must be powered up are activated at the start of the battle.

Sequence of Action

The sequence of action differs slightly from that of the Basic Combat System: It is simultaneous rather than sequential.

Each turn is still divided into sequential phases for different crew positions. However, *within* each phase, resolve actions for *all* crew on *all* spacecraft before the next phase begins. Thus, in 1. Command Tasks, the command crew of every spacecraft in the battle performs command tasks. In Phase 2: Engineering, the engineering officers of every spacecraft allocate power and perform other engineering tasks . . . and so on. The sequence of action is:

1. Command Tasks.
2. Engineering Tasks.
3. Navigation Tasks.
4. Piloting Tasks.
5. Electronics Operation Tasks.
6. Gunnery Tasks.
   - **A.** Missile Launch and Maneuver.
   - **B.** Gun Fire.
   - **C.** Beam Fire.
   - **D.** Ballistic Attack.
7. Crew Tasks.
8. Movement.

This sequence is the same as that of ***GURPS Spaceships*** (p. 50) except for the subdivision of the Gunnery tasks and addition of Movement.

Note: Crews of vessels in hangar bays (or similar) that have not yet launched may still perform activities, e.g., engineering tasks to power up systems prior to launch.

Order of Action

The order of action *within* the above phases is assumed to be simultaneous, but it's easier to manage if all crew members performing tasks do so one ship at a time.

In the Piloting Task phase, that order is determined by a Piloting skill roll. In other phases, the order is less critical, as all fire is assumed to be simultaneous. For phases other than Piloting Tasks the GM may roll randomly to see which ship acts first, or decide what his NPCs will do and then have the PCs declare their actions. In a multi-ship battle, the GM can roll randomly to see which *side* goes first, then have each side's commander alternate choosing a ship to perform the tasks until every crew has acted. The GM can retain this order in other phases, or determine the order anew each phase.

> *Keep the jump point open as long as you can. And put us between the civilians and the War Cruiser.*
>
> *– Narn Captain,* ***Babylon 5***

1-3. Command, Engineering, Navigation Tasks

Use the rules from ***GURPS Spaceships*** (pp. 51-52), except tasks for all vessels on both sides are resolved one spacecraft at a time within each phase before proceeding to the next phase.

4. Piloting Tasks

In this phase, piloting tasks are resolved one spacecraft's pilot at a time. All the basic combat system's "Move Maneuver" Piloting Tasks (***GURPS Spaceships***, pp. 53-56) are replaced by a single "Maneuvering Task."

First, determine the tactical initiative for this phase. Make a Piloting skill roll for each spacecraft that is capable of maneuvering.

Each pilot rolls against Piloting skill + Handling. This is not a task in itself, but the rolls will be modified by penalties for multitasking.

Pilots may then act in the *reverse order* of their margin of success (or least margin of failure). That is, the most successful pilot gets to act last.

Example: There are four spacecraft capable of maneuvering, so each of their pilots get to roll. Kim fails by 1, Luke fails by 3, Trask succeeds by 1, and James succeeds by 7. Therefore Luke must go first, followed by Kim, Trask, and James.

Once the order of initiative is determined each spacecraft may maneuver, as detailed under *Tactical Maneuvering* (pp. 28-29).

5. Electronics Operation Tasks

Characters acting as sensor or comm operators can perform communication and sensor tasks, one spacecraft at a time. Use the basic space combat rules for Communications Tasks (***GURPS Spaceships***, pp. 53-54) and Sensor Tasks (***GURPS Spaceships***, p. 52). However, the range modifiers for detection (***GURPS Spaceships,*** p. 44) are replaced with the *Space Range Modifiers Table* (p. 30).

6. Gunnery Tasks

The Gunnery tasks are broken into *four* phases: Missile Launch and Maneuver; Gun Fire; Beam Fire; Ballistic Attack. Resolve all actions for all vessels and salvos in one phase before proceeding to the next.

Gunners only perform Aim and Attack or Wait (Point Defense) tasks (***GURPS Spaceships,*** p. 52). The Wait (Aim and Attack) is not used in tactical combat.

6A. Missile Launch and Maneuver

Any gunner controlling missile launchers may launch missiles in this phase using an Aim and Attack maneuver; see *Gun and Missile Salvos* (pp. 29-31). Existing missiles may accelerate, and any gravity (pp. 33-34) effects are applied to missile salvos. No attack rolls are made in this phase.

Exception: Warp missiles are fired and maneuvered in the Gun Fire phase below.

6B. Gun Fire

A gunner controlling guns (or launchers with warp missiles) can fire them in this phase using an Aim and Attack task; see *Gun and Missile Salvos* (pp. 29-31). Gun salvos already fired can no longer maneuver, but gravity can affect them.

6C. Beam Fire

Gunners declare tasks and resolve fire one gunner and one spacecraft at a time. Gunners may choose to fire immediately using an Aim and Attack maneuver or to hold their fire for defensive purposes using Wait (Point Defense) maneuver.

Aim and Attack actions are considered simultaneous; a gunner ignores any damage he or his vessel sustained during this phase when he fires back.

See *Beam Fire* (p. 30) for the rules changes from the basic combat system.

6D. Ballistic Attack

A spacecraft or a salvo ("the attacker") can attempt a ballistic attack vs. another vessel ("the target") if on a collision course with it. See *Maneuvering Missile Salvos* (p. 29).

If a spacecraft or salvo encounters an object large enough to fill a hex (such as a planet), a collision may be unavoidable. See *Celestial Bodies* (pp. 33-34).

7. Crew Tasks

Resolve crew tasks such as damage control (***GURPS Spaceships,*** p. 54) one spacecraft at a time in any order the GM wishes.

8. Movement

A vessel or salvo moves if its position counter and vector counter occupy different hexes. Resolve movement one vessel at a time, but the order doesn't matter. See *Vector Movement* (p. 32).

Tactical Maneuvering

During the Piloting Tasks phase, a spacecraft's pilot may have his vessel *change facing, accelerate*, or both. Spacecraft may also launch, enter formation, rendezvous, and recover under certain circumstances. All are part of the same piloting task. However, facing changes occur *before* acceleration.

To be able to dodge, a spacecraft must have accelerated by 1 hex in Phase 4. To qualify for an evasive maneuver bonus, a spacecraft must have changed facing *and* accelerated. If many spacecraft maneuvered, make a note of which ones qualify!

Change Facing ("Turn")

This involves using the spacecraft or missile's thrusters to change facing. This alters the facing of the position (and vector) counter by one or more hex sides.

Spacecraft require a functional Control system to change facing.

The maximum facing change a vessel can perform during the turn, measured in hex sides, is shown on the *Facing Change Table* (below). Cross index the vessel's SM with the time scale to find the maximum facing change.

Facing Change Table

SM	*20-sec.*	*1-min.*	*3-min.*	*10-min.*
+6 or less*	any	any	any	any
+7-9	2 sides	any	any	any
+10-12	1 side	2 sides	any	any
+13 and up	1 side	1 side	2 sides	any

* Including missiles.

A craft with a fractional thrust rating may not change facing while in the process of performing an extended burn (see *Fractional Thrust and Extended Burns,* below).

Accelerate

Acceleration involves moving the accelerating craft's *vector counter* and thus altering its course and speed, since the vector counter is where the vessel will end its turn.

The vector counter can be moved up to as many hexes as the maneuvering craft's current thrust rating. If using a reaction drive, each hex moved requires expending one burn point.

A vector counter can only move into one of its own front hexes, and cannot change its own facing while moving. However, as a vessel has three front hexes, and the counter can move into any of them each time it moves one hex forward, this permits considerable freedom of maneuver.

Exception: A spacecraft accelerating with a rotary reactionless drive or space sail can move its vector counter in any direction, independent of facing.

Fractional Thrust and Extended Burns

A spacecraft with a fractional Thrust Rating must accelerate constantly in one direction for multiple turns to produce one hex of acceleration. This is called an *extended burn.* For example, a spacecraft with Thrust Rating 1/50 thrust requires a 50-turn extended burn to produce one hex of acceleration. A vessel with a fractional thrust rating may not change facing while performing an extended burn.

Launch

Craft in hangars, in docking clamps, or on the ground may be launched in this phase, subject to the rules detailed on p. 65 of ***GURPS Spaceships***. Since tactical turns are simultaneous, they enter play immediately.

Place ships on the map with their position and vector counters in the same hexes as those of the launching spacecraft.

The facing of the small craft's counters depends on the hull location of the launch system, typically a hangar bay, external clamp, or robot arm:

- If the launch system was in the front hull, the launched object's counter must face one of the launching spacecraft's front hexes.
- If the launch system was in the central hull, the launched object's counter must face one of the launching spacecraft's central hexes.
- If the launch system was in the rear hull, the launched object's counter must face one of the launching spacecraft's rear hexes.

Within these limits, the specific facing is up to the small craft's pilot. A craft that has just launched may also accelerate or maneuver. Determine the order they will maneuver relative to other craft in the usual fashion.

Missiles are not considered small craft; they launch in the Gunnery Tasks phase.

Formations, Rendezvous, Docking, and Recovery

A spacecraft is considered to be "in formation" (***GURPS Spaceships,*** p. 65) with another spacecraft if its position counter is in the same hex as the other vessel's position counter, *and* its vector counter is in the same hex as the other vessel's vector counter. This replaces the requirements listed in ***GURPS Spaceships.***

Vessels in formation can attempt to enter hangar bays, etc., as detailed on ***GURPS Spaceships*** (p. 65), provided they are already in formation *or* move into formation after accelerating. If a spacecraft successfully enters a hangar bay, remove it from the map.

Vessels in formation may choose to use point defense fire to protect the vessels they are in formation with.

A vessel may attempt to rendezvous with one other vessel they are in formation with, provided they are capable of maneuver and the other is cooperative or cannot maneuver. A vessel that has rendezvoused with another is within a few dozen yards of it and can attempt docking procedures (see ***GURPS Spaceships***, p. 42). Personnel may also attempt boarding in the Crew Tasks phase by leaping across, or using grappling hooks, thruster packs, etc. If either vessel has an external clamp or robot arm, the crew may use it to grab and connect the two vessels; see ***GURPS Spaceships*** (p. 15).

There is nothing so subject to the inconsistancy of fortune as war.

– Cervantes

Weapons Fire in Tactical Combat

These rules detail the changes in the basic combat system.

Gun and Missile Salvos

Missiles are launched in Phase 6A. Gun salvos are launched in Phase 6B. Both use similar rules. Shots of the same type, launched simultaneously, form a salvo.

A salvo can be one or many shots. It is represented by position and vector counters, like a spacecraft. When a gunner fires different types of missiles make a record of pertinent information: the identity of the salvo, the type and number of shots in it, and – for missiles – their thrust rating and burn points.

Example: Jan controls a tertiary battery with 28cm missile launchers that has RoF 30. He fires 30 identical nuclear missiles as a salvo. His player should record: "Salvo #3 (Jan): 30 × 28cm nuclear missiles, Thrust 10, Burn Points 20."

Place the salvo's position counter in the same hex as the launching spacecraft's position counter. Place the salvo's vector counter in the same hex as the launching spacecraft's own vector counter.

Missile counter facing is not important. Gun salvo vector counter's facing *is* important and depends on the battery that fired it.

Fixed battery in front hull or spinal mount: It must face one of the launching spacecraft vector counter's front hex sides.

Turret battery in front hull: It must face one of the launching spacecraft vector counter's front or central hex sides

Fixed battery in central hull: It must face one of the launching spacecraft vector counter's central hex sides.

Turret battery in central hull: It may face any hex side.

Fixed battery in rear hull (or rear-facing spinal mount): It must face one of the launching spacecraft vector counter's rear hex sides.

Turret battery in rear hull: It must face one of the launching spacecraft vector counter's rear or central hex sides

Maneuvering Missile Salvos

A missile salvo (including one that has just been launched) will maneuver in Phase 6A. Missile Launch and Maneuver.

Its gunner decides whether it will *drift* or *accelerate.* Missile salvos can accelerate in any direction. A drifting missile does nothing. Acceleration moves the salvo's *vector counter* a maximum distance in hexes equal to its missiles' thrust rating. However, each hex of thrust requires expending one burn point. If out of burn points, a missile can only drift. Salvos should maneuver to achieve a collision course with a desired target; see *Ballistic Attack* (pp. 30-31) for requirements.

Exception: Warp missiles are exceptions. They maneuver in the gun phase.

Ballistic Impulse of Gun Salvos

Immediately after firing a salvo of gun shots, the gunner may accelerate the salvo's vector counter, moving it up to the maximum number of hexes on the *Gun Ballistic Impulse Table* (p. 36). A gun shot's vector counter may only be moved into its own *front* hexes. This represents the initial velocity imparted by the gun's propellant or accelerator.

Gunners should generally strive to move their salvo's vector counter so that it ends in a hex containing a target's vector counter (or stationary target).

Gun salvos and warp missiles can only accelerate on the turn they are launched. On later turns they drift. GMs may wish to remove them at the end of the turn that they were launched, if it's not likely they are going to hit anything significant in their path.

Warp Missiles: These operate in the Gun Fire phase but use special rules. Move the warp missile salvo's vector counter to any target point that is within its range (see *Warp Missile Table,* p. 36) and the vector counter's front hexes.

Beam Fire

Gunners controlling beam weapons use Aim and Attack tasks or Wait (Point Defense) tasks (see ***GURPS Spaceships***, p. 53). The former are resolved in the Beam Fire phase; the latter in the Ballistic Attack phase. All fire in a phase is considered simultaneous.

Bearing

The facing of a firing vessel determines what beam weapons can fire. This depends on the location of the weapon battery, and the type of weapon or mount:

Spinal battery weapons can only fire on a target in their spacecraft position counter's front hexes and its own hex. (If the spinal mount was defined as rear-facing, they instead fire into the spacecraft position counter's rear hexes.)

Fixed mounts in the front hull can fire into the spacecraft position counter's front hexes and own hex.

Fixed mounts in the central hull can fire into the spacecraft position counter's central hexes.

Fixed mounts in the rear hull can fire into the spacecraft position counter's rear hexes.

Turrets in the front hull can fire into the spacecraft position counter's front or central hexes, and its own hex.

Turrets in the central hull can fire at any target.

Turrets in the rear hull can fire into the spacecraft position counter's rear or central hexes.

Rate of Fire, Range, and Targets

The rate of fire rules (***GURPS Spaceships***, p. 58) and target rules (***GURPS Spaceships,*** p. 58) are unchanged. Range rules (***GURPS Spaceships,*** p. 57) are replaced by the Weapon Tables (pp. 35-39) in this chapter to find range in hexes.

Beam Fire Attack Rolls

Use the basic space combat system's Beam Attack Rolls rules and modifiers (***GURPS Spaceships***, pp. 58-59) with the exception of Space Range. Replace the space range modifiers with the following based on the chosen scale and range in hexes.

Space Range: Use the modifiers on the *Space Range Modifier Table* (below) based on hex scale and range in hexes.

Space Range Modifier Table

Hexes	*10-mile*	*100-mile*	*1,000-mile*	*10,000-mile*
Rendezvous	+20	+20	+20	+20
Point Defense	+12	+6	0	-6
0	+12	+6	0	-6
1	+6	0	-6	-12
2	+4	-2	-8	-14
3-4	+3	-3	-9	-15
5-6	+2	-4	-10	-16
7-9	+1	-5	-11	-17
10-14	0	-6	-12	-18
15-19	-1	-7	-13	-19
20-29	-2	-8	-14	-20
30-49	-3	-9	-15	-21
50-69	-4	-10	-16	-22
70-99	-5	-11	-17	-23
100-149	-6	-12	-18	-24
150-199	-7	-13	-19	-25
200-299	-8	-14	-20	-26
per ×10	-6	-6	-6	-6

Rendezvous is for fire against vessels that have rendezvoused with the firing craft's vessel (i.e., firing at craft that are at boarding/docking ranges).

Point Defense is for point defense fire against incoming ballistic attacks (attacking the point-defending vessel or another in formation with it).

0 is for firing against targets in the same hex.

Dodge in Tactical Combat

A spacecraft may dodge beam fire or ballistic attack as described under *Dodge* (***GURPS Spaceships,*** p. 60). However, the prerequisites for dodge differ from the basic space combat system. A spacecraft may now dodge provided it accelerated by at least one hex/turn during this turn's Piloting Task phase. It gets the +1 Evasive Action Maneuver bonus if it accelerated *and* changed facing. A vessel held in a docking clamp or robot arm can't dodge. Salvos do not dodge.

Ballistic Attack

Ballistic attack occurs if the attacker's vector (the line its position counter hex to its vector counter hex) passes *into or through* a hex with the target's vector counter. In the case of motionless targets (i.e., no vector counter), a ballistic attack occurs if that line passes into or through their hex. The decision to make a ballistic attack is voluntary unless the attacker or target fills the hex (see *Stacking*, p. 26 and *Celestial Bodies,* pp. 33-34).

The pilot (for an intercepting vessel) or gunner (for a salvo) resolves the attack: Declare the attempt, calculate the relative velocity, and roll to hit.

If the target fills the hex, a hit is automatic, but you may still want to make an attack roll if trying to hit a smaller part of the target, or a city, building, parked spacecraft, etc., that is located on the surface of a celestial body.

If multiple ballistic attacks are declared in a turn, resolve them in the order of highest to lowest interceptor velocity, breaking ties by die roll or GM fiat.

Ballistic attacks are resolved using the rules below. They may be interrupted by attempts at *point defense* (***GURPS Spaceships,*** p. 59) if a gunner (on the target or on a vessel in formation with it) chose a Wait (Point Defense) task.

Resolving a Ballistic Attack

Ballistic attack rolls are made during the Ballistic Attack phase of the turn. Resolve them one at a time in any order. To resolve each ballistic attack:

1. Calculate the relative velocity of the interceptor and target.
2. Make a ballistic attack roll.
3. Resolve any Point Defense by the target or an ally in formation with it.
4. If the target was hit, make dodge rolls.
5. If the target fails to dodge, determine damage.

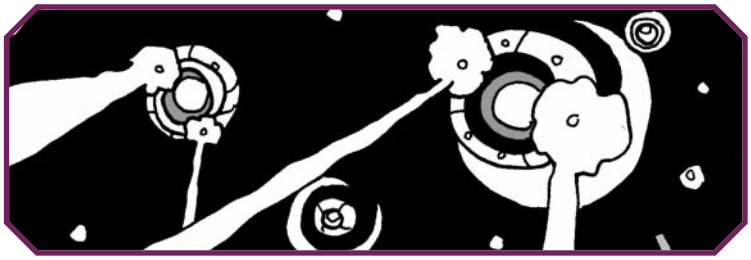
Calculating Relative Velocity

The basic space combat rules for calculating relative velocity (***GURPS Spaceships***, p. 59) and the *Base Relative Velocity Table* are replaced with the following rule.

If the attacker and target's position counters are in different hexes: Note the target's vector. This is the distance and direction from its present position to its vector counter. EFor instance, it might be two hexes "north" and three "north-west." (If the target is motionless, it is zero.) Next, note the attacker's position counter, and without moving it, determine the hex it would move to if the target's vector were applied to it. For example, in the above case, if moving it two hexes north and three northwest. Count the hexes from that point to the *attacker's* vector counter: this is the relative velocity in hexes/turn.

If the attacker and target's position counters are in the same hex: Relative velocity is the range from the interceptor's vector counter to the target's vector counter. (For a motionless target, use the target's position counter as its vector counter.)

Make a note of the relative velocity: It will be needed both for an attack roll modifier and collision damage.



Ballistic Attack Roll

All missiles or shots in a salvo make one attack per target. When attacking a formation, they can be divided at will among the vessels in formation (making one attack each).

Rules for ballistic attacks are resolved as described under *Ballistic Attack Roll* (***GURPS Spaceships***, p. 60), but the Relative Velocity Modifier is replaced by the one shown in the table above, and a Turn Length modifier is applied. For gun or missile salvos, be sure to indicate if using proximity detonation (***GURPS Spaceships,*** p. 59) before the attack roll.

Relative Velocity Modifier: Use relative velocity in hexes/turn (*Calculating Relative Velocity,* above) to derive a modifier via the *Relative Velocity Ballistic Modifier Table* (below). For example, a relative velocity of eight hexes/turn in 100-mile scale is a -3 to hit.

Turn Length Modifier: -6 for a 20-second turn, -3 for a 1-minute turn, 0 for a 3-minute turn, +3 for a 10-minute turn.

Removing Salvos

Ships or salvos that miss their targets (or were dodged) remain on the map (and can conceivably attack or maneuver again in latter turns). If *some* shots in a salvo missed, reduce the recorded number of missiles or shells left in the salvo by the number of hits. *Exception:* proximity-fused shots are lost whether they hit or miss!

Relative Velocity Ballistic Modifier Table

Hexes/Turn	*10-mile hex*	*100-mile hex*	*1,000-mile hex*	*10,000-mile hex*
0	+10	+4	-2	-8
1	+8	+2	-4	-10
2	+6	0	-6	-12
3-4	+5	-1	-7	-13
5-6	+4	-2	-8	-14
7-9	+3	-3	-9	-15
10-15	+2	-4	-10	-16
15-19	+1	-5	-11	-17
20-29	+0	-6	-12	-18
30-49	-1	-7	-13	-19
50-69	-2	-8	-14	-20
70-99	-3	-9	-15	-21
100-149	-4	-10	-16	-22
per ×10	-6	-6	-6	-6

Damage in Tactical Combat

Damage rules are unchanged from basic space combat except as noted below.

Ballistic Attack Damage

Nuclear and antimatter warheads may potentially affect everything in a hex. Collisions and conventional warhead damage depends on relative velocity in hexes/turn.

Collision and Conventional Warheads in Tactical Combat

The *Collision and Conventional Warheads* rules (***GURPS Spaceships***, p. 61) are unchanged, except damage is calculated usually a hex-based formula:

Gun or Missile: d-damage × relative velocity in hexes per turn × scale factor.

Collision: 6d × 3 × lesser dST × relative velocity in hexes per turn × scale factor.

Relative Velocity in hexes per turn is as determined.

Scale Factor is shown on the table below.

Lesser dST is the smaller of the victim or colliding vessel's dST.

D-damage is the dice of damage based on warhead caliber (***GURPS Spaceships,*** p. 68).

Scale Factor Table

Scales	*10-mile hex*	*100-mile hex*	*1,000-mile hex*
20-second turn	2	20	200
1-minute turn	0.6	6	60
3-minute turn	0.2	2	20
10-minute turn	0.06	0.6	6

Warp missiles and subwarp drives use pseudo-velocity. For collision *damage* purposes, treat the velocity as 10 mps or actual velocity, whichever is less. The GM may also rule that any reactionless drives and super missiles use the pseudo-velocity rules.

Nuclear and Antimatter Warheads in Tactical Combat

Use the rules in ***GURPS Spaceships*** (p. 68), with two additional considerations.

Rendezvous: Any object that the target rendezvoused with is *also* caught in the blast and takes the same damage. (This should also be the case in basic combat.)

Collateral Damage in 10-Mile Hexes: A 10-mile hex scale is small enough that every other vessel or object in the same hex may also be affected! Roll proximity damage, and then divide the rolled damage by another factor of 100.

> *War is nothing but a duel on a larger scale.*
>
> *– Karl von Clausewitz*

Hull Damage and Hit Location

These rules are unchanged. However, the GM may want to make up position and vector counters for characters blown out of a spacecraft (***GURPS Spaceships***, p. 63), treating them just like a small craft that had been (inadvertently) launched. Even if they can't maneuver, this will make it possible to determine whether a rescue mission can reach them!

Vector Movement

In Phase 8, for each spacecraft or other moving object, the GM or a player should do the following:

1. Put a placeholder (such as a small coin or die) in the hex containing the spacecraft's counter.
2. Move the spacecraft's counter into the same hex as its vector counter.
3. Imagine a line from the center of the placeholder's hex through the center of the spacecraft counter's hex and onward in the same direction. Move the vector counter along that line for a distance equal to the distance between the placeholder and the spacecraft counter.

That is, a spacecraft moves into the same place as its vector counter, and the vector counter is moved to a new location along the same projected course. In this way, a spacecraft that doesn't accelerate will continue to move each turn in the same direction, at the same speed, following its vector.

If a spacecraft or other object passes close to a world, gravity effects come into play, if using those rules. See *Gravity* (p. 33). If gravity effects do *not* come into play, or after they have been resolved, remove the placeholder and proceed with the next vessel or object's movement. The turn ends after all moving objects have been moved.

FTL Movement: If an FTL drive was powered up in the Engineering Task phase, any faster-than-light movement takes place at the start of this phase.

Salvos: GMs may remove salvos from the map at the end of this phase if it appears they can't hit anything and nothing is likely to blunder into them. This is the case for gun salvos and for missile salvos that ran out of burn points.

Special Rules

The special rules for *Ground Fire, Main Radiators in Combat, Precision Attacks,* and *Targeting Exposed Systems* are unchanged from those in the basic space combat system.

Rules for *Formations* and *Tractor Beams* are altered as detailed below, and special rules for celestial bodies have been added. The new rules for flag command tasks (pp. 34-35) and greater survivability (p. 35) can also be used with the basic combat system.

Tractor Beams in Tactical Combat

Tractor beams are operated and their force calculated as described on p. 66 of ***GURPS Spaceships***. However, their *effect* is different.

Calculate the tractor force and tractor pull of the beam as described in *Tractor Beams in Combat* (p. 66 of ***GURPS Spaceships***). Use the *Velocity, Thrust, and Burn Table* (p. 25) to determine the effective Thrust Rating (TR) of a tractor beam based on the Gs of tractor pull.

If the result is TR 1 or more, the tractor beam operator may move the *vector counter* of the target object as desired (without changing its facing) so long as this movement draws the counter closer to his own vessel. If the target's vector counter and position counter are both in, or moved into, the same hex as the tractor-user's vector and position counter, it may maneuver the target vessel as described under *Formations, Rendezvous, Docking, and Recovery* (p. 29), e.g., pull the target into rendezvous or into a hangar bay.

The target spaceship's position counter is not initially affected, but in Phase 8. Movement the change in vector will result in movement, as per the usual movement rules.

Formations

See *Formations, Rendezvous, Docking, and Recovery* (p. 29).

Celestial Bodies

Space actions may occur near planets, moons, asteroids, stars, and other celestial bodies. The rules for using these bodies depend on their size and the map scale.

Scaling and Celestial Bodies

To place a celestial body the GM will need to know its approximate diameter and its surface gravity. For example, Earth has a diameter of 7,926 miles, a radius of 3,963 miles, and a gravity of 1G. ***GURPS Space*** can be used to calculate any of these values for other celestial bodies.

Typical Gravity and Diameter

Gravity	*Description and Diameter*
0.01G-0.03G	Medium asteroids (50-300 miles diameter)
0.03G-0.1G	Small moons, large asteroids (200-1,000 miles)
0.1G-0.3G	Large moons, small planets (600-3,000 miles)
0.3G-1G	Medium planets (3,000-10,000 miles)
1G-3G	Large planets, small gas giants (10,000-30,000 miles)
3G-10G	Large gas giants (20,000 miles-100,000 miles)
10G-30G	Brown dwarfs, small stars
30G-100G	Most stars
100G-300G	Neutron stars, black holes

A celestial body's diameter in hexes is simply its diameter divided by the hex scale. It can be depicted on the map by making a cut-out template or drawing on the map sheet. If its size is less than one hex, it can still be depicted as a point on the map; its gravity (see below) may be larger than its own diameter, and spacecraft may hide behind it.

A celestial body should *not* be used if its size and influence utterly dominates the map at the chosen scale. A reasonable limit is 10 hexes in diameter. Larger bodies should be left off the map (assume the battle is occurring at a distance from them) or serve as a *backdrop* (see below). Alternatively, the scale should be adjusted to accommodate them.

The typical maximum size of a celestial body is shown below:

10-mile scale: Small or medium asteroids; small moons (up to 100 miles diameter).

100-mile scale: Large asteroids; medium-size moons (up to 1,000 miles diameter).

1,000-mile scale: Moons; medium-sized planets (up to 10,000 miles diameter).

10,000-mile scale: All planets, including gas giants (up to 100,000 miles diameter).

Gravity

The influence of a celestial body's gravity is represented by a *G-thrust rating* representing how much it pulls nearby objects toward it. Use the *G-Thrust Table* (below) to calculate the thrust rating for the celestial body. To find the G-thrust rating, multiply the celestial body's surface gravity by the appropriate factor on the *G-Thrust Table.* Treat this like a spacecraft thrust rating, but round to a whole number.

The gravity thrust should be between 1 and 12. If less than one, gravity has no noticeable effect at this scale (which simplifies things!). The body is on the map, but its gravity pull is negligible in this scale. If it's 13+, gravity will pull all the combatants off the map straight away! Consider switching to a different scale if that celestial body is to be part of the encounter.

G-Thrust Table

Hexes/Turn	*10-mile hex*	*100-mile hex*	*1,000-mile hex*	*10,000-mile hex*
20-second turn	0.2	0.02	0.002	0.0002
1-minute turn	2	0.2	0.02	0.002
3-minute turn	20	2	0.2	0.02
10-minute turn	200	20	2	0.2

Gravity Bands

A celestial body's gravity pull gets weaker with distance. This is depicted by a series of gravity bands, which can be shown by drawing circles on the map of progressively greater radius, each with a lower G-thrust. To find the radius and strength (in G-thrust) of these gravity bands, consult the *Gravity Band Table* (below).

The vertical G-thrust column is the surface gravity G-thrust, as calculated above. The horizontal columns numbered -1 to -12 are range bands, where the gravity thrust drops by 1, 2, and so on. The numbers on the table are distance multipliers. Multiply the radius of the object in hexes times this number to get the radius where G-thrust drops by one.

Round the result to the nearest integer. It is entirely possible that the numbers will round to the same value, meaning the gravity drops off quickly across the single hex.

Example: A world with a four-hex radius has G-thrust 2. At the surface the thrust is 2, at 1.2 × 4 = 4.8 rounded to 5 hexes thrust is 1; at 1.7 × 4 = 6.8, rounded to 7 hexes or more, G-thrust is zero. The range bands are thus: 0-4 hexes: 2; 5-6 hexes: 1. 7+ hexes: 0.

Gravity Band Table

G-Thrust	*-1*	*-2*	*-3*	*-4*	*-5*	*-6*	*-7*	*-8*	*-9*	*-10*	*-11*	*-12*
1	1.4											
2	1.2	1.7										
3	1.2	1.4	2.0									
4	1.1	1.3	1.6	2.2								
5	1.1	1.2	1.4	1.7	2.5							
6	1.1	1.2	1.3	1.5	1.9	2.6						
7	1.1	1.2	1.3	1.4	1.6	2.0	2.8					
8	1.1	1.1	1.2	1.3	1.5	1.7	2.1	3.0				
9	1.1	1.1	1.2	1.3	1.4	1.6	1.8	2.2	3.1			
10	1.0	1.1	1.2	1.3	1.4	1.5	1.7	1.9	2.3	3.3		
11	1.0	1.1	1.2	1.2	1.3	1.4	1.6	1.7	2.0	2.5	3.5	
12	1.0	1.1	1.1	1.2	1.3	1.4	1.5	1.6	1.8	2.0	2.6	3.6

Effects of Celestial Bodies

A celestial body large enough to fill one or more hexes will block movement and fire.

A spacecraft or salvo on a collision course with it will automatically hit and collide with it (unless shot down). Even if the body can move, it's too large to dodge.

Beam fire (except ghost particle beams) cannot shoot through the body, though targets on or above its surface may be attacked as per *Ground Fire* rules (***GURPS Space***, p. 65). Instead of treating beam fire as Short or Long Range, count the actual range.

Small Bodies: If a celestial body is *not* large enough to fill a hex, it's simply treated as a (motionless) drifting spacecraft. Vessels may deliberately attempt to collide with or rendezvous with it, using the rules for spacecraft collisions.

Landing: A vessel able to rendezvous with a body may opt to land, or, if the body has an atmosphere, to enter atmosphere (see *Atmospheric Flight,* ***GURPS Spaceships,*** p. 40). Attempting to land on a star, gas giant, or stellar remnant is generally fatal. A vessel with an active stasis field may survive, but will usually be trapped within the body's gravity.

Gravity Effects

Any celestial body with gravity bands extending past its surface can accelerate a spacecraft or salvo.

Spacecraft: During the Piloting Task phase, examine the current position of the spacecraft counter. If it is within a gravity band, move its vector counter by an amount equal to the Gravity Thrust rating in a direction toward the center of the gravity source.

Salvos: For salvos, do the same during Phase 6A for missiles or Phase 6B for guns. Note that this is the only way that gun salvos can change course after their first turn.

A *very* large body, located off one edge of the map, may simply apply an arbitrary gravity thrust rating to the entire map. For example, a planet off the south end of the map can be represented an appropriate vector that pulls everything "south."

Flag Command Tasks

A group of spacecraft may have one designated squadron commander, who can perform Flag Command tasks in the turn's Command phase. To perform these tasks, a squadron commander must be in either a spacecraft's control room or an ops center devoted to Strategy or Tactics skill. The following flag command tasks are possible:

Squadron Leadership: Motivate individual spacecraft commanders who recognize his authority by communicating with and supervising them. Both vessels must have a functioning comm/sensor array. Roll against Leadership skill. Success inspires them. This gives the benefit of a successful Leadership roll (adding to morale and self-control) as per p. B204, plus adds +1 to their own Tactics skill. Failure distracts them: -1 to their skill.

Heroic Speech: May be delivered only once during a battle, across open channels to everyone in the force. Roll against the lower of Leadership and Performance skill, at a -4 penalty. Success adds +1 to the Spacer skill of the entire squadron for the duration of the engagement. Failure has no effect. Critical failure gives a -1 penalty.

In devout cultures, Religious Ritual can be substituted for Leadership skill, if performed by a recognized religious authority.

Space Strategy: Use Strategy (Space) skill to deduce enemy plans; see p. B222.

Greater Survivability

Some GMs find that the balance of weapons vs. armor is tilted too heavily in favor of the offense, resulting in ships that seem to be "egg shells armed with hammers." This is in the spirit of 21st century naval and air warfare, but does not emulate space actions closer to the feel of 19th and 20th century battleship combat. To improve survivability, GMs may apply one or both of these optional Design Switches.

Advanced Armor: All TL8+ armor types (metallic laminate, advanced metallic laminate, nanocomposite, organic, diamondoid, exotic laminate) are automatically hardened at no extra cost. Ships that buy hardened armor are in fact *double*-hardened (i.e., they reduce armor divisors by two steps).

Damage Reduction: A spacecraft has extensive internal compartmentalization and sophisticated internal damage control systems such as automatic fire suppression, multiply redundant electronics, etc. This may justify giving spacecraft Damage Reduction 2 (***GURPS Powers,*** p. 53). Divide damage suffered by 2 *after* subtracting armor dDR and any other damage modifiers. The GM may rule that a ship that is poorly maintained (HT 8 or less) or is caught completely unprepared for trouble may not qualify for Damage Reduction.

Missile Shield: This option assumes that beam weapons can *easily* hit ballistic weapons that are targeting their vessel, and that this process can be automated. Beam weapons that are assigned to point defense may therefore *automatically* hit a number of incoming ballistic weapons (or ramming spacecraft) up to their maximum rate of fire. Ballistic weapons are killed; ramming spacecraft will suffer damage normally.

ECCM and ECM Tasks

GMs who want to involve characters in electronic warfare may use these two complementary tasks. They are performed in the Electronics Operation Task phase. Vessels often assign these tasks to sensor operators; large or specialized craft may also have dedicated electronic warfare operators.

Electronic Counter-Countermeasures (ECCM) Task

A character can perform this task if his spacecraft has a tactical or multipurpose array. He uses it to analyze and degrade a specific enemy vessel's electronic countermeasures. This is effective against any vessel that has a defensive ECM or cloaking device system.

The task requires a Quick Contest of Electronics Operation (EW) skill with the target. The attacker adds his array level; the target adds +2 per defensive ECM system installed. If the target vessel does not have a sensor operator who was performing an EW task, use a default skill 8.

Failure means the target uses his full defensive ECM. Success reduces his defensive ECM bonus by the margin of success (to a minimum of zero). It also reduces the modifiers for any cloaking device! These effects last until the ECCM operator's next electronic operation task phase.

This task can be performed against multiple vessels in succession, using the normal penalties for multitasking.

Electronic Countermeasures (ECM) Task

This involves managing defensive ECM and cloaking device systems. Normally, no skill roll is required . . . unless the enemy attempts an ECCM task against your vessel. If so, using this task defends against his ECCM attempt, rather than the default skill 8.

When performing this task, the sensor operator may additionally opt to use defensive ECM in escort mode. This *halves* its modifiers but protects all allied craft in formation with the vessel as long as their SM is no more than two greater than the defending vessel's. Multiple sources of defensive ECM are not cumulative; use the best single value. If an enemy attempts to use ECCM against any protected vessel in formation, the contest is against the defending vessel.

Weapon Tables

These tables are used in Tactical Space Combat.

Missile Tables

These tables give the thrust and burn point statistics of missiles. For missile damage, use the warhead tables (***GURPS Spaceships***, p. 68). All missiles are Recoil 1.

Fleet is to proceed ahead at flank speed!

– Commander Adama,
Galactica 1980

TL7-8 Missile Tables

Thrust Rating

Scale	*20-sec.*	*1-min.*	*3-min.*	*10-min.*
10-mile	1	12	120	1,200
100-mile	0.1	1	12	120
1,000-mile	0	0	1	12
10,000-mile	0	0	0	1

Burn Points

Scale	*20-sec.*	*1-min.*	*3-min.*	*10-min.*
10-mile	12	36	120	360
100-mile	1	4	12	36
1,000-mile	0	0	1	4
10,000-mile	0	0	0	0.3

A standard missile of up to 28cm caliber has acceleration 6G and delta-V 6 mps. The tables convert this to thrust rating and burn points in hexes/turn. It has a sAcc of TL-8. A 32cm or larger missile has twice the delta-V and burn points, and sAcc TL-7.

TL9-12 Missile Tables

Thrust Rating

Scale	*20-sec.*	*1-min.*	*3-min.*	*10-min.*
10-mile	1	10	100	1,000
100-mile	0.1	1	10	100
1,000-mile	0	0	1	10
10,000-mile	0	0	0	1

Burn Points

Scale	*20-sec.*	*1-min.*	*3-min.*	*10-min.*
10-mile	20	60	200	600
100-mile	2	6	20	60
1,000-mile	0	0	2	6
10,000-mile	0	0	0	0.6

A standard missile of up to 28cm caliber has acceleration 5G and delta-V 10 mps. The tables convert this to thrust rating and burn points in hexes/turn. It has sAcc of TL-8. A 32cm or larger missile has twice the delta-V and burn points, and sAcc of TL-7.

Super Missile Tables

Thrust Rating

Scale	*20-sec.*	*1-min.*	*3-min.*	*10-min.*
10-mile	100	1,000	10,000	100,000
100-mile	10	100	1,000	10,000
1,000-mile	1	10	100	1,000
10,000-mile	0.1	1	10	100

Burn Points

Scale	*20-sec.*	*1-min.*	*3-min.*	*10-min.*
10-mile	1,000	3,000	10,000	30,000
100-mile	100	300	1,000	3,000
1,000-mile	10	30	100	300
10,000-mile	1	3	10	30

A super missile of up to 28cm caliber has acceleration 500G and delta-V 500 mps. The tables convert this to thrust rating and burn points in hexes/turn. It has sAcc of TL-8. A 32cm or larger missile has twice the delta-V and burn points, and sAcc of TL-7.

Warp Missile Table

Scale	*10-mile*	*100-mile*	*1,000-mile*	*10,000-mile*
Up to 28cm	15,000	1,500	150	15
32cm or more	20,000	2,000	200	20

The table shows the range in hexes. Warp missiles have sAcc +17 if up to 28cm, or sAcc +18 if 32cm or larger.

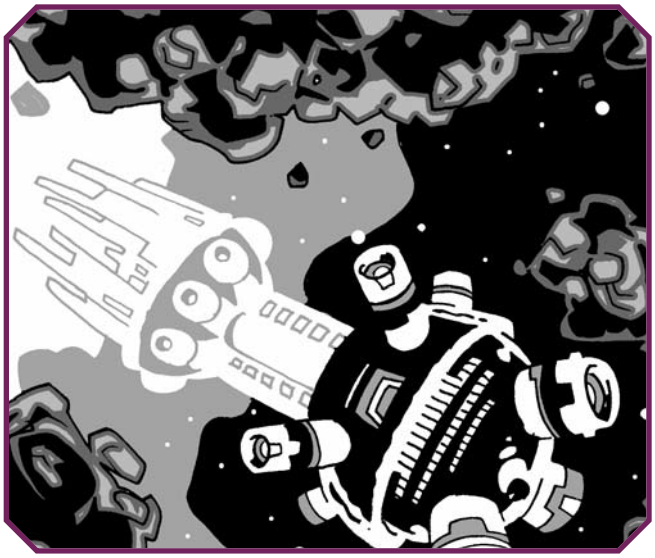
Gun Ballistic Impulse Table

At the intersection of each gun type, hex scale, and turn length is the maximum ballistic impulse in hexes. Thus, in a one-minute turn using 100-mile hexes, an electromagnetic gun has a one-hex impulse.

Weapon/Time	*20-sec.*	*1-min.*	*3-mi.*	*10-min.*
10-mile hexes				
Conventional Gun	1	3	10	30
Electromagnetic Gun	2	6	20	60
Grav Gun	10	30	100	300
100-mile hexes				
Conventional Gun	0	0	1	3
Electromagnetic Gun	0	1	2	6
Grav Gun	1	3	10	30
1,000-mile hexes				
Conventional Gun	0	0	0	0
Electromagnetic Gun	0	0	0	1
Grav Gun	0	0	1	3

At the 10,000-mile scale, ballistic impulse is always 0.

See ***GURPS Spaceships,*** p. 68 for gun Recoil and sAcc.



Beam Weapon Tables

These tables summarize beam weapon statistics including the 1/2D and Max range in 10-mile, 100-mile, 1,000-mile, or 10,000-mile hexes and the d-Damage.

Conversion, Disintegrator, Heat Ray, and Laser Beam Table

Output	*10-mile*	*100-mile*	*1,000-mile*	*10,000-mile*	*d-Damage*
3 kJ	15/50	2/5	0	0	1d-4
10 kJ	15/50	2/5	0	0	1d-3
30 kJ	15/50	2/5	0	0	1d-2
100 kJ	30/100	3/10	0/1	0	1d
300 kJ	30/100	3/10	0/1	0	1d+2
1 MJ	30/100	3/10	0/1	0	2d
3 MJ	70/200	7/20	1/2	0	3d
10 MJ	70/200	7/20	1/2	0	4d
30 MJ	70/200	7/20	1/2	0	6d
100 MJ	150/500	15/50	2/5	0/1	2d×5
300 MJ	150/500	15/50	2/5	0/1	3d×5
1 GJ	150/500	15/50	2/5	0/1	4d×5
3 GJ	300/1,000	30/100	3/10	0/1	3d×10
10 GJ	300/1,000	30/100	3/10	0/1	4d×10
30 GJ	300/1,000	30/100	3/10	0/1	6d×10
100 GJ	700/2,000	70/200	7/20	1/2	2d×50
300 GJ	700/2,000	70/200	7/20	1/2	3d×50
1 TJ	700/2,000	70/200	7/20	1/2	2d×100
3 TJ	1,500/5,000	150/500	15/50	2/5	3d×100
10 TJ	1,500/5,000	150/500	15/50	2/5	4d×100
30 TJ	1,500/5,000	150/500	15/50	2/5	6d×100
100 TJ	3,000/10,000	300/1,000	30/100	3/10	2d×500
300 TJ	3,000/10,000	300/1,000	30/100	3/10	3d×500
1 PJ	3,000/10,000	300/1,000	30/100	3/10	2d×1,000
3 PJ	5,000/15,000	300/1,000	30/100	3/10	3d×1,000

All these beam weapons have sAcc 0 and Rcl 1. Conversion beams do cor (10) damage with followup burn damage with exp rad sur modifiers. Disintegrators do cor (infinite) damage. Heat rays do burn damage. Lasers do burn (2) damage.

Graser, UV Laser, and X-Ray Laser Table

Output	*10-mile*	*100-mile*	*1,000-mile*	*10,000-mile*	*d-Damage*
3 kJ	30/100	3/10	0/1	0	1d-4
10 kJ	30/100	3/10	0/1	0	1d-3
30 kJ	30/100	3/10	0/1	0	1d-2
100 kJ	70/200	7/20	1/2	0	1d
300 kJ	70/200	7/20	1/2	0	1d+2
1 MJ	70/200	7/20	1/2	0	2d
3 MJ	150/500	15/50	2/5	0/1	3d
10 MJ	150/500	15/50	2/5	0/1	4d
30 MJ	150/500	15/50	2/5	0/1	6d
100 MJ	300/1,000	30/100	3/10	0/1	2d×5
300 MJ	300/1,000	30/100	3/10	0/1	3d×5
1 GJ	300/1,000	30/100	3/10	0/1	4d×5
3 GJ	700/2,000	70/200	7/20	1/2	3d×10
10 GJ	700/2,000	70/200	7/20	1/2	4d×10
30 GJ	700/2,000	70/200	7/20	1/2	6d×10
100 GJ	1,500/5,000	150/500	15/50	2/5	2d×50
300 GJ	1,500/5,000	150/500	15/50	2/5	3d×50
1 TJ	1,500/5,000	150/500	15/50	2/5	2d×100
3 TJ	3,000/10,000	300/1,000	30/100	3/10	3d×100
10 TJ	3,000/10,000	300/1,000	30/100	3/10	4d×100
30 TJ	3,000/10,000	300/1,000	30/100	3/10	6d×100
100 TJ	7,000/20,000	700/2,000	70/200	7/20	2d×500
300 TJ	7,000/20,000	700/2,000	70/200	7/20	3d×500
1 PJ	7,000/20,000	700/2,000	70/200	7/20	2d×1,000
3 PJ	15,000/50,000	1,500/5,000	150/500	15/50	3d×1,000

These beam weapons have sAcc 0 and Rcl 1. Grasers do burn sur (10) damage, UV lasers do burn (2) damage. X-ray lasers do burn sur (5) damage.

Ghost Particle and Particle Beam Table

Output	*10-mile*	*100-mile*	*1,000-mile*	*10,000-mile*	*d-Damage*
3 kJ	7/20	1/2	0	0	1d-4
10 kJ	7/20	1/2	0	0	1d-3
30 kJ	7/20	1/2	0	0	1d-2
100 kJ	15/50	2/5	0/1	0	1d
300 kJ	15/50	2/5	0/1	0	1d+2
1 MJ	15/50	2/5	0/1	0	2d
3 MJ	30/100	3/10	0/1	0	3d
10 MJ	30/100	3/10	0/1	0	4d
30 MJ	30/100	3/10	0/1	0	6d
100 MJ	70/200	7/20	1/2	0	2d×5
300 MJ	70/200	7/20	1/2	0	3d×5
1 GJ	70/200	7/20	1/2	0	4d×5
3 GJ	150/500	15/50	2/5	0/1	3d×10
10 GJ	150/500	15/50	2/5	0/1	4d×10
30 GJ	150/500	15/50	2/5	0/1	6d×10
100 GJ	300/1,000	30/100	3/10	0/1	2d×50
300 GJ	300/1,000	30/100	3/10	0/1	3d×50
1 TJ	300/1,000	30/100	3/10	0/1	2d×100
3 TJ	700/2,000	70/200	7/20	1/2	3d×100
10 TJ	700/2,000	70/200	7/20	1/2	4d×100
30 TJ	700/2,000	70/200	7/20	1/2	6d×100
100 TJ	1,500/5,000	150/500	15/50	2/5	2d×500
300 TJ	1,500/5,000	150/500	15/50	2/5	3d×500
1 PJ	1,500/5,000	150/500	15/50	2/5	2d×1,000
3 PJ	3,000/10,000	300/1,000	30/100	3/10	3d×1,000

These beam weapons have sAcc -3 and Rcl 1. Ghost particle beams do cr exp (infinite) damage. Particle beams do burn rad sur (5) damage.

Antiparticle Beam Table

Output	*10-mile*	*100-mile*	*1,000-mile*	*10,000-mile*	*d-Damage*
3 kJ	7/20	1/2	0	0	1d-2
10 kJ	7/20	1/2	0	0	1d-1
30 kJ	7/20	1/2	0	0	1d+1
100 kJ	15/50	2/5	0/1	0	2d
300 kJ	15/50	2/5	0/1	0	3d
1 MJ	15/50	2/5	0/1	0	4d
3 MJ	30/100	3/10	0/1	0	6d
10 MJ	30/100	3/10	0/1	0	8d
30 MJ	30/100	3/10	0/1	0	6d×2
100 MJ	70/200	7/20	1/2	0	4d×5
300 MJ	70/200	7/20	1/2	0	3d×10
1 GJ	70/200	7/20	1/2	0	4d×10
3 GJ	150/500	15/50	2/5	0/1	6d×10
10 GJ	150/500	15/50	2/5	0/1	8d×10
30 GJ	150/500	15/50	2/5	0/1	6d×20
100 GJ	300/1,000	30/100	3/10	0/1	2d×100
300 GJ	300/1,000	30/100	3/10	0/1	3d×100
1 TJ	300/1,000	30/100	3/10	0/1	4d×100
3 TJ	700/2,000	70/200	7/20	1/2	6d×100
10 TJ	700/2,000	70/200	7/20	1/2	8d×100
30 TJ	700/2,000	70/200	7/20	1/2	6d×200
100 TJ	1,500/5,000	150/500	15/50	2/5	2d×1,00
300 TJ	1,500/5,000	150/500	15/50	2/5	3d×1,000
1 PJ	1,500/5,000	150/500	15/50	2/5	4d×1,000
3 PJ	3,000/10,000	300/1,000	30/100	3/10	6d×1,000

Antiparticle beams have sAcc -3 and Rcl 1 and do cr exp sur rad (3) damage.

Tractor and Graviton Beam Table

Output	*10-mile*	*100-mile*	*1,000-mile*	*10,000-mile*	*d-Damage*
3 kJ	7/20	1/2	0	0	no
10 kJ	7/20	1/2	0	0	1d-5
30 kJ	7/20	1/2	0	0	1d-4
100 kJ	15/50	2/5	0/1	0	1d-3
300 kJ	15/50	2/5	0/1	0	1d-2
1 MJ	15/50	2/5	0/1	0	1d
3 MJ	30/100	3/10	0/1	0	1d+2
10 MJ	30/100	3/10	0/1	0	2d
30 MJ	30/100	3/10	0/1	0	3d
100 MJ	70/200	7/20	1/2	0	4d
300 MJ	70/200	7/20	1/2	0	6d
1 GJ	70/200	7/20	1/2	0	2d×5
3 GJ	150/500	15/50	2/5	0/1	3d×5
10 GJ	150/500	15/50	2/5	0/1	4d×5
30 GJ	150/500	15/50	2/5	0/1	3d×10
100 GJ	300/1,000	30/100	3/10	0/1	4d×10
300 GJ	300/1,000	30/100	3/10	0/1	6d×10
1 TJ	300/1,000	30/100	3/10	0/1	2d×50
3 TJ	700/2,000	70/200	7/20	1/2	3d×50
10 TJ	700/2,000	70/200	7/20	1/2	2d×100
30 TJ	700/2,000	70/200	7/20	1/2	3d×100
100 TJ	1,500/5,000	150/500	15/50	2/5	4d×100
300 TJ	1,500/5,000	150/500	15/50	2/5	6d×100
1 PJ	1,500/5,000	150/500	15/50	2/5	2d×500
3 PJ	3,000/10,000	300/1,000	30/100	3/10	3d×500

These beam weapons have sAcc 0 and Rcl 1. Tractor beams do no damage. Graviton beams do cr (infinite) damage.

Plasma Beam Table

Output	*10-mile*	*100-mile*	*1,000-mile*	*10,000-mile*	*d-Damage*
3 kJ	3/10	0/1	0	0	1d-2
10 kJ	3/10	0/1	0	0	1d-1
30 kJ	3/10	0/1	0	0	1d+1
100 kJ	7/20	1/2	0	0	2d
300 kJ	7/20	1/2	0	0	3d
1 MJ	7/20	1/2	0	0	4d
3 MJ	15/50	2/5	0/1	0	6d
10 MJ	15/50	2/5	0/1	0	8d
30 MJ	15/50	2/5	0/1	0	6d×2
100 MJ	30/100	3/10	0/1	0	4d×5
300 MJ	30/100	3/10	0/1	0	3d×10
1 GJ	30/100	3/10	0/1	0	4d×10
3 GJ	70/200	7/20	1/2	0	6d×10
10 GJ	70/200	7/20	1/2	0	8d×10
30 GJ	70/200	7/20	1/2	0	6d×20
100 GJ	150/500	15/50	2/5	0/1	2d×100
300 GJ	150/500	15/50	2/5	0/1	3d×100
1 TJ	150/500	15/50	2/5	0/1	4d×100
3 TJ	300/1,000	30/100	3/10	0/1	6d×100
10 TJ	300/1,000	30/100	3/10	0/1	8d×100
30 TJ	300/1,000	30/100	3/10	0/1	6d×200
100 TJ	700/2,000	70/200	7/20	1/2	2d×1,00
300 TJ	700/2,000	70/200	7/20	1/2	3d×1,000
1 PJ	700/2,000	70/200	7/20	1/2	4d×1,000
3 PJ	1,500/5,000	150/500	15/50	2/5	6d×1,000

Plasma beams have sAcc -6 and Rcl 2, and do burn exp (2) damage.

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