SMARTGUNS

This is my personal idea of how smartgun systems could work, beyond just saying it tells you where the bullet hits.

OPTICAL SMARTLINKS

Optical smartlinks do not use any active sensing equipment. They are primarily intended for low-cost and low signature systems.

Guncam -The guncam is a small CCD camera mounted on the weapon, often if place of, or integral to, the weapons scope. Pistols usually mount the camera below the barrel. This camera is usually not high resolution since it is not required for image processing. Framerate from the guncams will also vary on model (i.e. ChiCom guncams could be really low rez CCD cameras with like 5 FPS). This generally has no gameplay feature other then as an atmospheric tool (low-end smartgun systems will be annoying to use at length and will "stutter".) This is also affected by the signal processor since low end smartgun systems usually match terrible guncams with crappy processors.

Signal Processor-the signal processor works hand in hand with the smartgun adapter and gyro to create a simple ballistics 'line' for the weapon. Inside this processor it takes the guncam image and simply notes where the round will impact based on it's battlesight zero. This 'image' with the impact point and additional data from the smartgun processor and gyro is fed up to the users smartgun processor. Nothing more then you would get from actually looking down the sights.

Referencecam -The referencecam is simply what the user actually sees, this can either be from a cyberoptic or minicams mounted on the smartgoggles (ie take a look at the Smartgun II illustration from Fields of Fire (p. 57)). These don't necessarily need to be high quality for reasons explained below.

The reference images are keyed to be synced with the guncam images, this is likely a function of the smartgun standards themselves. So it would not do much good to have higher framerates on the referencecams then the guncam.

Smartgun Processor-These images are fed to the smartgun processor. The smartgun processor compares the images from the guncam and referencecam, identifies image tags on both (standard 'find the landmark' image comparison) using data from the gyro to help (though el-cheapo systems would use more processor cycles to figure out the data). The smartgun processor then finds where the impact dot would be on the reference image, marks it, and sends that and other relevant data back to the users cyberoptic or smartgoggle HUD. Note that the image fed back is not the referencecam image - it uses that as an alpha mask - all you see is the impact point and other passthrough data from the smartgun adapter such as ammo count, barrel temperature etc. IE the referencecam image is not visible, just the superimposed data is - that's why a pretty low-rez unit would work just fine.

Sniper Mode
This brings up a shortfall of the system, that of long range fire. As it stands now it simply shows where the rifle is aimed. Really no better then iron sights. What if you want the use of magnification or whatever sensors are built into your scope? Well in that case you switch over to snipermode.

In cheap smartgun adapters and weapons with short ranges (pistols, etc) the system works like a laser sight with no laser. Good idea in a world where everyone will have laser detectors. But rifles and the like can fire a lot farther then a normal laser sight can project.

When you go into snipermode you essentially have your vision replaced with that of the weapon. You can then zoom in, switch sensor modes and the like as if you were looking through the weapons scope. BUT you need not be looking through it! Poke the weapon around a corner and zoom in!

This would be quite fast (probably through small 'hotkeys' mounted on the weapons grip. A snipermode would be entered by aiming in using standard smartweapon targeting (putting the dot on target and them pressing 'zoom'. If you had vision magnification on the referencecam you would just notice your field of view (FOV) shrink, you would not "jump" to the weapons perspective unless your referencecam could not match the magnification. Another mark of difference between the quality of different systems. Would be a lot like any first person shooter of today when you go to a sniper weapon.

System Notes
Guncam images would have to be timed between shots since most weapons flash when firing would blind it anyways.

Common things the smartgun adapter could monitor (and I could see most
weapons having basic diagnostic functions even on the cheapest of polymer
one-shots).

- Rounds in clip (nonstandard clips could be a problem unless you
  hack the adapter to change its defaults)
- Barrel temperature
- Notices of mechanical failure.

Moving the weapon out of view of the reference cam would either result in weird results (crappy signal processors might find "common" landmarks even when there are none. Leading to jumping target reticules.

Likewise pointing the gun at yourself would probably result in the reticule disappearing or jumping all over the place on cheap systems.

Imagine the basic smartgun as a laser pointer without the laser. Essentially that's what it is.

IFF Functions
Friendlies could be marked by using small radio transmitters (most likely implanted or installed). Sensors on everyone's smartgoggles could be set to "see" these coded transmissions. The goggles will "interrogate" the signal and if its a friendly it will mark that area as "safe".

You would not necessarily "see" these transmission since it would be hard to move without hitting things (just like thermovision could have complications when moving around). The goggles would mark that location so that when the smartgun processor sent back the corrected referencecam image for superimposing the IFF processor would mark areas of that image with "hotspots" showing friendly locations. The smartgun reticule would probably change colors or otherwise warn the user they are pointing at friendlies.

Alternately friendly signal tags could be shown right on the HUD itself if close enough (though that could be confusing). You could still fire but it would give you a chance to reconsider. Sorry I don't see fire lockouts since the threat of spoofing or just plain computer error is too great. It's a check, not a foolproof system (which you could never have).

The cookiecutter operates on this principle IIRC, using radio transmitter badges. Trying to 'tag' people based on their signature/profile is sketchy at best,not very realistic at worst. Too many complications.

Remember, since its just an overlay you could be using whatever you wanted to see through (lowlight, thermo, whatever and you would still see the aimpoint). It would also move around based on arm movement as well (though cyberarms would be superb due to their lack of minor muscle movements).

Real World 'Optical Smartgun' Example
Imagine taking a scope you have on a weapon now and mounting a camera on the back of it. This scope takes pictures and feeds it to a set of goggles you wear. you would see through the scope in a little "box" in the corner of your vision. By pressing a button on the weapons grip you would zoom the box to centerview expanded. Another button controls the scope zoom. Add a few electronics to the camera and you could have a pretty good passive rangefinder. This could be done NOW and a similar concept will be used for the Land Warrior program.

Final Notes
Yes I know I did not cover "mentally" pulling the trigger or weirdness blike not wasting ammo in autofire (yeah right). I'll go over that at a later time. I only covered one possibility, I did not cover the 'slaving' of limbs in a reverse smartlink or anything like that.

Keep in mind the "no laser" statements. Though in many cases a laser sight would be just as good it can be seen and even if you get weird versions like tuned wavelength or something everyone and their brother will have laser detectors akin to advanced "laser tag"/MILES sensors that will give you away.