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STARFLEET MARINE CORPS

ARMS AND EQUIPMENT MANUAL

Revision 2010

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Arms & Equipment Manual

2010 EDITION

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Pronoun Disclaimer

In this manual, “he”, “him”, and “his” are used following the standard English-language grammatical convention to use these forms for gender-nonspecific pronouns. No sexist bias is intended. The convention is used merely for ease of writing and reading. There have been and hopefully always will be plenty of female members in the SFMC, and no slight to them is intended.

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SECTION 1 - Introduction

This Manual lists every major piece of equipment and vehicle in the current SFMC inventory. This manual superceeds all other manuals that detail SFMC arms and equipment. Please note that as with any military force, equipment will change quickly in response to changing conditions.

SECTION 2 - Armor in the SFMC

Armor is the reason for the fighting vehicle's existence, not mobility or firepower. For although the latter will compete with armor in a vehicle's design, they would be meaningless without the protection of armor to keep the crew and weapons safe.

There are two general categories of armor today. Physical armor is the actual material which comprises and protects the vehicle with a physical barrier. While today's heavy armor is formidable protection from most light weapons (and most all historical ones), today it is no longer enough. The introduction of phased-energy weapons, disruptors, matter-antimatter weapons, etc. have made many weapons a match for even the toughest physical armor. To combat these more serious threats, fighting vehicles now employ field manipulation technology to create energy armor.

2.01 Why Physical Armor?

With the impressive array of modern weapons, many wonder why we should bother with physical armor at all. After all, given the highly-touted performance of energy weapons, most average folk think you could punch through a starship hull with a hand phaser.

However, energy weapon performance standards are misleading. Take, for example, the impressive damage index posted for phasers. A tiny Type I hand phaser on setting 8 has a damage index of 120—meaning it can penetrate 120cm into a composite sample consisting of multiple layers of titanium, duranium, cortenite, lignin, and lithium-silicon-carbon 372. This sounds quite impressive. But while the performance of the phaser is definitely good, the damage index leads you to expect performance the weapon can't deliver on the battlefield.

What is not generally well known is that the composite sample used for phaser testing is nearly all rock—the layers containing metals are quite thin. And the metals chosen are not known for their energy refracting or absorbing properties. Fortunately, modern physical armor is composed with a little more foresight.

2.01.1 Physical Armor Composition

In addition to duranium and terminium (which provide substantial protection from physical armor penetrators), even the lightest SFMC armor uses spaced ceramic composites which can be quite effective at absorbing and dissipating energy to substantially counter phaser and disruptor beams. Heavier armor contains toranium, which is highly phaser resistant (hand phasers can't even cut the material efficiently with a solid beam and concentrated fire). Heavy armor usually also contains nitrium which is used to line EPS waveguides because of its excellent energy insulation properties. And finally, refractive crystals of kelbonite are embedded into the armor's topcoat, further refracting incoming energy beams and preventing much of the energy from making it into the deeper layers of the armor. Kelbonite has the additional advantage of scattering scanner beams and laser and maser beams effectively.

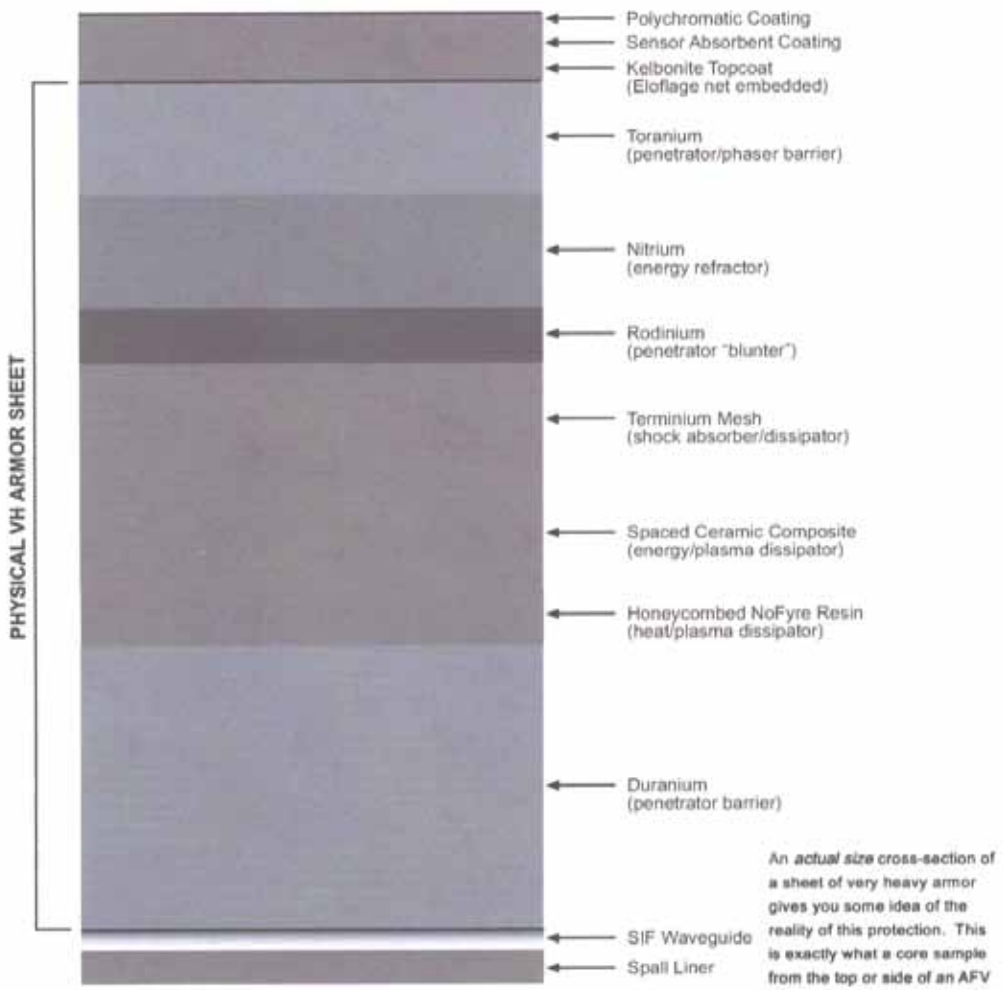
Along with the other layered materials in it, modern physical armor is capable of deflecting and/or absorbing quite a bit of punishment on its own. Most armor used in Armor Branch vehicles is rated at VH (very heavy), which means it can stand-up to direct momentary bursts of phaser energy up to setting 14 with little molecular degradation. The angle of the incoming fire is also important — if the incoming beam hits the armor at any angle shallower than 60°, much of the energy is scattered up and off the surface by the kelbonite.

Similar factors affect physical penetrators like long-rod kinetic penetrators and plasma-jet penetration from High Explosive Anti-Tank (HEAT) ordnance. Angle of attack is even more important against physical penetrators, which is why SFMC fighting vehicles have such low-profile, shallow angles in their outward design. The sandwiched armor package also helps dissipate plasma jets and absorb or deflect the kinetic energy of long-rod penetrators. Especially helpful is a layer of rodinium, which is so hard that it can actually blunt most rod penetrators, thus distributing their kinetic energy over a much large surface area and reducing their ability to penetrate. The drawback of extremely hard metals is that when enough kinetic energy is applied to actually break the material, it tends to shatter like glass. This is why hard materials like rodinium are sandwiched together with softer materials like terminium mesh to make effective overall protection.

In the rare circumstance when the physical armor is breached, pieces of armor can literally be torn off the interior surface and thrown around the inside of the vehicle causing damage to equipment and personnel. This process is called spalling, and the dislodged material is referred to as spall. To prevent this, a woven

kevlex spall liner is applied inside the armor surrounding crew areas or other vital systems. While it provides little protection against a penetrator, it is able to catch surrounding spall before it can be thrown into the vehicle's interior.

All things considered, VH armor is capable of withstanding most light infantry weapons, and even many vehicular or emplaced weapons without further assistance from energy armor. However, many heavier weapons can still make short work of even the triple-layered VH armor found on the forward surfaces of today's fighting vehicles.



An *actual size* cross-section of a sheet of very heavy armor gives you some idea of the reality of this protection. This is exactly what a core sample from the top or side of an AFV would look like. The principle properties of each armor layer are shown, although these materials have many other properties that make them desirable armor ingredients.

2.01.2 Physical Armor Ratings

To simplify comparison of differing forms of armor composition, a standardized rating system has been adopted. Regardless of an armor system's actual make-up, the protection it offers is equivalent to the examples shown below (materials listed for each rating are in order from inside to outside layer):

- **Light (LT):** 2 cm duranium base, 2 cm spaced ceramic composites, 1 cm terminium. Refractive crystals of kelbonite embedded in final topcoat.
- **Medium (MD):** 3 cm duranium base, 2 cm spaced ceramic composites, 2 cm nitrium alloy bonded to 1 cm terminium. Kelbonite topcoat.
- **Heavy (HV):** 4 cm duranium base, 1 cm honeycombed layer of NoFyre® foamed resin bonded to a 2 cm layer of spaced ceramic composites, 1 cm layer of rodinium, 2 cm layer of nitrium alloy bonded to 1 cm of toranium. Kelbonite topcoat.
- **Very Heavy (VH):** 5 cm duranium base, 1 cm layer of honeycombed NoFyre® foamed resin bonded to a 2 cm layer of spaced ceramic composites, 2 cm layer of woven terminium mesh, 1 cm layer of rodinium, 2 cm nitrium alloy bonded to 2 cm of toranium. Kelbonite topcoat

2.02 Energy Armor (Force Fields)

Field manipulation technology has led to any number of advancements in military technology, but none more meaningful than in energy armor. Energy armor can take several forms, but we will concentrate on the two most extensively used in the SFMC: force fields and structural integrity fields (SIFs).

A force field differs from the more popularly known deflector shield in important ways, even though force fields are casually referred to as 'shields' in the vernacular. Deflector shields work by altering local gravity (along a plane perpendicular to the incoming force) to extreme levels, bending energy waves away from the hull and completely destroying physical penetrators. On a planet, altering local gravity could have catastrophic results, so force fields are used by ground units and in-atmosphere aircraft. A force field is a barrier to incoming energy (kinetic, electromagnetic, heat, etc.) that distorts, absorbs or deflects that energy away from the unit generating the field.

Force fields can be projected a short distance from the vehicle, adding a superior outer-layer of defense to the armor system. The hull itself, in addition to being made from physical armor, is reinforced with an SIF. SIFs use a series of specially-calibrated forcefields to physically reinforce the armor's mechanical structure. The molybdenum-jacketed waveguides for the SIF fields run inside the vehicle's sensor-absorbent coating (the waveguides are actually located under the armor sheet), so it can be used without significant energy bleed which would reveal the vehicle's presence to sensors. This is important as it means the physical armor can still be reinforced even under strict energy-discipline.

When used with an SIF, the effectiveness of physical armor is nearly quadrupled. When force fields are added, the rating is increased nearly tenfold. Therefore, when a single sheet of VH armor—which measures 15cm thick—is reinforced with an SIF and a forcefield, it provides protection equivalent to 150cm of unreinforced VH armor! (That's a meter-and-a-half!) As you can see, when physical and energy armor are used together, they provide substantial protection. Better yet, the energy armor can be varied in intensity and concentration to provide an active defense against incoming weaponry.

2.02.1 Force Field Ratings

As a measure of their relative strength, force fields are rated from zero to ten. As a guideline, the following general equipment ratings are given:

- **Zero:** Slow leakage of gas , will not stop liquids or solids (used for tents, etc.).
- **One:** Resists physical penetration, stops gases and liquids (used as a water barrier, maintenance areas, etc.).
- **Two:** Limited ballistic shield, limited energy defense (personal diplomatic shields, standard confinement areas).
- **Three:** Light defensive field (crew served weapons, light vehicles).
- **Four:** Standard defensive field (heavy weapons, vehicles, powered infantry suits).
- Five: Medium defensive field (explosive concussion, medium combat vehicles, heavy ballistic weapons).
- **Six:** Heavy defensive field (heavy combat vehicles, some installations).
- **Seven:** Installation Defense Screen (used for fortifications).
- **Eight:** Light Orbital Defense Screen (medium fortifications, minimum defense for expected orbital bombardment).
- **Nine:** Medium Orbital Defense Screen (hardened sites, heavy fortification).
- **Ten:** Heavy Orbital Defense Screen (planetary defenses).

2.03 A Note on Camouflage in the SFMC

There are three schools of thought on camouflage: a) don't bother, the enemy has advanced sensors you won't fool anyway; b) just try to break up outlines and shapes so they won't be able to tell exactly what's out there; c) try to blend in as best you can...it couldn't hurt. Current SFMC Infantry doctrine supports "c".

Most pieces of equipment (including most weapons and PI suits) issued by the SFMC are coated with a substance known as "polychromatic paint." This coating is capable of changing colors and patterns according to commands issued by the paint controller. The paint controller is also connected to sensors which scan the surrounding terrain for the appropriate colors and patterns that will make the equipment blend in most efficiently.

Soft material garments not suitable for polychromatic paint can be optimized, by use of replication devices, with various camouflage patterns as prescribed by unit commanders. Adhesive tapes based on similar technology are available to cover equipment not polychromatic painted.

Further, all Marine infantry equipment is issued with finish designed to minimize radiation reflection. These measures are effective against visual identification from most members of known species, but are relatively limited in their effectiveness against any sensors or enhanced organic sensory capabilities (i.e. - a sense of smell). The aforementioned tapes and overgarments are also designed to break up an infrared signature to minimize the profile that can be recognized by infrared sensors.

SECTION 3 – Weaponry

3.01 Introduction

Weaponry in the SFMC can be broken down into three distinct groups; Phaser Based, Projectile, and Electromagnetic Projectile. Each group has distinct advantages as well as disadvantages and are discussed below. One weapon my work well for one mission, but is not suited for another mission even though the missions may be similar. Therefore it is imperative that the proper weapons be chosen to fit the mission profile. This section outlines all of the weapons systems that are currently in use by the SFMC.

3.01.1 Energy Based Weapons Systems

3.01.1.1 Phasers

Phasers (Phased Energy Rectification) have replaced the more primitive Lasers and Masers as technology advanced. The weapons system known as has been a mainstay of Starfleet and the Starfleet Marine Corps for well over a century at the time of this writing, and is used by many other governments and cultures under different names. There are two basic forms of phaser technique, the pulsed phaser and the beam phaser. The pulsed phaser fires a series of short energy beams (pulses) at the target, increasing the chances of an effective hit. The beamed phaser attempts to maintain a continuous energy beam on the target, achieving penetration in direct relation to dwell time. As a rule of thumb, beam phasers are more powerful, pulsed phasers are more accurate.

SFMC phasers, however, are modified significantly from their Starfleet counterparts—especially internally. Although the M-116A2 phaser rifle looks exactly the same as the Fleet's Type III Mark 2 phaser rifle from the outside, the insides are significantly different.

The added parameters that concern Marine infantry fall under weapon durability, quality of aiming devices, ease of manipulation, and above all else resistance to impulse interference from natural or fabricated dampening. It is very, very difficult to neutralize any Marine infantry device through a dampening field. Specially designed shielding and buffers within the control systems make Marine infantry systems over two thousand percent harder against dampening interference than comparable Starfleet systems. The trade-off has been additional procurement costs per unit, greater weight per weapon, and an increase in maintenance complexity.

All infantry phaser systems are recharged from sarium krellide power magazines or "clips as they are sometimes called. The SFMC requires that all phaser magazines accepted from a contractor must be meet the "five and five" rule: that is, they are capable of being recharged in less than five standard minutes, and capable of holding a full charge for five standard years in storage. They must also be immune to damage from all but the worst mishandling, and leach their energy out if damaged rather than explode.

Recently, SFMC units have begun receiving beam-frequency scramblers, which vary the frequency of the phaser beam and thus increase its effectiveness against adjustable screens such as those used by the Borg. The BF scrambler is normally fitted to the end of the weapon, integral with the emitter system, by the unit armorer. In the few instances when Marine and Borg units have clashed, the BF scrambler has proven extremely effective.

3.01.1.2 Plasma

A primitive, but effective alternative to phasers, the plasma gun has two advantages over phasers. First, phasers take more energy to fire, and are more complicated to maintain or repair. Second, the energy burst from a plasma hit often causes electronic components on and around the target to overload or feedback, causing secondary damage. In addition, plasma strikes in an atmosphere almost always ignite any flammable material in the blast radius. Plasma guns hold hydrogen fuel in a magnetic bubble, igniting and then superheating the hydrogen to a plasma state using a laser. The magnetic bubble (or plasma bolt, as it is known) is launched at the target and immediately begins to decay. This decay limits the plasma gun's range to 1000 meters in an atmosphere, and about ten times that in space.

3.01.1.3 Fusion Beams

Fusion Beams are a logical outgrowth of plasma weapons. If you hold the superheated hydrogen fuel in a plasma state for a while longer, a fusion reaction begins. Opening one end of the magnetic bubble releases a stream of energy at the target (a fusion beam). This fusion beam doesn't produce the electromagnetic disruption that a plasma bolt does, but it does much more damage. The beam is harder to aim, and has an extremely short range, under 500 meters in an atmosphere, and about ten times that in space.

3.01.2 Projectile Weapons Systems

Energy weapons have long been the backbone of SFMC offensive and defensive munitions. Many have opined that in today's battlefield, there exists no purpose for anything but energy weapons. The SFMC maintains that this is simply not the case. The performance characteristics available to projectile weapons simply cannot, in many instances, be duplicated by energy devices. Similarly, force or energy shielding can be effective in stopping or reducing the effect of an energy attack, but the use of projectile weapons, especially in volume, necessitates armor.
Projectile weapons in the SFMC break down into two major types: Electromagnetically Propelled Weapons (EMPW), and Chemically Propelled Weapons (ChemFire).

Against lightly armored or relatively unprotected targets, projectile weapons can be quite effective. They have several advantages over phasers in many applications. First and foremost (and of highest consideration for sniper weapons), there is no "tracer effect" of a phaser beam which pinpoints your position for enemy forces. "Firing a phaser is like painting a big line in the sky that says, 'shoot here,'" said one Marine Sniper Instructor. Projectile weapons are more energy efficient as well.

3.01.2.1 Electromagnetic Projectile Weapons

This class of weapons relies upon electromagnetic linear acceleration to propel projectiles downrange. Most small-arms projectile weapons in the SFMC inventory are either missiles or electromagnetically fired 'gauss guns' which operate by using a series of miniature superconducting magnets to draw a projectile from the breech, through the barrel, and out the muzzle in a very short amount of time. In larger EM cannon (20mm and above), the EM firing system is capable of muzzle velocities in excess of 4000m/s!

EM-fired projectiles require no chemical propellant and so are caseless. This means more ammunition can be carried by an infantryman, and more can be stored and transported in any given space. It also means no 'dirty' propellant residue to foul the barrel or increase maintenance requirements.

3.01.2.2 Missiles & Torpedoes

Missiles are self-propelled projectile weapons which include a propulsion package, a guidance system, and a warhead. They differ from rockets which have no guidance system. Modern torpedoes are technically missile systems, but their main role of anti-shipping weapon has lead to the use of the more traditional name (in ancient times, torpedoes were seaborne weapons launched by ships or aircraft against marine vessels).

3.01.2.3 Bombs

Bombs are projectile weapons which may or may not have guidance sections, always have warheads, but have no propulsion sections. Since they are not self-propelled, they are only useful against ground targets which are relatively stationary, and on planets with substantial gravitational fields. Therefore, their use in the SFMC is somewhat limited. However, they are extremely cheap and easy to produce, even in guided "smart bomb" form, so are used frequently when circumstances allow.

3.02 Man-Portable Weapons

These weapons are designed to be carried by a single marine and therefore are designated as "Man-Portable". However some of these weapons cannot be fired without being mounted either to a portable tripod or a vehicle.

3.02.1 Phaser, Beam

For a general description of phaser weaponry please see Section 3.01.1. Please note that beam phaser weapons are being gradually replaced by pulse phaser weapons as the pulse phaser weapons have numerous advantages over the beam type weapons, including lower power consumption.

3.02.1.1 M-116A2 Phaser Rifle

The M-116A2 is the new standard Light Infantry weapon of the SFMC. Introduced in the fall of 2375 as the M-116A1 (which is the same unit as the Type III Mark 2 carried by Starfleet), the A2 version adds luminescent lines on the dorsal side to serve as a low-light waist-aiming device for snap shots, an enhanced illuminated reticule system in the scope, and increased countermeasures against dampening. It is slightly heavier than the rifle it replaces

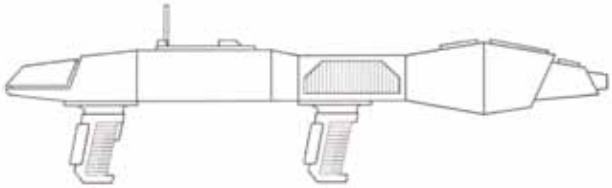
(the M-110/Starfleet Type III), but is also more powerful. More importantly, it has a shoulder stock—the lack of which was the chief complaint about the M-110 (which is still in service as a light carbine).

This rifle provides the necessary firepower for common direct-fire infantry situations. It possesses the full standard sixteen power levels of the Starfleet phaser rifle, with the addition of a pulse-burst automatic firing mode that conserves energy over the steady stream that is found on the M-970. It is reloaded from standard WC-2 power clips, of which three are normally carried in battle dress. The M-116A2 can have accessories such as laser-dot sights and beam scramblers fitted to it, in addition to the weapon mount grenade launcher system, discussed later. Like all phasers in the SFMC inventory, its beam can be adjusted from a wide-field cone dispersion pattern to a "needle" pinpoint beam application.

3.02.1.2 M-110A1 Carbine

Resembling the older Starfleet Type III phaser rifle, the M-110A1 carbine is a light phaser rifle that is small, lightweight, and easy to maneuver. It is used for really close-quarter battle (CQB) where the goal is to quickly and accurately put phaser beams on target in cramped quarters. It is used by antiterrorist units, hostage rescue teams, and other specialized CQB units.

3.02.1.3 M-2A3 Heavy Phaser Rifle



Just sitting in the weapons rack it looks heavy, difficult to move, clumsy to operate, and powerful enough to take out a small asteroid... and it is. It is the M-2A3 heavy phaser rifle. A compression phaser rifle with both beam and pulse firing capabilities, the M-2 is nearly the size of most of its operators and must be carried in pieces by a heavy weapons fire team unless anti-gravs can be used (in which case it takes only two to carry).

The M-2A3 is basically the equivalent of a Type 5 shuttle-mounted phaser emitter in portable form (and as an M-2 crew will tell you, "portable" is being used loosely here). It is tripod mounted when carried, or more commonly it is mounted on an APC. For all its drawbacks, however, it packs a punch well worth hauling it around.

3.02.1.4 M-970A1 Compression Phaser Rifle

The 970A1 is a powerful compression phaser rifle capable of establishing a base of fire to support Infantry squad operations. For this reason, it is also known as the Squad Compressed Rectification Phaser Rifle (SCRPR) and its operators are known by Infantrymen as "scrappers". A scrapper is usually a Light Infantry fire team's light weapons specialist.

In external appearance the SCRPR looks like the standard Starfleet compression phaser rifle, although it has a different internal arrangement which includes a larger clip housed in the stock as opposed to the grip, and a hardier emitter assembly to handle the higher power settings. The M-970A1 has the sixteen standard power settings of other phasers, with of four additional higher settings. These settings are only for use during limited situations due to their extreme destructive yield and use of power. For reference, setting twenty is thus described:

"A discharge of .30 seconds onto a surface will cause an explosion capable of geologic displacement of 1,980 cubic meters of rock in a confined area, penetration of shielding up to most main battle tanks, and/or a lethal burst radius of 300 meters from the impact point for unprotected hominid life forms with emitter set for maximum needle setting. Effective range of fire on this setting to obtain listed yield is two thousand and ninety meters on needle, with steady exponential fall-off and spread-out of discharge past this point."

3.02.1.5 M-1024 Light Infantry Support Phaser

The M-1024 is a crew served support weapon. Crew generally consists of a gunner, who also carries the weapon during transit, and a spotter, who also carries the power cases in transit. In a vehicular mount the spotter is, of course, not required neither are the separate power cases. In either mounted or un-mounted applications, a full range of settings, from stun to disintegrate, are available to the operator. Multiple weapon mounts are used in some applications.

3.02.1.6 M-1056 Heavy Infantry Support Phaser

The M-1056 is a crew served support weapon. Crew generally consists of a gunner, who also carries the weapon during transit, a porter, who also carries the heavy tripod and anchoring tools in transit, and a spotter, who also carries the power cases in transit. In a vehicular mount the gunner is the only required crewman. In either mounted or un-mounted applications, a full range of settings, from stun to disintegrate, are available to the operator. Multiple weapon mounts are used in some applications.

3.02.1.7 M-1137 Light Infantry Support Pulse Phaser

The M-1137 is a crew served support weapon. Crew generally consists of a gunner, who also carries the weapon during transit, and a spotter, who also carries the power cases in transit. In a vehicular mount the spotter is, of course, not required neither are the separate power cases. Multiple weapon mounts are used in some applications.

3.02.1.8 M-1160 Heavy Infantry Support Pulse Phaser

The M-1160 is a crew served support weapon. Crew generally consists of a gunner, who also carries the weapon during transit, a porter, who also carries the heavy tripod and anchoring tools in transit, and a spotter, who also carries the power cases in transit. In a vehicular mount the gunner is the only required crewman. Multiple weapon mounts are used in some applications.

3.02.1.9 M-1A2 Hand Phaser

This is the Marine Corps version of the venerable Type 1 Starfleet hand phaser. In the cramped quarters of a cockpit, this extremely small weapon is ideal as it takes up little room yet packs a solid punch. The M- 1A2 is carried in an underarm or chest holster in the PPG-AE304 vest. Unlike the Fleet's Type 1, though, the M-1A2 is painted solid matte black and has anti-dampening features to counteract enemy jamming or natural radiogenic interference.

3.02.1.10 M-3A4 Tactical Hand Phaser

Although it is authorized for use in Marine units, the Starfleet "broom handle" phasers and pocket phasers leave a lot to be desired from a tactical standpoint. Both weapons can be damaged rather easily, neither has integral sights, and the controls are complicated and hard to manipulate quickly while under stress. These factors led the SFMC to retain the "Combat Phaser" Type M-3 as a sidearm despite the fact that it's power levels and capabilities were obsolete for many purposes. In 2328 the first of a series of upgrades on the frame of the M-3 were performed by the original Earth-based contractor and a fourth series of upgrades on this device are now also being done by them to bring these units up to the level of the M- 3A4.

This phaser has a conformal shape that the firer grips fully in hand and aims with constant illumination sights atop the phaser. A window below the sight displays the power level. A button on the left side of the grip allows the firer to cycle through power settings, while another button on the right side allows the firer to select up to five "pre-shot" settings quickly (the settings are entered through a control pad on the top of the phaser, that is covered by a panel during use). All of the phaser controls can be manipulated without the firer altering the firing posture.

After the phaser is fired, the sights automatically increase their illumination to compensate for possible night-vision loss from the phaser bloom during low light combat. Although the illumination of the sights is not visible from the front or sides of the weapon, nor at a range of more than two meters behind, another button forward of the rear sight allows the illumination to be cancelled entirely.

The M-3 has two safety devices. A grip safety prevents the weapon from firing without a hand gripping the control surface solidly, and there is an integral safety within the trigger that is released as the trigger is pulled. There is no button or key safety, the M-3 is "cold" with the trigger released and instantly "hot" with the trigger compressed. This highly effective trigger system has been a trademark of the M- 3's manufacturer and to this day is still copied by competitors, with never quite the same final level of perfection as the original.

3.02.1.11 M-45 Special Operations Hand Phaser

The M-45 is a more powerful and accurate version of the standard-issue M-3 pistol-type hand phaser. Each M-45 is manufactured by the SFMC itself: standard M-3s are meticulously reworked by hand by Corps armorers. The most distinctive feature of the M-45 is the longer "clip", that is, the larger energy cell which protrudes from the bottom of the grip. While it does make the weapon slightly more awkward to draw, the increased power availability is worth the trouble. The M-45 is also rebalanced so that it rests comfortably in the operator's hand and is no trouble to keep on target for extended periods. Other features include a more powerful emitter and an improved sighting system.

3.02.1.12 M-9A2 Special Operations Hand Phaser

Resembling the small Type 1 Starfleet hand phaser, the M-9 is perfect for covert activity when displaying weapons would bring unwanted attention. The Marine version of the weapon is flat black, and is hardened against interference or damping as all SFMC phasers are (the primary difference between Marine and Starfleet phasers).

3.02.1.13 EVA Phaser Rifle

Specially designed for use with environment suits, the EVA rifle has two pistol grips and no trigger-guard for ease of handling, as well as magnetized areas for securing in zero gravity conditions.

3.02.1.14 Infinity Modulator

I-mod constantly changes its energy frequency to thwart an enemy Borg's modulating shields. If the I-mod had to be compared to a standard first-person shooter weapon, it could be found somewhat similar to a low-spread shotgun. Its blast is impressive and nearly immediate, but doesn't contain the spread of your traditional shotgun. The primary mode shoots a small, purple beam of energy with a rapid firing rate. Without spread, you must line up your crosshairs well to strike targets consistently.

3.02.1.15 M-218 Phaser Shotgun

The M218 Phaser Shotgun is a short range field of effect weapon designed to fill the requirement for a man portable quick fire suppressive fire weapon. It fires a plane of fire which extends 60 degrees to either side of direct center. This field of effect extends to a range determined by the effect set for on the weapon's control panel. The higher power required for the main effect, the less power available for the carrier signal, hence the shorter range. Stun effects have the longest range, potentially out to 250m. Disintegrate effects have the shortest range, 25-40m at the highest settings. Physically, the M218 uses the grip, frame, and receiver modules from the M-116A2 with a drastically modified collimator/emitter unit. The weapon has no shoulder stock. It does carry the standard M-116A2 sighting mechanism though it is used mostly for low light situations.

The M218 may have users in the IN Branch among light infantry units fighting in urban settings. It may also be expected to be used within the SO community for units doing door breaching missions. CE units may find the M218 useful as a defensive weapon requiring little marksmanship training to still be very effective. Due to its small overall length, AR or AE units may find the M218 useful as a "emergency bailout weapon". MO units may prefer the M218 for repelling boarders.

3.02.1.16 M-107 Precision Marksmanship Phaser

The M107 Precision Marksmanship Phaser is designed as a long range energy weapon. Its carrier signal, unlike other phaser weapons, uses the X-Ray spectrum rather than the visible light spectrum thus producing no waste visible light. Due to this unusual carrier signal, the M107 consumes power at a phenomenal rate. Each rechargeable standard weapon power pack produces 10 pulses. Each pulse is .01 of a second. Each pulse will pierce the target with a 20 mm (.79 inch) hole out to ranges of 3.22 km (2 miles). The lack of waste visible light should help marksmen avoid counter-sniper fire and the extremity of the range should render sonic detection something of a moot point.

Physically, the M107 appears as a slightly longer barreled M116-A2 with a much heavier scope assembly and a bipod. Many users of this weapon will prefer to add a padded cheek piece to the stock, which is available from the manufacturer and normally issued with the weapon.

3.02.2 Projectile, Ballistic

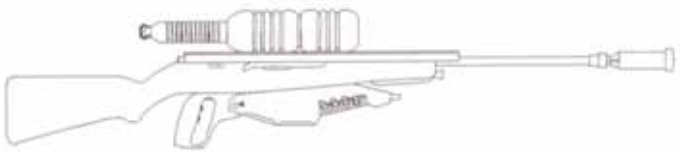
For a general description of projectile weaponry please see Section 3.01.2.

3.02.2.1 M-12A4 Combat Shotgun

No matter how far weapons technology advanced over the centuries, no one has invented anything better for Close Quarter Battle (CQB) against lightly armored personnel than the combat shotgun. Light, small (compared to electromagnetic projectile weapons), easily aimed (one merely needs to point the barrel in the general direction of the target), and with great stopping power, the shotgun is still used by CQB units when Threat forces are not armored or shielded. Of course, there have been changes over the centuries. First and foremost is the chemical propellant.

The mix now used burns much more efficiently, almost completely cleanly, and contains enough oxidizer so that performance doesn't suffer in zero-oxygen environments. Also, a much wider range of ammunition is now available, including several types of nonlethal rounds favored by HEAT teams.

3.02.2.2 P-688 Sniper Rifle



The P-688 is an electromagnetically fired projectile weapon capable of hitting targets accurately at a maximum range of 5km (average effective range: 2.3km). The P-688 has an integral air data probe which can evaluate the atmosphere for wind and pressure, adjusting the sight picture accordingly in its holographic sight assembly. Through analyzing this data, the P-688 can also self-adjust its muzzle velocity to just under the speed of sound in any given atmosphere, making the weapon silent.

Although snipers rarely have a need for rapid projectile firing, the P-688 is capable of emptying its 10-round magazine in 15 seconds. The P-688 fires 5mm caliber projectiles of five types: ITR (inert training round), JHP (jacketed hollow point antipersonnel round), explosive antipersonnel round, incendiary round, and light armor piercing round. One magazine each of the latter three and two of the JHP rounds are typically carried by each shooter in a Scout/Sniper team.

Fitted below the forward body is a clip-on unit called a "3-pak" which contains a power cell, ammunition magazine, and phaser unit for CQB. The P-688 is the only projectile weapon which also has a phaser capability. The 15mm caliber weapons are just too big to be used in CQB to begin with, and the 5mm Squad Automatic Weapon (below) uses all of its available room for ammunition storage. The 3-pak enhances the safety of the P-688 as it cannot be operated without the rifle, the rifle cannot be operated without it, and each 3-pak is programmed to function with only one P-688. Other safety features include a retina scanner inside the scope which is programmed for only the user. It also scans for blood flow so that a dead eyeball cannot activate it. The larger caliber cousin of the P-688, the P-788A1 below, has the

same scope and scope safety system.

3.02.2.3 M-323 Light Machine Gun (8mm)

The M-323 8mm Light Machine Gun, nicknamed "Chatterbox", is the smallest of this class of weapon system. It fires up to 400 rounds per minute from an 800 round box. It has a muzzle velocity of 1200fps and a maximum effective range of 800m. It has controls allowing selection of 3 and 10 round bursts as well as full automatic and Safe (off).

3.02.2.4 M-334 Heavy Machine Gun (13mm)

The M-314 13mm Heavy Machine Gun is the descendant, many times removed, of the venerable M-2 Browning machine gun from Earth's First World War. It is extremely effective at its role as an antipersonnel/ anti material weapon. Modern SFMC ammunition only serves to enhance this level of effectiveness.
The M-314 spits out 13mm ammunition at 2900fps and at effective ranges out to 6500m. Its rate of fire is 750 rounds per minute. The recoil from this weapon is significant and it is never intended to be fired un-mounted from either a tripod or vehicular mount.

3.02.2.5 M-349 Very Rapid Fire Rotary Gun (8mm)

Another hold over concept, the M-349 is the descendent of the M-134 Minigun. The idea, still valid, is that such a multi-barrelled weapon can fire a truly horrific number of rounds without overheating the barrel. This six barreled system can fire up to 5000 rounds per minute with an effective range of out to 800m. Ammunition is loaded in cartridges of 1000 which may be attached to the weapon in either of 2 ammo ports

3.02.2.6 M-356 15mm Machine Cannon

This weapon was originally designed as the smallest SFMC weapon using ammunition with a "payload capacity", i.e. capable of performing functions other than punching holes in the target. The continued development of such ammunition in smaller calibers has removed the "niche" in which this system existed. Even so, this is a devastating small weapon system with a broad range of ammunition available.

The M-306 is a single barrel weapon with a rate of 250 rounds per minute and an effective range of 3000 meters. Though originally designed to be fired from a gyroscopically stabilized balance arm mount worn about a marine's waste, such mounts are no longer in use by the SFMC. Due to this, the M-306 has been relegated to vehicular applications only.

3.02.2.7 M-326 Light 20mm Grenade Launcher

The M-326 fires a 20mm grenade on a flat trajectory to a range of 500m. On a arcing trajectory, that range is approximately doubled. Several types of grenades are available. The box magazine carries 25 rounds. The weapon fires at 700fps and a maximum rate of 60rpm. Operator settings allow firing shots singly, 3 round burst, and Safe (off). It comes equipped with a folding bipod.

3.02.2.8 M-352 Heavy 40mm Grenade Launcher

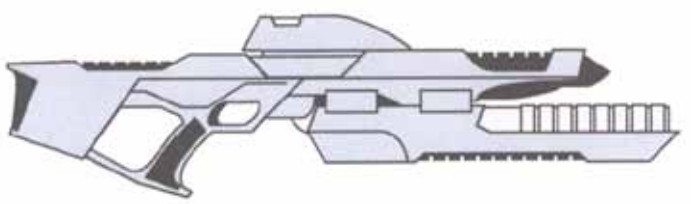
The M-352 Grenade Launcher is a tripod mounted, fully automatic weapon. If fires a variety of chemically propelled grenades to ranges of 1500m. It has a muzzle velocity of 800fps and a maximum firing rate of 60rpm. Operator settings include 3-10 round burst, full automatic, and Safe (off).

3.02.2.9 AGL-19 Automatic 40mm Grenade Launcher

This weapon fires Rocket Assisted Multipurpose (RAM) grenades to ranges of 1000 meters with an effective range of 250m for point targets and 600m for area targets. It has a maximum firing rate of 60rpm. The weapon comes in two varieties, a turret mounted version, and a crew served portable version (mounted on a heavy tripod).

The turreted version is fed by two internally mounted 50 round drums, while the portable version is fed by a removable 20 round magazine. In both cases the feed systems may be loaded with different types of ammo (a single type in each ammo drum or magazine). The weapon may be fired one grenade per pull of the trigger (single shot mode, useful for hitting point targets) or in bursts of 5 grenades per pull of the trigger. In the turreted version, the gunner may select which ammunition type will be fired in each burst by changing the feed selector switch with his thumb before firing.

3.02.2.10 SPW-201A1 Weapon mounted Grenade Launcher



The WGL is attached to the underside of the emitter tube on both the M-116A2 and M-110A1 phasers. They utilize forty millimeter EM accelerated and armed grenades similar in construction to MAPLIML rounds, although they do not have homing capabilities and their range and destructive power are considerably less. The WGL is loaded with single rounds. A PI suit mounted version is available with a five-round tube style clip.

WGL is intended to be uses as a combination direct and indirect fire system, unlike MAPLIML. WGL ammunition, with the exception of HIVAP, is designed to be fired in an arcing trajectory that will enable it to strike targets that might be out of the line of sight or directly shielded. Controls on the WGL allow the operator to select an indirect firing thrust mode per shot or use the default full-power thrust setting for direct firing. The WGL feeds power for its electromagnetic drivers from the power magazine of the phaser it is attached to, and consumes a minuscule amount of energy.

The sighting system for the WGL is attached to the rifle scope, and the WGL cannot be detached for independent operations with existing accessories. For most WGL operations it is necessary to physically cock the rifle at an inclined angle for firing, which in turn rules out the use of the LOS sight used for phaser firing. The WGL sight has a ranging system that utilizes an EM sensor with an adjustable frequency laser backup for use in countermeasure environments. The sight reticule has standard illumination and reticule options with the addition of a rangefinder that operates by assessing a hominid target's head in a variable reticule; most every being that the SFMC anticipates fighting in a land battle at this time is hominid-shaped.

All of the forty millimeter G-12 rounds used in this weapon have a minimum arming distance of sixty meters and a maximum effective range of 800 meters in direct fire. WGL's munitions are not, by doctrine, considered useful at ranges over 1000 meters due to atmospheric variances (the HIVAP can travel farther, but is not considered a viable weapon at any but short ranges). All rounds are impact fused. Ammunition types include grenade-variants of the PCP, CDM, HIVAP, HE, Beacon/marker, Incendiary and Fragmentation warheads found in the MAPLIML missiles. Two unique non-lethal WGL rounds are also available

3.02.2.11 M-302 Man Pack Mortar 60mm

The M-302 is the smallest of the purpose built indirect fire weapon in the SFMC inventory. It consists of a base, supports and launching tube for the mortar munitions. It can be aimed and fired manually or may be connected to the Combat Tricorder for computer driven aiming and firing. It has a maximum effective range of 5000 meters.

3.02.2.12 P-622A2 Squad Automatic Weapon

The P-622A2 SAW is a rapid-firing EM projectile weapon which fires the same 5mm ammunition as the P-688. This weapon is typically used by a fire team's light weapons specialist in place of the SCRPR when conditions favor projectile weapons. If the targets a squad is likely to encounter are susceptible to projectile weapons fire, a SAW can be more effective in laying down suppressive fire than a SCRPR which produces thermal and other side-effects during sustained firing.

The small caseless projectiles take up little space, so many can be carried by the SAW gunner. With a fully loaded weapon and tactical harness, it is not difficult at all for a SAW gunner to go into the field with over 10,000 rounds of antipersonnel projectiles! Though small, the high muzzle velocity of these projectiles give them enough kinetic energy for adequate stopping power. In fact, the muzzle velocity is so high that especially soft and dense osmium hollow-point cores must be used in the JHP ammunition to transfer energy quickly and prevent target run-through. The explosive antipersonnel rounds require an extremely quick fuse for the same reason.

3.02.2.13 P-722A3 Heavy Automatic Projectile Weapon

This is the 15mm caliber version of the P-622. It is usually carried by a Light Infantry Company's heavy weapons platoon by a three-man team. One man carries the ammunition and acts as loader during firing operations, one carries the barrel/bipod subassembly, and acts as spotter during firing, and the third carries the loader/body subassembly and is the shooter.

Considering that most tactical aerospace craft are armed with EM cannon only 5mm larger in diameter, one can see that the P-722A3 is the "big gun" of Light Infantry projectile weapons. It can also be mounted on vehicles such as an APC, and is standard equipment on many armored vehicles.

3.02.2.14 P-788A1 Sniper Rifle

The 15mm projectile fired by the P-788A1 can do substantial damage against protected targets. It is capable of hitting "equipment-sized" targets at over 7km (although 3km is actually the limit of its *effective* range). The larger barrel and frame of the P-788 fortunately make room for a miniature IDF generator in the stock. With the IDF on, the rifle has surprisingly little kick. With the IDF off, however, the weapon can be hard to handle, especially at the maximum muzzle velocity of 1000mps. And since acceleration is constant over the travel of the barrel with EM projectile weapons, this recoil makes the weapon hard to keep on target.

3.02.2.15 TR-116 Projectile Rifle

An experimental weapon developed by Starfleet Security. It fires tritanium projectiles propelled by expanding gases from a chemical detonation.

This rifle was designed for use in areas of high electromagnetic (EM) interference (whether artificial or natural) that would render phasers useless, but was dropped in favor of regenerative phasers. Access to the replicator pattern for this design is restricted to Starfleet officers. One unique aspect of the gun is its Exographic Targeting System, a separate sighting device that communicates with the weapon. The operator wears a wire frame helmet with a monocle attached over one eye, and moves a mouse trackball (mounted on both sides of the weapon, making it ambidextrous) located on the rifle to zoom in to the target. The magazine is contained in the forward handgrip under the barrel, being removed by releasing a catch and sliding it forward. In 2375, one of these rifles was modified on Deep Space Nine with a microtransporter connected near the barrel exit. The rifle dematerialized the bullet after firing and rematerialized it just in front of the target, and could possibly have done it inside the victim. The person responsible, a traumatized Vulcan officer, murdered several Starfleet personnel before being wounded by another modified TR-116 and taken into custody.

3.02.3 Projectile, Missile

For a general description of projectile weaponry please see Section 3.01.2.

3.02.3.1 HPW-184A2 Arbalest Heavy Missile System

The Arbalest HMS is the most powerful weapons system in use by the SFMC Light Infantry. It is designed to enable otherwise lightly armed Marine elements to engage and destroy heavy tanks, space vehicles engaging in strafing attacks, and other very high threat targets in situations where supporting aerospace, armor, or other forces have been unable to prevent the threat from closing in on the Marine unit.

Arbalest differs from most standard Marine weapons in a crucial aspect; the weapon is based on antimatter. Only one other such device is issued to Marine units, and that is the M/A round for use with the MAPLIML weapon. Due to the inherent difficulties with containment safety, Infantry Branch planners do now and will continue to regard these as Special Weapons and to severely limit their deployment.

The system consists of three elements, and is designed to be used by heavy weapons or air defense fire team. The first element of the system is the LRSS-987 EM sensor array. It weighs 10 kilograms. This system is used only with the Arbalest and is capable of detecting targets the size of small missiles out to 300km maximum. It can be linked to larger arrays for increased target acquisition capability. The 987 is powered by a sarium krellide cell with an endurance of 42 hours.

The second element of the system is the launcher itself, which weighs 8.3 kilograms. The Arbalest launcher can be used without the sensor array, but this is unusual. The launcher consists of a launching tube, a firing grip, and a conformal sight with a fire control processor that is designed for use without helmet assists. The sight is linked by cable to the sensor array (which is designed for stationary use) to highlight targets within the launch operator's view as the launch operator stands in the firing position and swivels the weapon on their shoulder to bring it to bear on the target vector. If this is undesirable, the array operator can call out target bearings to the launch operator as he reads them on the goggle enclosed array sensor display and the launch operator can attempt to acquire them using infrared and visual scanning.

The third component of the Arbalest system is the missile weapon itself. The missile, designated the Mark 184, is used with the Arbalest launcher as well as with some of the power armor suit units that the SFMC deploys. The warhead has a maximum potential yield of 1.1 kiloton with an average yield of .8 kiloton on an orbital target. Much more yield is retained on ground targets. The extremely high particle annihilation rate of the warhead will damage shields and armor caught in the blast out of proportion to the raw expressed yield; it is believed that this weapon can destroy any likely air or land vehicle threat, with the exception of some extreme cases such as atmosphere-capable starships or very heavy tanks. The missile has a range of over 300 kilometers.

3.02.3.2 M-387 Manpack Light Infantry Missile Launcher

The MAPLIML, or "Mapper", as it is often called, is considered by many to be the most versatile and useful weapon of the SFMC light infantry. It is usually carried in the heavy weapons squad of a rifle platoon, or the heavy weapons platoon of a rifle company.

The MAPLIML weighs 5 kg empty and 8 kg loaded with a full canister of six missiles. It consists of a rotary canister, frame, grips and folding shoulder-stock (it can be fired with or without this extended), and integral sighting system. A variety of 40mm missiles, each with an effective range of 12km, can be carried. Each missile uses differential thrust for maneuvering (tail fins—once so popular for missiles—are absolutely useless on the zero-atmosphere battlefields which the SFMC sometimes fights on). A gas bottle in the rear of the missile shoots the round out cold and at a distance of approximately twenty yards the rocket motor takes over.

One of the unique features of this launcher (and arguably the feature that makes it so popular) is that the operator can "spool through" the canister manually through push-buttons until the round of choice is in position, and rounds can be manually loaded one upon another into the canister as they are expended. Thus, a skilled MAPLIML operator will have a variety of ordnance at hand for any situation that might materialize.

3.02.3.3 MP-404 Squad Infantry Missile

The SIM is a disposable missile launch tube capable of carrying any one MAPLIML missile. The capability of carrying individual 40mm missiles allows each Infantryman in a rifle fire team to carry at least one missile without getting weighed down. If mission objectives necessitate, each fire team could be issued as many as six missiles between it's two Infantrymen and Fire Team Leader (although it is much more common to issue only one to each Infantryman). The missile type can be selected according to mission

3.02.4 Projectile, Electromagnetic

This class of weapons is designed primarily to be carried by infantry units in the field. As a secondary application, they may be mounted on light vehicles as defensive weapons with a gunner to provide these vehicles with measure of security they would not, otherwise, possess. For a general description of electromagnetic projectile weaponry please see Section 3.01.2.1.

3.02.4.1 M-240 Rapid Fire Weapon Light (8mm) EMPW

This is the EMPW version of the standard issue squad automatic weapon issued by the SFMC. It launches an 8mm solid projectile at a muzzle velocity of 4000fps. It has a box magazine capacity of 500rds and a firing rate of 2000rpm. It has settings allowing semi-automatic fire as well as 5 round bursts and Safe (off). It comes equipped with a folding bipod

3.02.4.2 M-253 Rapid Fire Weapon Heavy (13mm) EMPW

This is the larger version of the M-240 weapon. It has similar firing characteristics though it fires a heavier 13mm projectile. It also fires at a muzzle velocity of 4000fps and rate of 2000rpm. It carries a magazine capacity of 500rds and has settings allowing semiautomatic, 5 round bursts, full automatic, and Safe (off).

It comes equipped with a folding bipod

3.02.4.3 M-283 Machine Cannon (15mm) EMPW

This weapon was originally designed as the smallest SFMC weapon using ammunition with a "payload capacity", i.e. capable of performing functions other than punching holes in the target. The continued development of such ammunition in smaller calibers has removed the "niche" in which this system existed. Even so, this is a devastating small weapon system with a broad range of ammunition available.

The M-283 Squad Machine Cannon is a tripod mounted EMPW weapon. It carries 3 magazines that can be loaded with the same or different ammunition types. If loaded identically, the magazines can be fired from serially or specifically selected. If loaded differently, the magazines may be fired from sequentially or specifically selected. Each magazine has a capacity of 1000rnds of 15mm ammunition. Several types of ammunition are available. It has a maximum firing rate of 2500rpm which may be operator selected to fire in 3-10 round bursts, fully automatic, or Safe (off). The weapon fires at a muzzle velocity of 4200fps.

3.02.4.4 M-214 Light 20mm Grenade Launcher EMPW

The M-214 is a light version of the standard squad issue EMPW grenade launcher. It fires a 20mm grenade on a flat trajectory to a range of 500m. On a arcing trajectory, that range is approximately doubled. Several types of grenades are available. The box magazine carries 25 rounds. The weapon fires at 1200fps and a maximum rate of 60rpm. Operator settings allow firing shots singly, 3 round burst, and Safe (off). It comes equipped with a folding bipod.

3.02.4.5 M-228Heavy 40mm Grenade Launcher EMPW

The M-228 Grenade Launcher is a tripod mounted, fully automatic weapon. If fires a variety of EMP propelled grenades to ranges of 1500m. It has a muzzle velocity of 1200fps and a maximum firing rate of 60rpm. Operator settings include 3-10 round burst, full automatic, and Safe (off).

3.02.5 Grenades

All of the hand grenades in the SFMC arsenal share a number of design traits for ease of manufacture, shipping, and issue. Each is, however, physically distinctive enough to be distinguished from the others by a marine, with a gloved hand, without looking. Each has a base height, the height of the main body of the grenade, of 125mm (4.9"). Each has a base diameter, the diameter of the rims at top and bottom, of 63mm (2.5"). Each weighs .5kg (1.1lbs). Because they all have the same weight, they can all be thrown, by the average marine on a 1G world, approximately 30m. Each has, on its side, a 25mm x 25mm (1" x 1") square button with an oversized ring hanging through it. Each has a 25mm x 50mm (1" x 2") display unit. Finally, all have identical arming procedures and hardware

3.02.5.1 Standard Arming Sequence

The SFMC Hand Grenade body is designed to require proper grenade usage technique. Arming and throwing the grenade absolutely requires the use of two hands. Means do exist, however, which will assist marines in converting the hand grenade into an area denial device. Those will be discussed in a document on that subject.

The Arming Sequence for the SFMC Hand Grenade is a fairly simple process. Each grenade body includes a pressure sensitive display screen which, by default displays two buttons: "Set" and "ENABLE". Pressing the much smaller "Set" button will allow the marine to select from a number of fuse setting options appropriate to the grenade in use. Once a fuse setting has been selected, the screen will revert to the original two button display. Pressing the "ENABLE" button tells the grenade that you are ready to deploy it at the setting selected. The "ENABLE" button should be pressed as part of the motion grasping the grenade preparatory to throwing. Pressing the "ENABLE" button prior to pressing the "Set" button indicates that the marine wishes to use the default fuse setting. Once the "ENABLE" button is pressed, the "Set" button is locked out.

Proper grasp of the hand grenade has the index finger of the throwing hand resting on the "ENABLE" button and the ring hanging over the thumb-index web of the same hand. Final arming of the grenade takes place when the marine grasps the ring, pulls it outward, rotates ring and button assembly 90 degrees and releases. The grenade is now armed and ready to throw. Once the arming ring/button assembly has been turned and released, releasing the "ENABLE" button starts the timer on the fuse.

If, for any reason, the marine decides after arming that he no longer wishes to throw the grenade, he may disarm it by again grasping the ring, pulling outward, rotating 90 degrees (in either direction), and release.

The rule of thumb is that if the ring can hang down along the side of the grenade it is NOT armed

3.02.5.2 G-18 Fragmentation Grenade

The G-18 is the latest fragmentation hand grenade in the SFMC arsenal. It consists of the standard SFMC hand grenade chassis, an explosive core of 114g of Ultritium Composition 283 (often referred to in shorthand as Ultritium 283), and a deeply pre-scored sleeve of duranium. Fragmentation occurs as the explosive force shreds the duranium sleeve along its scoring sending the fragments through the gripshell at high speed. The default timer setting is I+10 or Impact plus .10 seconds. The blast radius of the G-18 is 15m with a fatality radius of 8m.

3.02.5.3 G-37 Smoke Grenade

The G-37 is the standard SFMC smoke hand grenade. It consists of the standard SFMC hand grenade chassis, an incendiary core of Clancium Oxide doped with Ferillium, and a toroid shaped container of smoke agent. The gripshell on this grenade is composed of three spaced layers of ferro-ceramic insulation.

The smoke agent is a special blend of prismatic micro-crystals of Duranium, Transparent Aluminum, and other energy resistant and reflective materials suspended in a liquid base. When detonated this solution produces a thick white smoke screen capable of obscuring the electromagnetic spectrum from 5 nanometers to 5 millimeters (Soft X-Ray Radiation to Extremely High Frequency Radio Wave ranges). This adequately protects any units from observation by any standard battlefield optical sensor and engagement systems; it will actually provide some protection from energy weapons fire as well.

The default timer setting is I+10 or Impact plus .10 seconds. The Ferrilium doping prevents the Clancium Oxide from exploding and forces it into a slow burn at a moderate temperature. Due to this construction, this grenade has no explosive burst radius. Though it is generally assumed to be safe for use as a signaling smoke, it is not recommended for this use due to the inability to change colors. It is also not recommended to allow its detonation in close proximity to friendly forces, even though some have proposed this in certain battlefield situations due to the device's safety record.

3.02.5.4 G-7 Stun Grenade

The G-7 Stun Hand Grenade is the latest in a long line of less-than-lethal weapons which have, for centuries, been termed "Flashbangs". It is a two stage grenade with an electronic component as well as an explosive component. The explosive component consists of the core of 114g of Thallarian Dioxide. Thallarian Dioxide is a fast burning, very low energy explosive that is generally considered a useless noisemaker. Its 180db report is virtually its only explosive effect. Within minutes after use, the remains of a G-7 can be safely picked up and disposed of in a standard waste container. The electronic component is the flash circuit connected to the 4 large light emitting panels on the sides of the grenade. The electronic component delivers a flash of two million candlepower lasting 1/50th of a second.

The electronic package goes off first, delivering its blinding flash, followed 3/1000ths of a second later with the deafening report. The practical application of these two effects is a stunning effect overloading the optical and aural receptors of the brain of anyone inside the target area. In an enclosed area of 225m^2 (2421sqft), a single G-7 should disable and disorient everyone without protective eye wear and hearing protection. Default timer setting is I+50 or Impact plus one half second. Facing of persons in the target area is of little or no consequence. Marines deploying the G-7 should, themselves, be equipped with protective eye wear and hearing protection.

3.02.5.5 RAM-4 Rocket Assisted Multipurpose Grenades (RAM Grenades)

The standard RAM grenade uses a small chemical rocket motor to give it extended range and flat trajectory. It is fired from special launchers and as rifle grenades from certain infantry combat rifles. Muzzle velocity upon firing is 250 meters per second, accelerating to 500 meters per second as the rocket booster ignites. Each grenade weighs 1.5 kg, and has a maximum range of 1000 meters. Standard ammunition types include High Explosive (HE), Flechette, Smoke, Incendiary, and High Explosive Armor Piercing

3.02.6 Explosives and Breaching Tools

Marines Infantryman may also carry a variety of light explosives and tools which they most often use for breaching obstacles, doors, windows, etc. to gain forceful entry into structures. Although some of these explosive devices are tailored to specific uses, many are improvised from components carried by the Marine to suit a specific application. SpecOps Teams make much more regular use of explosives and breaching tools than the average Infantryman. Operators carry and use the FES-55/56 door poppers used by the Infantry, but they also carry explosives and associated supplies for improvised devices much like Combat Engineers.

Specialized breaching devices are also used by the teams. For example, HEAT teams make use of a system of shaped charges that can be formed to match the dimensions of any door or window and deployed on an extendible boom. One team member holds the boom and places the device up to the entry point, activates the unit, and the door or window is blown in and down with a minimum of effort. HEAT operators can then file in through the opening.

NOTE: It is important in using the system, though, that the unit's top is placed at the top of the door or window: it detonates a few microseconds before the rest of the charges to blow the obstacle down to the floor. If the unit's top is placed upside down, the obstacle will be sent flipping end over end into the structure, possibly harming hostages inside.

Ship Seizure teams use a similar principle on a larger scale. They use a shuttle-mounted system that can blow in a ship's airlock doors after making a hard seal with a shuttle-mounted airlock. The Ship Seizure Team can then rush the airlock without pesky decompression problems. A more powerful version on a telescoping airlock (to protect the shuttle from back-blast) can even be used to make holes in the hull!

3.02.6.1 G-7 FES-55/FES-56 "Door Poppers"

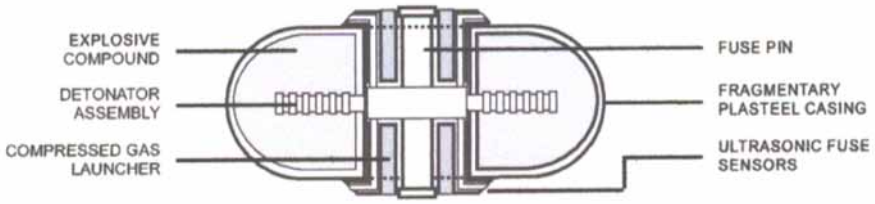
These small, lightweight charges come pre-assembled in a shaped casing system; one for sliding doors (FES-55), and one for hinged doors (FES-56). The "door poppers", as they are known to Infantrymen, will easily force open or unhinge most structure doors up to the equivalent of starship cargo bay doors (some doors of this size/strength may require two charges). The charge is armed by insertion of the detonator plug and is command detonated by combat tricorder, or by phaser burst. A second setting on the detonator will allow timed detonation with a preset timer of 30 seconds. Door poppers are small enough to be transported in a pocket of the standard Infantry load bearing vest.

3.02.7 Mines

The land mine is one of the most useful and versatile devices in the Marine Infantry arsenal. Although decried by some as inhumane following some well-publicized incidents of noncombatants blundering into mine units near roads and cities, the Corps continues to deploy land mines during operations. They are simply too useful to eliminate; however, non-lethal mines are being used extensively whenever their application can be as effective as lethal mine versions.

Nonetheless, mine operations must be conducted with extreme care. Any mine that a Marine deploys is to be noted as to nomenclature, type of charge, detonation settings, position, and any other special information that may be needed to disarm it, such as whether it has been fitted with anti-disturbance systems. Mine fields, defined as two or more mines set in by the same Marine or Marine unit in the same area to work in concert with each other, are to be recorded similarly. Mine deployment is to be reported to the chain of command as soon as possible after it's completion in order to ensure no danger to friendly forces or personnel. The OIC of a Marine field unit is responsible for seeing to it that recorded mine data is preserved and passed up to higher levels as appropriate.

3.02.7.1 SWS-108A5 Manpack Infantry Mine



The Manpack Infantry Mine (coined the "minimike" by Marines during the Ingroesti Insurgency of the early 2300's) has remained essentially unchanged since it's service introduction seventy years ago. The mine casing is a circular disk five centimeters in diameter by two centimeters high (the illustration above is actual-size!). The edge of the casing is rounded so that the mine will always fall flat no matter how it is dispensed.

The control core (which can be changed according to mission objectives), contains four compressed gas tubes which launch the mine in the air upon trip but before detonation (an air blast being the most effective). All fusing and launching mechanisms are duplicated between the top and bottom of the control core so the mine will operate no matter which side it settles on. The fuse pin is pushed into the top of the disk and clicks in place with a magnatomic coupler. To deactivate the mine, remove the pin with a magnatomic decoupler.

Minimikes come in three types. The first is a standard HE casing with an effective blast radius of 10m given a proper airburst. More lethal is the 50m blast radius of the CDM casing. Also available is the nonlethal stun casing which releases a burst of stunning phaser energy from a circular emitter around the circumference of the casing. This is a one-shot unit that can be recharged after the mine is recovered.

When the mine is tripped, an omnidirectional burst transmission is made by the fuse pin in the split second between trip and detonation. This transmission is on coded frequency, and notifies friendly forces of which mine is detonating and where it is. This will alert ground forces to enemy advances, as well as notify security troops to dispatch to the area for suspect pickup in the case of the nonlethal stun mine. All three versions can be detonated by pressure, trip-wire, ultrasonic field, or by commanded detonation using a combat tricorder.

For hand-emplacement by Infantry, this mine is issued in a field portable package that contains six mine bodies and six fuse assemblies. It can also be dispensed from pre-loaded tube dispensers which can be carried, mounted on armor suits, or installed in vehicles. Using the tube dispenser, a Powered Infantry Phoenix trooper can lay 360 minimikes before reloading.

3.02.7.2 SWS-270A3 Manpack Heavy Mine

The Manpack Heavy Mine is a dedicated anti-vehicle system designed to disable vehicles up to and including tanks and Mecha. The 270A3 has a 3kg charge of electrothermally focused explosive in a 1kg casing, and is designed to detonate underneath its target. The Mark 4A fuse assembly is pushed into the top of the mine, where it fits flush with the outer casing.

This mine is issued in a field portable package consisting of one mine body and one fuse assembly. It can also be dispensed from vehicles or powered suits. The mine has a shaped casing which forces it to land in an upright position no matter how it falls to the ground from the dispenser. However, the most effective method for laying this particular mine is to place it by hand, partially burying the mine casing and camouflaging the trip.

The SWS-270A3 can be set automatically for pressure or ultrasonic detonation; under both, the mine will not detonate under pressure or disturbance levels typical of infantry or very small vehicles. It can also be set for command detonation via combat tricorder.

This mine is disarmed by a fuse pin as well, and can be safely handled by personnel as it is insensitive to detonation; however, care must be taken to ensure that it has not been fitted with anti-disturbance systems by hostile elements. Despite its anti-vehicle mission, the explosive is lethal to unprotected hominids at a

range of 200m. This mine should not be deployed less than 100m from a similar unit to avoid fratricidal detonation.

3.02.8 Miscellaneous

This section contains man-portable weapons that do not fall into any of the standard categories.

3.02.8.1 FLM-2 Flame-Thrower, Portable

This weapon is a direct descendant of the flame-throwers of the early 20th century, updated by the use of modern technology but just as useful in the 24th century as it was then. The weapon system consists of a backpack (containing the fuel tank), a fuel line and a dispensing nozzle with an igniter. The tank holds 30 liters of extremely flammable liquid in one main tank and a catalyst in a small 5 liter tank mounted directly below it. The igniter assembly and fuel pump are powered by a standard power cell, and can be operated in three modes. In standard operation, the firer wears the backpack, adjusting the hose to either the left or right side of the body, and holds the igniter/dispensing nozzle by the pistol grips. By activating the ignition element and then the fuel feed, up to 60 one second bursts of flaming liquid may be fired at a target. The firer may elect to hold the trigger down for a period of time longer than one second, of course. This mode is most often used against vehicles and personnel. The next mode of operation is to activate the fuel feed first, soaking an area down with fuel and then activating the igniter. This is most often used for precision incendiary attacks, allowing the firer to see clearly the area that will be affected and thoroughly soaking the target area with flammable material. The last mode of operation uses a chemical catalyst to rapidly change the fuel from a liquid to a vapor, upon contact with oxygen. When dispensed, the liquid stream becomes a cloud of flammable vapors at ranges from 5 to 25 meters depending on the amount of catalyst introduced into the fuel mixture. A one second spray of liquid creates a vapor cloud 2 meters in diameter. The vapor cloud is extremely flammable, and can be ignited by almost any heat source. It burns very fast, depleting the oxygen in and around the vapor cloud as it does so and generating very intense heat. This makes it very effective against bunkers and other limited ventilation fortifications.

It is very dangerous to use however, since wind may blow the vapor cloud back over the user. When using this mode of operation, the supply of catalyst is enough for 30 seconds of operation and uses half a tank of flammable fuel.

3.02.8.2 M-100 Weapon-Mounted IDF unit

While not really a weapon in itself, the M-100 is counted here because it is invaluable to SpecOps forces who frequently work in zero-gravity environments. The M-100 makes it possible to fire weapons in zero-g without sending the firer flying backwards from the recoil. A miniature Inertial Dampening Field generator is powered by a standard W-2 power pack, and provides precise recoil damping for the weapon to which it is attached. It will fit the stock of any SFMC rifle (including the combat shotgun), although it does make the weapon much more difficult to handle and maneuver (which is why it is not simply a standard feature on all light weapons). The M-100 is also a power hog and can drain its clip in just a few dozen shots.

3.02.8.3 M-17A6 Collapsible Baton

This nonlethal suspect control weapon is a matte black duranium baton which measures approximately 50cm extended and 15cm stowed. It's base has a grip with two small, curved protrusions to aid in control: The baton is held with the backward-facing grip protrusion in-between the thumb and forefinger, so that the stun tip trigger is under the thumb tip (see illustration). When held in this way, the forefinger can be wrapped around the opposite protrusion like a trigger. The rest of the fingers are then curled around the grip. Other grips can be used on the baton as needed—this is only one common one. The M-17 can be used in a poking or striking manner, or to block strikes or stabs. It is for use primarily when stunning phaser energy is contraindicated (bystanders, flammable liquids in area, etc.). The baton collapses into the grip and is worn in a belt holster when not in use.

The very tip of the baton is capable of delivering a burst of stunning energy that is nearly equivalent to a hand phaser on setting one. It is delivered by contacting a suspect with the tip of the baton and depressing the trigger. The trigger may be depressed before contacting the suspect or after, but the tip must be in physical contact

with the suspect before the charge will be delivered. A safety sensor prevents an air discharge of the energy burst.

3.02.8.4 M-77 Chemical Dispenser

Another nonlethal alternative for the MP is the use of chemical agents to incapacitate suspects when stunning phaser energy is contraindicated (see above). The M-77 is similar in size and appearance to a field hypospray, but unlike a hypospray is capable of dispensing chemicals at a distance of 2m via a needle-thin stream. In this mode, the chemicals are applied to the suspect externally to be absorbed through the skin and/or inhaled. It can, on its other dispenser setting, inject suspects directly via hypospray nozzle. In this mode, the dosage administered is obviously much smaller.

It holds two standard hypospray vials in tandem within the body of the unit. The officer selects the chemical to be used via a thumb switch below and to the left of the spray trigger, and selects the dispersion method with a button above and to the left of the trigger. The chemicals in the M-77 must be capable of being administered either topically in large quantity, or subcutaneously in small doses. The two most common are anesthezine to induce unconsciousness, and irritol which produces incapacitating irritation in mucus membranes. The effects of irritol are nearly identical to oleoresin capsicum (used in 40mm OC grenades), but irritol can be safely injected into the blood stream.

3.02.9 Personal Weapons

Many Marine infantry troops carry a personal "backup" weapon of some sort, despite the fact that each Marine infantryman is issued a hand phaser in addition to the heavier rifle or other weapon they may carry. Most often these are low-tech weapons like blades or chemically fired projectile weapons. One reason cited by many troops interviewed is that they fear a dampening field will render their issued weapons inert. Others include the need for sentry removal and utility purposes (daggers and knives). Doctrine encourages Marines to carry what they feel they need to do their job, within the limits of unit safety and practicality.

Every special operator is likely to have at least one (if not several) "backup" weapon of some sort. At the very minimum they will have a low-tech but highly-reliable knife. Doctrine encourages Marines to carry what they feel they need to do their job, within the limits of unit safety and practicality. Ultimately, the Team Leader is responsible for approving his team's personal weapons.

3.02.10 Foreign Weapons

During Basic Infantry School, all Marines are familiarized with the weapons of the Federations Allies, as well as with any Threat weapons they may come across in the field. The need for this training is obvious: should an unarmed Marine come across a foreign weapon, the ability to use it becomes paramount. Light weapons specialists are given even further training in the use of foreign light weapons, especially various Threat weapons. Heavy weapons specialists receive similar training for correspondingly larger foreign weapons. While all Marines are familiarized with foreign weapons in Infantry School, special operators make regular use of them. They are as proficient with any Klingon, Romulan, Cardassian or Jem' Hadar rifle as they are with their M-116A2. In fact, depending on the mission, SpecOps teams may leave all their Federation equipment behind and use only foreign equipment and weapons.

3.03 Powered Infantry

A powered armor suit is without question the most complex piece of machinery in the Infantry's inventory. It is beyond the scope of this familiarization guide to explain the detailed workings of these suits; however, some general principles and suit-types can be covered.

3.03.1 Suit Control Principles: Negative Feedback

Except for the obvious difference in scale, PI suits resemble some types of Mecha vehicles. This leads the general public to assume controls and operation of each are the same, but nothing can be further from the truth. Mecha vehicles are *vehicles*: the pilot sits at controls that he operates both with his hands, and through his neural interface helmet. A PI suit is fitted to its wearer and operates as an extension of himself. It adds to his strength, his speed, and his survivability, but it functions *with* him, not *for* him.

It does this through a complex system of sensors which press themselves against the wearer when he climbs into and activates the suit. These then sense the wearer's body movements on a continual basis. For example, when the wearer lifts his forearm, the sensors feel the increased pressure between the top of the wearer's arm and the inside of the suit's upper forearm. As long as the wearer continues to push, the suit will raise it's forearm in an effort to relieve the pressure on the sensors. When the wearer stops their arm, the pressure on the sensors also stops, so the suit's arm stops. This is negative feedback.

What negative feedback means to the wearer is that the suit moves with them naturally and instinctively from the very first instant they climb into it. They do not have to learn complex controls to make the suit move, they require only experience in learning the suit's capabilities. From the first time a recruit climbs into the suit, they can walk, run, jump, pick items up, etc. Of course, not knowing how much the suit amplifies their movements, they may find themselves atop a building the first time they try to jump. That's where experience comes in.

3.03.2 Suit Capabilities

Powered suits magnify the strength of the wearer by using servomotors and heavy load bearing structural components to increase the power of the wearer's natural arms and legs. For instance, in a powered suit, the average human can lift 10 to 20 times the amount of weight they could normally lift on a class M planet (the amount varies with suit type). Accordingly, the amount of weight a trooper can carry is increased as well. While this is uite impressive when the items in question are things like people and furniture, the statistic is somewhat less impressive when one notes that this means one Powered Infantryman can only just pick up another.

In the same manner arm strength is amplified, so too is leg strength. Even in the heavy Dragoon suit, a PI can run at about 30mph. The lighter Pathfinder suit—built for speed—can manage over 50mph. This means that PI troops very rarely require vehicles for deployment as they can run about as fast as an APC anyway. Leg strength is amplified in another way as well. By using jump-jet assemblies in the legs (similar to common jet-boots used by recreational mountain climbers), a powered suit can jump much higher than an average hominid. On a class M world a Pathfinder scouting suit can average a vertical leap of 15m with little effort. There is enough fuel in the Pathfinder leg assemblies for a hundred such jumps. The heavier Dragoon suit has neither the height-range nor endurance of the Pathfinder, but even the much heavier assault suit can crank out a 10m vertical leap when need arises.

Powered armor also increases a PI's survivability by protecting him with both physical and energy armor. The suit's skin is duranium composite in most areas, very resistant to impact and damage. Vital areas also have a thin layer of cast rhodinium added (helmet, chest, back). If energy usage is not a problem, the suit can also use a low-level force-field that will protect it from most light weapons for a good amount of time.

A powered suit also increases a PI's endurance by providing him with a comfortable environment inside the suit, and by giving him water and nutrients on demand (through a food/water tube inside the helmet). A PI can even sleep inside his suit if necessary (the suit can be set to remain stationary while the trooper relaxes). The real limit to a PI's endurance, then is his suit, which runs on charge packs similar to a tactical aerospace fighter. Charge pack endurance varies widely with suit load, operating environment, suit type, etc.

3.03.3 Capability Standards

In the following listings of suit types, each suits' average capabilities are listed. Although it should be noted that since weapons mix, field equipment, and fighting environment can vary widely, these figures are really only valid for comparing one suit type to the others under the same circumstances. The actual maximums of the suit vary too widely to cover ever permutation in this brief guide. For purposes of these comparisons, the following standards are established:

1. The suit is operating in a Class M environment (as defined by Starfleet Regulatory Agency (SFRA) standard 102).
2. The suit environment is being maintained to SFRA standard 102.19 for Class M compatible oxygen-breathing personnel.
3. The suit is being worn by an average hominid (as defined by SFRA-standard 103).
4. The suit is operating with the average ordnance load-out listed in the suit description, and under battlefield conditions.

3.03.4 Powered Armor Suits

3.03.4.1 PRS-06 Phoenix Powered Infantry Rifleman Suit

The Phoenix is the new standard-issue PI suit in the SFMC. This suit replaces the Phoenix that has been service for a number of years. As a multi-proposes suit all PI troopers are now trained first in this suit, with modifications depending on the unit. Weapons loading is widely variable, as is sensor fitting. Fire team and squad leaders typically have an upgraded battlefield surveillance system and better communication (including a dedicated fire support channel).

Standard Powered Infantry Rifleman ordnance load-out:
Dominant Hand

- *Top forearm station:* SM-134A1 combat phaser
- *Outboard forearm station:* SM-134 secondary emitter
- *Inboard forearm station:* TDRS-44 target designation system

Opposite Hand

- *Top forearm station:* Combat Tricorder, suit-mounted
- *Outboard forearm station:* SP-628A2 5mm EMPW w/300 rounds
- *Inboard forearm station:* SP-682 ammunition magazine

Left Side of Suit

- *Outboard shoulder station:* SQD-12 flare/chaff dispenser
- *Top shoulder station:* SM-344 LI missile launcher w/6 rounds mixed
- *Back station:* SM-344 reloader w/6 rounds mixed
- *Outboard thigh station:* Field Medical Pack

Right Side of Suit

- *Outboard shoulder station:* SQD-14 flare/chaff dispenser
- *Top shoulder station:* EQW-14 Battlefield Surveillance Sys
- *Back station:* Field Pack
- *Outboard thigh station:* Field Suit-Casualty Pack

Comparative Suit Capabilities: PRS-06
Maximum Speed: 75kph for one hour
Maximum Vertical Leap: 17.5m
Average Endurance: 22 hours
Armor Rating/Sensor Rating: 7/5

3.03.4.2 PAS-71A Pathfinder Powered Infantry Scout Suit

The Pathfinder is built for speed; it is lightly armored and has few weapons (it doesn't even have inboard forearm stations). Instead, it is packed with sensors, targeting, navigational and fire control systems, and other forward-area recon systems. However, if need arises for scouts to fight, a 5mm EMPW and four SIMs can be swapped with the scouting gear listed below.

Standard Powered Infantry Scout ordnance load-out:
Dominant Hand

- *Top forearm station:* SM-134A1 combat phaser
- *Outboard forearm station:* TDRS-44 target designating system
- *Inboard forearm station:* TDRS-44 target designating system

Opposite Hand

- *Top forearm station:* Force Recon Tricorder, suit-mounted
- *Outboard forearm station:* TDRS-29 advanced target designation/ illumination system

Left Side of Suit

- *Outboard shoulder station (bottom):* SQD-12 flare/chaff dispenser
- *Outboard shoulder station (top):* EQW-801 Air Defense Sensor Suite
- *Top shoulder station:* SM-344B LI missile launcher w/6 rounds mixed
- *Back:* Reserve Charge Pack
- *Outboard thigh station:* Field Medical Pack

Right Side of Suit

- *Outboard shoulder station (bottom):* EQW-18 forward-deployable remote sensor beacon dispenser
- *Top shoulder station:* EQW-28 Battlefield Surveillance Sys
- *Back:* Field Pack
- *Outboard thigh station (right):* Field Suit-Casualty Pack

Comparative Suit Capabilities: PAS-71A
Maximum Speed: 100kph for one hour
Maximum Vertical Leap: 35m
Average Endurance: 45 hours (with reserve pack)
Armor Rating/Sensor Rating: 3/9

3.03.4.3 PRS-104 Dragoon Powered Heavy Weapons Suit

The Dragoon is the newest Heavy Weapons suit for the SFMC. It replaces the older Dragoon and can carry more and larger weapons than the Phoenix but just like the Dragoon it still has reduced speed and maneuverability. Dragoons have the widest variety of ordnance load-out since they can carry any suit-mounted weapon. In most units the Dragoon can be configured to provide the best for mission capable.

Standard Dragoon Heavy Weapons ordnance load-out:
Dominant Hand
- *Top forearm station:* SM-908A2 compression phaser
- Outboard forearm station: SM-134A1 combat phaser
- *Inboard forearm station:* SPW-201A1 w/5 round tube magazine

Opposite Hand
- *Top forearm station:* SP-777 control module
- *Outboard forearm station:* SP-777 15mm EMPW w/2000 rounds
- *Inboard forearm station:* SPW-201A1 w/5 round tube magazine

Left Side of Suit
- *Outboard shoulder station (bottom):* SQD-12 flare/chaff dispenser
- *Outboard shoulder station (top):* SM-344B LI missile launcher w/6 rounds mixed
- *Top shoulder station:* SM-344B LI missile launcher w/6 rounds mixed
- *Outboard thigh station:* Field medical pack

Right Side of Suit
- *Outboard shoulder station (bottom):* SQD-12 flare/chaff dispenser
- *Outboard shoulder station (top):* SM-344B LI missile launcher w/6 rounds mixed.
- *Top shoulder station:* EQW-14 Battlefield Surveillance Sys
- *Outboard thigh station:* Field suit-casualty pack

Dominant Side of Suit
- *Back station:* Field pack

Opposite Side of Suit
- *Back station:* SP-777 ammunition magazine

Comparative Suit Capabilities: PRS-104
Maximum Speed: 55kph for one hour
Average Endurance: 20 hours
Armor Rating/Sensor Rating: 8.4/4

3.03.4.4 PRS-8 C1 Powered Infantry Leader Suit

The C1 is the Command, Control and Communications suit worn by all PI officers and senior NCOs. The suit is the same frame as the Phoenix; the weapons/sensor load-out still is reminiscent of the Pathfinder suit. It's armored as a Phoenix, but uses a reserve charge pack and larger leg jump jets to achieve speeds comparable to a Pathfinder. This gives the commander the ability to maneuver amongst his deployed units more effectively. The C1 also has expanded communications capabilities, which typically include a private channel for unit commanders, and a direct line to tactical HQ.

Left Side of Suit

- *Outboard shoulder station:* SQD-12 flare/chaff dispenser
- *Top shoulder station:* EQW-801 Air Defense Sensor Suite
- *Back station:* Reserve charge pack
- *Outboard thigh station:* Field medical pack

Right Side of Suit

- *Outboard shoulder station:* SQD-12 flare/chaff dispenser
- *Top shoulder station:* EQW-28 Battlefield Surveillance Sys
- *Back station:* Field pack
- *Outboard thigh station:* Field suit-casualty pack

Comparative Suit Capabilities: PRS-8 C1
Maximum Speed: 60kph for three hours
Maximum Vertical Leap: 35m
Average Endurance: 25 hours (with reserve pack)
Armor Rating/Sensor rating: 7/9

3.03.5 Powered Infantry Suit Mounted Weapons Control

3.03.5.1 SM-1 Multi-Function Grip (MFG)

Triggering of all mounted weapons is done with the SM-1 multifunction grip (MFG). An MFG is mounted on the back of each hand and is rotated around the inside of the hand and into the palm with a simple flick of the wrist. It is rotated out with a flick in the opposite direction, returning to its mounting and leaving the hand free for other uses.

Thumb controls on the MFG allow the user to toggle through several options including mounted weapon selection, ammunition type (if applicable), targeting method, etc. There are fingertip buttons on the MFG for weapons discharge/release triggering. Each button is permanently assigned to a mounted weapon (or weapons station in the case of interchangeable weapons). For instance, the forearm-mounted phaser is always fired with the index finger of the hand on which the unit is mounted.

Powered Infantry recruits often feel awkward with the MFG at first, but once they adapt to this unique method of weapons control, it becomes second-nature. In fact, throughout Powered Infantry School, recruits wear MFG simulators on their forearms whenever they are not inside a suit.

3.03.5.2 SM-9A5 "Bullseye" TVD

Sighting with mounted weapons is much different from carried rifles and launchers. Projected onto the faceplate of a powered armor suit is a through-visor display (TVD) very similar to those used by aerospace pilots. The current version of this display is the SM-9A5 TVD, although new software upgrades are due soon that will up-rate the TVD to the SM-9A6. This electronic display gives the suit operator all the targeting information he requires to put whichever weapon he selects on-target.

3.03.6 Powered Infantry Suit Mounted – Phaser, Beam

3.03.6.1 SM-134A1 Suit-Mounted Combat Phaser

The mounted weapons on any particular suit vary by the type of suit and its mission. However, most suits currently in use have a combat phaser mounted in the forearm of the operator's dominant hand. This unit is the SM-134A1 which, internally, is a twin to its Light-Infantry-carried brother, the M-116A2. It has the same 16 settings, although controls are on a panel on top of the forearm unit. The emitter runs along the top of the forearm and does have small luminescent sights for instances when the TVD is inoperable or being used for some other purpose.

The SM-134A1 is a snap-in/snap-out unit with magnatomic couplers on the internal mounts. Each mount also houses a datalink contact with the suit. The unit can be decoupled by the operator using the thumb switch on the MFG, but cannot be operated in this condition as the rifle draws its power from the suit.

3.03.6.2 SM-908A2 Suit-Mounted Compression Phaser

This phaser emitter is the Powered Infantry equivalent to the Light Infantry's M-970 Compression Phaser Rifle. This is basically a Powered Infantry "scrapper" to establish a base of fire for a fire team. It is usually mounted on the forearm in place of the SM-134A1. The powered suit hardly notices the difference in weight, and the operator doesn't notice at all—until they see their power usage figures. The larger drain in suit power on the standard Phoenix suit is the primary reason this weapon is not simply issued to everyone. It is typically for the fire team's light weapons specialist. The SM-908 is used extensively on the Dragoon heavy weapons suit.

3.03.6.3 SM-600 "Viper" Suit-Mounted Heavy Phaser

On some Dragoon suits, you will find a large cylinder running parallel to the spine down one side of the back. Coming from the top and reaching over one shoulder is a steerable device resembling a snake's head. This is the SM-600 Suit-Mounted Heavy Phaser known as the "viper". The viper is nearly the equivalent of a shuttle-mounted phaser, with a steerable emitter controlled by the MFG and TVD. The suit operator simply looks at a target, depressed the appropriate trigger on the MFG, and the target goes away.

This is an incredibly powerful unit, but it drains a suit's resources (even the hearty Dragoon). It consumes an enormous amount of energy in its own right. But it also tasks the servos of the suit to support its incredible weight, further draining the suit's power and increasing component wear. It is, however, a formidable presence on the battlefield.

3.03.7 Powered Infantry Suit Mounted – Projectile, Missile

3.03.7.1 SM-344 Suit-Mounted Light Infantry Missile Launcher

Ask any Powered Infantryman what the difference is between him and his Light Infantry counterpart. You will probably see his eyes glaze over with a distant look, a slow, subtle smile will spread across his face, and he will softly say, "missiles."

Every suit in the SFMC inventory is capable of carrying a missile launcher of some sort, the most common being the SM-344 — identical to the MAPLIML Light Infantry unit save the grip assembly. This is mounted on the shoulder of the Phoenix and Dragoon suits (two can be carried, one on each shoulder, if no other shoulder-mounted weapons are carried). The rotating missile drum can be cycled through like its Mapper counterpart using the thumb switch of the MPG. The TVD shows missile type selected along with targeting information.

A shoulder-mounted launch canister has limited side-to-side rotation, but the suit itself is easily rotated. Being on the shoulder, though, they do have quite a bit of elevation range which is good because it is difficult to bend backwards in a powered armor suit to angle your shoulders back. In fact, the units can elevate to 90°, lying flat against the back to engage aerial threats—although care must be taken to avoid missile propulsion back-blast (a suit will protect you, but the heat and energy can overload sensors).

Using the same launch assembly as the Mapper makes for much easier logistics and maintenance in the field. It also means the same ammunition can be used for both. This is the reasoning behind most of the common weaponry between the Light and Powered fields.

3.03.7.2 SM-371A2 Suit-Mounted SIM Launcher

The SM-371A2 is a reusable 40mm launch tube which fires the Mapper and SIM ammunition from fixed mounts on the shoulders of the C3 and Pathfinder suits. Up to two per shoulder can be mounted. These single-shot units can be reloaded in the field the same as the larger SM-344, but chances are if a scout unit has to use a SIM, they are in trouble too big to worry about reloading.

3.03.8 Powered Infantry Suit Mounted – Projectile, Electromagnetic

There are no Powered Infantry sniper weapons, but there are two types of projectile weapons available for use in suits. In addition, a version of the Light Infantry's SAW, specially modified to be gripped and carried by armored troops is also available.

3.03.8.1 SP-628A2 Suit-Mounted 5mm EMPW

This light Electromagnetic Projectile Weapon (EMPW) is mounted on the forearm opposite the phaser unit on most Phoenix suits. Ammunition is stored in a linkless drum system which wraps completely around the arm several times. Ammunition and firing principle are identical to the SAW and P-688; targeting and triggering are similar to mounted phasers.

Pathfinder scouting suits and C3 command suits usually forego the projectile weapon altogether, having advanced sensors mounted in the non-dominant forearm. However, if mission parameters dictate projectile weapons be used, the SP-628A2 can be fitted instead of the SM-134 on the dominant arm. If the heavy Dragoon Suit carries any projectile weapon, it is usually the larger SP-777.

3.03.8.2 SP-777 Suit-Mounted 15mm EMPW

The SP-777 is a no-nonsense projectile weapon capable of inflicting substantial damage on equipment-sized targets. It is mounted in the non-dominant forearm of the Dragoon suit, and can be fitted to the Phoenix suit at the cost of some sensor capability. It is not possible to mount this unit on a C3 or Pathfinder Suit. Also, the limits the unit places on maneuverability (see below) mean that it is not a weapon for every Marine on every mission.

Ammunition for the SP-777 is carried in a magazine on the back of the suit and fed to the barrel by a linkless conduit system, which is remarkably resistant to jams and stoppages. The large caliber ammunition requires a long barrel, though, and the unit does extend past the elbow on most hominids. This leaves the flexible conduit attached to the breech of the weapon about 20cm to the rear of the elbow. This limits the range of motion of the non-dominant arm, and care must be used not to get the conduit caught on any obstacles.

3.04 Vehicle Mounted Weapons

These weapons are usually too large to be carried by a single marine and are designed to be mounted and used on SFMC vehicles.

3.04.1 Phaser, Beam - Multipurpose

This class of weapons is designed to be mounted on light vehicles to convert such vehicles into offensive firing platforms. Alternatively, these weapons also make good defensive weapons for SFMC craft of various types (aerospace, maritime, engineering, etc.). They are not designed to be cupola mounted with a gunner, but rather mounted in an auto-turret with a remote gunner in the crew/passenger compartment. Due to several factors including power consumption, this type of weapon is being gradually phased out in favor of similarly sized pulse phaser weapons.

3.04.1.1 M-1219 Light Vehicular Phaser Cannon

The M-1219 is designed to offer to light vehicular units a significant ability to engage, disable, or destroy soft or lightly armored targets. Applications exist utilizing single, double, triple, and even quadruple mounts of M-1219 weapons acting in concert. The M-1219 has proven particularly effective in protecting vehicles from incoming missile weapons and unshielded UAVs.

3.04.1.2 M-1263 Medium Vehicular Phaser Cannon

Significantly more powerful than the M-1219, the M-1263 offers more offensive punch to the vehicles to which it is applied. As with its lighter cousin, applications exist using up to a quadruple mount of M-1263 weapons.

3.04.1.3 M-1278 Heavy Vehicular Phaser Cannon
Still more powerful than the M-1263, the M-1278 offers the vehicles to which it is applied the ability to engage, disable, or destroy soft to moderately armored targets. Due to power requirements and the possibility of system shock, only single and double mounts of the M-1278 exist in the SFMC inventory.

3.04.2 Beam Phaser - Heavy Direct Fire
This class of weapons is designed to be turret or hull mounted on AFV/IFV/CFV type armored vehicles, though some other applications exist. All weapons of this class are equipped with integral fire control systems that may be operated either at the weapon itself or at the vehicular command controls. There are no low power settings for this class of weapon, i.e. all fire is at full power. This class of weapon is slowly being phased out in favor of similar sized pulse phaser weapons.

3.04.2.1 M-249 Vehicle Mounted Compression Phaser
This phaser is for engaging primarily personnel or light vehicle targets off the main firing axis. Most AFVs and many IFVs have at least one M-249 mounted on a remotely-controlled firing gimbal. In terms of beam energy, the M-249 would be roughly equivalent to an Infantry crew-served phaser. It is the same unit found atop the Support Branch's Six-By cargo trucks

3.04.2.2 M-1418 Light Phaser Gun
The M-1418 phaser is designed to be mounted as the main weapon on a light AFV or medium IFV/CFV class vehicle. It is capable of penetrating H to VH armor at ranges up to 3000m and will knock down Class Five defensive screens with a 2 second firing.

3.04.2.3 M-1430 Medium Phaser Gun
The M-1430 is designed to be mounted as the main weapon on a medium AFV or heavy IFV/CFV class vehicle. It is capable of penetrating VHH armor (VH+H) at ranges exceeding 3000m, 2VH armor at ranges up to 2000m, and will knock down Class Six defensive screens with a 2 second firing.

3.04.2.4 M-1488 Heavy Phaser Gun
The M-1488 is designed to be mounted as the main weapon on a heavy AFV class vehicle. It is capable of penetrating 3VH armor at ranges out to 2000m, and is capable of penetrating 2VH armor at considerably longer (4000+m) ranges. It is capable of knocking down Class Seven defensive screens.

3.04.3 Phaser, Beam - Artillery
3.04.3.1 FV/WM-250 Artillery Phaser Module, Beam
This phaser module is a beam emitter roughly equivalent in power to those found on smaller starships. This is a lot of power, but the occasions on which artillery can engage targets on a direct line of sight are even more infrequent than those for AFVs and IFVs. It is a good option to have, though.

3.04.3.2 FV/WM-200 Heavy Phaser Module
This module consists of a turret-mounted Type V phaser emitter, roughly equivalent to the phaser mounted on most larger Starfleet shuttles. It is more than capable of dispatching vehicular and building targets up to the size of a typical Threat main battle tank.

3.04.4 Phaser, Pulse – Multipurpose
This class of weapons is designed to be mounted on light vehicles to convert such vehicles into offensive firing platforms. Alternatively, these weapons also make good defensive weapons for SFMC craft of various types (aerospace, maritime, engineering, etc.). They are not designed to be cupola mounted with a gunner, but rather mounted in an auto-turret with a remote gunner in the crew/passenger compartment.

3.04.4.1 M-1362 Light Vehicular Pulse Cannon
The M-1362 is designed to offer to light vehicular units a significant ability to engage, disable, or destroy soft or lightly armored targets. Applications exist utilizing single, double, triple, and even quadruple mounts of M-1362 weapons acting in concert. The M-1362 has proven particularly effective in protecting vehicles from incoming missile weapons and unshielded UAVs.

3.04.4.2 M-1368 Very Rapid Pulse Cannon
The M-1368 is designed to put maximum stresses onto whatever target upon which it is trained. The notion is, and has been born out both in testing and combat, that putting a target under stress of fire and

then relieving that stress many times in rapid succession can actually cause the materials of the target to aid in its own destruction.

Accomplishing this mission required modifying the chassis of an M-1377 weapon with a reinforced compression chamber and extremely high frequency pulse fire circuitry system. The practical result is a weapon the same size and power requirements of the M-1377 which delivers pulses similar to those of the M-1362 weapon at 10 to 50 times the pulse rate of the M-1362.

3.04.4.3 M-1377 Medium Vehicular Pulse Cannon
Significantly more powerful than the M-1362, the M-1377 offers more offensive punch to the vehicles to which it is applied. As with its lighter cousin, applications exist using up to a quadruple mount of M-1377 weapons

3.04.4.4 M-1395 Heavy Vehicular Pulse Cannon
Still more powerful than the M-1377, the M-1395 offers the vehicles to which it is applied the ability to engage, disable, or destroy soft to moderately armored targets. Due to power requirements and the possibility of system shock, only single and double mounts of the M-1278 exist in the SFMC inventory.

3.04.5 Phaser, Pulse – Heavy Direct Fire
This class of weapons is designed to be turret or hull mounted on AFV/IFV/CFV type armored vehicles, though some other applications exist. All weapons of this class are equipped with integral fire control systems that may be operated either at the weapon itself or at the vehicular command controls.

3.04.5.1 M -1501 Light Pulse Gun
The M-1510 phaser is designed to be mounted as the main weapon on a light AFV or medium IFV/CFV class vehicle. It is capable of penetrating H to VH armor at ranges up to 3000m and will knock down Class Five defensive screens with 2-3 pulses.

3.04.5.2 M-1560 Medium Pulse Gun
The M-1560 is designed to be mounted as the main weapon on a medium AFV or heavy IFV/CFV class vehicle. It is capable of penetrating VHH armor (VH+H) at ranges exceeding 3000m, 2VH armor at ranges up to 2000m, and will knock down Class Six defensive screens with 2-3 pulses.

3.04.5.3 M-1564 Heavy Pulse Gun
The M-1584 is designed to be mounted as the main weapon on a heavy AFV class vehicle. It is capable of penetrating 3VH armor at ranges out to 2000m, and is capable of penetrating 2VH armor at considerably longer (4000+m) ranges. It is capable of knocking down Class Seven defensive screens.

3.04.6 Phaser, Pulse – Artillery
3.04.6.1 FV/WM-251 Artillery Phaser Module, Pulse
This pulse phaser is nearly the size of the units used aboard Defiant-class ships. The layered phaser pulse they produce is harder for a target to disperse than a standard phaser beam, however, the beam wins out for long-term attrition by staying on target longer than the pulse can. Both have their applications on the modern battlefield.

3.04.7 Disruptor - Arillery
3.04.7.1 FV/XWM-254 Artillery Disruptor Module
As the result of a limited technology exchange with the Klingon Empire, SFMC R&D Command was able to engineer a disruptor cannon suitable for use in the MVS. This large and ungainly weapon is quite powerful, but difficult to operate and maneuver. There are currently no further plans to adapt disruptor technology to SFMC armament until the bugs are worked out of this artillery system.

3.04.8 Projectile, Ballistic - Multipurpose
This class of weapons is designed to be mounted on light vehicles to convert such vehicles into offensive firing platforms. Alternatively, these weapons also make good defensive weapons for SFMC craft of various types (aerospace, maritime, engineering, etc.). They are not designed to be cupola mounted with a gunner, but rather mounted in an auto-turret with a remote gunner in the crew/passenger compartment. These weapons use a flexible track loading system. This allows the weapon to be mounted above the vehicle in its turret while the weapon's ammunition magazine is located in the vehicle's crew/passenger compartment for easy reloading.

3.04.8.1 M-501 Light Rotary Cannon (20mm)
Designed for use on light vehicles, the M-501 delivers a flurry of 20mm ammunition downrange in a relatively short time. Though a chemically fired, six barrel rotary cannon, it has similar performance characteristics to the EMPW fired M-437 weapon. The weapon has a maximum operational rate of fire of 2400 rounds per minute and a muzzle velocity of 1200fps. This weapon is designed primarily to engage soft targets, aerospace craft, and incoming ordnance. Differing ammunition types can, however, alter this weapon's mission drastically

3.04.8.2 M-589 Medium Cannon (25mm)
The M-589 Medium Cannon is a single barrel weapon. Its 25mm projectiles deliver a savage attack on the designated target. The weapon has a maximum operational rate of fire of 800 rounds per minute and a muzzle velocity of 1200fps. This weapon is designed primarily to engage soft targets, aerospace craft, and incoming ordnance. Differing ammunition types can, however, alter this weapon's mission drastically.

3.04.8.3 M-595 Heavy Rotary Cannon (30mm)
The M-595 is a heavier version of the M-501. Designed as a tank busting cannon, it fires a high volume of heavy 30mm rounds downrange. Its fires 3600 rounds per minute at 2800 feet per second muzzle velocity. It is designed to be able to eliminate hard armored vehicles from over 2km range with a 1 second burst of fire.

3.04.9 Projectile, Ballistic - Heavy Direct Fire
This class of weapons is designed to be turret or hull mounted on AFV/IFV/CFV type armored vehicles, though some other applications exist. Multiple types of ammunition exist for these weapons. All weapons of this class are equipped with integral automatic loading systems as well as fire control systems that may be operated either at the weapon itself or at the vehicular command controls. The modernization program of these weapon systems gives them very similar performance characteristics to their EMPW counterparts.

3.04.9.1 M-724 Light FV Gun (75mm)
This 75mm cannon is designed to be mounted as the main weapon on a light AFV or medium IFV/CFV class vehicle. The standard L50 configuration is capable, with APDS round, of penetrating H to VH armor at ranges up to 2000m and will knock down Class Five defensive screens.

3.04.9.2 M-764 Medium FV Gun (120mm)
This 120mm cannon is designed to be mounted as the main weapon on a medium AFV or heavy IFV/CFV class vehicle. The standard L50 configuration is capable, with APDS round, of penetrating VHH armor (VH+H) at ranges exceeding 2000m, 2VH armor at ranges up to 1500m, and will knock down Class Six defensive screens

3.04.9.3 M-783 Heavy FV Gun (140mm)
This 140mm cannon is designed to be mounted as the main weapon on a heavy AFV class vehicle. The standard L44 configuration is capable, with APDS round, of penetrating 3VH armor at ranges out to 2000m, and is capable of penetrating 2VH armor at considerably longer (4000+m) ranges. It is capable of knocking down Class Seven defensive screens.

3.04.9.4 M-299/A97 Demolition Gun (CEV) (175mm)
This weapon is the primary weapon system on the Combat Engineer Vehicle. It fires a 175mm chemical explosive round, either High Explosive Plastic or High Explosive Armor Piercing. It has a practical sustained rate of fire of 12 rounds per minute, although higher rates of fire have been seen with trained crews. The weapon has a muzzle velocity of 800 meters per second. The very short barrel limits the weapons accuracy, however, giving it a practical range of only 800 meters. The HEP round is a 25 kg plastic explosive warhead, and can be fused in a variety of ways. The most common are point detonating (PD), proximity (PX), and penetrating delay (PT). The HEAP rounds are the standard type, and used primarily for bunker busting or anti-vehicular attack.

3.04.10 Projectile, Ballistic - Artillery

Traditionally, howitzer class cannon have a barrel length of 15 to 25 times the caliber. The SFMC employs what has been termed a “gun-howitzer” with longer, lightweight barrels. Barrel lengths of L35 to L55 are the norm. These guns, mounted in the gun castle of self-propelled artillery vehicles, are capable of adjusting to firing elevations ranging from 0 to 65 degrees. SPA gun castles are not capable of traversing fully, but are limited to 75 degrees of traverse.

3.04.10.1 M-920 Light Artillery Cannon (105mm)

This 105mm cannon is produced in a standard L45 configuration (4.72m length). It has a maximum firing range of 20000m.

3.04.10.2 M-982 Medium Artillery Cannon (155mm)

This 155mm cannon is produced in a standard L40 configuration (6.2m length). It has a maximum firing range of 28000m

3.04.10.3 M-990 Heavy Artillery Cannon (203mm)

This 203mm cannon is the heaviest of the caseless chem-fired line of weapons. It is produced in a L45 configuration (9.14m length). It has a maximum effective range of 37000m

3.04.10.4 M-958 Medium Mortar 80mm

The M-958 Medium Mortar is designed to give infantry and cavalry unit an integrated indirect fire capability. Mountable in light IFV or CFV class vehicles, these weapons provide the sort of beyond line of sight punch they would otherwise be lacking. The M-958 is capable of firing one of the many types of ammunition available in a high trajectory to effective ranges out to 14000m.

3.04.10.5 M-994 Heavy Mortar 120mm

The M-994 fills a similar niche as the M-958 but delivers a larger punch from a larger package. Mountable on medium or heavy IFV or CFV class vehicles, these weapons can deliver their 120mm ordnance to ranges out to 18000m.

3.04.11 Projectile, Missile

3.04.11.1 FV/WM-205 Microtorpedo Launcher

The new 133mm-long microtorpedoes are finding many new applications. Originally introduced for light starships like the Danube-class runabout, these little gems have proven outstanding indirect fire weapons on the planetary battlefield. A microtorpedo mortar is under development for the infantry, and the vehicle-mounted version has just been introduced in the Armor Branch. As opposed to a turret-mounted single-barrel launcher, a vertical launch system is used where dozens of microtorpedoes are each mounted in single-use launchers scattered across the module. Each torpedo can be assigned its own target regardless of the initial direction its fixed launcher is pointing. This approach eliminates loading time and makes launcher failure a minimal problem. One drawback is the lower initial velocities of the microtorps due to the extremely short barrel length—this leads to longer overall time to target, making interception or interference more likely.

3.04.11.2 FV/WM-207B High-Volume MAPLIML

Colloquially known as the Big Mapper, this vertical launcher holds 18 standard six-round MAPLIML canisters. The launcher is rigged so that it could fire all 108 missiles nearly simultaneously. Use of the standard Infantry missiles make ammunition logistics much easier, and means that Armor and Infantry units can actually resupply each other if necessary. In fact, entire six-round canisters can be removed from the launcher, fitted with grips, and used by Infantry in a pinch. The Big Mapper can fire any of the standard Infantry mapper rounds, including the small-but-powerful matter/antimatter round.

3.04.11.3 FV/WM-257 Artillery Torpedo Launcher

This full-size photon torpedo launcher is the single largest ordnance system deployed by SFMC ground forces. The launcher is so large in respect to the AFV chassis, that the entire vehicle must be repositioned in order to aim the launcher. Fortunately, torpedoes can be programmed to fly their own trajectory like missiles, so launcher aiming is of little concern. Torpedoes are transported in a separate IFV chassis modified for the task, and loading is accomplished through a purpose-built device which sits in the weapons-module spot on the IFV. This is obviously not a weapons system utilized lightly, and continued usage of matter/antimatter weapons this size against planetary targets can lead to severe environmental damage to the planet itself.

3.04.11.4 FV/WM-259 Artillery Missile System (AMS)
This steerable box launcher is capable of firing up to 28 guided missiles depending on the type of missile chosen. Through the use of launching and loading adaptors, a wide variety of Mecha and Aerospace missiles can be used, further simplifying ordnance logistics. With the wide choice of missiles, the AMS can be used as a field artillery piece or an air defense artillery piece. The most popular missile used in the system at the moment is the new RL-55 “Dragon Fire” missile system originally developed for the A-78 Dragon Tactical Attack Craft. Twenty-eight Dragon Fires can be held in the box launcher. With the variety of warheads available for the RL-55, 28 missiles equals a pretty serious punch. The AMS is reloaded by the use of a Caisson Artillery Ammunition Carrier which simply places another fully-loaded box launcher into position with its autoloading antigrav crane.

3.04.11.5 SM-344C LI Missile Launcher
The same MAPLIML-variant launcher mounted on powered infantry suits can be mounted to hardpoints on the sides of AFVs and IFVs. The fixed firing arc means that success of the missile shot can be dependent on vehicle attitude. This adds 12 missiles of any MAPLIML type to the arsenal fielded by each vehicle—a real force multiplier on the battlefield.

3.04.12 Projectile, Electromagnetic - Multipurpose
This class of weapons is designed to be mounted on light vehicles to convert such vehicles into offensive firing platforms. Alternatively, these weapons also make good defensive weapons for SFMC craft of various types (aerospace, maritime, engineering, etc.). They are not designed to be cupola mounted with a gunner, but rather mounted in an auto-turret with a remote gunner in the crew/passenger compartment. These weapons use a flexible track loading system. This allows the weapon to be mounted above the vehicle in its turret while the weapon’s ammunition magazine is located in the vehicle’s crew/passenger compartment for easy reloading.

3.04.12.1 P-626 15mm EMPW
Operated from the same firing gimbals as the M-249, the P-626 provides a projectile-weapon option for vehicle crews. The P-626 fires the same projectile types as the Infantry Branch’s 15mm guns, again simplifying ordnance logistics. This weapon is designed to engage similar targets to the M-249, and both are secondary weapons systems usually operated by the SysOp.

3.04.12.2 M-437 Light Cannon (20mm) EMPW
Designed for use on light vehicles, the M-437 delivers a flurry of 20mm ammunition downrange in a relatively short time. The weapon has a maximum operational rate of fire of 2400 rounds per minute and a muzzle velocity of 2200fps. This weapon is designed primarily to engage soft targets, aerospace craft, and incoming ordnance. Differing ammunition types can, however, alter this weapon’s mission drastically

3.04.12.3 M-464 Medium Cannon (25mm) EMPW
The M-464 Medium Cannon is a somewhat heavier version of the M-437 weapon. Its 25mm projectiles deliver a savage attack on the designated target. The weapon has a maximum operational rate of fire of 2400 rounds per minute and a muzzle velocity of 2200fps. This weapon is designed primarily to engage soft targets, aerospace craft, and incoming ordnance. Differing ammunition types can, however, alter this weapon’s mission drastically.

3.04.12.4 M-481 Heavy Cannon (30mm) EMPW
The M-481 is designed as a tank busting cannon. It fires a high volume of heavy 30mm rounds downrange. Its fires 4800 rounds per minute at 3600 feet per second muzzle velocity. It is designed to be able to eliminate hard armored vehicles from over 2km range with a ½ second burst of fire.

3.04.13 Projectile, Electromagnetic - Heavy Direct Fire
This class of weapons is designed to be turret or hull mounted on AFV/IFV/CFV type armored vehicles, though some other applications exist. Multiple types of ammunition exist for these weapons. All weapons of this class are equipped with integral automatic loading systems as well as fire control systems that may be operated either at the weapon itself or at the vehicular command controls.

3.04.13.1 FV/WM-202A 72mm EMPW
This turret-mounted Electromagnetic Projectile Weapon (EMPW) fires a 72mm-diameter round via a gauss cannon which quite resembles its chemically-fired ancestors. It can fire a variety of caseless projectile types including HIVAP, personnel suppression rounds, high-explosive, incendiary, and beacon/ marking rounds. Also available are rounds which can deploy surveillance equipment and/or mines. Most rounds can be fitted with laser or tachyon guidance equipment for precision guidance to target.

3.04.13.2 M-650 Light FV Main Gun (75mm) EMPW
This 75mm cannon is designed to be mounted as the main weapon on a light AFV or medium IFV/CFV class vehicle. The standard L50 configuration is capable, with APDS round, of penetrating H to VH armor at ranges up to 2000m and will knock down Class Five defensive screens.

3.04.13.3 FV/WM-255 105mm Artillery EMPW
It has rightly been accused of being a mass driver, and it is, in fact, capable of placing projectiles into low planetary orbit depending on the intensity of the local gravitational field. It has the ability to vary it's muzzle speed through an impressive range of values, the largest of which is nearly 5000 meters/ second. Few targets can withstand a constant barrage of fire from such a weapon without extensive energy drains on shields and/or forcefields.

3.04.13.4 M-670 Medium FV Main Gun (120mm) EMPW
This 120mm cannon is designed to be mounted as the main weapon on a medium AFV or heavy IFV/CFV class vehicle. The standard L50 configuration is capable, with APDS round, of penetrating VHH armor (VH+H) at ranges exceeding 2000m, 2VH armor at ranges up to 1500m, and will knock down Class Six defensive screens.

3.04.13.5 M-680 Heavy FV Main Gun (140mm) EMPW
This 140mm cannon is designed to be mounted as the main weapon on a heavy AFV class vehicle. The standard L44 configuration is capable, with APDS round, of penetrating 3VH armor at ranges out to 2000m, and is capable of penetrating 2VH armor at considerably longer (4000+m) ranges. It is capable of knocking down Class Seven defensive screens.

3.04.14 Projectile, Electromagnetic - Howitzers
Traditionally, howitzer class cannon have a barrel length of 15 to 25 times the caliber. The SFMC employs what has been termed a "gun-howitzer" with longer, lightweight barrels. Barrel lengths of L35 to L55 are the norm. These guns, mounted in the gun castle of self-propelled artillery vehicles, are capable of adjusting to firing elevations ranging from 0 to 65 degrees. SPA gun castles are not capable of traversing fully, but are limited to 75 degrees of traverse.

3.04.14.1 M-832 Light Howitzer (105mm) EMPW
This 105mm cannon is produced in a standard L45 configuration (4.72m length). It has a maximum firing range of 20000m.

3.04.14.2 M-885 Medium Howitzer (155mm) EMPW
This 155mm cannon is produced in a standard L40 configuration (6.2m length). It has a maximum firing range of 28000m.

3.04.14.3 M-896 Heavy Howitzer (203mm) EMPW
This 203mm cannon is the heaviest of the EMPW line of weapons. It is produced in a L45 configuration (9.14m length). It has a maximum effective range of 37000m

3.05 MECHA Mounted Weapons

The weapons in this section are for use on MECHA only. These systems are not compatible with any other SFMC vehicles or equipment.

3.05.1 Phaser, Beam

3.05.1.1 Type III Vehicle Emitter

The Type III Vehicle Emitter is the equivalent of the standard Phaser Rifle emplaced on a vehicle, hardened against damage and linked into the vehicle's main power system. It is capable of roughly three times the damage output of the infantry-carried Type III due to these enhancements. Against Mecha, it is a backup weapon at best, but excels at anti-infantry operations in close.
Mass: 0.5 ton
Volume Index: 1.0
Damage: 3 TSU
Heat Bloom: 1
Range Index: 1/2/3

3.05.1.2 Type IV Vehicle Emitter

The Type IV Vehicle Emitter is the latest upgrade to the Type III Vehicle Emitter. It almost doubles the range of the Type III Emitter, without losing any of its damage output.
Mass: 0.5 ton
Volume Index: 1.0
Damage: 3 TSU
Heat Bloom: 2
Range Index: 2/4/5

3.05.1.3 Type IV(A) Vehicle Emitter

The Type IV Vehicle Emitter is another upgrade to the Type III Vehicle Emitter. It improves the hit probability of the phaser attach at the cost of more heat.
Mass: 1.0 ton
Volume Index: 1.0
Damage: 3 TSU
Heat Bloom: 2
Range Index: 1/2/3

3.05.1.4 Type V Vehicle Emitter

Pound for pound this may be the best vehicular weapon ever devised by SFMC research. This weapon is light, reasonably heat-damage efficient, and takes up very little volume in most design configurations.
Mass: 1.0 ton
Volume Index: 1.0
Damage: 5 TSU
Heat Bloom: 3
Range Index: 3/6/9

3.05.1.5 Type VI Vehicle Emitter

The Type VI Vehicle Emitter is the latest upgrade to the Type V Vehicle Emitter. It produces more heat than the Type V, but has a longer range.
Mass: 1.0 ton
Volume Index: 1.0
Damage: 5 TSU
Heat Bloom: 5
Range Index: 4/8/12

3.05.1.6 Type VII Vehicle Emitter

The Type VI Vehicle Emitter is another upgrade to the Type V Vehicle Emitter. It can deliver more damage with less heat than the Type VI, but at the cost of range and mass.
Mass: 2.0 tons
Volume Index: 1.0
Damage: 6 TSU
Heat Bloom: 4
Range Index: 2/4/6

3.05.1.7 Type VIII Vehicle Emitter
This is the heaviest phaser normally mounted on a ground vehicle. The Type VIII masses five times what the type V does, with twice the volume index. Range is increased in this model by 66%, however, and damage to target is 60% better than the Type V. The down side to this trade off is the power required, which causes the heat to damage ratio to reach a 1:1 level.
Mass: 5.0 tons
Volume Index: 2.0
Damage: 8 TSU
Heat Bloom: 8
Range Index: 5/10/15

3.05.1.8 Type IX Vehicle Emitter
The Type VI Vehicle Emitter is the latest upgrade to the Type V Vehicle Emitter. It delivers it's damage a greater distance, but at the cost of a larger heat bloom.
Mass: 5.0 tons
Volume Index: 2.0
Damage: 8 TSU
Heat Bloom: 12
Range Index: 7/14/19

3.05.2 Energy, Particle
3.05.2.1 Class X Particle Accelerator Cannon
The PAC is both longer ranged and more powerful than the largest practical vehicular phasers. The PAC fires a stream of charged particles at relativistic velocities, creating a massive static discharge that causes the often spectacular 'lightning effect' along the path of the particle discharge. Although these weapons build up large amounts of heat in the engine core of the Mecha that carry them, they are used throughout the Corps as support weapons. PAC systems are designed for longer ranged engagements, and their targeting systems often have trouble firing at ranges less than 90m.
Mass: 7.0 tons
Volume Index: 3.0
Damage: 10 TSU
Heat Bloom: 10
Range Index: (3)6/12/18

3.05.2.2 Class XI Particle Accelerator Cannon
The Class XI Particle Accelerator Cannon is the latest upgrade to the Class X Particle Accelerator Cannon. It extends the range of the Class X Particle Accelerator Cannon by 27%, and allows firing of the Class XI Particle Accelerator Cannon at point blank range with only a 50% increase of the heat normally generated.
Mass: 7.0 tons
Volume Index: 3.0
Damage: 10 TSU
Heat Bloom: 15
Range Index: 7/14/23

3.05.3 Projectile, Electromagnetic
3.05.3.1 P-722A4 Vehicle Mount EM Gun
A modification of the standard P-722 used throughout the SFMC, the P-722A4 is integrated into the Mecha's targeting systems and protected by the armor plating. These weapons are only slightly effective against enemy armor and Mecha, but are included in many designs for their excellent anti-infantry capability.
Mass: 0.5 ton
Volume Index: 1.0
Damage: 2 TSU
Heat Bloom: 0
Ammo Per MT: 200 Bursts
Range Index: 1/2/3

3.05.3.2 Light EM Rifle

The Light EMR is designed to project it's firepower over longer battlefield ranges, but has little more punching power than the P-722. This weapon is often used in an anti-aircraft role, due to its range and hypervelocity round.
Mass: 6.0 tons
Volume Index: 1.0
Damage: 2 TSU
Heat Bloom: 1
Ammo Per MT: 45 Bursts
Range Index: (4)8/16/24

3.05.3.3 Medium EM Rifle

This weapon is, arguably, the standard ballistic weapon in the SFMC's inventory. A balanced trade between weight, damage and heat bloom, the Medium EMR appears on more designs than any other ballistic weapon.
Mass: 8.0 tons
Volume Index: 4.0
Damage: 5 TSU
Heat Bloom: 1
Ammo Per MT: 20 Bursts
Range Index: (3)6/12/18

3.05.3.4 Heavy EM Rifle

The Heavy EMR packs twice the punch of the Medium EMR, but at slightly diminished range. Some Mecha pilots prefer the Heavy EMR for its massive punch and lack of heat buildup. To its detriment, the weapon is heavy, bulky, and requires a full ton of design space for each ten bursts of ammunition.
Mass: 12.0 tons
Volume Index: 7.0
Damage: 10 TSU
Heat Bloom: 3
Ammo Per MT: 10 Bursts
Range Index: 5/10/15

3.05.3.5 Super Heavy EM Rifle

Arguable the most feared weapon on the Mecha battlefield, the Superheavy EMR inflicts enough damage in a single discharge to knock most Mecha off balance. It will shatter over a ton of standard ablative plate, and has been known to sever entire undamaged limbs and cockpits. Drawbacks are its immense weight and bulk, as well as its limited ammunition supply and relatively short range.
Mass: 14.0 tons
Volume Index: 10
Damage: 20 TSU
Heat Bloom: 7
Ammo Per MT: 5 Bursts
Range Index: 3/6/9

3.05.3.5 LB EM Rifle

An improvement over the standard EM Rifle, the LB EM Rifle uses a lighter, heat dissipating alloy to reduce both weight and heat build-up.
Mass: 11.0 tons
Volume Index: 6.0
Damage: 10 TSU
Heat Bloom: 2
Ammo Per MT: 10 Bursts
Range Index: 6/12/18

3.05.3.6 Rotary EM Rifle

The Rotary EM Rifle is a multi-barrel concept, designed to increase the rate of fire. The pilot must determine if he wishes to fire one, two, four or six shots. If firing a single shot, use the standard values below. If firing two shots, it will produce twice the heat, and use two bursts. If firing four shots, it will produce four times the heat, and use four bursts. If firing six shots, it will produce six times the heat, and use six bursts.
Mass: 10.0 tons
Volume Index: 6.0
Damage: 5 TSU
Heat Bloom: 1
Ammo Per MT: 20 Bursts
Range Index: 5/10/15

3.05.3.7 Light Photon Cannon

The Light Photon Cannon is a smaller version of the Photon Cannon (see 3.05.3.8).
Mass: 12.0 tons
Volume Index: 5.0
Damage: 8 TSU
Heat Bloom: 1
Ammo Per MT: 16 Bursts
Range Index: (3)8/17/25

3.05.3.8 Photon Cannon

The Photon Cannon uses magnets instead of a internal propulsion system to deliver a photon torpedo device to its intended target. Although is uses a lot of power to launch the device, it generates very little heat, and can achieve a muzzle velocity of twice that of any conventional weapon.
Mass: 15.0 tons
Volume Index: 7.0
Damage: 15 TSU
Heat Bloom: 1
Ammo Per MT: 8 Bursts
Range Index: (2)7/15/22

3.05.3.9 Heavy Photon Cannon

The Heavy Photon Cannon is a heavier, and more powerful, version of the Photon Cannon.
Mass: 18.0 tons
Volume Index: 11.0
Damage: 25/20/10 TSU
Heat Bloom: 2
Ammo Per MT: 4 Bursts
Range Index: (4)6/13/20

3.05.4 Projectile, Missile

3.05.4.1 Short Range Missile Launcher

The SRM launcher fires small, semi -guided rockets in multiple rocket volleys. The rockets have about the range of a Type V Vehicular Phaser, and each inflicts an average of two TSUs of damage. The designers of the weapon decided to focus on several flights of smaller missiles over mounting single, high-damage missiles due to the intention of using Mecha in urban environments, where Federation doctrine dictates that collateral damage must be kept to a minimum. SRM packs come in dual, quad, and six-tube configurations, each fed by an auto-loading magazine.

Mass: 1.0 tons (Dual Tube)
2.0 tons (Quad Tube)
3.0 tons (Six-Tube)
Volume Index: 1.0 (Dual and Quad Tube)
2.0 (Six-Tube)
Damage: 2 TSU per Missile
Heat Bloom: 2 (Dual Tube)
3 (Quad Tube)
4 (Six-Tube)
Ammo Per MT: 50 Flights (Dual Tube)
25 Flights (Quad Tube)
15 Flights (Six-Tube)
Range Index: 3/6/9

3.05.4.2 Computer Guided Short Range Missile Launcher

The Computer Guided Short Range Missile contains a targeting computer that will prevent the firing of the missile if there is no target lock. Once locked on, the missile always hits its target.

Mass: 1.5 tons (Dual Tube)
3.0 tons (Quad Tube)
4.5 tons (Six-Tube)
Volume Index: 1.0 (Dual and Quad Tube)
2.0 (Six-Tube)
Damage: 2 TSU per Missile
Heat Bloom: 2 (Dual Tube)
3 (Quad Tube)
4 (Six-Tube)
Ammo Per MT: 50 Flights (Dual Tube)
25 Flights (Quad Tube)
15 Flights (Six-Tube)
Range Index: 3/6/9

3.05.4.3 Medium Range Missile Launcher

The Medium Range Missile Launcher was developed to fill the need of a cheap, easily produced weapon that could be used by new Mecha pilots. Originally dubbed “dead-fire missiles” or “dummy rockets,” these were unguided missile systems.
Mass: 3.0 tons (Ten-Tube)
7.0 tons (Twenty-Tube)
10.0 tons (Thirty-Tube)
12.0 tons (Forty-Tube)
Volume Index: 2.0 (Ten-Tube)
3.0 (Twenty-Tube)
5.0 (Thirty-Tube)
7.0 (Forty-Tube)
Damage: 1 TSU per Missile
Heat Bloom: 4 (Ten-Tube)
6 (Twenty-Tube)
10 (Thirty-Tube)
12 (Forty-Tube)
Ammo Per MT: 24 Flights (Ten-Tube)
12 Flights (Twenty-Tube)
8 Flights (Thirty-Tube)
6 Flights (Forty-Tube)
Range Index: 3/8/15

3.05.4.4 Long Range Tactical Rocket Delivery System

The LRT-RDS (“Lart Rods”) is employed as an area denial weapon and bombardment tool when true artillery would be overkill. The LRT -RDS rocket is virtually unguided, a rarity on the modern battlefield, yet manages to accomplish its design parameters rather well. It is an inexpensive, low maintenance weapon system that allows Mecha and other SFMC units to call in near fire support without the need for massive mobile artillery units. LRT_RDS pods are manufactured in five, ten, fifteen, and twenty-tube configurations.
Mass: 2.0 Tons (Five-Tube)
5.0 Tons (Ten- Tube)
7.0 Tons (Fifteen-Tube)
10.0 Tons (Twenty-Tube)
Volume Index: 1.0 (Five-Tube)
2.0 (Ten- Tube)
3.0 (Fifteen-Tube)
5.0 (Twenty-Tube)
Damage: 1 TSU per Missile
Heat Bloom: 2 (Five-Tube)
4 (Ten-Tube)
5 (Fifteen-Tube)
6 (Twenty-Tube)
Ammo Per MT: 24 Flights (Five-Tube)
12 Flights (Ten-Tube)
8 Flights (Fifteen-Tube)
6 Flights (Twenty-Tube)
Range Index: (6)7/14/21

3.05.4.5 One Shot Long Range Tactical Rocket Delivery System

The One Shot Long Range Tactical Rocket Delivery System is the same as the LRT-RDS above, but does not have reload capability during the battle.

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SECTION 4 – Ordnance

Weapons are useless without some sort of ammunition. Since not all weapons in the SFMC inventory are energy weapons, many require some sort of ammunition. This section outlines the ordnance that is in the current SFMC inventory.

4.01 Ordnance Code Guide

Ordnance in the SFMC all have a specific purpose, which is denoted by a special code that is part of their name. This section explains how the coding system works.

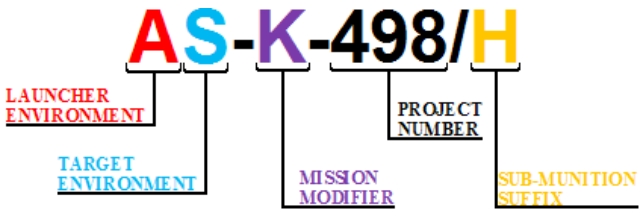


Figure above: Example of a ordnance code.

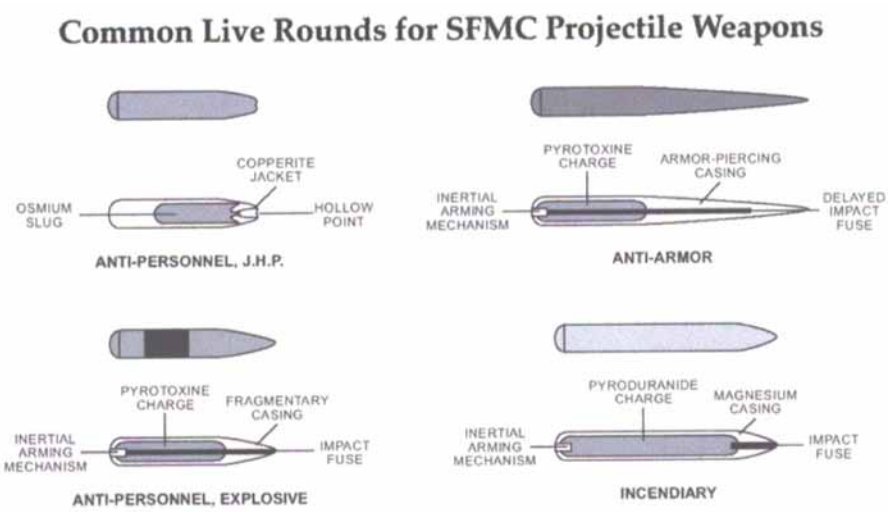
4.01.1 Ordnance Prefix List

A – Aerospace
B – Bomb
C – Attack
D – Sub-munitions
E – Electronic Attack
G – Artillery
H – Heavy
I – Infantry
K – Cruise Missile
M – Maritime
N – Medium Range
O – Orbital
P – Projectile
Q – Rocket
R – Short Range
S – Surface
T – Theater Range
U – Sub-surface
V – Vehicular
W – Warhead
X - Restricted

4.01.2 Ordnance Suffix List

A - Alphagas Cartridge
B - Blue Spectrum Visible
C - Oleoresin Capsicum Cartridge
E - High Explosive-Armor Piercing Sub-Munitions
F - High Explosive-Armor Piercing-Incendiary Sub-Munitions
G - Green Spectrum Visible
H - High Explosive Sub-Munitions
I - Infrared Light Visible
J - Iridagel Gas Cartridge
K - Incendiary Sub-Munitions
L - Anti-Personnel Area Denial Mine Sub-Munitions
M - Mixed Load Area Denial Mine Sub-Munitions
N - Anti-Vehicle Area Denial Mine Sub-Munitions
O - Orange Spectrum Visible
P - Phased Energy Sub-Munitions
R - Red Spectrum Visible
U - Ultra Violet Light Visible
V - Violet Spectrum Visible
W - Standard White Light Visible
X - Anti-Vehicle Sub-Munitions
Y - Yellow Spectrum Visible

4.02 Ballistic Projectiles



Shown here are the four most common munitions types for the SFMC's arsenal of EM projectile Infantry weapons. Not shown is the inert training round. The rounds shown here are 5mm rounds, although 15mm rounds appear very similar and use the same basic internal arrangements. EM projectile weapons with a muzzle velocity higher than 4000m/s (as on mecha, aerospace craft, etc.) use simple duranium slugs because, at those speeds, their kinetic energy produces more destructive force than the equivalent weight of explosives.

The projectile weapons used by the STARFLEET Marine Corps are classified into two broad categories: Electromagnetic Projectile Weapons (EMPWs) and Case-Less Weapons (CLWs). To simplify the lines of production, the ballistic projectiles used in either EMPWs or CLWs are exactly the same. CLWs only require the addition of their propellant shell in order to be made complete. In every case the round looks like a large finless dart with a base that has a pronounced spherical shape. This shape allows maximum penetration of the target along with greater aerodynamic properties. While the internal structure and materials are different between each round, the external casing is the same in all cases. The exterior of the round is a laminate of Polyalloy, which is capable of withstanding large amounts of physical stress without failing. This Polyalloy laminate is also nearly frictionless, giving the round a smoother passage through an atmosphere.

To assist in propelling a round along the barrel of an EMPW, all rounds are constructed with a collar of Gallicite composite. In its pure form Gallicite has extreme electrical reactions with any other types of metal, to the degree that dangerous electrical discharges accompany any contact. In order to make the Gallicite safe yet still harness its electrical properties a composite is formed with carbon nano-tubes. These nano-tubes stabilize the metal so that it has almost no reactions with other metals, but the material is still able to accept phenomenal amounts of electromagnetic energy. The Gallicite collar allows the EMPW's electromagnets to use less energy to propel the round to greater velocities then if the round had simpler magnetic properties.

4.02.1 Basic Slug

This is the basic type of ammunition for many sizes of projectile weapons. The core of the round is a solid piece of Duranium; hard yet brittle in the purity used in ammunition, yet when jacketed in the Polyalloy shell it can allow the round to effectively penetrate personal grade and light vehicle armor.

Variants: *P643 6mm Slug, P240 8mm Slug, P434 13mm Slug, P638 15mm Slug*

4.02.2 Armor Piercing
Typically used in fire support weapons, its core is made up of three different materials. The round has a second Monotanium laminate inside the typical Polyalloy shell; its electromagnetic properties give the round a greater chance to penetrate the defensive force shields around armored vehicles. The nose is pure Rodinium which allows maximum penetration of an armored target. However, Rodinium is brittle when used in ammunition and requires the core to be made of Duranium, which adds mass and hardness to the round.

Variants: *P808 6mm Armor Piercing, P939 8mm Armor Piercing, P669 13mm Armor Piercing, P586 15mm Armor Piercing, P318 20mm Armor Piercing P976 30mm Armor Piercing, P540 25mm Armor Piercing*

4.02.3 Incendiary
A reserve type of ammunition in fire support weapons when anticipated targets are lightly armored and contain flammable materials. The round's core is a supply of Clancium Oxide surrounded by a thin shell of Terminium. The Clancium Oxide has marginal explosive properties but burns slowly and at incredibly intense temperatures. The Terminium is the same material used in Photon Torpedo casings, and adds an oxidizing fuel source to the incendiary properties of the Clancium when ignited. In order to ignite the Clancium Oxide, the round has an impact fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Incendiary rounds. These amounts are more than enough for the purposes needed, and to add a small explosive charge to spread the incendiary agent.

Variants: *P863 13mm Incendiary, P631 15mm Incendiary, P294 25mm Incendiary, P325 75mm Incendiary*

4.02.4 Explosive
A common type of ammunition typically used in conjunction with Armor Piercing rounds or in situations that require destruction of the target by explosion. The core is a solid piece of Ultritium 283 which is a very energetic explosive, surrounded by a thin shell of Terminium. Because this round is not meant to produce fragmentary shrapnel, its explosive power is completely directed against the target causing impressive damage in relation to the size of the round. In order to detonate the Ultitium 283, the round has an impact fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds but these quantities are more than enough for the purposes needed.

Variants: *P384 6mm Explosive, P518 8mm Explosive, P323 13mm Explosive, P738 15mm Explosive, P714 20mm Explosive, P352 30mm Explosive, P507 25mm Explosive, P226 75mm Explosive*

4.02.5 Armor Piercing-Incendiary
This form of ammunition is used mainly by larger weapons against targets that are armored but contain a large volume of flammable materials, such as fuel tankers or ammunition trucks. The nose of the round is solid Rodinium, which is brittle when used in ammunition but is strong enough to pierce a respectable amount of armor before breaking apart. At the core is a supply of Clancium Oxide surrounded by a shell of Terminium. The Clancium Oxide has marginal explosive properties but burns slowly and at incredibly intense temperatures. The Terminium is the same material used in Photon Torpedo casings, and adds an oxidizing fuel source to the incendiary properties of the Clancium when ignited.

In order to ignite the Clancium Oxide, the round has a delayed impact fuse with a core of Mooride Polyronite 4. The fuse will detonate the explosive charge .001 seconds after impact so that the round is either embedded in the armor of a target or inside the target itself once it detonates. Mooride is incredibly explosive itself and only microscopic amounts are used in Incediary rounds. These amounts are more than enough for the purposed needed, and to add a small explosive charge to spread the incendiary agent.

Variants: *P158 13mm Armor Piercing-Incendiary, P177 15mm Armor Piercing-Incendiary, P193 20mm Armor Piercing-Incendiary, P369 30mm Armor Piercing-Incendiary, P978 25mm Armor Piercing-Incendiary, P683 75mm Armor Piercing-Incendiary*

4.02.6 Armor Piercing-Explosive

A favored round with the weapons onboard armored vehicles; it can pierce many forms of light and medium armor while still imparting an explosive charge. The nose of the round is solid piece of Rodinium backed by an equally thick piece of Duranium. This combination of materials gives the round excellent armor piercing qualities while still leaving room for the explosive Ultritium 283. The Ultritium is very energetic and once detonated will actually fragment the Rodinium and Duranium throwing dangerous shrapnel into the interior of the target.

In order to detonate the Ultitium 283, the round has a delayed impact fuse with a core of Mooride Polyronite 4. The fuse will detonate the explosive charge .001 seconds after impact so that the round is either embedded in the armor of a target or inside the target itself once it detonates. The Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds but these quantities are more than enough for the purposes needed.

Variants: *P874 8mm Armor Piercing-Explosive, P201 13mm Armor Piercing-Explosive, P711 15mm Armor Piercing-Explosive, P528 20mm Armor Piercing-Explosive, P670 30mm Armor Piercing-Explosive, P546 25mm Armor Piercing-Explosive, P859 75mm Armor Piercing-Explosive*

4.02.7 Armor Piercing-Incendiary-Explosive

This is an all-in-one round used primarily in Aerospace cannons, possessing good penetrating properties while still having enough explosive agents to cause respective damage and igniting any flammable materials. The nose of the round is solid piece of Rodinium backed by an equally thick piece of Duranium. This combination of materials gives the round excellent armor piercing qualities while still leaving room for the explosive-incendiary agent. At the core is a supply of Clancium Oxide surrounded by a laminating shell of Takemurian Lite. The Clancium Oxide has marginal explosive properties but burns slowly and at incredibly intense temperatures. The Takemurian Lite is highly explosive by itself and is only used in explosive ordnances that lack the available mass to use more common explosives.

The detonating agent for both the Clancium Oxide and Takemurian Lite is a delayed impact fuse with a core of Mooride Polyronite 4. The fuse will detonate the explosive charge .001 seconds after impact so that the round is either embedded in the armor of a target or inside the target itself once it detonates. Mooride is incredibly explosive itself and only microscopic amounts are used in these types of rounds; but these amounts are more than enough for the purposed needed.

Variants: *P490 15mm Armor Piercing-Incendiary-Explosive, P221 20mm Armor Piercing-Incendiary-Explosive, P916 30mm Armor Piercing-Incendiary-Explosive, P192 25mm Armor Piercing-Incendiary-Explosive, P571 75mm Armor Piercing-Incendiary-Explosive*

4.02.8 Anti-Aerospace

The round used in Aerospace Defense Artillery units or any units expecting attack by enemy aerospace units. The nose of the round is a Rodinium laminated piece of Monotanium which together is capable of defeating the armor plating of a typical aerospace vehicle. The Monotanium also has electromagnetic properties which serve two other purposes than armor penetration: initially it makes the round more capable of penetrating a vehicle's defensive force shield, and second the round is able to sense close proximity to other metals.

Under ideal conditions the explosive charge will detonate after the round has made contact with the target, but in order to assure that the target takes damage even from a near-miss a small computer nano-chip is imbedded within the Monotanium nose. This nano-chip's jobs are to detect when the round is fired, arming the round, and detecting close proximity to a large metallic object, the threat aerospace vehicle, in order to detonate the explosive charge. The nano-chip's programming will only detonate the explosive charge if it has not made an impact detonation within .001 second of detection of a metallic mass. The round's core is made up of Ultritium 283, which is a very high explosive, surrounded by a pre-scored shell of Duranium in order to produce fragmentary shrapnel in case of a near miss. The fuse, controlled by both impact and the computer nano-chip, is made up of minute quantities of Mooride Polyronite 4. The Mooride produces a pressure wave when detonated and the quantities in the fuse will not only detonate the Ultritium 283 but also double the effective fragmentary range of the round.

Variants: *P486 13mm Anti-Aerospace, P273 15mm Anti-Aerospace, P925 20mm Anti-Aerospace, P789 30mm Anti-Aerospace, P381 25mm Anti-Aerospace, P224 75mm Anti-Aerospace*

4.02.9 Sabot

This is a sub-caliber anti-armor round that is used against the heaviest of armored targets. The core of the round is made of a solid piece of Monotanium, which has respectable armor piercing abilities along with certain electromagnetic properties that allow it to more easily penetrate force shields. A small bit of the nose is Rodinium which gives added strength to the armor piercing capabilities. The round is also stabilized in flight by four rear-mounted fins that induce a high velocity spin to the penetrator that will allow it to travel farther with no appreciable effect on accuracy.

The caliber of the Monotanium/Rodinium/Polyally round is actually 50% smaller than the barrel of the weapon using it. This is done so that a smaller point on the target can be hit with the same force and pressure that a normal sized round hits with. Therefore the Gallicite collar has been redesigned to not only propel the round in an EMPW but also to center and stabilize it within the barrel of a projectile weapon. The Gallicite collar is not designed to be aerodynamic and is ripped away from the rest of the round after it leaves the muzzle, allowing the penetrator to proceed to the target.

Variants: *P502 13mm Sabot, P164 15mm Sabot, P938 25mm Sabot, P358 75mm Sabot*

4.02.10 Frangible

Frangible rounds are used in environments when penetrating anything more than a single individual or any form of solid surface is undesirable. The core is a porous piece of Terminium which while hard enough to pierce organic flesh breaks apart when striking something hard. This fragmentary effect is devastating when inside an organic body because the round stops being a solid piece and instead becomes shrapnel, ripping apart the insides of a target. However, when striking a piece of non-organic material it harmlessly fragments and doesn't penetrate even the lightest armor materials.

Variants: *P422 6mm Frangible, P919 8mm Frangible*

4.03 Ballistic Ordinance

Ordnance carrying weapons used by the STARFLEET Marine Corps are classified into two broad categories: Electromagnetic Projectile Weapons (EMPWs) and Case-Less Weapons (CLWs). Both categories have roughly equivalent performance characteristics and are capable of being used in one another's place. To simplify the lines of production, the rounds used in either EMPWs or CLWs are exactly the same. CLWs only require the addition of their propellant shell in order to be made complete. Ordnance rounds resemble blunt nosed projectile rounds, which allow them to carry more ordnance. They depend mostly on heavy explosive charges to destroy their targets more than passive ballistic or design characteristics. While the internal structure and materials are different between each round, the external casing is the same in all cases. The exterior of the round is a laminate of Polyalloy over a shell of Terminium, which together are capable of withstanding large amounts of physical stress without failing. The Polyalloy laminate is also nearly frictionless, giving the round a smoother passage through an atmosphere. The Terminium shell is tough, durable, and the same material used in Photon Torpedoes; it is also pre-scored to produce dangerous shrapnel in nearly all rounds. All rounds, except Grenades, also incorporate retractable fins to stabilize the round in flight. Each round has eight stabilization fins mounted at the rear that will extend at lock into place once fired. In low/no atmosphere environments the stabilization fins will be replaced with a thruster assembly that will give equivalent performance but at a larger mass per round.

To assist in propelling a round along the barrel of an EMPW, all rounds are constructed with a collar of Gallicite composite. In its pure form Gallicite has extreme electrical reactions with any other types of metal, to the degree that dangerous electrical discharges accompany any contact. In order to make the Gallicite safe yet still harness its electrical properties a composite is formed with carbon nano-tubes. These nano-tubes stabilize the material so that it has almost no reactions with other metals, but the material is still able to accept phenomenal amounts of electromagnetic energy. The Gallicite collar allows the EMPW's electromagnets to use less energy to propel the round to greater velocities then if the round had simpler magnetic properties. Unlike other forms of EMPWs, however, these rounds can be used as true ballistic weapons capable of arching over or through obstacles to strike targets that line-of-sight weapons cannot hit. Therefore the gunners of these weapons have the ability to control the amount of force/velocity imparted to the round by the electromagnets, and therefore to control the ballistic trajectory of their rounds in order to hit their targets efficiently and consistently.

4.03.1 High Explosive

A type of round used frequently in situations that require destruction of unarmored targets and in combat areas with a high concentration of Infantry forces. The core is a solid piece of Ultritium 283 which is a very energetic explosive. The typical Terminium shell is twice the thickness as is typical in normal rounds in order to increase the number and density of the fragmentary shrapnel produced upon detonation. However, this increased thickness is not present in the nose cone since any shrapnel produced in this part of the round would be wasted against the object being impacted. In order to detonate the Ultitium 283, the round has an impact fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only miniscule amounts are used in Explosive rounds but these quantities are more than enough for the purposes needed.

Variants: *P188 20mm High Explosive Grenade, P720 40mm High Explosive Grenade, P403 60mm High Explosive Mortar, P191 80mm High Explosive Mortar, P606 120mm High Explosive Mortar, P311 120mm High Explosive Cannon Shell, P342 140mm High Explosive Cannon Shell*

4.03.2 Anti Armor-High Explosive

A round designed for attacking armored or otherwise protected targets, along with still being able to produce respectable sprawl shrapnel within the target itself. In the nose of the round is a shaped charge of Takemurian Lite and Tritanium. The Takemurian Lite fills the body of the round and provides the explosive potential. The Tritanium is shaped into a hollow cone with the base towards the nose of the round; when detonated the cone will fail in a predictable top to bottom fashion which will force the entire explosive potential of the round against a small point on the target. This focused explosion is capable of defeating nearly all reinforced structures and many types of heavy armor. However, it will still detonate nearly harmlessly against any energy force shield.

In this round the typical Terminium shell is replaced with sturdier Duranium, which will still be destroyed when the round detonates but will hold its integrity long enough to assist in focusing the explosive potential better than Terminium. The whole round is detonated by an impact fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds; however, these amounts are more than enough for the purposes needed.

Variants: *P656 20mm Anti Armor-High Explosive Grenade, P117 40mm Anti Armor-High Explosive Grenade, P818 120mm Anti Armor-High Explosive Cannon Shell, P395 140mm Anti Armor-High Explosive Cannon Shell*

4.03.3 Air Bursting High Explosive

This is a programmable round that can detonate at a preset distance from the ground or any solid surface. The core is a solid piece of Ultritium 283 which is a very energetic explosive. The typical Terminium shell is twice the thickness as is typical in normal rounds in order to increase the number and density of the fragmentary shrapnel produced upon detonation. The construction of the Terminium shell in Grenade rounds differ from Mortar and Artillery rounds because each weapon has a different typical attack profile. The Terminium in a Grenade is equal thickness around the entire round since Airburst Grenades are most effective when clearing structures and small areas. The Terminium in Air Burst Mortars and Artillery is specially pre-scored on just the nose and the flanks because these rounds are meant to fragment and spread shrapnel around a large area when still above the ground.

The round is controlled by a computer nano-chip in conjunction with an integrated laser sensor assembly. The nano-chip's duty is to detect when the round is fired and arm both the fuse and the laser sensor. The sensor, which has been wirelessly programmed by the firing weapon, will detect when the distance to a solid object or target reaches the preprogrammed distance and then detonate the explosives. In order to detonate the Ultitium 283 explosive core, the round has a computer controlled fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds but these quantities are more than enough for the purposes needed.

Variants: *P197 20mm Air Bursting High Explosive Grenade, P314 40mm Air Bursting High Explosive Grenade, P658 60mm Air Bursting High Explosive Mortar, P296 80mm Air Bursting High Explosive Mortar, P453 120mm Air Bursting High Explosive Mortar, P171 105mm Air Bursting High Explosive Artillery Shell, P123 155mm Air Bursting High Explosive Artillery Shell, P291 203mm Air Bursting High Explosive Artillery Shell*

4.03.4 Guided Anti Armor-High Explosive

This round is designed to be used with accuracy at extreme ranges against mobile targets. In the nose of the round is a shaped charge of Takemurian Lite and Tritanium. The Takemurian Lite fills the body of the round and provides the explosive potential. The Tritanium is shaped into a hollow cone with the base towards the nose of the round; when detonated the cone will fail in a predictable top to bottom fashion that will force the entire explosive potential of the round against a small point on the target. This focused explosion is capable of defeating nearly all reinforced structures and many types of heavy armor. However, it will still detonate nearly harmlessly against any energy force shield. In this round the typical Terminium shell is replaced with sturdier Duranium, which will still be destroyed when the round detonates but with hold its integrity long enough to assist in focusing the explosive potential better than Terminium. The whole round is detonated by an impact fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds; however, these amounts are more than enough for the purposes needed.

In order to increase their effectiveness in every situation the round integrates a guidance package. The guidance package consists of a simple “beam rider” seeker head and a more robust maneuvering package that, in Cannon and Artillery Shells, includes a second set of fins or maneuvering assembly behind the nose. The seeker head needs for the target to be illuminated by tachyon, electromagnetic, or laser means in order to strike its target. Mortar and Artillery rounds will typically do most of their maneuvering during the decent phase of their trajectories in order to render a top attack, where most structures and vehicles have their weakest armor protection. Cannon rounds have restricted maneuverability and cannot engage a high performance target, like a small vehicle or aerospace craft; its range of motion is limited to a 15° cone focused on the muzzle of the weapon when fired.

Variants: *P831 60mm Guided Anti Armor-High Explosive Mortar, P464 80mm Guided Anti Armor-High Explosive Mortar, P184 120mm Guided Anti Armor-High Explosive Mortar, P113 120mm Guided Anti Armor-High Explosive Cannon Shell, P615 140mm Guided Anti-Armor-High Explosive Cannon Shell, P675 105mm Guided Anti Armor-High Explosive Artillery Shell, P209 155mm Guided Anti Armor-High Explosive Artillery Shell, P990 203mm Guided Anti Armor-High Explosive Artillery Shell*

4.03.5 Incendiary

A reserve type of ammunition that is designed to discourage and destroy infantry and light vehicles. The round’s core is a supply of Clancium Oxide, which has marginal explosive properties but burns slowly and at incredibly intense temperatures. The normal Terminium in the shell adds an oxidizing fuel source to the incendiary properties of the Clancium when ignited. In order to ignite the Clancium Oxide, the round has an impact fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Incendiary rounds. These amounts are more than enough for the purposes needed, and to add a small explosive charge to spread the incendiary agent.

Variants: *P469 40mm Incendiary Grenade, P128 80mm Incendiary Mortar, P189 120mm Incendiary Mortar, P493 105mm Incendiary Artillery Shell, P650 155mm Incendiary Artillery Shell, P973 203mm Incendiary Artillery Shell*

4.03.6 Phased Energy

A round used to deliver a fatal strike against infantry targets with minimal damage to structures or vehicles. The core consists of two high density phased energy capacitors charged to near overload and connected by low resistance isolinear circuitry that would allow the energy to pass between the two capacitors without any resistance. However each capacitor is charged with energy of a different polarity, this means that when the connecting circuitry is made active the highly differential charges would cause a massive short circuit with a massive explosion. This exposition would release a phased energy pulse equivalent to the Level 16 setting on a standard Phaser Rifle, with lethal effects on any organic target within the blast radius. The effective range of this round is directly proportional to the size of the capacitors, maxing out at about 500 meters on clear terrain. The blast effects cannot pass through solid objects, such as vehicles or structural walls, but will damage these objects along with any un-hardened electrical components.

The round is controlled by a computer nano-chip in conjunction with a laser sensor assembly. The nano-chip’s duty is to detect when the round is fired and arm both the isolinear circuitry and the small laser sensor. The sensor, which has been wirelessly programmed by the firing weapon, will detect when the distance to a solid object or target reaches the preprogrammed distance and then activate the short circuit causing the explosive pulse.

Variants: *P351 20mm Phased Energy Grenade, P479 40mm Phased Energy Grenade, P388 60mm Phased Energy Mortar, P729 80mm Phased Energy Mortar, P172 120mm Phased Energy Mortar, P668 105mm Phased Energy Artillery Shell, P185 155mm Phased Energy Artillery Shell, P212 203mm Phased Energy Artillery Shell*

4.03.7 Canister

This round has been the subject of many debates throughout the years because of its devastating, and sometimes gruesome, effects on its targets. It contains thousands of small razor-like pieces of Duranium enclosed with the typical Polyalloy shell. The Duranium razors, once fired, will disperse in a narrow cone from the muzzle of the weapon but its effective range is rather limited (100 meters for Grenades and 500 meters for Cannon Shells). The effect of this round will shred or otherwise injure unprotected and lightly armored organic targets.

The shell of this round is composed of only a thin shell of Polyalloy only designed to protect the Duranmium razors before firing. Because of the accelerating effects of the EMPWs electromagnets, the Duranium will be traveling faster than the Polyalloy inside the barrel; therefore the shell will disintegrate before the round leaves the muzzle. Also the Gallicite collar has be redesigned into thin segments so that once fired, it will actually split and become razor-like and add to the damaging effects of the round. In CLWs, the Polyalloy shell is sufficiently weakened that it will not survive the explosive acceleration of the Thalmerite propellant; the overall result will be the same as with EMPWs.

Variants: *P609 20mm Canister Grenade Shell, P130 40mm Canister Grenade Shell, P822 120mm Canister Cannon Shell, P199 140mm Canister Cannon Shell*

4.03.8 Sabot

This is primary round for Cannons and is used against the heaviest of armored targets. The core of the round is made of a solid piece of Monotanium, which has respectable armor piercing abilities along with certain electromagnetic properties that allow it to more easily penetrate force shields. A small bit of the nose is Rodinium which gives added strength to the armor piercing capabilities. The round is also stabilized in flight by four rear-mounted fins that induce a high velocity spin to the penetrator that will allow it to travel farther with no appreciable effect on accuracy.

The caliber of the Monotanium/Rodinium/Polyally round is actually 50% smaller than the barrel of the weapon using it. This is done so that a smaller point on the target can be hit with the same force and pressure that a normal sized round hits with. Therefore the Gallicite collar has been redesigned to not only propel the round in an EMPW but also to center and stabilize it within the barrel of a projectile weapon. The Gallicite collar is not designed to be aerodynamic and is ripped away from the rest of the round after it leaves the muzzle, allowing the penetrator to proceed to the target.

Variants: *P626 120mm Sabot, P532 140mm Sabot*

4.03.9 Indirect Fire Anti-Armor

This round is used against targets in defilade or obscured by obstacles when artillery is not available or recommended. Its design resembles a Mortar round more than a Cannon round; the round's main section has a rounded blunt nose but is only half the length of a normal round. The final half of the length is a tail section with deployable tail fins for maneuverability. The fins will deploy once fired and take steering instructions from the acquisition and detonation seeker head. Once fired, the seeker head will orient the bottom of the round with the ground and seek out its target; this round has no cross mobility so it cannot prosecute a target, but it can detect its presence and orientate the bottom of the round in order to make a strike on the target. The maneuvering fins are replaced with a thruster assembly in no/low atmosphere environments with no appreciable effect on the rounds flight profile or lethality.

The lethality of the round depends on an explosively shaped penetrator on its bottom, which can pierce the top armor of any current and many projected armored vehicles. The explosive element of the round is a shaped charge of Mooride Polyronite 4 focused against the convex surface of a sheet of Monotanium. When detonated the Mooride will destroy the round but will also send the Monotanium sheet towards the target. Once exposed to this explosive force the Monotanium sheet will fold in on itself and compress into a solid slug very similar to a Sabot round. This slug will penetrate the armor and render crippling damage to its target; also Monotanium has electromagnetic properties that allow it to more easily penetrate force shields than normal materials.

The seeker head has a simple sensor system that can detect proximity to and the relative location of a target; caution should be used as this sensor system cannot discriminate between friendly and threat vehicles, therefore will detonate against any detected vehicle. When the round has detected that it has properly orientated itself so the Monotanium penetrator will strike the target, the seeker head will detonate the Mooride Polyronite 4 explosive with an electrical charge.

Variants: *P983 120mm Indirect Fire Anti-Armor Cannon Shell, P376 140mm Indirect Fire Anti-Armor Cannon Shell*

4.03.10 Demolition-Soft

This round is used primarily in infantry support roles because of its remarkable ability to create holes in nearly any building or structure. It does have a secondary anti-tank function, but due to modern force shields and advanced composite armor it is rarely used in this role. The round consists of a highly malleable explosive head contained within the standard Polly Alloy shell. The Terminium part of the shell is deleted from a majority of the body of the round and only remains at the base in order to support the Gallicite collar and provide stability to the round. The malleable head of the round is composed of plasticized Ultritium 283 which is solid enough to withstand being fired at hypersonic velocities but will intentionally “squash” against any hardened surface. When “squashed” the Ultritium 238 sticks to and forms a nearly perfect disc against the stricken target. When detonated micro-seconds later, the explosive force will create a sizable hole in or critically damage the stricken target.

The Ultritium 238 is detonated by a delayed impact fuse with a core of Mooride Polyronite 4. The Mooride is molded into fibers embedded throughout the Ultritium 238 and connected to the fuse so as to create a unified and simultaneous explosion. Because it is incredibly explosive itself, only microscopic amounts are used in Explosive rounds; however, these amounts are more than enough for the purposes needed.

Variants: *P457 120mm Demolition-Soft Cannon Shell, P969 140mm Demolition-Soft Cannon Shell*

4.03.11 Demolition-Penetrator

This round is a favorite of Combat Engineering units or any other units needing a quick way to destroy buildings and obstacles. The nose is constructed with a solid piece of Rodinium that will allow the round to penetrate any reinforced structure or formation. The typical Terminium shell is replaced with Duranium, which while thicker where backing the Rodinium nose, in order to add in penetration, is also thinner along the flanks of the round, so as to not dampen the explosive potential of the core. The core of the round is a mixture of Anicium and Yurium explosives, which have high energy outputs in comparison to the amounts used.

The whole round is detonated by a variably delayed impact fuse with a core of Mooride Polyronite 4. The fuse is calibrated with every round so that the crew using it can control how long the delay will be. This allows the round to be tailored to meet any target; simple earthen berms would need only a short delay while hardened and reinforced structures would need a longer delay. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds; however, these amounts are more than enough for the purposes needed.

Variants: *P373 120mm Demolition-Penetrator Cannon Shell, P161 140mm Demolition-Penetrator Cannon Shell*

4.03.12 Guided Anti-Aerospace

This is a rare type of ammunition used only when both anti-aerospace missiles and energy weapons are in short supply or ineffective in a given environment. The nose of the round has a small sensor guidance package that controls arming, detonation, and can control the maneuvering package in order to engage high performance aerospace vehicles. Once fired, the sensor system will calculate the trajectory of the round and begin searching for any aerospace vehicle within that trajectory. Once a target has been chosen the guidance system will use the maneuvering system, which includes a second set of fins/thrusters near the nose, to bring the round into the closest proximity to the target. Neither the sensor nor maneuvering systems are capable of tracking and or pursuing a target, they only have the ability to detect a target and slightly modify the round’s trajectory; in effect assisting rather than replacing good gunnery practices.

Under ideal circumstances the round will detonate within 5 meters of its chosen target, hopefully destroying it or at least severely crippling it. However, the sensor package can also render detonation if one of two

possible conditions is present: another target crosses the path of the round during flight (a target of opportunity) or the round detects no targets. When no targets are detected the round will detonate after a certain time in flight, wirelessly set by the gunner before firing.

The round's core is made up of Ultritium 283, which is a very high explosive, surrounded by a pre-scored shell of Monotanium in order to produce highly capable fragmentary shrapnel. The Monotanium is strong enough to pierce most hull materials on aerospace vehicles, and it possess electromagnetic properties that allow it to more easily pass through defensive force shields. The fuse is controlled by the sensor package and is made up of minute quantities of Mooride Polyronite 4. The Mooride produces a pressure wave when detonated and the quantities in the fuse will not only detonate the Ultritium 283 but also double the effective fragmentary range of the round.

Variants: *P124 105mm Guided Anti-Aerospace Artillery Shell, P437 155mm Guided Anti-Aerospace Artillery Shell,*
P852 203mm Guided Anti-Aerospace Artillery Shell

4.03.13 Guided Anti-Radiation

This round is used specifically to disable or destroy sensor vehicles or instillations at long ranges. The core is a solid piece of Ultritium 283 which is a very energetic explosive. The typical Terminium shell is replaced by Duranium and is twice the thickness as is typical in normal rounds in order to produce thick pieces of fragmentary shrapnel that can penetrate all but the thickest armors and heavily reinforced structures.

This round has a guidance package incorporates an electronic warfare suite and an area reference system in order to precisely attack a target. The electronic warfare suite will track its target by homing in on the targets own electronic emissions. The specific emissions to be targeted will be programmed into the round when fired so that only certain classes of threat systems will be identified. Once the round has located its target, it will constantly update the area reference system; this system's only purpose is to allow the round to strike its target if the particular electronic signatures being tracked are disabled. The area reference system is not capable rendering a hit against a mobile target, but it will place the round on the last known position of the target; and due to the large area of effect for this round, close is good enough for at least a mission kill.

In order to detonate the Ultitium 283, the round has a computer controlled fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds but these quantities are more than enough for the purposes needed. The fuse can detonate the round either by impact, when the electronic warfare suite is used, or by air burst, when the area reference system is in use.

Variants: *P104 105mm Guided Anti-Radiation Artillery Shell, P579 155mm Guided Anti-Radiation Artillery Shell, P960 203mm Guided Anti-Radiation Artillery Shell*

4.03.14 Smoke

A round designed to conceal and camouflage units and or areas of terrain. At the core is a piece of Mooride Polyronite 4, which is not only a very energetic explosive but also produces a pressure wave when detonated that helps vaporize and disperse the smoke agent. The typical Terminium shell is a quarter of the thickness as is typical in normal rounds in order to drastically decrease the number and density of the fragmentary shrapnel produced upon detonation. This is done in order to reduce the chances of fratricide because these types of rounds are usually used in close proximity to friendly forces.

The Mooride is detonated by a computer nano-chip in conjunction with an equally small laser sensor assembly. The nano-chip's duty is to detect when the round is fired and arm both the fuse and the small laser sensor. The sensor, which has been wirelessly programmed by the firing weapon, will detect when the round has reached the preprogrammed distance above the ground and then detonate the explosive core.

The smoke agent is a special blend of prismatic micro-crystals of Duranium, Transparent Aluminum, and other energy resistant and reflective materials suspended in a liquid base. When detonated this solution produces a thick white smoke screen capable of obscuring the electromagnetic spectrum from 5 nanometers to 5 millimeters (Soft X-Ray Radiation to Extremely High Frequency Radio Wave ranges). This adequately protects any units from observation by any standard battlefield optical sensor and

engagement systems; it will actually provide some protection from energy weapons fire as well.

Variants: *P902 20mm Smoke Grenade, P438 40mm Smoke Grenade, P583 60mm Smoke Mortar, P236 80mm Smoke Mortar, P942 120mm Smoke Mortar, P195 105mm Smoke Artillery Shell, P324 155mm Smoke Artillery Shell, P178 203mm Smoke Artillery Shell*

4.03.15 Burst Signaling

This round is used for aerial visual signals in order to mark positions, signal friendly units, and any other signaling tasks for which electronic silence but not visual stealth is required. The round has a computer nano-chip that controls both arming and determines when the round as reached the apogee of its trajectory. When the apogee has been reached the nano-chip detonates a rod of Thalmerite explosive in the center of the round. The Thalmerite will serve two purposes: it will disperse and ignite the luminary properties of the individual visual signaling segments.

The outer shell of the round is divided into eight rows of various numbers of pyramidal segments of Terminium specially treated with a Clanicium Oxide Composite. While the typical Polyalloy laminate is still present in this round, the Terminium part of the shell is not. This allows the individual segments to maintain integrity during launch and flight but be properly dispersed when the explosive is detonated. The Clancium Oxide treated Terminium is a composite with any of eight additional chemicals in order to produce a particular wavelength of the electromagnetic spectrum. Possible wavelengths are: Ultraviolet (U-type, 10nm-400nm), Violet Light (V-type, 380nm-450nm), Blue Light (B-type, 450nm-495nm), Green Light (G-type, 495nm-570nm), Yellow Light (Y-type, 570nm-590nm), Orange Light (O-type, 590nm-620nm), Red Light (R-type, 620nm-750nm), and Infrared (I-type, 750nm-15000nm). In each case the segments are designed not to burn for more than five seconds, making sure that no incendiary effect is felt on the ground.

Variants: *P483 20mm Burst Signaling Grenade Series, P106 40mm Burst Signaling Grenade Series, P885 60mm Burst Signaling Mortar Series, P998 80mm Burst Signaling Mortar Series, P552 120mm Burst Signaling Mortar Series*

4.03.16 Illumination

A round used to illuminate a large area with light in a predetermined segment of the electromagnetic spectrum. The round has a computer nano-chip that controls both arming and determines when the round as reached the apogee of its trajectory. When the apogee has been reached the nano-chip detonates a thin sheet of Thalmerite explosive between the outer shell and the core of the round. The Thalmerite will serve two purposes: it will remove the outer shell of Polyalloy and Terminium, and ignite the illumination properties of the round's core.

The core of Grenade and Mortar rounds contain a solid piece of Terminium specially treated with a Clanicium Oxide Composite, and a small anti-gravity generator and power source. The core of Artillery Shells contains many segmented pieces of Terminium and Clanicium Oxide Composite, each with a small anti-gravity generator and power source. The Terminium will oxidize while burning and be completely extinguished after about 60 standard seconds, and hopefully before the still burning material hits the ground. The Clancium Oxide is a composite with any of three other chemicals in order to produce a particular wavelength of the electromagnetic spectrum. Possible wavelengths are: Ultraviolet (U-type, 10nm-400nm), Standard White (W-type, 380nm-750nm), and Infrared (I-type, 750nm-15000nm). The anti-gravity generator provides the ability to deploy this round in nearly any situation and environment, and has enough power to slow the descent of the round during the entire burn time of the Terminium at a rate of .5 meters per second.

Variants: *P731 20mm Illumination Grenade Series, P937 40mm Illumination Grenade Series, P730 60mm Illumination Mortar Series, P836 80mm Illumination Mortar Series, P543 120mm Illumination Mortar Series, P125 105mm Illumination Artillery Shell Series, P582 155mm Illumination Artillery Shell Series, P735 203mm Illumination Artillery Shell Series*

4.03.17 Ground Marker

A round designed as a ground based signal to friendly units using a combination of visual smoke, light beacon, sensor beacon, and communications beacon. Controlled by a computer nano-chip, it will arm itself once fired and begin transmitting its signaling devices once impact is made with a hard surface or its velocity is at or close to zero. Even though the round has the ability to transmit many types of signals, it can be programmed to only transmit specific emissions so it can be tailored to individual missions, environments, and situations.

The smoke is made of prismatic micro-crystals of Monotanium suspended in a liquid base. In order to vaporize the liquid smoke, it is heated to extreme temperatures; this is done by the light beacon portion of the round. Visible light is produced by burning a specialized piece of Terminium treated with Clancium Oxide Composite enclosed within the Pollyalloy shell, which doesn't allow the heat to escape and therefore eliminates any possibility of accidental incendiary effects. The Clancium Oxide is a composite with any of eight additional chemicals in order to produce a particular wavelength of the electromagnetic spectrum. Possible wavelengths are: Ultraviolet (U-type, 10nm-400nm), Violet Light (V-type, 380nm-450nm), Blue Light (B-type, 450nm-495nm), Green Light (G-type, 495nm-570nm), Yellow Light (Y-type, 570nm-590nm), Orange Light (O-type, 590nm-620nm), Red Light (R-type, 620nm-750nm), and Infrared (I-type, 750nm-15000nm). This burning Terminium also has an effect on the electromagnetic properties of the Monotanium, as the electrically reactive crystals will take on the properties of the light being produced. This means that whichever form of light is being produced, the smoke will reflect the same portion of the electromagnetic spectrum. Both the smoke and the light are designed for sixty seconds of activity.

The electronic portion of the round is powered by a small battery which allows for a similar sixty seconds of signaling as the smoke and light once activated by the controlling nano-chip. The sensor and communications beacon work off the same transmitter and can be programmed to emit in many pre-set frequencies. This allows units not within visual range of the light and smoke of the round, or when these features are not used, to locate the position marked by the round. The battery also has two secondary functions: one as a fuse for an explosive charge and as an igniter for the flammable Terminium. The explosive charge is a small piece of Thalmerite that is treated so that once exposed to an electrical current it becomes unstable; when the electrical charge stops it detonates. This means that the technology, and the round itself, will be destroyed after sixty seconds. However, the explosive charge is so small, and largely contained by the Polyalloy shell of the round, that dangerous effects are only felt within half a meter; these effects are also limited to flash stun effects and small cuts.

Variants: *P506 20mm Ground Marker Grenade Series, P126 40mm Ground Marker Grenade Series, P847 60mm Ground Marker Mortar Series, P952 80mm Ground Marker Mortar Series, P167 120mm Ground Marker Mortar Series*

4.03.18 Behavioral Modification Gas

This round is designed as a way to clear small open areas and enclosed rooms without using energy or other direct impact physical weapons. Once contact is made with the ground or other hard solid surface it will begin to disperse one of three chemical agents: Oleoresin Capsicum (C-type or OC), Alphagas (A-type), or Iridagel (J-type). All three will cause a constriction of the airway, temporary blindness, and skin irritation in varying degrees depending on the levels of exposure. Oleoresin Capsicum is generally effective on most humanoid life forms, while Alphagas and Iridalgel are used against hardier forms of life, or species that have an immunity and or resistance to OC gas. The specifications for any of the chemical agents state that they have an incapacitating effect within 5 to 8 meters of the round. However, this figure is highly dependent on the environmental conditions of the area where the round is deployed.

Variants: *P144 20mm Behavioral Modification Gas Grenade Series ,P411 40mm Behavioral Modification Gas Grenade Series*

4.03.19 Behavioral Modification Non-Lethal Impact

This round is designed to incapacitate or stun an individual humanoid target without using an energy weapon. Its head is a low density poly-carbon composite with a blunted shape that is incapable of penetrating even unarmored organic targets. The Pollyalloy shell is deleted from this round, and the Gallicite collar is located at the rear of the round with a piece of porous Terminium to stabilize the poly-carbon head. When fired at low velocity, it will cause the target to become incapacitated from blunt force trauma. While not designed to be fatal, it can cause death if care is not given to aiming the weapon away from vulnerable points on the target's anatomy.

Variants: *P341 20mm Behavioral Modification Non-Lethal Impact Grenade, P431 40mm Behavioral Modification Non-Lethal Impact Grenade*

4.03.20 Sub-Munitions Carrier

This round is strictly designed to disperse quantities of different types of ordnance over a large area. While the types of carried ordnance can vary between seven different types of sub-munitions, the central operating principles of the round are the same regardless. The round consists of the standard tail assembly, a Thalmerite explosive core, Polyalloy shell, and a computer nano-chip in the nose. The Thalmerite is located in the center of the round in order to disperse the carried sub-munitions and will not damage any of their operating functions. The Polyalloy shell provides the structural integrity to the overall round and preserves the aerodynamic flight characteristics but will still fragment easily and in a predictable fashion when detonation occurs; the Terminium is deleted from this round's shell. The computer nano-chip will be programmed with a target area to which the sub-munitions are to be dispersed to, and once that area has been reached will detonate the Thalmerite to scatter the ordnance.

Variants: *P603 60mm Sub-Munitions Carrier Mortar Series, P662 80mm Sub-Munitions Carrier Mortar Series, P187 120mm Sub-Munitions Carrier Mortar Series, P953 105mm Sub-Munitions Carrier Artillery Shell Series, P198 155mm Sub-Munitions Carrier Artillery Shell Series, P992 203mm Sub-Munitions Carrier Artillery Shell Series*

4.03.21 Propulsion Module

This is not a separate type of munitions but an add-on package that consists of a reservoir of Moyerite propellant and a varying number of exhaust ports (single powerful aft port in Artillery and eight ports at equilateral points around the circumference in Mortars). This is a standard and common attachment, so all Mortar and Artillery rounds are equipped with quick-connect points so that the assembly can be used in the field under combat conditions. The Moyerite is a common thruster material in star ships and is completely inert in a majority of atmospheres. The exhaust port(s) act as powerful jet that can add 75% to the range of any round it is used on, however in Artillery rounds they will lengthen the round by nearly 50% when used.

The package also has a computer nano-chip integral to its construction in order to control when the thrust effect kicks in. It can be programmed to ignite the thruster in the ascent, apogee, or descent phases. When used during the ascent phase the round gains altitude and therefore a small amount of range and a certain amount of cross mobility when the round is guided. During the apogee phase the thruster provides the greatest amount of distance, and is the most common phase when the thruster is ignited. To provide greater hitting power for anti-armor or high explosive rounds, the thrusters can be ignited in the descent phase.

In low/no atmosphere or low gravity environments, this system are used on Mortar and Artillery rounds at all times. The purpose is to provide guidance and stability due to the reduced effectiveness of the tail fins in these environments. When used in such conditions the computer nano-chip is switched to its alternate setting, and uses the same basic logic programming to provide flight assistance to the round. This alternate setting reduces its booster ability but it's a noble sacrifice in order to make sure that Mortars and Artillery can be used in every situation.

Variants: Q860 60mm Mortar Propulsion Module, Q527 80mm Mortar Propulsion Module, Q476 120mm Mortar Propulsion Module, Q837 105mm Artillery Shell Propulsion Module, Q163 155mm Artillery Shell Propulsion Module, Q939 203mm Artillery Shell Propulsion Module

4.04 Infantry Based Missile Systems

All missiles used by ground forces have the same basic construction principles: a protective shell, missile body, seeker head, explosive element, and propulsion. The protective shell is cylindrical shaped, Polyalloy composite designed to encase the missile from production till employment. The flanks of the shell are thick and are capable of taking an incredible amount of punishment without failing; the ends are lighter and meant to break apart when the missile is fired and exits the shell. The whole shell is air-tight and allows the missile to be stored without maintenance or upkeep until it is used; a single data port is located in the nose end of the tube which allows the missile to be linked to its respective control/targeting package used by the individual Marine. For these missiles to be used in any environment or situation, each protective shell is equipped with a gas expulsion charge. This charge uses Moyerite, a thruster-type gas that is completely inert in most atmospheres, to launch the missile from the shell before the propulsion system engages. This prevents the dangerous back blast from the missile's propulsion system, and allows the missiles to be used in confined spaces and without consideration to what is behind the missile shell at the time of launch.

The missile body is made of Polyalloy laminated Terminium, which imparts a good blend of light weight and strength. The Polyalloy laminate is nearly frictionless, giving the missile a smoother passage through an atmosphere. The Terminium shell is tough, durable, and the same material used in Photon Torpedoes. Seeker heads and explosive elements vary widely between missiles depending on their expected targets and level of sophistication.

Propulsion is provided by a Deuterium-fueled Micro-Fusion Thruster and various reaction control micro-thrusters. The main propulsion thruster uses a high yield fusion reactor to propel the missile to speeds anywhere from 1000 to 11000 meters per second depending on mission and sophistication. The exhaust port for the fusion thruster is designed so that it can direct the thrust anywhere within a 45° cone focused on the center-line of the missile. This would provide for the primary maneuvering ability, reaction control and secondary maneuverability is provided by two micro-thruster assemblies located midway down the length and at the aft end of the missile. Each assembly has sixteen exhaust ports spaced equilaterally around the missile's circumference, and therefore capable of directing the missile into any needed maneuvers. The fuel for these thrusters is directly governed by the size and mission of each missile, so performance varies greatly between missile types.

4.04.1 SS-I-622 60mm "Bullet Ant" Individual Missile System

This piece of ordnance is a man portable missile system designed for line of sight engagement of bunkers, fortifications, and light armored vehicles. It is designed to be a single use system that uses its protective shell as the firing tube. The shell/tube is equipped with a simplistic targeting system that only provides the user with a read out of the seeker head's targeting data. The seeker head itself is equally basic, only being capable of optical tracking within the White range of the visible electromagnetic spectrum (380nm-750nm) with a maximum range of one kilometer and a practical range of just under 250 meters. The missile body is small, being 50 centimeters long, so fuel is restricted to the point that its effective ranges are equal to that of the seeker head. Overall a useful system since it weighs, missile and launch tube, only 2 kilograms and has a length of just under a meter. Able to be distributed to every member of a unit, it can provide a substantial force multiplier in built up areas or against unexpected armored threats.

The nose of the missile is a Rodinium/Carbon composite that is strong enough to penetrate soft or earthen fortifications, this allows the missile to travel a short distance into the target and detonate within its center. This method will concentrate the explosive power of the missile and make the resulting explosion more devastating. However the Rodinium composite nose will fracture and break apart upon impact with a hardened surface, vehicle armor or reinforced structures; when this happens the explosive element will "squash" against the target and form a nearly perfect disc against the surface. When detonated micro-seconds later, the explosive force will create a sizable hole in or critically damage the stricken target.

The explosive element is made of plasticized Ultritium 238 which has the explosive potential needed in this type of ordnance yet is still malleable enough to "squash" against a target. The seeker head has a computer controlled fuse with a core of Mooride Polyronite 4. The computer controlled fuse can detect if the nose of the missile has fractured upon initial impact; if it has, the round will detonate within microseconds, but if it stays intact detonation could be up to a full second after impact. The Mooride is molded into fibers embedded throughout the Ultritium 238 and connected to the fuse so as to create a unified and simultaneous explosion.

4.04.2 SS-I-700 90mm "Fire Ant" Man Portable Missile System

This system is designed to provide small units with an organic missile system capable of being used against all possible threats. It consists of two parts, a reusable control module and variable number of 90mm missiles of a standard design, all with the same engagement abilities. The control system weighs 7 kilograms and is an advanced optical type capable of identifying targets throughout the visible electromagnetic spectrum (380nm-750mm). It also integrates a micro-computer system that will allow the gunner to identify a specific target signature amongst a cluster of possible targets.

The missile was designed for line of sight engagement out to a range of 2 kilometers but with a practical range of only 750 meters. The missile package also weighs 7 kilograms and will attach to the back of the firing tube integral to the Targeting and Control Package creating a total system length of 130 centimeters. While the mobility of the missile is rather limited it can track and prosecute slow moving targets like armored combat vehicles. The missile's seeker head is capable of engaging any target identified by the control package; to engage a target within a cluster, it will use a recognition system that can identify the minutest differences between the various signatures and strike the target identified by the gunner. Also all the missiles of the 90mm type are equipped with an independent firing attachment (fixed forward sight, pop out graduated rear sight for range and speed, and trigger) that allows it to be used without a control package. In this case the missile will only fly straight till it reaches its maximum range or it impacts a surface, without guidance or target selection capability.

Used with: MK913 90mm Missile Targeting and Control Package

4.04.3 SS-I-559 120mm "Jack Jumper" Team Portable Missile System

This system gives Infantry units the ability to successfully engage main battle tanks and similar targets. The operating components of this system are the missile shell/launch tube and the control module that attaches to one side of the missile shell. The control package is capable of identifying targets by using an advanced optical sensor capable of detecting the entire visible electromagnetic spectrum (380nm-750mm) and an active target designation system. The optical system is backed up by a micro-computer that allows the targeting a specific target from amongst a cluster by detecting the slight differences between its signatures and those emanating from every other possible target. The target designator is a microwave laser system that can be used one of two ways: assisting the optical sensor in identifying a target at extreme ranges, or being used to actively guide the missile onto a specific target. The drawback to the active guidance mode is that gunner needs to keep the target identified throughout the entire flight of the missile or risk a miss. This is obviously dangerous for the missile crew, as they would probably be detected either by the missile's launch or even the use of the laser system, but in certain conditions it would be unavoidable.

The missile is a moderately mobile system that is designed to render a direct attack against a target or maneuver to engage a target from the side or top. Its maximum range for a direct attack is 3 kilometers but this range will reduce rapidly depending on differing attack profiles, in application the practical range is about 1 kilometer. The guidance/seeker head is more than capable of engaging any target that the control package can identify; using a similar optical sensor/computer combination and active guidance system capable of tracking on the microwave laser that would be used by the control package. The missile is also able to switch from active laser guidance to passive optical and vice-versa depending on the situation. This gives the gunner the ability to launch a missile on optical tracking but provide updates by means of the microwave laser when in a rapidly changing environment; or conversely to identify a target by the microwave laser but because of counter attack be forced to move, the missile would then prosecute the attack by means of the optical sensor/computer combination.

All missiles of the 120mm type are equipped with an independent targeting system can allow the missile to be used without the aid of the control package. This system is nothing more than a pop out trigger and a spotting scope that allows the gunner to use the optical tracking system of the missile's seeker head as the targeting system. Because of the missile's lack of ability to engage a target without the control package its acquisition range is severely limited and it will not be able to pick out an individual target from amongst a cluster. Also without the guidance input from the control package it will not be able to plot attack courses, meaning that the missile will be limited to direct attack profiles. But it will operate perfectly when used in situations when sending a missile down range means survival, or used in close range combat against fortifications or armored vehicles.

Used with: MK979 120mm Missile Targeting and Control Package

4.04.4 SS-H-951 150mm "Maricopa" Crew Portable Missile System

This system combination was designed to be used primarily from vehicle platforms; however it can be used while dismounted with a crew of four (the full infantry firing platform and one missile weighs in at 90 kilograms). The control package weighs 22 kilograms alone, but while heavy it possesses an impressive array of sensor targeting equipment. The basic means of target identification is an advanced optical sensor capable of detecting the entire visible electromagnetic spectrum (380nm-750mm), which is backed up by a micro-computer that allows the targeting a specific target from amongst a cluster by detecting the slight differences between its signatures and those emanating from every other possible target. A secondary means of target designation is a small, forward looking active sensor system that can provide a clear electronic picture of the battlefield when optical searches are problematic or impossible. While the sensor system is readily detectable by threat armored vehicles, common practice restricts its use to obtaining a quick look around the battlefield or in situations when firing a missile means survival. The control package also integrates a Tachyon Beam designation system that will mark a target with a unique residual energy signature that the missile can then track without the gunner needing to have the target constantly illuminated by a standard targeting laser.

The missile system, each encased round is 20 kilograms, is moderately mobile and designed to render a direct attack against a target or maneuver to engage a target from the side or top. Its maximum range for a direct attack is 5 kilometers but this range will reduce rapidly depending on differing attack profiles, in application the practical range is about 2 kilometers. The guidance/seeker head is more than capable of engaging any target that the control package can identify; using a similar optical sensor/computer combination and even a small active sensor search system capable of independently engaging targets, however the active sensor is largely used to engage a preselected target or in situations when all other tracking means have failed. The sensor receivers for the active system have a secondary function in that they are used to locate a target when it has been identified by the Tachyon Beam designator. An ingenious guidance computer within the missile is able to switch between any of its tracking systems depending on the situation. This gives the gunner the ability to launch a missile on optical tracking but provide updates by means of the active sensor or Tachyon Beam designator when in a rapidly changing environment; or in another case to identify a target by the control package's active sensor but because of counter attack be forced to move, the missile would then prosecute the attack by means of the optical sensor/computer combination or its own active sensor.

Used with: MK298 150mm Missile Targeting and Control Package

4.04.5 Phased Energy Missile Warhead

A warhead type used to deliver a fatal strike against infantry targets with minimal damage to structures or vehicles. The core consists of two high density phased energy capacitors charged to near overload and connected by low resistance isolinear circuitry that would allow the energy to pass between the two capacitors without any resistance. However each capacitor is charged with energy of a different polarity, this means that when the connecting circuitry is made active the highly differential charges would cause a massive short circuit with a massive explosion. This exposition would release a phased energy pulse equivalent to the Level 16 setting on a standard Phaser Rifle, with lethal effects on any organic target within the blast radius. The effective range of this round is directly proportional to the size of the capacitors, maxing out at about 400 meters on clear terrain. The blast effects cannot pass through solid objects, such as vehicles or structural walls, but will damage these objects along with any un-hardened electrical components.

The warhead is controlled by the guidance/seeker head which will determine when to activate the short circuit causing the explosive pulse. When connected to the control package the missile is capable of three different types of strikes: air burst, remote detonation, and impact. The simplest method of detonation is impact, when the missile strikes any type of hard target; this is also the only type of detonation capable when the missile is used without the control package. With this type of warhead/missile combination a small laser range finder is added to the seeker head which can detect the distance to any surface. When the pre-set range is met the warhead can render an air burst allowing a greater possible area of effect for the energy pulse. When operating on open terrain, impact and air bust detonation methods might be problematic to use, so the gunner can program a range setting into the missile's guidance system that will cause a detonation after a certain amount of flight time. Using this "remote" detonation method, the gunner can give the weapon its maximum range of effect.

Variants: *W235 90mm Phased Energy Missile Warhead, W249 120mm Phased Energy Missile Warhead*

4.04.6 High Explosive Missile Warhead

The nose of any missile with this warhead is constructed with a Rodinium/Carbon composite that is strong enough to penetrate soft or earthen fortifications, this allows the missile to travel a short distance into the target and detonate within its center. This method will concentrate the explosive power of the missile and make the resulting explosion more devastating. However the Rodinium composite nose will fracture and break apart upon impact with a hardened surface, vehicle armor or reinforced structures; when this happens the explosive element will "squash" against the target and form a nearly perfect disc against the surface. When detonated micro-seconds later, the explosive force will create a sizable hole in or critically damage the stricken target.

The explosive element is made of plasticized Ultritium 238 which has the explosive potential needed in this type of ordnance yet is still malleable enough to "squash" against a target. The seeker head has a computer controlled fuse with a core of Mooride Polyronite 4. The computer controlled fuse can detect if the nose of the missile has fractured upon initial impact; if it has, the round will detonate within microseconds, but if it stays intact detonation could be up to a full second after impact. The Mooride is molded into fibers embedded throughout the Ultritium 238 and connected to the fuse so as to create a unified and simultaneous explosion.

Variants: W225 90mm High Explosive Missile Warhead, W488 120mm High Explosive Missile Warhead, W625 150mm High Explosive Missile Warhead

4.04.7 Armor Piercing-High Explosive Missile Warhead

A warhead designed for attacking armored or otherwise protected targets, along with still being able to produce respectable sprawl shrapnel within the target itself. The explosive element is a shaped charge of Takemurian Lite and Tritanium. The Takemurian Lite fills the body of the round and provides the explosive potential. The Tritanium is shaped into a hollow cone with the base towards the nose of the round; when detonated the cone will fail in a predictable top to bottom fashion which will force the entire explosive potential of the round against a small point on the target. This focused explosion is capable of defeating nearly all reinforced structures and many types of heavy armor. However, it will still detonate nearly harmlessly against any energy force shield.

The warhead section is encased in a second shell made of Duranium, which will still be destroyed when the round detonates but with hold its integrity long enough to assist in focusing the explosive potential better than the single shell made of Terminium. The whole round is detonated by an impact fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds; however, these amounts are more than enough for the purposes needed.

Variants: W845 90mm Armor Piercing-High Explosive Missile Warhead, W890 120mm Armor Piercing-High Explosive Missile Warhead, W290 150mm Armor Piercing-High Explosive Missile Warhead

4.04.8 SA-I-719 "Wasp" Infantry Portable Aerospace Defense Missile System

This missile system is designed as a way for small units to possess a fully capable anti-air missile system. The seeker head of this missile is an advanced optical tracker backed up by a small active sensor. The optical sensor system is fully compatible with the Mk913 Targeting and Control Module, which is the primary dismounted launch system, and therefore has a detection range of the entire visible electromagnetic spectrum (380nm-750mm). Being passive, this method of tracking and engagement allows the missile to achieve a modicum of surprise against unsuspecting targets. If, however, the target becomes alerted and manages to nullify the passive tracking system, the missile can switch to its active system. The active sensor is short range only, maximum range in ideal conditions is only 5 kilometers, but it can detect any viable target anywhere within that range. The guidance package on the missile has the ability to quickly switch between the two sensor systems as each has acquired the selected target; if the optical system losses the target the active sensor will engage, and if the optical system has reacquisition the active system will turn off. The maneuverability package of this missile was designed with close combat in mind; meaning that even though the range is limited to 30 kilometers, its maximum speed is close to 2000 meters per second and it can execute turns at nearly 30 times the force of standard gravity. These combined systems allow the missile to achieve a nearly 80% kill probability even against high speed, high performance aerospace craft.

The missile body itself maintains the same basic construction principles as any other ground based

system. However, it is both longer and thinner than the 90mm missiles typically used with the Mk913; 35mm in diameter and 1.5 meters long. The protective shell of this missile will fit inside the firing tube of the targeting package, intentionally designed in this manner so that the combined system will not be prohibitively cumbersome to use. The warhead section is a high explosive type, a large amount of Ultritium 238 encased in a pre-scored shell of Monotanium triggered by either proximity or impact detonation. The shell of the warhead section is especially thick in the forward part of the missile in order to either send fragmentary shrapnel into the target's body, or create a denser cone of shrapnel against a targets probable position. The Monotanium has electromagnetic properties that allow it to more easily pass through the force shields of the target. The warhead is detonated by a computer controlled fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds; however, these amounts are more than enough for the purposes needed.

4.05 Artillery Based Missile Systems

All missiles used by ground forces have the same basic construction principles: a protective shell, missile body, seeker head, explosive element, and propulsion. The protective shell is cylindrical shaped, Polyalloy composite designed to encase the missile from production till employment. The flanks of the shell are thick and are capable of taking an incredible amount of punishment without failing; the ends are lighter and meant to break apart when the missile is fired and exits the shell. The whole shell is air-tight and allows the missile to be stored without maintenance or upkeep until it is used; a single data port is located near the tail end of the tube which allows the missile to be linked to its respective fire control system.

The missile body is made of Polyalloy laminated Terminium, which imparts a good blend of light weight and strength. The Polyalloy laminate is nearly frictionless, giving the missile a smoother passage through an atmosphere. The Terminium shell is tough, durable, and the same material used in Photon Torpedoes. Seeker heads and explosive elements vary widely between missiles depending on their expected targets and level of sophistication. The one constant is that range and payload size is the primary differences between each size class. Larger missiles have greater quantities of fuel for the propulsion equaling greater range and greater space for their explosive elements. Missiles of the 200mm type have ranges of 140 kilometers and can carry 120 kilograms of payload; the 400mm type has a range of 210 kilometers and 360 kilograms of payload; the 600mm type has a range of 420 kilometers and 720 kilograms of payload.

Propulsion is provided by a Deuterium-fueled Micro-Fusion Thruster and various reaction control micro-thrusters. The main propulsion thruster uses a high yield fusion reactor to propel the missile to speeds anywhere from 1000 to 2000 meters per second depending on mission and sophistication. The exhaust port for the fusion thruster is designed so that it can direct the thrust anywhere within a 45° cone focused on the center-line of the missile. This would provide for the primary maneuvering ability, reaction control and secondary maneuverability is provided by two micro-thruster assemblies located at the fore and aft ends of the missile. Each assembly has sixteen exhaust ports spaced equilaterally around the missile's circumference, and therefore capable of directing the missile into any needed maneuvers. The fuel for these thrusters is directly governed by the size and mission of each missile, so performance varies greatly between missile types.

The guidance systems for these missiles are oriented to ballistic tracks, meaning that despite great range potential they cannot fly independent courses. The limit of their flight systems is angle adjustment after being launched from a vertical launcher. While the seeker head placed in some versions have the ability to engage specific targets, they cannot follow these targets though high performance maneuvers. This limits Artillery missiles to engaging fixed installations and area effect against mobile targets.

4.05.1 High Explosive Artillery Missile

Missiles of this class are the most basic and are used only to supplement projectile artillery fires by providing quicker response times and higher firing rates. Before firing, the launching vehicle will provide the guidance system of each missile of a volley with a designated strike zone. The missile will then try to strike the center of its designated zone providing for a more accurate and dispersed area of effect for the barrage. These missiles are better suited to quick strikes, few artillery missile platforms have the ability to keep up a high volume of fire for extended periods of time like projectile artillery units.

The guidance system uses a laser range finder and sensor altimeter in order to assist in rendering a detonation at a preset distance from the ground or any solid surface. This will allow the fragmentary shrapnel produced by the explosion to cover a larger area. The core of the warhead is Ultritium 283 which is a very energetic explosive. The shell around the warhead section is twice as thick as the rest of

the missile and is constructed with pre-scored Terminium in order to increase the number and density of the fragmentary shrapnel produced upon detonation. In order to detonate the Ultitium 283, the warhead has a computer controlled fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds but these quantities are more than enough for the purposes needed.

Variants: *SS-G-433 200mm "Cobra-I" High Explosive Artillery Missile, SS-G-145 400mm "Gwardar-I" High Explosive Artillery Missile, SS-G-508 600mm "Taipan-I" High Explosive Artillery Missile*

4.05.2 Artillery Penetrator Missile

This missile class is a quick way to destroy reinforced fortifications, bunkers, any anything else that positively needs to be destroyed quickly. The nose is constructed with a solid piece of Rodinium that will allow the round to penetrate any reinforced structure or formation. Duranium is also added as a stabilizing and reinforcing backing the Rodinium nose, in order to aid in penetration, together the two metals allow the missile to penetrate nearly any physical barrier. The explosive element of the missile is Ultritium 342; the most powerful chemical explosive known to the Federation, its explosive yield is reportedly just short of small nuclear fusion weapons (the Taipan-II was once mistaken as one). The guidance system detonates the Ultritium 342 by a variably delayed impact fuse with a core of Mooride Polyronite 4. The fuse is calibrated with every round so that the crew using it can control how long the delay will be. This allows the round to be tailored to meet any target; standard bunkers would need a short delay while hardened, subsurface reinforced structures would need a longer delay. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds; however, these amounts are more than enough for the purposes needed.

The propulsion system is designed to provide the greatest amount of thrust during the descent phases of its ballistic track, giving the missile even greater penetration capabilities. The unusual feature of this weapon is the maneuvering thrusters; they're more robust and better controlled than the norm in order to allow fine course corrections or in-flight target changes. This was done so that the missile, which is a precision kill weapon, can be constantly updated with new targeting data all through its ballistic trajectory.

The guidance system is designed to engage a point target at the maximum range of its missile. It does this by using passive optical sensors in conjunction with a terrain recognition system, and a target designation interface. Normally the missile is programmed with the basic course trajectory with an impact site, this system is 98% effective; however, in order to assure a precise impact optical sensors are used to recognize and confirm the terrain and prominent features around the target. The optics can detect the entire visible electromagnetic spectrum (380nm-750mm), and will confirm the target with its stored information and maneuver to deliver the most precise strike possible, verging on 99.9% effectiveness. To achieve perfect effectiveness the missile requires the target to be designated by either microwave laser or Tachyon Beam. The missile will then use this information to constantly update its target fix and render the most effective attack possible.

The Achilles heel of this missile class is energy barriers, such as Force Shields, which are hard to pierce with a physical weapon. The missile is therefore equipped with two additions in its construction to assist in its mission, a Monotanium shell and Shield Scrambler. The Monotanium, added as a thin layer between the Polyalloy laminate and Turminium shell, has electromagnetic properties that allow it to more easily travel through a Force Shield. The Shield Scrambler is, in application, a miniature, focused electromagnetic pulse generator. It was designed to disrupt the basic operation of any Force Shield directly in the trajectory of the missile in order to render the Shield ineffective. The drawbacks are two-fold: this disruption is limited and even manually controlled shield generators are able to counteract the effects in less than 5 seconds, and use of the scrambler will destroy all the electronic components of the missile except the especially hardened fusing system. However, if the Scrambler is used seconds before impact with the target's Force Shield, the Monotanium of the shell can give the missile a better chance to pierce the defensive energy plane and render a physical impact on the target.

Variants: *SS-G-247 200mm "Cobra-II" Artillery Penetrator Missile, SS-G-927 400mm "Gwardar-II" Artillery Penetrator Missile, SS-G-118 600mm "Taipan-II" Artillery Penetrator Missile*

4.05.3 Guided Anti-Radiation Artillery Missile

This missile is used specifically to destroy threat vehicles or instillations emitting electromagnetic signatures at long ranges. The guidance package incorporates an electronic warfare suite and an area reference system in order to precisely attack any target. The electronic warfare suite will track its target by homing in on the specific electronic emissions its producing. The specific emissions to be targeted will be programmed into the round when fired so that only certain classes of threat systems will be identified. Once the missile has located its target, it will constantly update the area reference system; this system's only purpose is to allow the round to strike its target if the particular electromagnetic emissions being tracked are disabled. The area reference system is not capable rendering a hit against a mobile target, but it will place the round on the last known position of the target; and due to the large area of effect for this missile, close is good enough for at least a mission kill.

The warhead is composed of Ultritium 283 which is a very energetic explosive. The warhead section of the missile is surrounded by a pre-scored Duranium shell in order to produce thick pieces of fragmentary shrapnel that can penetrate all but the thickest armors and heavily reinforced structures. In order to detonate the Ultitium 283, the round has a computer controlled fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds but these quantities are more than enough for the purposes needed. The fuse can detonate the round either by impact, when the electronic warfare suite is used, or by air burst, when the area reference system is in use.

Variants: *SS-G-473 200mm "Cobra-III" Guided Anti-Radiation Artillery Missile, SS-G-927 400mm "Gwardar-III" Guided Anti-Radiation Artillery Missile, SS-G-118 600mm "Taipan-III" Guided Anti-Radiation Artillery Missile*

4.05.4 Armor Piercing Artillery Missile

This is a reserve type of ordnance that is extremely limited in the type of targets it is supposed to attack. The missile was designed to be used with accuracy at extreme ranges against heavily armored mobile targets. The warhead section is a shaped charge of Takemurian Lite and Tritanium. The Takemurian Lite provides the explosive potential, with the Tritanium shaped into a hollow cone with the base towards the nose. The warhead section is encased in second, sturdier shell of Duranium, which will still be destroyed when the round detonates but with hold its integrity long enough to assist in focusing the explosive potential better than the single Terminium shell. When the explosive element is detonated the cone will fail in a predictable top to bottom fashion that will force the entire explosive potential of the round against a small point on the target. This focused explosion is capable of defeating nearly all reinforced structures and many types of heavy armor. However, it will still detonate nearly harmlessly against any energy force shield. The warhead is detonated by an impact fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds; however, these amounts are more than enough for the purposes needed.

The guidance system is designed to engage a point target at the maximum range of its missile. It does this by using passive optical sensors in conjunction with an active sensor system, and a target designation interface. The missile is programmed with the basic course trajectory with an engagement zone; once inside the zone, the missile will activate one of its sensor systems which have also been programmed to engage a specific target. The basic means of target identification is an advanced optical sensor capable of detecting the entire visible electromagnetic spectrum (380nm-750mm), which is backed up by a micro-computer that allows the targeting a specific target from amongst a cluster by detecting the slight differences between its signatures and those emanating from every other possible target. A secondary means of target designation is a small, forward looking active sensor system that can provide a clear electronic picture of the battlefield when optical searches are problematic or impossible. While the sensor system is readily detectable by threat armored vehicles, the speed of the missile during its attack/descent phase limits the reaction time of the threatened crew to mere seconds. The control package also integrates a Tachyon Beam designation system that allows Fire Support Controllers, or any similarly equipped unit, to mark a target with a unique residual energy signature that the missile can then track without using the active sensor system

The Achilles heel of this missile class is energy barriers, such as Force Shields, which are hard to pierce with a physical weapon. The missile is therefore equipped with two additions in its construction to assist in its mission, a Monotanium shell and Shield Scrambler. The Monotanium, added as a thin layer between the Polyalloy laminate and Turminium shell, has electromagnetic properties that allow it to

more easily travel through a Force Shield. The Shield Scrambler is, in application, a miniature, focused electromagnetic pulse generator. It was designed to disrupt the basic operation of any Force Shield directly in the trajectory of the missile in order to render the Shield ineffective. The drawbacks are two-fold: this disruption is limited and even manually controlled shield generators are able to counteract the effects in under 5 seconds, and use of the scrambler will destroy all the electronic components of the missile expect the specially hardened fusing system. However, if the Scrambler is used seconds before impact with the target's Force Shield, the Monotanium of the shell can give the missile a better chance to pierce the defensive energy plane and render a physical impact on the target.

Variants: *SS-G-349 200mm "Cobra-IV" Armor Piercing Artillery Missile, SS-G-917 400mm "Gwardar-IV" Armor Piercing Artillery Missile, SS-G-382 600mm "Taipan-IV" Armor Piercing Artillery Missile*

4.05.5 Sub-Munition Carrier Artillery Missile

This missile is designed to disperse large quantities of different types of ordnance over a large area. While the warhead section can carry varying numbers of up to seven different types of sub-munitions, the central operating principles of the round are the same regardless. The warhead incorporates two separate charges of Thalmerite explosives, which in both cases will not harm or otherwise adversely affect the functioning of the sub-munitions. A charge is located between the Terminium shell and the carried sub-munitions in order to completely remove the shell around the warhead section and present the ordnance to the atmosphere. The second charge is in the center of the warhead section serves to explosively scatter the ordnance.

The guidance system is designed to place the sub-munitions within a specific area at the maximum range of the missile. It does this by using passive optical sensors in conjunction with a terrain recognition system. Normally the missile is programmed with the basic course trajectory with an area to which the sub-munitions are to be deployed; this system is 98% effective. However, in order to assure a precise location fix optical sensors are used to recognize and confirm the terrain and prominent features around the target. The optics can detect the entire visible electromagnetic spectrum (380nm-750mm), and will confirm the target with its stored information and maneuver to deliver the most precise distribution possible, verging on 99.9% effectiveness.

Variants: *SS-G-912 200mm "Cobra-V" Sub-Munition Carrier Artillery Missile Series, SS-G-820 400mm "Gwardar-V" Sub-Munition Carrier Artillery Missile Series, SS-G-280 600mm "Taipan-V" Sub-Munition Carrier Artillery Missile Series*

4.06 Aerospace Based Missile Systems

All missiles used to engage aerospace craft have the same basic construction principles: missile body, seeker head, explosive element, and propulsion. The missile body is made of Polyalloy laminated Terminium, which imparts a good blend of light weight and strength. The Polyalloy laminate is nearly frictionless, giving the missile a smoother passage through an atmosphere. The Terminium shell is tough, durable, and the same material used in Photon Torpedoes. Seeker heads and explosive elements vary widely between missiles depending on their expected targets and level of sophistication.

Propulsion is provided by a Deuterium-fueled Micro-Fusion Thruster and various reaction control micro-thrusters. The main propulsion thruster uses a high yield fusion reactor to propel the missile to speeds anywhere from 1000 to 11000 meters per second depending on mission and sophistication. The exhaust port for the fusion thruster is designed so that it can direct the thrust anywhere within a 45° cone focused on the center-line of the missile. This would provide for the primary maneuvering ability, reaction control and secondary maneuverability is provided by two micro-thruster assemblies located at the fore and aft ends of the missile. Each assembly has sixteen exhaust ports spaced equilaterally around the missile's circumference, and therefore capable of directing the missile into any needed maneuvers. The fuel for these thrusters is directly governed by the size and mission of each missile, so performance varies greatly between missile types.

Each type of missile has three slightly different versions that are meant for use in three distinct environments. Aerospace launched missiles are the most basic from a construction standpoint; the missile has no additional attachments or environmental protection. Missiles launched from a planetary environment have a cylindrical shaped protective shell made of Polyalloy composite designed to encase the missile from production till employment. The flanks of the shell are thick and are capable of taking an incredible amount of punishment without failing; the ends are lighter and meant to break apart when the missile is fired and exits the shell. The whole shell is air-tight and allows the missile to be stored without

maintenance or upkeep until it is used; a single data port is located near the tail end of the tube which allows the missile to be linked to its respective fire control system. Missiles intended to be used from Maritime shipping are constructed in the same fashion as those for use on the planetary environment, only their protective shells are designed to fit in specific launcher assemblies.

4.06.1 "Raijin" Defense Range Anti-Aerospace Missile

This missile is designed as a short range, defense system for units needing close range protection, or for units that do not normally need to have dedicated anti-aerospace systems. The seeker head of this missile is an advanced optical tracker backed up by a small active sensor. The optical system has a detection range encompassing the entire visible electromagnetic spectrum (380nm-750mm). Being passive, this method of tracking and engagement allows the missile to achieve a modicum of surprise against unsuspecting targets. If, however, the target becomes alerted and manages to nullify the passive tracking system, the missile can switch to its active system. The active sensor is short range only, maximum range in ideal conditions is only 5 kilometers, but it can detect any viable target anywhere within that range. The guidance package on the missile has the ability to quickly switch between the two sensor systems as each has acquired the selected target; if the optical system losses the target the active sensor will engage, and if the optical system has reacquisition the active system will turn off. The maneuverability package of this missile was designed with close combat in mind; meaning that even though the range is limited to 30 kilometers, its maximum speed is close to 3000 meters per second and it can execute turns at nearly 30 times the force of standard gravity. These systems allow the missile to achieve a nearly 90% kill probability even against high speed, high performance targets.

The warhead section is a high explosive type, 8 kilograms of Ultritium 238 encased in a pre-scored shell of Monotanium triggered by either proximity or impact detonation. The shell of the warhead section is especially thick in the forward part of the missile in order to either send shrapnel into the target's body, or create a denser cone of shrapnel against a targets probable position. The Monotanium has electromagnetic properties that allow it to more easily pass through the force shields of the target. The warhead is detonated by a computer controlled fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds; however, these amounts are more than enough for the purposes needed.

Variants: *AA-R-718, SA-H-718, SA-M-718*

4.06.2 "Lei Gong" Short Range Anti-Aerospace Missile

This system is designed to be the primary short range anti-aerospace missile weapon for every environment. The seeker head of this missile is an advanced optical tracker that has a detection range encompassing the entire visible electromagnetic spectrum (380nm-750mm). Being passive, this method of tracking and engagement allows the missile to achieve a modicum of surprise against unsuspecting targets. This sensor has a maximum range in ideal conditions of 40 kilometers and it can detect any viable target anywhere within that range. Since the guidance package relies on the launching vehicle for its target information and initial tracking/trajectory information the missile can be launched from any aspect ratio; even when the target is directly aft of the missile. However, once launched, the missile must make an independent positive identification of it target within 15 seconds or it will safety itself, and be rendered useless. Once identification is made the missile is capable of following the target through nearly any maneuvers, having a top speed of nearly 4000 meters per second and capable of turns equaling 35 times the acceleration of gravity.

The warhead section is a high explosive type, 12 kilograms of Ultritium 238 encased in a pre-scored shell of Monotanium triggered by either proximity or impact detonation. The shell of the warhead section is especially thick in the forward part of the missile in order to either send shrapnel into the target's body, or create a denser cone of shrapnel against a targets probable position. The Monotanium has electromagnetic properties that allow it to more easily pass through the force shields of the target. The detonator is a computer controlled fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds; however, these amounts are more than enough for the purposes needed.

Variants: *AA-R-829, SA-H-829, SA-M-829*

4.06.3 "Perun" Medium Range Anti-Aerospace Missile

This missile is the standard missile weapon for the Aerospace Branch and renders good service to other units needing a standoff anti-aerospace weapon. The seeker head of this missile is an active sensor system backed up by an advanced optical tracker. The active sensor is a fully capable system capable of detecting low visibility targets at the maximum range of the missile. While the system does require the launching vehicle to identify a specific target before launch, once fired the missile is capable of homing in on that specific target without assistance. To counter possible use of electronic countermeasures and for terminal guidance, the missile has an optical tracking system with the ability to detect the entire visible electromagnetic spectrum (380nm-750mm). However, the range of the optical system is limited when compared to the 80 kilometer range of the missile. Since the guidance package relies on the launching vehicle for its target information and initial tracking/trajectory information the missile can be launched from any aspect ratio; even when the target is directly aft of the missile. However, once launched, the missile must make an independent positive identification of it target within 25 seconds or it will safety itself, and be rendered useless. Once identification is made the missile is capable of following the target through nearly any maneuvers, having a top speed of nearly 4000 meters per second and capable of turns equaling 35 times the acceleration of gravity.

The warhead section is a high explosive type, 30 kilograms of Ultritium 238 encased in a pre-scored shell of Monotanium triggered by either proximity or impact detonation. The shell of the warhead section is especially thick in the forward part of the missile in order to either send shrapnel into the target's body, or create a denser cone of shrapnel against a targets probable position. The Monotanium has electromagnetic properties that allow it to more easily pass through the force shields of the target. The detonator is a computer controlled fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds; however, these amounts are more than enough for the purposes needed.

Variants: *AA-N-604, SA-V-604, SA-M-604*

4.06.4 "Indra" Long Range Anti-Aerospace Missile

This missile was designed to have exceptional long range engagement capabilities while still being able to maneuver against high performance targets. The seeker head of this missile is an active sensor system backed up by an advanced optical tracker. The active sensor is a fully capable system capable of detecting low visibility targets at the maximum range of the missile. While the system does require the launching vehicle to identify a specific target before launch, once fired the missile is capable of homing in on that specific target without assistance. To counter possible use of electronic countermeasures and for terminal guidance, the missile has an optical tracking system with the ability to detect the entire visible electromagnetic spectrum (380nm-750mm). However, the range of the optical system is limited when compared to the 180 kilometer range of the missile. Since the guidance package relies on the launching vehicle for its target information and initial tracking/trajectory information the missile can be launched from nearly any aspect ratio; its maximum is 180° of the centerline of the centerline of the missile. However, once launched, the missile must make an independent positive identification of it target within 35 seconds or it will safety itself, and be rendered useless. Once identification is made the missile is capable of following the target through nearly any maneuvers, having a top speed of nearly 4000 meters per second and capable of turns equaling 30 times the acceleration of gravity.

The warhead section is a high explosive type, 65 kilograms of Ultritium 238 encased in a pre-scored shell of Monotanium triggered by either proximity or impact detonation. The shell of the warhead section is especially thick in the forward part of the missile in order to either send shrapnel into the target's body, or create a denser cone of shrapnel against a targets probable position. The Monotanium has electromagnetic properties that allow it to more easily pass through the force shields of the target. The detonator is a computer controlled fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds; however, these amounts are more than enough for the purposes needed.

In order to assure that this type of missile achieves the most damaging explosion it is equipped with two additions in its construction, a Monotanium shell and Shield Scrambler. The Monotanium, added as a thin layer between the Polyalloy laminate and Turminium shell, has electromagnetic properties that allow it to more easily travel through a Force Shield. The Shield Scrambler is, in application, a miniature, focused electromagnetic pulse generator. It was designed to disrupt the basic operation of any Force Shield directly in the trajectory of the missile in order to render the Shield ineffective. The drawbacks are two-

fold: this disruption is limited and even manually controlled shield generators are able to counteract the effects in less than 5 seconds, and use of the scrambler will destroy all the electronic components of the missile except the especially hardened fusing system. However, if the Scrambler is used seconds before impact with the target's Force Shield, the Monotanium of the shell can give the missile a better chance to pierce the defensive energy plane and render a physical impact on the target.

Variants: *AA-L-691, SA-V-691, SA-M-691*

4.06.5 "Pikne" Theater Range Anti-Aerospace Missile

This missile was primarily intended to be used from ground locations as a standoff defense weapon against large aerospace craft and cruise missiles. The aerospace launched version was brought about as a force multiplier weapon for Aerospace Branch forces engaging large numbers of space-capable attack ships. The seeker head of this missile is an active sensor system backed up by an advanced optical tracker. The active sensor is a fully capable system capable of detecting low visibility targets at the maximum range of the missile. While the system does require the launching vehicle to identify a specific target before launch, once fired the missile is capable of homing in on that specific target without assistance. To counter possible use of electronic countermeasures and for terminal guidance, the missile has an optical tracking system with the ability to detect the entire visible electromagnetic spectrum (380nm-750mm). However, the range of the optical system is limited when compared to the 200 kilometer range of the missile. Since the guidance package relies on the launching vehicle for its target information and initial tracking/trajectory information the missile can be launched from nearly any aspect ratio; its maximum is 180° of the centerline of the centerline of the missile. However, once launched, the missile must make an independent positive identification of it target within 40 seconds or it will safety itself, and be rendered useless. Once identification is made the missile is capable of following the target through nearly any maneuvers, having a top speed of nearly 4000 meters per second and capable of turns equaling 30 times the acceleration of gravity

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The warhead section is a high explosive type, 100 kilograms of Ultritium 238 encased in a pre-scored shell of Monotanium triggered by either proximity or impact detonation. The shell of the warhead section is especially thick in the forward part of the missile in order to either send shrapnel into the target's body, or create a denser cone of shrapnel against a targets probable position. The Monotanium has electromagnetic properties that allow it to more easily pass through the force shields of the target. The detonator is a computer controlled fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds; however, these amounts are more than enough for the purposes needed.

In order to assure that this type of missile achieves the most damaging explosion it is equipped with two additions in its construction, a Monotanium shell and Shield Scrambler. The Monotanium, added as a thin layer between the Polyalloy laminate and Turminium shell, has electromagnetic properties that allow it to more easily travel through a Force Shield. The Shield Scrambler is, in application, a miniature, focused electromagnetic pulse generator. It was designed to disrupt the basic operation of any Force Shield directly in the trajectory of the missile in order to render the Shield ineffective. The drawbacks are two-fold: this disruption is limited and even manually controlled shield generators are able to counteract the effects in less than 5 seconds, and use of the scrambler will destroy all the electronic components of the missile except the especially hardened fusing system. However, if the Scrambler is used seconds before impact with the target's Force Shield, the Monotanium of the shell can give the missile a better chance to pierce the defensive energy plane and render a physical impact on the target.

Variants: *AA-T-742, SA-V-742, SA-M-742*

4.06.6 "Xolotl" Orbital Range Anti-Aerospace Missile

This missile is the only way from planetary forces to defend themselves from hostile starship forces. The Aerospace Branch also uses this missile to allow for standoff capabilities against starship targets in any environment. The seeker head of this missile is an active sensor system backed up by an advanced optical tracker. The active sensor is a fully capable system capable of detecting low visibility targets at the maximum range of the missile. While the system does require the launching vehicle to identify a specific target before launch, once fired the missile is capable of homing in on that specific target without assistance. To counter possible use of electronic countermeasures and for terminal guidance, the missile has an optical tracking system with the ability to detect the entire visible electromagnetic spectrum (380nm-750mm). However, the range of the optical system is limited when compared to the 600 kilometer range of the missile. Since the guidance package relies on the launching vehicle for its target information

and initial tracking/trajectory information the missile can be launched from nearly any aspect ratio; its maximum is 180° of the centerline of the centerline of the missile. However, once launched, the missile must make an independent positive identification of it target within 60 seconds or it will safety itself, and be rendered useless. Once identification is made the missile is capable of following the target through nearly any maneuvers, having a top speed of nearly 12000 meters per second and capable of turns equaling 25 times the acceleration of gravity.

This missile has is highly restricted in its engagement situations because its uses a matter/anti-matter warhead. Since anti-matter weapons have a devastating effect on the environment of nearly any planet, Marine forces may not detonate this weapon within 100 kilometers of a planet's surface. The only exception is when a clear and imminent threat exists from an atmospheric capable starship operating below this altitude. The warhead is the standard Matter/Anti-Matter type used in Star Fleet Type-6 Photon Torpedoes, capable of a maximum yield of 200 isotons. However this particular warhead has a selectable yield feature which can limit the explosive force to a minimum of 20 isotons, particularly useful when engaging small starships under the 100 kilometer altitude restriction.

In order to assure that this type of missile achieves the most damaging explosion it is equipped with two additions in its construction, a Monotanium shell and Shield Scrambler. The Monotanium, added as a thin layer between the Polyalloy laminate and Turminium shell, has electromagnetic properties that allow it to more easily travel through a Force Shield. The Shield Scrambler is, in application, a miniature, focused electromagnetic pulse generator. It was designed to disrupt the basic operation of any Force Shield directly in the trajectory of the missile in order to render the Shield ineffective. The drawbacks are two-fold: this disruption is limited and even manually controlled shield generators are able to counteract the effects in less than 5 seconds, and use of the scrambler will destroy all the electronic components of the missile except the especially hardened fusing system. However, if the Scrambler is used seconds before impact with the target's Force Shield, the Monotanium of the shell can give the missile a better chance to pierce the defensive energy plane and render a physical impact on the target.

Variants: *AO-X-547, SO-X-547, SO-M-547*

4.07 Attack Missile Systems

All missiles used to engage surface targets have the same basic construction principles: missile body, seeker head, explosive element, and propulsion. The missile body is made of Polyalloy laminated Terminium, which imparts a good blend of light weight and strength. The Polyalloy laminate is nearly frictionless, giving the missile a smoother passage through an atmosphere. The Terminium shell is tough, durable, and the same material used in Photon Torpedoes. Seeker heads and explosive elements vary widely between missiles depending on their expected targets and level of sophistication.

Propulsion is provided by a Deuterium-fueled Micro-Fusion Thruster and various reaction control micro-thrusters. The main propulsion thruster uses a high yield fusion reactor to propel the missile to speeds anywhere from 1000 to 11000 meters per second depending on mission and sophistication. The exhaust port for the fusion thruster is designed so that it can direct the thrust anywhere within a 45° cone focused on the center-line of the missile. This would provide for the primary maneuvering ability, reaction control and secondary maneuverability is provided by two micro-thruster assemblies located at the fore and aft ends of the missile. Each assembly has sixteen exhaust ports spaced equilaterally around the missile's circumference, and therefore capable of directing the missile into any needed maneuvers. The fuel for these thrusters is directly governed by the size and mission of each missile, so performance varies greatly between missile types.

Each type of missile has three slightly different versions that are meant for use in three distinct environments. Aerospace launched missiles are the most basic from a construction standpoint; the missile has no additional attachments or environmental protection. Missiles launched from a planetary environment have a cylindrical shaped protective shell made of Polyalloy composite designed to encase the missile from production till employment. The flanks of the shell are thick and are capable of taking an incredible amount of punishment without failing; the ends are lighter and meant to break apart when the missile is fired and exits the shell. The whole shell is air-tight and allows the missile to be stored without maintenance or upkeep until it is used; a single data port is located near the tail end of the tube which allows the missile to be linked to its respective fire control system. Missiles intended to be used from Maritime shipping are constructed in the same fashion as those for use on the planetary environment, only their protective shells are designed to fit in specific launcher assemblies.

4.07.1 High Explosive Rocket Pod

These weapons were designed as a cheap, effective, and highly deployable general purpose weapon capable of being used from multiple platforms. Each reusable launching pod contains a variable number of rockets, 19 for the 70mm version and 7 for the 140mm version, that are ripple fired at a rate of one rocket every second. While the warhead section is rather small, the sum total of multiple rockets being placed within a 10 meter circle from the 400 meter effective range can have a devastating effect. To decrease maintenance requirements the propulsion and reaction control systems have been drastically simplified as compared to other missile systems. The main thruster nozzle doesn't have the ability to direct the thrust, and the reaction control system has been reduced to a single assembly at the tail. However, since it was designed as a line of sight, minimally guided weapon there was no need for excessive maneuverability.

The weapon does integrate a very basic guidance system that can only aid in targeting and not pursue or independently engage a target. The seeker head is a small active sensor system that can detect humanoid sized targets at the maximum effective range of the weapon within a 45° cone of the launch trajectory. The guidance system will then use this data to place the missile as close as possible to a target. The sensor system can also detect range to the ground or any other solid surface which the guidance system will use to render an air burst detonation at a 2 meter altitude. However the guidance package doesn't have the ability to distinguish between friendly and hostile forces, so care should be taken when being used around friendly forces.

The warhead section for the 70mm version contains 5 kilograms of Ultritium 283, and the 140mm version has 10 kilograms. The fusing is computer controlled and the fuse itself has a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds but these quantities are more than enough for the purposes needed.

Variants: *AS-R-850 "Hankyū" 70mm High Explosive Rocket Pod, SS-R-850 "Hankyū" 70mm High Explosive Rocket Pod, SS-M-850 "Hankyū" 70mm High Explosive Rocket Pod, AS-R-454 "Yumi" 140mm High Explosive Rocket Pod, SS-R-454 "Yumi" 140mm High Explosive Rocket Pod, SS-M-454 "Yumi" 140mm High Explosive Rocket Pod*

4.07.2 Armor Piercing Rocket Pod

These weapons were designed as a cheap, effective, and highly deployable weapon capable of defeating armored vehicles and field fortifications from multiple possible platforms. Each reusable launching pod contains a variable number of rockets, 19 for the 70mm version and 7 for the 140mm version, that are ripple fired at a rate of one rocket every second. While the warhead section is rather small, the sum total of multiple rockets being placed on a single target from the 400 meter effective range can have a devastating effect. To decrease maintenance requirements the propulsion and reaction control systems have been drastically simplified as compared to other missile systems. The main thruster nozzle doesn't have the ability to direct the thrust, and the reaction control system has been reduced to a single assembly at the tail. However, since it was designed as a line of sight, minimally guided weapon there was no need for excessive maneuverability.

The weapon does integrate a very basic guidance system that can only aid in targeting and not pursue or independently engage a target. The seeker head is a small active sensor system that can detect humanoid sized targets at the maximum effective range of the weapon within a 45° cone of the launch trajectory. The guidance system will then use this data to try and place the missile within 2 meters of, if not directly against, a target. However the guidance package doesn't have the ability to distinguish between friendly and hostile forces, so care should be taken when being used around friendly forces.

The warhead is shaped charge of Takemurian Lite and Tritanium. The Takemurian Lite fills the body of the warhead and provides the explosive potential. The Tritanium is shaped into a hollow cone with the base towards the nose of the rocket; when detonated the cone will fail in a predictable top to bottom fashion that will force the entire explosive potential of the round against a small point on the target. This focused explosion is capable of defeating nearly reinforced structures and many types of armor. However, it will still detonate nearly harmlessly against any energy force shield. In this missile the shell around the warhead section is made with Duranium instead of the typical Terminium. This is done because the Duranium, though it will still be destroyed upon detonation, will hold its integrity long enough to properly focus the explosion better than Terminium.

Variants: *AS-R-850 "Hankyū" 70mm Armor Piercing Rocket Pod, SS-R-850 "Hankyū" 70mm Armor*

Piercing Rocket Pod, SS-M-850 "Hankyū" 70mm Armor Piercing Rocket Pod, AS-R-623 "Yumi" 140mm Armor Piercing Rocket Pod, SS-R-623 "Yumi" 140mm Armor Piercing Rocket Pod, SS-M-623 "Yumi" 140mm Armor Piercing Rocket Pod

4.07.3 "Bolo" Surface Attack Missile

This missile is a general purpose missile designed to engage any number of surface threats. The guidance package of the missile is a combination system of both an active sensor system and a passive optical system. In either case the missile will take its target information from the launching vehicle, and use this data to independently acquire the target. The active system is capable of detecting any number of possible targets out to the maximum range of the missile, which is 30 kilometers. The passive optical sensor, the preferred method of engagement, is slightly less capable with a maximum range of only 25 kilometers and it can only detect targets within a 180° cone of the front of the missile. However, it is capable of detecting the entire visible electromagnetic spectrum (380nm-750mm). In either case the guidance package has a micro-computer that allows the missile to engage a specific target from amongst a cluster by detecting the slight differences between its signatures and those emanating from every other possible target.

The maneuverability of the missile is sufficient enough to engage mobile targets like main battle tanks but will have trouble rendering a direct impact against a highly mobile target. The guidance package can also be programmed with a particular attack profile or trajectory in order to assist the warhead in delivering the most devastating damage possible; however the target must remain within the line of sight of the missile to be effective. The warhead itself is composed of 140 kilograms of Ultritium 238, a very energetic chemical explosive. The warhead is encased in a Duranium shell in the shape of a shallow cone; this arrangement is referred to a rough shaped charge. While not as effective as a true shaped charge, it does focus about 60% of the explosive force of the Ultritium 238 against the surface being struck. This force is more than enough for standard fortifications and light armored vehicles, and still produces enough fragmentary shrapnel to be dangerous to infantry targets and light vehicles.

Variants: *AS-C-608, SS-C-608, SS-M-608*

4.07.4 "Kunai" Short Range Heavy Attack Missile

This missile is designed to engage and destroy heavily armored vehicles and reinforced structures at 10 kilometer ranges. The guidance and maneuvering systems support this mission; while exceedingly accurate they have difficulty engaging highly mobile targets. The seeker head contains a dual tracking system, a laser or Tachyon Beam tracking seeker and a passive sensor receiver. The launching vehicle, or other similarly equipped unit, will designate a target by means of a microwave laser, Tachyon beam, or active sensor onto which the missile tracks. This allows the unit that is controlling the terminal guidance to ensure that the missile strikes the correct target, even if that targets changes during the flight of the missile. Any method of illuminating a target can be dangerous due to possible counter attack during the missile's flight, but the unit designating the target is usually a highly mobile aerospace craft or well concealed ground unit. The guidance package is also capable of variable flight profiles against a particular target; it can attack on a direct path from the launching unit, or render an attack the target's sides or top. While not strictly a line of sight weapon, its greatest performance is given when used in such a role.

The 20 kilogram warhead is a shaped charge of Takemurian Lite and Tritanium. The Takemurian Lite fills the body of the warhead and provides the explosive potential. The Tritanium is shaped into a hollow cone with the base towards the nose of the rocket; when detonated the cone will fail in a predictable top to bottom fashion that will force the entire explosive potential of the round against a small point on the target. This focused explosion is capable of defeating nearly reinforced structures and many types of armor. However, it will still detonate nearly harmlessly against any energy force shield. In this missile the shell around the warhead section is made with Duranium instead of the typical Terminium. This is done because the Duranium, though it will still be destroyed upon detonation, will hold its integrity long enough to properly focus the explosion better than Terminium.

Variants: *AS-C-597, SS-C-597, SS-M-597*

4.07.5 "Makhaira" Long Range Heavy Attack Missile

This missile was originally designed as a long range anti-shipping missile for engaging maritime surface targets. But the maneuverability and guidance packages are more than capable of engaging reinforced structures and even heavily armored vehicles. The seeker head of this missile is an active sensor system backed up by an advanced optical tracker. The active sensor is a fully capable system capable

of detecting low visibility targets at the maximum range of the missile. While the system does require the launching vehicle to identify a specific target before launch, once fired the missile is capable of homing in on that specific target without assistance. To counter possible use of electronic countermeasures and for terminal guidance, the missile has an optical tracking system with the ability to detect the entire visible electromagnetic spectrum (380nm-750mm). However, the range of the optical system is rather limited when compared to the 250 kilometer range of the missile. The guidance package on the missile has the ability to quickly switch between the two sensor systems as each has acquired the selected target; if the optical system losses the target the active sensor will engage, and if the optical system has reacquisition the active system will turn off. To aid in long range strikes the guidance uses a micro-computer linked to the optical sensors to recognize and confirm the terrain and prominent features around the target. This micro-computer can also be used to confirm the target with its stored information and maneuver to deliver the most precise strike possible.

The 250 kilogram warhead is a shaped charge of Takemurian Lite and Tritanium. The Takemurian Lite fills the body of the warhead and provides the explosive potential. The Tritanium is shaped into a hollow cone with the base towards the nose of the rocket; when detonated the cone will fail in a predictable top to bottom fashion that will force the entire explosive potential of the round against a small point on the target. This focused explosion is capable of defeating nearly all reinforced structures and many types of armor. However, it will still detonate nearly harmlessly against any energy force shield. In this missile the shell around the warhead section is made with Duranium instead of the typical Terminium. This is done because the Duranium, though it will still be destroyed upon detonation, will hold its integrity long enough to properly focus the explosion better than Terminium.

In order to assure that this type of missile achieves the most damaging explosion it is equipped with two additions in its construction, a Monotanium shell and Shield Scrambler. The Monotanium, added as a thin layer between the Polyalloy laminate and Turminium shell, has electromagnetic properties that allow it to more easily travel through a Force Shield. The Shield Scrambler is, in application, a miniature, focused electromagnetic pulse generator. It was designed to disrupt the basic operation of any Force Shield directly in the trajectory of the missile in order to render the Shield ineffective. The drawbacks are two-fold: this disruption is limited and even manually controlled shield generators are able to counteract the effects in less than 5 seconds, and use of the scrambler will destroy all the electronic components of the missile except the especially hardened fusing system. However, if the Scrambler is used seconds before impact with the target's Force Shield, the Monotanium of the shell can give the missile a better chance to pierce the defensive energy plane and render a physical impact on the target.

Variants: *AS-C-877, SS-C-877, SS-M-877*

4.07.6 "Khopesh" Short Range Anti-Radiation Missile

This missile is designed to allow small units to possess a capable weapon to attack sensor positions and any units using active electronics. The guidance package incorporates an electronic warfare suite and an area reference system in order to precisely attack any target. The electronic warfare suite will track its target by homing in on the specific electronic emissions its producing from a range of 50 kilometers. The specific emissions to be targeted will be programmed into the round when fired so that only certain classes of threat systems will be identified. Once the missile has located its target, it will constantly update the area reference system; this system's only purpose is to allow the round to strike its target if the particular electromagnetic emissions being tracked are disabled. The area reference system is not capable rendering a hit against a mobile target, but it will place the round on the last known position of the target; and due to the large area of effect for this missile, close is good enough for at least a mission kill.

The 12 kilogram warhead is composed of Ultritium 283 which is a very energetic explosive. The warhead section of the missile is surrounded by a pre-scored Duranium shell in order to produce thick pieces of fragmentary shrapnel that can penetrate all but the thickest armors and heavily reinforced structures. In order to detonate the Ultitium 283, the round has a computer controlled fuse with a core of Mooride Polyronite 4. Mooride is incredibly explosive itself and only microscopic amounts are used in Explosive rounds but these quantities are more than enough for the purposes needed. The fuse can detonate the round either by impact, when the electronic warfare suite is used, or by air burst, when the area reference system is in use.

Variants: *AS-E-955, SS-E-955, SS-M-955*

4.07.7 "Eskrima" Medium Range Anti- Radiation Missile

This missile is designed to engage and destroy sensor positions or other units using active electronics at standoff ranges with accuracy. The guidance package incorporates an electronic warfare suite and an area reference system in order to precisely attack any target. The electronic warfare suite will track its target by homing in on the specific electronic emissions its producing from 110 kilometers away. The specific emissions to be targeted will be programmed into the round when fired so that only certain classes of threat systems will be identified. Once the missile has located its target, it will constantly update the area reference system; this system's only purpose is to allow the round to strike its target if the particular electromagnetic emissions being tracked are disabled. The area reference system is not capable rendering a hit against a mobile target, but it will place the round on the last known position of the target; and due to the large area of effect for this missile, close is good enough for at least a mission kill.

The warhead itself is composed of 160 kilograms of Ultritium 238, a very energetic explosive. The warhead is encased in a Duranium shell in the shape of a shallow cone; this arrangement is referred to a rough shaped charge. While not as effective as a true shaped charge, it does focus about 60% of the explosive force of the Ultritium 238 against the surface being struck. This force is more than enough for standard fortifications and light armored vehicles, and still produces enough fragmentary shrapnel to be dangerous to infantry targets and light vehicles. The fuse can detonate the round either by impact, when the electronic warfare suite is used, or by air burst, when the area reference system is in use.

Variants: *AS-E-804, SS-E-804, SS-M-804*

4.07.8 "Sarissa" Long Range Anti-Radiation Missile

This missile could be described as a cruise missile with its 450 kilometer range, but its guidance package is specifically designed to attack electronic emissions. The guidance package incorporates an electronic warfare suite, an area reference system, and an internal navigation system in order to precisely attack any target. The navigation system is programmed with the all the data necessary to fly a precise course from its launch point to the target area. However, the system maintains a link with the navigational system of the launching vehicle at all times, and is constantly updating its own flight path in direct relation to the carrying vehicle. This assures that once the missile has been properly programmed, it can always find its way to its engagement area no matter what action the launching vehicle is taking. Once inside the engagement area the electronic warfare suite will begin to track its target by homing in on the specific electronic emissions. The specific emissions to be targeted will be programmed into the round when fired so that only certain classes of threat systems will be identified. Once the missile has located its target, it will constantly update the area reference system; this system's only purpose is to allow the round to strike its target if the particular electromagnetic emissions being tracked are disabled. The area reference system is not capable rendering a hit against a mobile target, but it will place the round on the last known position of the target; and due to the large area of effect for this missile, close is good enough for at least a mission kill.

The warhead itself is composed of 200 kilograms of Ultritium 238, a very energetic explosive. The warhead is encased in a Duranium shell in the shape of a shallow cone; this arrangement is referred to a rough shaped charge. While not as effective as a true shaped charge, it does focus about 60% of the explosive force of the Ultritium 238 against the surface being struck. This force is more than enough for standard fortifications and light armored vehicles, and still produces enough fragmentary shrapnel to be dangerous to infantry targets and light vehicles. The fuse can detonate the round either by impact, when the electronic warfare suite is used, or by air burst, when the area reference system is in use.

Variants: *AS-E-499, SS-E-499, SS-M-499*

4.07.9 "Halberd" Attack Cruise Missile

This missile is the epitome of long range missile weaponry; capable of ranges in excess of 2000 kilometers it can precisely deliver a high explosive warhead with little or no input from controllers. Designed to strike fixed, reinforced structures the guidance package is robust but not particularly agile. To assure accuracy at long ranges is a quintuplet of systems referred to as the Comprehensive Missile Guidance Package (CMGP) which incorporates an active sensor, inertial guidance system, electronic warfare suite, a passive sensor receiver, and an optical sensor array. The inertial guidance system is the basic navigational tool of the overall guidance package, it is updated and programmed by the firing vehicle with not only the flight path to the target, but also all the details of the terrain from the point of launch to the target. This hyper accurate mapping system allows the missile to change its course without outside control so as to avoid

threats and make changes in response to unforeseen situations. The optical system is an advanced design capable of detecting the entire visible electromagnetic spectrum (380nm-750mm), therefore can be used during any atmospheric condition to detect the local terrain around the missile. This allows the inertial navigation system to constantly track and confirm itself with its pre-programmed data. The active sensor is used for final trajectory and prosecuting the target; once activated it's capable of detecting humanoid sized targets out to 10 kilometers and identify any structure or vehicle within that range. Used to confirm the missile's target and allow for the most precise detonation or attack profile. The passive sensor receiver is keyed to track on Tachyon Beams or microwave lasers used in target designation systems so as to achieve an overtly precise and or stealthy attack. With the inertial guidance system having a large amount of information that the CMGP uses the electromagnetic warfare system or passive sensor receiver to detect a threat system capable of attacking the missile and then avoids the systems in order to preserve either stealth or for self-defense.

The nose of the missile is constructed with a solid piece of Rodinium that will allow the round to penetrate any reinforced structure or formation. Duranium is also added as a stabilizing and reinforcing backing the Rodinium nose, in order to aid in penetration, together the two metals allow the missile to penetrate nearly any physical barrier. The warhead is composed of 500 kilograms of Ultritium 238, a very energetic chemical explosive. The warhead is encased in a Duranium shell in the shape of a shallow cone; this arrangement is referred to a rough shaped charge. While not as effective as a true shaped charge, it does focus about 60% of the explosive force of the Ultritium 238 against the surface being struck. This force is more than enough for standard fortifications and light armored vehicles, and still produces enough fragmentary shrapnel to be dangerous to infantry targets and light vehicles. The fuse can detonate the round either by impact, air burst, or delayed impact when used against bunkers or other reinforced structures.

In order to assure that this type of missile achieves the most damaging explosion it is equipped with two additions in its construction, a Monotanium shell and Shield Scrambler. The Monotanium, added as a thin layer between the Polyalloy laminate and Turminium shell, has electromagnetic properties that allow it to more easily travel through a Force Shield. The Shield Scrambler is, in application, a miniature, focused electromagnetic pulse generator. It was designed to disrupt the basic operation of any Force Shield directly in the trajectory of the missile in order to render the Shield ineffective. The drawbacks are two-fold: this disruption is limited and even manually controlled shield generators are able to counteract the effects in less than 5 seconds, and use of the scrambler will destroy all the electronic components of the missile except the especially hardened fusing system. However, if the Scrambler is used seconds before impact with the target's Force Shield, the Monotanium of the shell can give the missile a better chance to pierce the defensive energy plane and render a physical impact on the target.

Variants: *AS-K-901, SS-K-901, SS-M-901*

4.07.10 "Ji" Sub-Munitions Carrying Cruise Missile

This missile is the epitome of long range missile weaponry; capable of ranges in excess of 2000 kilometers it can precisely deliver a devastating assortment of ordnance with little or no input from controllers. Designed to carpet an area with sub-munitions the guidance package is robust but not particularly agile. To assure accuracy at long ranges is a quintuplet of systems referred to as the Comprehensive Missile Guidance Package (CMGP) which incorporates an active sensor, inertial guidance system, electronic warfare suite, a passive sensor receiver, and an optical sensor array. The inertial guidance system is the basic navigational tool of the overall guidance package, it is updated and programmed by the firing vehicle with not only the flight path to the target, but also all the details of the terrain from the point of launch to the target. This hyper accurate mapping system allows the missile to change its course without outside control so as to avoid threats and make changes in response to unforeseen situations. The optical system is an advanced design capable of detecting the entire visible electromagnetic spectrum (380nm-750mm), therefore can be used during any atmospheric condition to detect the local terrain around the missile. This allows the inertial navigation system to constantly track and confirm itself with its pre-programmed data. The active sensor is used for final trajectory and prosecuting the target; once activated it's capable of detecting man sized targets out to 10 kilometers and identify any structure or vehicle within that range. Used to confirm the missile's target and allow for the most precise detonation or attack profile. The passive sensor receiver is keyed to track on Tachyon Beams or microwave lasers used in target designation systems so as to achieve an overtly precise and or stealthy attack. With the inertial guidance system having a large amount of information that the CMGP uses the electromagnetic warfare system or passive sensor receiver to detect a threat system capable of attacking the missile and then avoids the systems in order to preserve either stealth or for self-defense.

While the warhead section can carry 500 kilograms of up to seven different types of sub-munitions, the central operating principles of the round are the same regardless. The warhead incorporates two separate charges of Thalmerite explosives, which in both cases will not harm or otherwise adversely affect the functioning of the sub-munitions. A charge is located between the Terminium shell and the carried sub-munitions in order to completely remove the shell around the warhead section and present the ordnance to the atmosphere. The second charge is in the center of the warhead section serves to explosively scatter the ordnance. Where this ordnance is scattered is determined by the pre-programmed coordinates of the missile. When used independently the missile is given a precise pattern to disperse the sub-munitions and then will render a kinetic impact to the nearest threat target in hopes of at least damaging it. When used in conjunction with other missiles, each individual missile is programmed with a separate dispersal pattern. However since the gunners will normally program these patterns to overlap, the missile can use its active sensor along with its intelligent guidance package to adjust profiles while in attack mode. If the active sensor detects that the programmed dispersal pattern is void of targets or another section of the attack area has more targets the missile will adjust its trajectory to strike these secondary targets. In this way ordnance will not be wasted against destroyed targets or a rapidly changing situation can be exploited without outside input.

Variants: *AS-K-498, SS-K-498, SS-M-498*

4.08 Bombs

Bombs are weapons used by Aerospace craft as a quickly deployable, force multiplier that equates high performance with low technology options. The body of every bomb is made of Polyalloy laminated Terminium, which imparts a good blend of light weight and strength. The Polyalloy laminate is nearly frictionless, giving the bomb a smoother passage through an atmosphere. The Terminium shell is tough, durable, and the same material used in Photon Torpedoes. These weapons do not use propulsion or anti-gravity systems, therefore all their momentum is imparted by the inertia of the launching craft. A reaction control system is used to stabilize the bombs and ensure that they impact exactly where the launching vehicle intends them to. This reaction control system consists of two micro-thruster assemblies located at the fore and aft ends of the missile. Each assembly has sixteen exhaust ports spaced equilaterally around the missile's circumference, and therefore capable of directing the missile into any needed maneuvers. The fuel for these thrusters is directly governed by the size and mission of each missile, so performance varies greatly.

Using a bombardment weapon takes skill on the part of the pilot or gunner since these weapons are minimally guided in most situations. When in use, the engagement system on the launching craft will calculate an individual bomb's trajectory based on the maneuvers and speed of the craft and the planet's geography, environmental conditions, and atmosphere. Once the bomb has been armed, its guidance system is constantly updated by the engagement systems of the launching craft as to the projected trajectory. Using an advanced optical sensor capable of detecting the entire visible electromagnetic spectrum (380nm-750mm), the guidance system of the bomb is able to maintain a lock on the projected impact point provided by the craft's engagement system. These position locks can also be designated by the launching craft, and using the optical sensor the guidance system can engage a specific target by detecting the slight differences between its signatures and those emanating from the surrounding environment or other targets. This allows the launching craft to designate particular target or location for the bomb to impact. While the lack of any sort of propulsion system restricts the cross mobility of bombardment weapons, meaning they cannot reliably strike mobile targets, it does allow the weapon to strike fixed fortifications or a particular location with a high degree of reliability.

Using the optical sensor, the guidance system is capable of detecting the distance to the surface of a planet or other hardened material. This allows every class of bomb to render the traditional impact detonation, air burst, or delayed impact. With air bursting, the pilot or gunner must chose the distance above the target for the weapon to detonate at; the automatic preset on every weapon is 10 meters. The delayed impact detonation is rather more complicated, as not every bomb has the physical ability to penetrate much in the way of hardened or reinforced material. While the pilot or gunner can select a depth that the bomb will detonate at, the bomb's guidance is capable of overriding this selection if necessary. This override is controlled by the bomb's microcomputer that monitors overall weapon performance and structural integrity. When performing a delayed impact detonation, if the control microcomputer detects that the weapon will suffer too much damage prior to reaching the prescribed depth and is in danger of failing to detonate, the bomb will detonate prematurely in order to at least inflict some damage on the target.

4.08.1 AS-B-109 "Elara" Phased Energy Bomb

This weapon is of limited usefulness in a general combat arena due to its particular lack of defeating medium armored vehicles or reinforced structures. The core consists of two high density phased energy capacitors charged to near overload and connected by low resistance isolinear circuitry that would allow the energy to pass between the two capacitors without any resistance. However each capacitor is charged with energy of a different polarity, this means that when the connecting circuitry is made active the highly differential charges would cause a massive short circuit with a massive explosion. The explosion releases a phased energy pulse that can be as powerful as the level 32 setting on a Heavy Phaser Rifle, with lethal effects on any organic target within the 600 meter blast radius. However this weapon is rarely used as an attack weapon, instead it's used as an area clearing device.

When detonated, the pressure wave produced by the phased energy explosion exerts a physical force on the surrounding terrain. While certainly note enough to cause crippling damage to reinforced structures; primitive structures along with nearly all types of vegetation are crushed underneath the pressure wave. In this way the weapon can be used to clear a landing zone for units to immediately exploit. Because every situation is different and not always requiring such a massive explosion, the weapon has a selectable yield ranging from the traditional blast energy equivalent to the level 16 setting on a standard Phaser Rifle, which actually has a blast radius of over 1000 meters but with significantly less impact on the terrain, to the large blast earlier described.

4.08.2 General Purpose Bomb

This is a common and general use bombardment weapon capable of being used in nearly any situation. The Terminium shell is twice as thick in this weapon as normal, and specially pre-scored to deliver a wide range of sizes of fragmentary shrapnel. The warhead itself is composed of Ultritium 238, a very energetic explosive. The warhead is shaped into a shallow cone; this arrangement is referred to a rough shaped charge. While not as effective as a true shaped charge, it does focus about 60% of the explosive force of the Ultritium 238 against the surface being struck. This force is more than enough for standard fortifications and light armored vehicles, and still produces enough fragmentary shrapnel to be dangerous to infantry targets and light vehicles. In each weapon, the mass of explosive element is exactly 75% of the weapons total mass; meaning that the 1000 kilogram weapon has 750 kilograms of explosive.

Variants: *AS-B-251 "Europa" 125 Kilogram, AS-B-485 "Io" 250 Kilogram, AS-B-287 "Callisto" 500 Kilogram, AS-B-962 "Ganymede" 1000 Kilogram*

4.08.3 AS-B-480 "Himalia" Anti-Surface Bomb

This bombardment weapon is used to destroy low cross section, hard to target surface instillations such as air strips, landing zones, vehicular roadways, etc. The nose is constructed with a solid piece of Rodinium that will allow the round to penetrate any reinforced material or formation. Duranium is also added as a stabilizing and reinforcing backing the Rodinium nose, in order to aid in penetration, together the two metals allow the bomb to penetrate nearly any physical barrier. The explosive element of the weapon is 200 kilograms of Mooride Polyronite 4; a powerful explosive that creates an intense pressure wave, so strong it's used as a starting agent in fusion reactors. It will usually bury itself up to 5 meters into a target's surface before detonating, producing a sizable 600 square meter crater. The detonation will also produce a sizable surface shock wave that will affect an area equaling a square kilometer with varying degrees of destructive potential. In this way, a near miss by the weapon can still produce successful mission.

4.08.4 Bombardment Penetrator

This bombardment class is a quick way to destroy reinforced fortifications, bunkers, any anything else that positively needs to be destroyed quickly. The nose is constructed with a solid piece of Rodinium that will allow the round to penetrate any reinforced structure or formation. Duranium is also added as a stabilizing and reinforcing backing the Rodinium nose, in order to aid in penetration, together the two metals allow the bomb to penetrate nearly any physical barrier. The explosive element of the missile is Ultritium 342; the most powerful chemical explosive known to the Federation, its explosive yield is reportedly just short of small nuclear fusion weapons. In each weapon, the mass of explosive element is exactly 50% of the weapons total mass; meaning that the 1000 kilogram weapon has 500 kilograms of explosive. The guidance system detonates the Ultritium 342 by a variably delayed impact fuse with a core of Mooride Polyronite 4.

The problem with these types of weapons is attacking targets that utilize energy barriers, such as Force Shields, which are hard to pierce with a physical weapon. The weapon is therefore equipped

with two additions in its construction to assist in its mission, a Monotanium shell and Shield Scrambler. The Monotanium, added as a thin layer between the Polyalloy laminate and Turminium shell, has electromagnetic properties that allow it to more easily travel through a Force Shield. The Shield Scrambler is, in application, a miniature, focused electromagnetic pulse generator. It was designed to disrupt the basic operation of any Force Shield directly in the trajectory of the bomb in order to render the Shield ineffective. The drawbacks are two-fold: this disruption is limited and even manually controlled shield generators are able to counteract the effects in under 5 seconds, and use of the scrambler will destroy all the electronic components of the missile expect the specially hardened fusing system. However, if the Scrambler is used seconds before impact with the target's Force Shield, the Monotanium of the shell can give the missile a better chance to pierce the defensive energy plane and render a physical impact on the target.

Variants: *AS-B-110 "Io-Heavy" 250 Kilogram, AS-B-607 "Callisto-Heavy" 500 Kilogram, AS-B-775 "Ganymede-Heavy" 1000 Kilogram*

4.08.5 AS-B-827 "Amalthea" Sub-Munitions Dispenser

This bomb is designed to disperse large quantities of different types of ordnance over a large area. While the warhead section can carry up to 700 kilograms of seven different types of sub-munitions, the central operating principles of the round are the same regardless. The bomb is with a terrain recognition system within the guidance package that allows the weapon to release its load with accuracy at long ranges in a precise pattern. The terrain recognition system uses the optical sensors to recognize and confirm the terrain and prominent features around the target, so when the sub-munitions are released it is in a precise pattern, exactly where they are supposed to be.

The warhead section of the weapon incorporates two separate charges of Thalmerite explosives, which in both cases will not harm or otherwise adversely affect the functioning of the sub-munitions. A charge is located between the Terminium shell and the carried sub-munitions in order to completely remove the shell around the warhead section and present the ordnance to the atmosphere. The second charge is in the center of the warhead section serves to explosively scatter the ordnance.

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SECTION 5 - Personal Protective Gear

5.01 FE-7800 Marine Infantry Personal Protective Armor (MIPPA)

The MIPPA issued to Marine infantry is designed to provide limited protection from direct fire and fragmentary projectiles. Although no individual armor system can protect a Marine from all potential threat weapons, the MIPPA system strikes a good balance between protection and maneuverability.

MIPPA consists of several components. First is a helmet that is designed to permit maximum head movement and visibility while maintaining a reasonable amount of head protection. The helmet has built-in ear filters that amplify low sounds while dampening loud noises. It also has a transparent aluminum visor with filters that operate in three modes: (1) visible light wavelengths with optional UV blockage, darkening and polarization, (2) light gathering, and (3) infrared. Light gathering maximizes available visible light, while infrared detects heat and can function in the total absence of visible light. Both are power-assisted modes that operate off the helmet battery.

The second component of MIPPA is a full-torso vest assembly held in slight standoff from the torso via underlying flexible platelets to avoid inhibiting breathing. This has a detachable lower-body protector to cover the groin and buttocks, but most Marines find this piece inhibits movement too much and forgo wearing it.

Next are armored gloves with a gauntlet that covers most of the forearm. These self-seal to the sleeve of the THEOG and EXCHEG. The forearm unit has a magnatomic strip for attaching personal weapons, the combat tricorder, or other small field equipment. These, along with the last component—armored boots—are often worn even without the vest unit; and in fact must be worn with the THEOG or EXCHEG to provide a completely airtight environment.

The armor material used by the MIPPA system is a molecularly aligned composite solid that utilizes kinetic dampening material and crystalline terranium to resist both energy and projectile weaponry. Both the vest and helmet are capable of withstanding kinetic impacts of 1000 m/sec by projectiles of up to 200 grains weight; however, the concussive shock of impacts this severe will almost always severely injure or kill a Marine despite their inability to penetrate the armor.
For projectiles that do disrupt the vest, the outer shell is designed to give rather than shatter, trapping the projectile in the vest backing, which is a lighter form of anti-kinetic material. It also provides a standoff against residual energy, either charged particle or electrical, that might seep through the armor shell.

Against energy weapons, the armor is capable of resisting an energy discharge equivalent setting five on a Federation Type II phaser for a duration of one second repeatedly without loss of cohesion. Given the weaponry that Federation forces have found in the inventories of potential aggressors, it is believed that this armor will successfully resist most standard small arm emissions.

5.02 FE-7800M Marine Infantry Personal Protective Armor-Mecha (MIPPA)

A fairly recent development, the FE-7803M version of the standard MIPPA armor includes a slightly improved climate control system for the extreme heat regulation demands that Mecha pilots must deal with, as well as a set of neural receptors built into the helmet to provide NECI support, and allow the Mecha to synch it's internal gyroscope to the pilot's own sense of balance. The MIPPA suit comes in male and female configurations, and is sized by unit armorer to fit particular Marines.

A further development of the MIPPA system adds hardpoints that allow the MOSPEADA variable geometry powered armor to lock on to the MIPPA suit for conversion into a light power
suit for the wearer.

5.03 FE-7803A Marine Infantry Personal Protective Armor (MIPPA) Spec Ops Helmet

This is a special "smart" helmet worn by special operators to provide them a higher level of battlefield intelligence than the average infantryman. It also has a more sophisticated communications suite. Along with the SpecOps CEMS unit (see "Field Gear"), it can even provide Through-Visor Display TVD) of

weapon targeting.

The SpecOps helmet requires a good deal of getting used to. For one thing, it's nearly twice the weight of the standard Infantry helmet. But mostly, the problem is one of "task saturation"—the helmet can provide the operator with ***too much*** information, overwhelming their senses and hampering their effectiveness so badly that the operator is useless to their team. Training focuses on sorting all the information the helmet provides until it becomes second nature. Just in case, though, helmet controls allow for shutting down the extra systems if need be.

Depending on what sensors, scanners, and intelligence systems the helmet is connected to through the SpecOps CEMS, the visor can show the operator the location of mines in his path, categorize targets and assign shooting priority, even show him adversaries hidden behind walls or around corners. It is often no replacement for a set of eyes, though: some of the more sophisticated Threat forces are already learning how to trick the system into displaying false information.

A special sniper module is also available for the helmet which can provide magnified scans to the TVD, serving as a built-in spotter scope. This module is available for the standard helmet as well, but is much more heavily used by SpecOps Snipers.

5.04 FE-7803M Marine Infantry Personal Protective Armor (MIPPA) Combat Medic Helmet

This is a special "smart" MIPPA helmet worn by medical personnel. Connected to the medic's tricorder, it can provide through-visor display (TVD) of medical information on a patient, including real-time displays of internal organs and diagnostic information being obtained by the tricorder's medical scanner. It has an extendable full-face cover to provide a barrier to bodily fluid even when the helmet's detachable rebreather mask is not being used.

5.05 FE-7808A Lightweight MIPPA

This is a super-lightweight, thin, and flexible personal body armor that can be worn under loose-fitting civilian clothes without being detected. It does not provide nearly the same protection of standard MIPPA, but it does give undercover operators some measure of protection—particularly against small projectile weapons. The material is woven, so it can even pass for clothing itself. In fact, a hooded poncho is available which protects an operator's head and shoulders as well.

5.06 FE-7810 EOD MIPPA

A special version of the MIPPA vest and helmet are also available for EOD (Explosive Ordnance Disposal) work. The units are both thicker and heavier than standard MIPPA. In fact, the vest is so bulky it is difficult to move in, but it is also highly blast resistant. The EOD Helmet provides a unique TVD which can superimpose on the operator's field of view real-time scans of the explosive device's internal makeup—essentially giving the operator "x-ray vision". A specially-designed set of gloves and leg protectors completes the kit.

5.07 PGC-1 Combat Environment Suit "Zoot Suit"

Power Source: 1 standard power cell.
Endurance: 72 hours for respirator/analyzer/PECM, 12 hours for each chill can. Optional air supply unit lasts 12 hours.

The Combat Environment Suit (commonly called a Zoot Suit) is an airtight, loose-fitting jumpsuit with separate gloves, boots and hood. It is constructed of woven synthetic polymers and cooling tubes, and comes in a variety of camouflage patterns (snow, jungle, desert, etc.). Attached to the rear of the suit, directly above and between the shoulder blades is a small power unit that consists of a respirator, chill can, chemical/temperature analyzer, and a built in PECM unit. The respirator filters the incoming air that the wearer breathes, eliminating harmful toxins and chemical agents. In certain circumstances, a separate air supply unit may be attached below the power unit to provide air in a completely hazardous environment. The chill can helps cool the heat signature of the wearer by matching it's exhaust temperature with the surrounding terrain. The chemical/temperature analyzer monitors the surrounding terrain and atmosphere for changes in temperature and toxicity, as well as known chemical and biological agents. A readout of this information is available through a wrist display found on the back of the gloves, at the wearer's discretion. The PECM unit is standard Marine equipment, distorting and muting the wearer's electronic

sensor signature and reducing the enemy's ability to locate him precisely by electronic means.

5.08 PPG-05 Extended Wear Undergarment

It sounds incredibly obvious and a little bit simplistic, but special operators need good underwear. They may be in the field, totally unsupported, for weeks or months. Their supply line is what they can carry on their back or in their pockets, and they may have to go days on end without bathing. When these factors are considered, the need for a specialized undergarment becomes understandable.

The first outstanding feature of the PPG-005 is its thermal capabilities. With a tap to a switch on the wristband of the one piece garment, it warms to body temperature—another tap, it cools to a few degrees below. It also has an external layer that not only keeps the temperature inside stable, but masks the garment (and wearer's) temperature from IR sensors.

The other notable feature of the 005 is its inner lining of antibacterial and antifungal chemicals. This allows the garment to be worn dirty for days without accumulating body odors and causing skin problems. Therefore the operator can pack far less clothing in his rucksack, saving valuable weight.

5.09 PPG-10 Battle Dress Uniform

(picture to left) This two-piece cloth uniform is the basic combat utility uniform for operation in normal Class-M environments. It is comfortable and durable nylex fabric which is normally black, but can be replicated in camouflage patterns if needed.

The BDU is very archaic-looking by 24th-century fashion standards, but it has two distinctly practical features. First and foremost it has pockets—lots of them. Infantrymen carry a lot of equipment into the field, and even with load bearing vests and packs, there never seems to be enough places to put it all. Second, it has buttons. These may be old fashioned closures, but consider: they can be easily replaced/repaired in the field without technology, and can be opened and closed silently.

5.10 PPG-24 Flight Suit

(picture to right) The PPG-24 is made of polystylete fabric which, in the absence of oxygen, changes it's molecular structure to a dense non-breathable material. When worn with boots, gloves and helmet it is a limited duration, self-contained spacesuit. Provided no caustic or corrosive substances are present, the flight suit (with survival vest-supplied oxygen) is more than sufficient for deplaned operations of limited duration. In more extreme environments or NBC conditions, an Infantry THEOG or EXCHEG suit may be required.

5.11 PPG-24A2 Armored Vehicle Crew Garment

This one-piece jumper is nearly identical in appearance and function to the PPG-24 flight suit worn by the Aerospace Branch. It is made of polystylete fabric which feels like cloth, but when exposed to a non-oxygen atmosphere, changes it's molecular structure to a dense non-breathable material. When worn with boots, gloves and helmet it is a limited duration, self-contained spacesuit. Provided no caustic or corrosive substances are present outside the vehicle, the flight suit (with survival vest-supplied oxygen) is more than sufficient for dismounted operations of limited duration. In more extreme environments or NBC conditions, an Infantry THEOG (p. 46) or EXCHEG (p. 47) suit may be required.

Newer AE-40A helmets have a medical scanner installed at the base for use with an Emergency Medical Dispensing system similar to the ones used in Mecha vehicles. Mecha EMDs have gotten mixed reviews,

so not all Armor units are implementing them.

5.12 PPG-25 Deck Crewman's Jumpsuit

In your average shuttlebay there are few craft being launched or recovered simultaneously, and only a handful of crew members, so operations are relatively simple. On a carrier or planetary air base, matters are much more confusing and hectic. It is impossible for the pilot and ground crewmen to communicate easily with engines turning over, aircraft launching or landing and all the other things going on in such an environment. Therefore, deck or ground crewmen wear special uniform items which help others to identify who is responsible for various operations on the flight deck.

A combination of color coded vests or jackets (often called jerseys) and protective headgear are the most obvious aid to identification on the flight deck. Although other specialized combinations exist, the most common are:

5.12.1 Jersey/Helmet/Duty

Jersey	Helmet	Duty
Blue	Blue	Chock and Chain/Elevator Hand
Blue	Yellow	Aircraft Director/Launch & Recovery Crew
Brown	Brown	Plane Captain
Brown	Green	Maintenance Crew Chief
Green	Green	Maintenance Crew
Purple	Purple	Fueler-DeFueler/Power Xfer/Atmospheric Gases
Red	Red	Ordnance Crew
White	White w/Red Cross	Medical Personnel
White	Red	Firefighter
White	Black & White checked	Safety Observer/Inspector
Yellow	Yellow	Hangar Officer
Yellow	Green	Launch Officer

Another common visual aid involves stenciled or reflective lettering on the back of the jersey or vest which identifies the job of the crewman specifically, including the work area or area of responsibility of the crew member. Lettering also appears on the helmet to identify the communications frequency of the wearer (i.e. - "FREQ 6") so others can reach them with a minimum of difficulty.

5.13 PPG-50 Thermal Hazardous Environment Overgarment (THEOG)

Phaser beams and projectiles are not the only hazards faced by a Marine Infantryman. Sometimes the atmosphere of a planet (or lack thereof) can be just as deadly. Corrosive atmospheres, toxic chemicals, lethally cold and hot temperatures, and the possibility of encountering dangerous biological matter make the THEOG (pronounced "thug") an indispensable part of the Marine's equipment load on many planets. Each Marine is issued one THEOG in addition to their standard Battle Dress Uniform (BDU) allotment. It is usually worn only when environmental extremes are anticipated.

The THEOG is a lightweight full-body suit resembling the polystylite flight suit worn by aerospace personnel. But unlike the polystylite suit which becomes airtight only in the absence of atmosphere, the dermalock fabric of the THEOG maintains a uniformly airtight condition with a much higher endurance. When worn with gloves, boots, and the standard-issue helmet, the THEOG completely seals the Marine away from the surrounding environment.

The THEOG consists of several layers (from outermost to innermost):

- Plasticized textile polytetrafluorethylene to provide resistance to most chemical and biological contaminants.
- Dermalock fabric to provide airtight integrity and uniform suit pressure under external pressure variances from zero to four Class M atmospheres.
- Viscous polymer-based sealant to auto-seal minor suit breaches.
- Thermal stabilizing filament layer to control internal suit temperature under outer temperature extremes of -100°C to +500°C.

Although it is not rated as armor, the THEOG is also capable of preventing penetration by low-velocity

shrapnel and thermal effects below weapons-grade. A pressure backup in the air circulator will maintain suit pressure in the event of a minor puncture and permit the operator to carry on normal operations. A major rupture, such as one that could be caused by a large piece of shrapnel or a phaser hit, will incapacitate the sealant system; but, the THEOG has a rupture-sensitive transponder that can signal a transporter or medical team to withdraw the operator. Medical injection systems are carried with every Marine unit that can inject medications repeatedly through the garment safely.

5.14 PPG-100 Extreme Conditions Hazardous Environment Garment (EXCHEG)

The PPG-100 EXCHEG is a limited-issue garment that is designed for specialty work that falls somewhere between the environmental extremes between normal operations and those requiring power armor suits. It is basically a heavier version of the THEOG suit. It has three extra layers of sealant membrane, enhanced pressure resistance and puncture resistance, and is roughly 12% bulkier and is 3kg heavier.

5.15 PPG/AE-304B Survival Vest

The survival vest is a unit worn over the PPG-24. It contains an emergency life support unit capable of generating oxygen for 6 hours, and is plugged directly into the flight suit or helmet. The remainder of the vest contains a holster for a hand phaser, a combat tricorder, standard combat ration pack, standard combat medical kit, knife, PM-1 locator beacon, communicator, an emergency inflatable shelter, 2 half-liter pouches of drinking water, and a respirator/filter mask.

The one key exterior difference between the Armor version and the Aerospace version of the flight suit is a wide fabric “extraction handle” across the back between the shoulder blades. This strap can be used to pull a crewman free of their vehicle in an emergency. In outward appearance, it is in every other way identical to the Aerospace version. Internally, there is one additional difference: The addition of extra padding on the knees and elbows to guard against the frequent bumps that occur in the cramped quarters of an armored vehicle.

5.16 PPG/AE-40 Tactical Helmet

As with the PPG-24A2 suit, the AE-40 helmet is more than it appears. It’s outer shell is a protective garment that keeps the crew member’s head from injury when being tossed about a cockpit or vehicle cabin. It is a full face unit with a fitted visor.

Inside the helmet, are a variety of important systems. First is the neck seal capable of automatically forming an airtight bond with the AE-20 suit. It is also inflatable to provide cervical spine protection during hard maneuvering or when the crew member may be injured. Second is an emergency water and ration caplet supply in case the pilot faces survival conditions wherein his helmet can’t be removed. Third is a polarized automatic visor tinting system that protects the crew member from changing glare conditions. Fourth is the TVD (through-visor display) system (see above), and last is the I-LINK 103 internal helmet communicator.

5.17 PPG-230 Surgical Scrubs

These garments provide a complete fluid and bacterio-viral barrier for the wearer on all covered surfaces. The full ensemble includes a smock, pants, and head and foot covers which all seal to each other at their overlapping seams. There is an optional complete face cover with clear eyepiece; however, most people simply wear the traditional hood with a PPG- 240 or 242 mask. Smocks come in waist-length or knee-length.

Although red is the traditional color for scrubs, SFMC personnel also have three other color choices (green, gray, and tan) which may be worn in the field (where red attracts unwanted attention from the enemy). Extra-large sizes are available to be worn over the BDU with or without MIPPA gear. Scrubs are generally replicated on site, and are fed into the replicator for reprocessing when changing clothing. This keeps them as clean as possible.

5.18 PPG-240 Surgical Mask

This filter/barrier mask provides complete protection for the wearer from fluids, bacteria, and viruses, yet allows gas to penetrate easily to allow free breathing and speech. Although it appears to be cheap, disposable foam, the mask is actually a complex series of textile filters and barriers. Like the scrubs above, they are replicated on sight and fed back to the replicator for reprocessing after use. Their surface can be easily sterilized with a SSF field in between patients if a new mask can't be used for some reason. The masks are lightweight and very comfortable to wear and use.

5.19 PPG-242 Surgical Mask with Eye Shield

The 242 mask is identical to the 240 in every respect except for the addition of a clear nylex eye shield to provide a fluid barrier for the wearer's eyes. Should vision enhancement gear not be needed, the 242 provides the quickest and easiest method for eye protection.

5.20 PPG-245 Surgical Gloves

These polylatex gloves come in a variety of shapes and sizes to provide form-fitting protection to medical personnel of all species from contaminants with which their hands may come in contact. They come in the same four colors as surgical scrubs, and also in a light beige/off white color that many personnel prefer since it is easier to see small things on the gloves or being held between the fingers.

The gloves are more than passive protection, since their outer layer is impregnated with sterilite which actually kills the most common live contagions encountered. This greatly reduces cross-infection, but care must be used in handling living tissue and culture samples. Non-impregnated gloves are also available, as some wearers and patients have exhibited allergic reactions to the impregnated gloves.

5.21 PPG-250 Protective Smock (Lab Coat)

The lab coat provides the wearer with nominal protection against casual contact with bodily fluids and other contaminants. It also provides extra pockets for often-used equipment. It is most often worn with the class B uniform, but is authorized for use with the class C BDU. They are available in red, tan, green, grey, white, and black. Doctors wear the 250A which is knee-length, other personnel wear the 250B which is just below waist-length.

5.22 PPG-800 Orbital Entry Jumpsuit

(picture to left) This one-piece jumpsuit is covered externally by flexible heat shielding in the form of interlocked tiles (see illustration at left). These tiles protect the wearer from orbital entry heat in orbit-to-ground parachuting operations. The suit also has an integral force-field unit to augment protection. The suit comes with helmet and boot covers as well as special gloves to complete the protection. The inside of the suit is a cool insulative liner that keeps the entry heat from being transmitted inside the suit.

5.23 PPG-820 Wet Suit

An underwater diving suit which provides some buoyancy and good insulation from mild water temperatures. The suit allows in a thin layer of water which it traps under its foam exterior to insulate the body. It is lightweight and easy to move in. It is also coated with anti-friction polymer to make movement through the water extremely easy.

5.24 PPG-825 Dry Suit

Slightly bulkier than the PPG-820, this diving suit is airtight, allowing no water in and instead using a layer of air trapped in the suit to insulate the wearer. This suit provides protection from much cooler temperatures, and can be worn over BDUs or THEOG suits. Since the PPG-825 is watertight, whatever the diver wears under it will remain dry and serviceable. In fact, most divers will wear the PPG-005 under the suit for added thermal stability, especially when operating in near-freezing liquid or under ice. The trade-off is that the dry suit is harder to work and swim in and is not nearly as smooth and frictionless in the water as the PPG-820.

5.25 PPM-200B Circulating Breather

It does little good on the modern battlefield to armor soldiers against shrapnel or phasers but leave them vulnerable to hazardous fumes or biomatter. To ensure that Marines will not become disabled or inhibited in their operations by chemical agents or noxious atmospheric components, the PPM-200B is worn as a piece of standard equipment with the THEOG and MIPPA uniform components during many Infantry operations.

The 200B is composed of an armored bottle (charged with a supply of oxygen-heavy breathing air at the start of operations), a re-breather mask, and a tube that connects the two and runs under the load-carrying equipment. The mask scrubs the exhaled carbon dioxide from the circulator and recycles oxygen back into the system.

The 200B can be deactivated to admit outside atmosphere by means of a blower if the operator desires; however, during normal combat operations against all but the most primitive opponents this is not encouraged. Although the circulator is a bit bulkier than a filter mask, the advantages of recirculation versus filtering make the trade-off well worth it.

The mask portion of the unit is interchangeable with the face protector of the MIPPA helmet so that when the re-breather is needed, the Marine simply switches the mask for the face protector, maintaining his face protection and easing the fit and application for the wearer.

5.26 The NECI Helmet

The Neuro -link helmet allows the Mecha to ‘image’ the Mecha through various maneuvers too intricate for hard controls. For instance, while a pilot may use the ‘pip’ to guide a Mecha’s arm toward an item to pick up, the Mecha pilot will ‘see’ the Mecha’s hand open the right amount in his mind’s eye, and the NECI helmet will cause the Mecha’s hand to respond accordingly. It takes practice and training for the gross control movements and tiny ‘imaging’ commands through the NECI helmet to mesh properly, because contrary to the popular misconception, the NECI helmet is not a ‘mind-reader’ in the strictest sense, it simply interprets motor-cognitive impulses when properly in context with the actual cockpit controls.

SECTION 6 - Field Equipment

There is a great deal of field equipment used by the SFMC. A few particularly interesting pieces of field equipment are:

6.01 Knee PADD

This item of a pilot's gear is essentially a wider and flatter version of the standard PADD issued by STARFLEET, with bigger buttons for use with gloves. It is strapped to the pilots thigh, where it can be easily seen during flight. It is used to record critical navigation instructions, preflight checklists, communication code frequencies and other pieces of important information.

6.02 CTS-8907 Combat Tricorder System

The combat tricorder is the "core" calculation, sensor, and analysis device of most Federation military personnel in addition to the SFMC infantry. The 8907 incorporates the full 235 sensor assemblies and features found on the standard Starfleet TR-595H(P) tricorder with the some additions, some of which are readily apparent upon examination such as the CEMS outlet for direct-feed of data to a MIPPA helmet.

Other features include "silent" mode, for use in a tactical environment. A large database of military information is incorporated into the onboard memory, with emphasis on subjects that would be most relevant to infantry warfare.
The 8907 has a detachable sensor nozzle assembly that is designed to be mounted on the MIPPA helmet to allow the tricorder to maintain much of its effectiveness while leaving the operator's hands free. The CEMS can then transmit the tricorder readings to the helmet goggles. This particular arrangement is favored by many Marine combat veterans.

6.03 CTS-8911 Force Recon Tricorder System

An even "beefier" version of the 8907 is the 8911 Force Recon Tricorder which has a greater range, broader sensor suite, and improved silent operation mode. 8911s are carried by recon and scout/sniper teams, as well as fitted into Pathfinder PI suits.

6.04 CTS-8911A2 Enhanced Force Recon Combat Tricorder System

This long-range/low-emission tricorder is nearly the same as the standard Force Recon Tricorder, but has even greater stealth features that make it ideal for use by dismounted scouts and artillery spotters who need maximum range with minimal chance of revealing their position. The 8911A2 also has remote nozzles that can be setup in an area and then remotely monitored.

6.05 CTS-8911A3S Specialized Combat Tricorder System (SCTS)

The CTS8911A3S is a specialized variant of the CTS-8911 Force Recon Combat Tricorder System. The addition of a specialized remote sensing module as well as very specialized programming make the CTS8911A3S a powerful identification tool for both protective forces and surgical strike forces alike. The SCTS is an end-user programmable specialist tricorder. It is designed to accept specialist hardwire programming modules allowing it to become a specialist device with programming that is additionally hardened against remote hack. The first such programming module is a facial feature recognition/identification suite that, rather than rely on the tissue covering of the face, scans the maxillofacial structure of the target, matches it with musculature and tissue formation norms for his/her species, and matches that against known person files. The practical upshot of this programming is that this recognition program will specifically ignore applied or surgical alterations of the face which do not alter the structure of the skull itself. Information output from this device can be routed to Heads Up

Displays in either the Combat Helmet visor, data glasses, or a marine's weapon targeting scope.

6.06 EAW-1 Worksuit, Engineer Armored

Armor: Yes, light.
Force Field: None.
CBR Life Support: Standard life support for 1 man; 72 hour endurance.
Power Source: Charge pack.
Endurance: 72 hours at normal load.
Propulsion Method: Walking.
Maximum Altitude: N/A
Maximum Speed: Varies by type (see below).
Crew: (1) Operator.
Passengers: None.
Weapons: None.
Special Equipment: Varies by type.

The Engineer Armored Worksuit is a modified version of the basic Powered Infantry suit, used for all kinds of work in hazardous environments. The suit has a set of built in tools, including a communicator, laser welder, electric wrench, and spotlights. The suit enhances the wearers strength by a factor of two, allowing him to lift three times his normal maximum. A built in anti-gravity belt counteracts the suit's weight and allows the wearer to jump up to 15 meters horizontally or 5 meters straight up. The suit provides total life support, and is capable of being used in a hard vacuum. In exoatmospheric operations (construction in space, etc.) a maneuvering thruster is used for mobility. For deep water operations, a special maneuvering pack is added to the suit's back, which uses water jets to move the wearer around. Speed for this unit is 20 kph (12.5 mph) underwater, and the suit is limited to a safe operating depth of 500 meters. Specially constructed suits, using composite hard shell/force field designs can operate to depths of 1200 meters. For firefighting, a layer of ablative and reflective coating is applied to the suit, and a chemical dispenser added. A heat exchanger completes the backpack unit, allowing the operator withstand very high temperature fires while maneuvering and extinguishing them.

6.07 EPHD-1 Exoskeleton, Powered (Heavy Duty)

Armor: None.
Force Field: None.
CBR Life Support: None.
Power Source: Charge pack.
Endurance: 24 hours at normal load.
Propulsion Method: Walking.
Maximum Altitude: N/A.
Maximum Speed: 20 kph (12.5 mph)
Crew: (1) Operator.
Passengers: None.
Weapons: None.
Special Equipment: 2 lifting arms with large manipulator claws, cutting/ welding torch (front center chassis), 2 floodlights (above cockpit, to either side).

This is a one man powered exoskeleton, used for heavy lifting and cargo loading. The operator straps into the control cockpit, standing up. The arms and legs mimic his movements, with the manipulator claws and cutting/welding torch being controlled by thumb switches. The claws are not normally capable of fine movements, but a very skilled operator can open a bottle of synthahol without crushing it. The exoskeleton can lift up to 5 tons safely and can lock the arms in several positions, allowing the operator to exit the cockpit and examine the cargo from below/behind. The exoskeleton itself weighs 2 tons, and stands 3.5 meters tall. It's arms are 2.5 meters long, and it's manipulator claws can open to a maximum of 0.75 meters in diameter. Each claw has a magnetic grapple and non-skid surfaces along the gripping areas. As a safety measure, a rotating amber light on top of the vehicle flashes while a beeper sounds as it moves, warning pedestrians to stand clear. This light and beeper can be shut down for combat situations, at the discretion of the operator.

6.08 EPLD-1 Exoskeleton, Powered (Light Duty)

Armor: None.
Force Field: None.
CBR Life Support: None.
Power Source: Charge pack.
Endurance: 24 hours at normal load.
Propulsion Method: Walking.
Maximum Altitude: N/A.
Maximum Speed: 40 kph (25 mph)
Crew: (1) Operator.
Passengers: None.
Weapons: None.
Special Equipment: 2 lifting arms with 5 digit manipulators, spotlight (above cockpit).

This exoskeleton is the light duty version of the larger cargo lifter. It is similar in design, but on a much smaller scale, and its 5 digit manipulators are capable of very fine movements (which simulate the operators finger movements). The operator steps into the frame, strapping himself in while standing. The spotlight is mounted above the cockpit and is controlled by voice commands. The exoskeleton is capable of lifting up to one ton of weight safely, and can lock its arms in several positions, allowing the operator to exit the cockpit and examine the cargo from below/behind. Its arms are 1.5 meters long, with the manipulators able to open to a maximum width of 0.25 meters. The manipulators have magnetic grapples and non-skid surfaces on the gripping areas. The exoskeleton itself weighs 500 kg, and stands 2.5 meters tall.

6.09 EWD-202SO "Holoflage" Special Operations Holographic Generator

The Infantry version of this device can cover a Light Infantry squad with a hologram, but its energy signature is easily detected by most sensors. The SpecOps version uses a classified add-on module that reduces its energy signature significantly. It also, unfortunately, reduces the useful size of the hologram and increases the generator's power consumption.

6.10 IPS-105/IPS-110 Mobile Infantry Shielding Systems

Infantry operate on a battlefield where every combatant may be carrying an area effect weapon capable of negating a zone the size of a building. They are also subject to constant attack by air or even aerospace vehicles up to and including spacecraft. It is not possible, with current technology, for infantry to carry deflector capabilities that can shrug off an attack by a capital ship's weapons, or even those of a heavy tank or fighter. However, it is possible-- and necessary-- for infantry to have shielding that enables them to defeat the firepower of other infantry or moderately armed combatant vehicles. The alternative is to so spread infantry out on the battlefield that they become tactically useless as a combined force.

Infantry formations in the SFMC make use of two shielding systems that are issued at the team or squad and platoon level typically. The IPS-105 MISS array is a backpack-sized instrument that projects a force field in either a "bubble" or "screen" configuration. The "bubble" is useful against indirect fire and area effect weapons, whilst the "screen" is most often used during direct-fire situations. The screen has a frontage of seventy meters by forty-five, maximum, while the bubble will cover an area about fifty meters in diameter. The deflector is most effective when the area covered is reduced. It can be used while moving, if set to allow low-velocity matter through; and in screen use the operator can project the field up to fifty meters. The exact angles, coverage, and power levels that the array operates at are at the discretion of the operator, and a skillful operator can make the MISS array a formidable advantage for his or her unit.

The IPS-110 array is larger, and is intended to be carried by three operators in dismantled sections. It has an area coverage of 200 meters in bubble with a frontage of one hundred and forty meters by eighty in screen, and has roughly five times the strength of an IPS-105. It can be projected one hundred meters from the unit.

6.11 M-411 Self-Adjusting Handcuffs

One unique piece of equipment commonly used by MPs are handcuffs, or "binders" as they are sometimes known, to restrain suspects temporarily. The standard SFMC-issued cuffs are the M-411 made by Ruger, Colt, Smith & Wesson on Mars. The cuffs are a single slim-line unit with a central tensioner and locking device which can be programmed for keys, combination, or DNA signature. Extending from each end of the central unit are the cuffs themselves which wrap around the suspect's extremities and then slip into the locking end of the unit. The tensioner then pulls the padded kevlex binder tight and locks it into place. The tension can be manually adjusted as well

6.12 MIU-400E Field Replication System

This system is one of the heaviest pieces of special equipment used by the Marines; requiring three Marines to carry and set up, and as such is usually brought in only to secure areas. It consists of a logic unit processor, a front-end raw materials feed, and a fabrication unit.

The 400E is capable of manufacturing any piece of equipment or component with a mass of 36 cubic centimeters or less of size. It can be used to build parts for weapons or other devices. Given enough time, it can produce complete weapons if there are sufficient raw materials. Depending upon what it is called to produce, it may require special software instructions or extra time to formulate the molecular lattices.

All components for any Marine small arm or other piece of equipment are included in the memory. Per procedure, no weapon or piece of equipment manufactured in this device will be accepted for full-time service until it has been examined and determined that the components meet or exceed the manufacturer's tolerances for the component. Some materials, such as dangerous chemicals, may require approval of the unit commander to make.

Weapons, in addition, must be given a SFMC registry number and entered properly in the TO&E when manufactured. Improvised or modified weapons may be stored at the unit commander's discretion, and although they will be listed on the TO&E they will not be given formal registry numbers. With alternate isolinear chip modules, this unit can also be used to replicate food as part of a field kitchen.

6.13 MIU-692 Light Field Equipment Repair System

This is a ten-by-five-by-six centimeter container with a variety of tools designed to diagnose and correct equipment problems in the field. Enclosed tools include welders, scanners, power wrenches and drivers to remove and install components, testing devices, a PADD with repair data for Marine equipment, and such basic items as a spread-out cover to work on and a light to use during low-light conditions. This system is generally not capable of repairs on equipment with large parts, although it might be used to fix the smaller components of a fire control system or global positioning device on a tank or vehicle.

6.14 MIU-701 Field Suit Casualty Kit

This is a specialized tool kit specifically for powered armor suits. Each suit has such a kit on board (usually on an outboard thigh station). With the resources of this kit, small holes and cracks can be patched, servomotors repaired, weapons stations serviced, etc. The tools in the kit are all adapted for use by powered-armor-gloved hands with larger grips, buttons, etc. Most often, this type of work is done by one suited PI trooper on another, although the trooper can get out of his suit and use the kit with bare hands on his own suit if conditions permit.

Field maintenance kits have limited usefulness on the battlefield, though. It is important to remember the words of one Higher Maintenance Depot Gunny, *"Just remember, lots of times the best thing to do is beam the thing back to the ship and have 'em send down a new one, and don't waste your time trying to fix the thing in the mud. You probably got other problems, right?"*

6.15 SFE/PA-807A1 Holographic Imager

This is the ubiquitous "camera" used by the P&P Office (especially by broadcast journalists). It is a headset unit with a light on one side and a holographic imager on the other. Packaged with the imager is an onboard sound system which is programmed to tone down the operator's voice to match the recording input of the imaged sources so a reporter can ask questions without sounding harsh on the air.

The 807A1 is capable of 2D or 3D imaging in the visible spectrum or infrared. It can provide a live feed transmission, or can record up to 1 standard hour. With an accessory tricorder, the unit's recording capacity increases 10 fold. The lighting unit is capable of transmitting visible light, infrared, both, or neither. The units' critical functions (as well as a view of the imaged area) can be monitored through an adjustable eyepiece. The imager uses sophisticated software to compensate for movement of the operator's head and keep the picture steady.

6.16 SFE/MP-808C Crime Scene Imager

Similar to the holographic imagers used by Public Affairs, the 808C is worn by Criminal Investigation Division's crime scene investigators. It is a headset which not only continually images the crime scene, but simultaneously logs the position and composition of every item in the field of view. This information is fed to a tricorder dedicated to the task and attached to the investigator's belt. The unit can image in all visible light frequencies, infra red, ultraviolet, and x ray; in 2D or 3D mode; in still frame or full motion; and can provide live transmission to a command post or headquarters.

The unit will also record the DNA signatures of all persons on the scene so they can later be sorted from residues picked up for analysis. It will also remind the investigator of steps in the crime scene procedure should it become apparent one has been skipped or is not being executed properly. This maintains due process and saves cases from being dismissed on technicalities.

6.17 6TL-66 Thermal Lance

This weapon is actually a standard TL-66 hand welder, which is standard equipment for nearly all Combat Engineer personnel. During the Cardassian War, it was discovered that it could be easily modified by the operator to fire it's power charge in four powerful bolts of energy, instead of the usual 4 hours of welding beam it was designed for. Once this information became readily known, it became a standard modification for combat deployed engineers. A simple code switches from welding mode to lance mode, allowing the user to fire a high powered bolt of energy at a target. This beam will penetrate most metals and plastics, and can penetrate 1.5 meters of concrete. The power cells are depleted one per shot, however, so the weapon is limited to four shots. The power cells may be changed out in less than a minute, or they can be recharged off of any standard fusion plant in about 15 minutes. An alternative use of the TL-66 is to set the welding beam on continuous discharge, and wield it like a sword in close combat (which has occurred in more than one instance).

6.18 Field Observation Devices

The ability to see an enemy and assess his strength before the enemy performs in kind is one of the most important capabilities any infantry unit can have. Ideally, a thorough reconnaissance is done before the infantry are deployed, but this is not always possible.

For light infantry, several portable but highly effective FODs are issued. The first are integral with all MIPPA helmets: zoom-capable imagers using the light gathering and infrared modes as backup to the normal viewing. The imagers in the helmet can zoom images up to 500 times. At the ranges that the infantry do their job, visual scanning is still largely the superior method of observing the foe -- this has been so since the earliest days of infantry warfare and has not changed; although the added dimensions of cloaking technology as used by Jem'Hadar, Klingon, and Romulan forces have presented new challenges.

6.18.1 EQW-14 Battlefield Surveillance System

Observation of protected targets in detail is accomplished by the EQW-14 Battlefield Surveillance System, which uses FLIR, neutrino, quark resonance, and EM scanning. A frequency-hopping algorithm is used to complicate attempts at jamming, and a "snapshot" system will fish out the best scans for use in the overall

sensor picture. The BSS has a maximum range of one thousand kilometers in atmosphere, which is much more limited at ground level. It is carried by one Marine and can be linked to a tricorder for maximum accuracy in aiming on fast-moving or hard-to-see targets. One can be carried by each trooper in a PI formation as it is easily and quickly mounted on one of the shoulder stations.

6.18.2 EQW-18 "Sentry" Forward-Deployable Remote Sensor Transponders

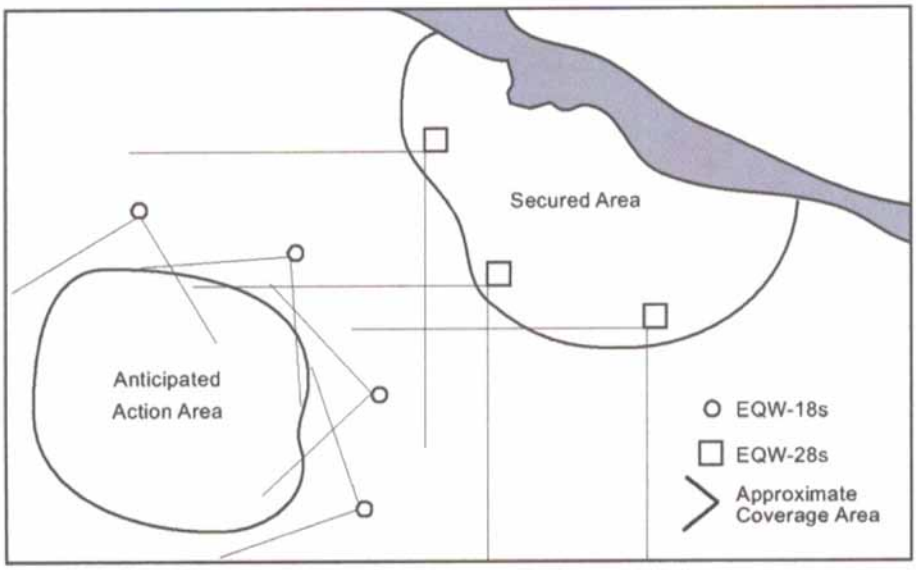
These are dispensed, tricorder-like units which can take both passive and active readings and transmit them via secure datalink to a remote terminal and/or relay device. These can be hurriedly canister-dispensed like land mines, or can be deliberately hand-placed and carefully hidden.

Each transponder can be individually programmed with one of three gathering modes: 1) Passive Only, wherein the sensor will make no attempt at active scanning so as not to alert the enemy to its presence; 2) Burst Active, which will periodically send out a single "ping" on each of its active sensors to get a snapshot of the tactical situation without readily giving away its presence; and 3) Steady Active, with all sensors on all the time for use when the transponder's presence is not intended to be covert as in a perimeter security alarm.

In addition to these scan modes, four types of transmission modes can be programmed: 1) Omnidirectional Burst, which periodically sends out a short, data-compressed signal in all directions simultaneously (for when the location of the receiver is unknown at emplacement or will be moved during emplacement); 2) Omnidirectional Standard, which sends standard signals whenever new data is collected; 3) Unidirectional Burst, which sends a tight-beam burst transmission to a specific point; 4) Unidirectional Standard, which is a tight-beam transmission whenever new data is collected.

Lastly, the transponder can be set to passively gather and record-only for the ultimate in stealth. However, the device will then have to be collected by someone before the gathered data can be analyzed for useful information

6.18.3 EQW-28 Advanced Battlefield Surveillance System



A typical arrangement of FODs on the battlefield. In addition to these emplacements, EQW-14s, manpack drones and Air Defense Systems would likely be in use as well.

This sensor package basically consists of a boosted EQW-14 in conjunction with an EQW-808C. It has a greater range that the 14 along with the increased sensing capability of the 808. It is a large, bulky unit that usually is only powered suit mounted for recon or command forces.

6.18.4 EQW-50 Manpack Drone

This small drone is only seven centimeters in diameter, but can be one of the infantry leader's greatest assets. The EQW-50 is capable of sustained reconnaissance operations for a period of seventy hours on a single charge while carrying out hover and flight activity. It can move at a rate of one hundred and ten kilometers per hour, with a sensor range and capability equivalent to that of a combat tricorder. Data reception and transmission capabilities identical to the EQW-18 are included along with a "mother" processor that autopilots the device in lieu of specific instructions.
Although it can still be detected by alert sentries or sensors, this drone can penetrate dangerous areas and give it's owner a "first look" at the threats therein without exposing personnel to risk.

6.18.5 EQW-55 Mini-Drone

Based on the highly successful EQW-50 drone, this miniature version has half the range and endurance, but a much finer control system that allows operators to make ultra-fine course adjustments. It is also much smaller, which reduces its likelihood of being detected, and at the same time gives it access to unusual target areas its big brother could never dream of.
In one prime example, a Recon Team actually flew an EQW-55 into an exhaust vent of a target building, through its air handling ducts, and landed it right behind an intake screen in one of the targeted rooms. There it sat for two days providing the team with valuable intelligence. When the building was finally raided, the team recovered the Mini-Drone, recharged it, and packed it up for the next mission.

6.18.6 EQW-622 Passive Observation Collector

The POC is a suite of passive sensors which essentially extend the eyes, ears, and even noses of the team much farther than their MIPPA gear—without revealing their position. The unit carries extremely sensitive unidirectional and omnidirectional microphones; high magnification visual, infrared, and ultraviolet optical sensors; even a chemical receptor to detect odors or sense trace quantities of NBC agents to give advanced warning to the team that more may be on the way.

6.18.7 EQW-804 Air Defense Sensor System

The difficult and demanding job of detecting and tracking air, trans-atmospheric, and orbital threats is accomplished by the EQW-804 system. This is a large sensor package with an even larger deployable antenna which must be vehicle or suit mounted. It can be carried on antigravs in a pinch, but would take several men to lift unaided.

6.18.8 EQW-808C Spectral Shift Sensor

For detecting ground-based cloaking technology, the Light Infantry use the EQW-808C spectral shift assessor (SSA), which detects variances in light-wave travel at ground level. Cloaking technology is very hard to employ in the clutter of an atmosphere, vegetation, and landscape with the same degree of success one would enjoy in airless space. In addition, quantum singularity traces revealed on tricorders may also indicate the use of a cloaking device in the vicinity; however, this is very hard to pinpoint. The 808C can be used with the BSS sensor or a boosted tricorder to identify a potentially cloaked area or target and then confirm the status of the reading.

6.18.9 FDS-100 Auxiliary Map/Directional System

The disadvantage of relying upon computer tracking and sensors, or overhead satellites, for guidance on the battlefield is that same sensors can be fooled or destroyed, or atmospheric or other forces can block the satellite signals. Marine infantry units or individual Marines must always have the ability to navigate on a surface without the help of outside agencies. For this purpose, one FDS-100 system is issued per individual.

The FDS-100 is preset prior to the mission according to the magnet fields of the operational area, with map data entered into the unit for overlay. Using a compass and a "bounce" setting to account for pace count, the unit will track an individual's progress over any planetary surface where they maintain a standard pace and the influence of the planet's magnetic poles are also constant.

The unit also has built-in inertial navigation, which measures distance and course travelled from a predetermined starting point to determine current position. However, this feature is only useful when starting point position and angular positioning data on the subject planet are available.

6.19 Miscellaneous Field Equipment

Marines make use of many other implements in the field other than the ones in their basic issue, and experience has shown that it is often best to let units equip themselves on some matters as opposed to trying to anticipate their every need. Nonetheless, there are many small items the Corps does issue that are not covered in this manual in detail. Miniature lights, ponchos, canteens, entrenching tools (with battery vibroblade capabilities), transponders, rappel gear, personal first aid kits, multipurpose adhesives, and many, many other “tiny” items are included in this category. Many Marine infantrymen choose some commercially available items for inclusion in their equipment, especially knives.

Ration packs are one item that Marine procurement officers are especially proud of. Although it is hard to anticipate the dietary wants of Marines from many different cultures and planets, Marines report that rations are generally good and that some of the reported favorites are unique to the SFMC ration system, such as the field-named “Veal THEOG”. A typical ration pack will sustain a Marine in combat for twenty-four to thirty-six hours at full energy. It consists of a main course, two side dishes, and a variety of beverage powders, candies, stimulants, and the often-reviled but never scorned “stop-up” tablets that are designed to minimize bowel movements for troops wearing thick protective garments in hazardous environments for long periods of time. And yes, there is also toilet paper in them.

6.19.1 SpecOps Rations

Special operators carry what most in the service call “hard-core” rations. These are supplement bars which provide a full complement of vitamins, minerals, calories, and protein, but are very small and ultra-light. This substantially reduces the pack load for operators, even though the rations are unanimously hailed as disgusting from a culinary standpoint.

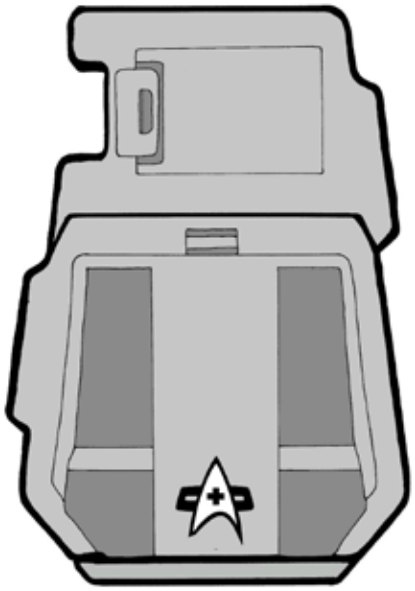
SECTION 7 - Medical Equipment

7.01 Advanced Life Support for Trauma, Transport And Resuscitation (ALSTTAR) system

The ALSTTAR (pronounced "all-STAR") is a self-contained medivac platform with advanced life support systems to sustain one severely wounded patient. The unit itself is about the length and width of a standard biobed and about twice as thick. It fits nearly all SFMC aerospace support craft, all full-size STARFLEET shuttles, the Mercy and Nightingale ground ambulances, and can even be carried on its own with hand-held antigravs.

The ALSTTAR contains a full diagnostic scanning/processing computer for patient physiology monitoring that can also perform blood chemistry analysis. Its other equipment includes a ventilator with onboard O_2, fluid drug infusion, suction, defibrillator, and neural stimulator. It has self-contained power charge packs, sophisticated system data management computers, and communications connectivity.

7.02 FMD-54C Combat Medic Field Medical Kit



This is the standard med kit carried by C-Medics and E-Medics. It is small enough to be easily carried on the battlefield, though its resources are limited to basic emergency care, or as it is known in the vernacular, "scoop and run". The 54C has magnatomic attachments so that it can be carried directly attached to MIPPA or powered armor components without straps or pouches. It can also be carried in a standard rucksack. Many C-Medics on the front lines will carry two on their armor, and two in their rucksack if they anticipate heavy casualties. The members of a combat unit will gladly split up the rest of the Medic's load so he can carry more med kits.

Detailing the contents of every Med Kit used by the Medical Branch would require more space than we have in this volume, but examining the contents of the basic field med kit may be illuminating for new personnel:

Ventilation

(2) combitubes
(2) microventilators
(1) collapsible ambu-bag (backup to microventilator)

Pharmaceutical

(1) field hypospray
(1) spare sprayhead

Pharmaceutical (continued)

(10) EMS Field Ampules
(10) extra tri-ox ampules
(5) hemosynthelite ampules
(5) hyronalyn ampules
(1) inaprovaline ampule
(5) metropan ampules
(1) polyadrenaline ampule
(3) vertazine ampules

IV/Fluid Therapy
(1) IV Autoinitiator Unit (20 needles pre-loaded)
(5) hypospray IV sprayhead adaptors
(1) water sterilizer
(5) 1000ml IV bags PRF
(5) sterile IV bags (for sterile water)
(5) IV bags dehydrated normal saline solution
(5) IV bags dehydrated D5W
(5) IV bags dehydrated lactated ringers

Bandages/Splints
(1) self-inflating air splint
(1) roll uncured styrolite
(5) rolls of gauze
(4) abdominal trauma pads
(5) water-gel trauma pads
(1) large cervical collar
(1) roll of 2 inch wide tape
(1) box 4X4 gauze
(2) eye trauma pads

Miscellaneous
(1) pair trauma shears
(10) ammonia inhalants
(1) dermal regenerator
(1) autosuture kit (backup to dermal regenerator)
(1) box alcohol wipes
(1) medical tricorder

7.03 FMD-54E Field Medical Kit

This is a MIPPA-pouch sized aid kit that is designed for use by an individual Marine. It is designed for use by personnel inexperienced in medicine. With it's implements (including a fold-out PADD device that contains a database of medical data and instructions) it is possible for Marines to treat minor injuries easily and even conduct emergency surgery to save a wounded Marine.

Procedures for the use of the kit do encourage infantry personnel to refer casualties to medical personnel, and serious injuries will be treated with this kit only when there is no other choice.

7.04 FMD-54G Powered Infantry Field Medical Kit

This medical kit essentially has the same contents as the 54E, with the addition of hypospray adaptor nozzles and a panel key. The key unlocks the medical access panel on any SFMC suit, through which one Marine can administer any medication to another completely suited PI trooper through the suit's life support system (the special hypospray adaptor nozzles are required for this).

The 54G also comes in an armored leg pack with magnatomic couplers so that it can be fitted on either outboard thigh station of any PI suit. Extra kits are often carried by Powered Combat Support Specialists.

7.05 FMD-54I Independent Duty Medic Field Medical Kit

This suitcase-sized affair contains a larger quantity of nearly everything in the 54C kit for treating more patients. More types of IV fluids and drugs are available to the I-Medic also, as well as a neural stimulator, laser scalpel, tissue regenerator, and laryngoscope.

7.06 FMD-54S Field Surgical Kit

The SO Team Medic carries this complete field surgery kit. Its contents rival the suitcase-sized Starfleet Medical field kits, but in addition, the 54S contains primitive scalpels and other non-energy using/emitting surgical tools. This is due to two factors: one, the medic may have to give treatment in an environment where energy emissions might give him or his unit away; and two, the medic may need the kit to give instruction to indigenous populations which do not have access to powered surgical tools. The kit also contains a limited amount of veterinary drugs and equipment.

7.07 Other Field Medical Kits

Field medical kits should be distinguished from hospital medical kits. The former are generally portable by a single person, whereas the latter can be huge containers requiring anti-gravs to transport. Some of the other field med kits commonly used in SFMC Medical include the following:

FMD-54A Basic First Aid Kit, Individual (being phased out-see FMD-54E)
FMD-54B Basic First Aid Kit, Squad (being phased out-see FMD-54F)
FMD-54D Combat Medic Field Medic Kit, Company
FMD-54F Field Medical Kit, Squad
FMD-54H Special Operations Field Medical Kit
FMD-54J Field Medical Kit, Aid Station
FMD-54K Cardiac Emergency Kit (aka - “crash cart”)
FMD-54M NBC Response Medical Kit
FMD-54N Neonatal Emergency Med Kit
FMD-54O Obstetric Emergency Med Kit
FMD-54P Pediatric Emergency Kit (aka - “peds crash cart”)

7.08 Med Kit Supplies

While most of the supplies listed for med kits are self-explanatory or covered as field equipment elsewhere, there are a few listed supplies not described elsewhere with which the new Med Branch recruit may need to familiarize themselves.

7.08.1 Styrolite

This plasticized substance is used for everything from bioisolation containers to splints. It is highly versatile, lightweight, and easy to use. Before it is cured with laser light, styrolite is soft and pliable; after curing it becomes stiff and very strong. It is supplied in many med kits in uncured form in pre-scored sheets or rolls. Medics can then tear off whatever size portion they need, fashion a splint, brace, or even cervical collar, then cure the material in place (a dermal regenerator on low will do). When not being used, the styrolite should be kept in its lightproof container, as regular visible light will eventually cure the material over time on its own.

7.08.2 IV Autoinitiator Unit

This small device is used to start intravenous fluid therapy. For a complete description see “More on IV Therapy” in the Procedures section of the Medical Branch manual.

7.08.3 Water-Gel

Water Gel is a thick solution which immediately removes heat from a burn. It can also provide protection against burns if applied preventively. Water Gel works so rapidly that it can instantly stop the advancement of a burn in progress. However, this fast action can also induce shock in already severe burns, so its use should be limited to medical professionals.

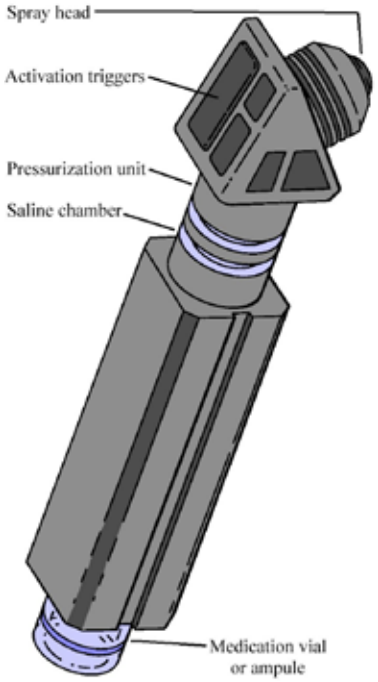
7.08.4 FMD-100 Gravitic Stretcher Assembly

This device is a “must” for Marine units that have to transport wounded personnel. A combat-loaded Marine plus equipment is very heavy. To have to move one around that has been incapacitated is a tremendous strain on a unit.

The FMD-100 consists of six twelve-centimeter long poles with two cross-supports that fit together in threes to produce two shafts, which have suspended between them a web holder. The unit, when turned on, can reduce the weight of cargo within it’s frame to five percent of it’s normal weight in standard gravity. It is powered by a standard nuclear battery with a life of forty hours.

7.08.5 FMD-108 Stasis Transport Tube

An FMD-108 is a limited-use stasis assembly of two tubes stacked atop one another. The unit can hold two humanoids in stasis for up to 12 hours, and can be loaded into most ambulances and shuttles. When an ALSTTAR is stacked on top of an FMD-108, it winds up being at just the right work height for most Medics, so this arrangement is used in most ambulances.



7.08.6 FMD-200 Hypospray

The standard hypospray's function is identical to the field hypospray. The only difference is that regular hyposprays are not loaded with saline solution for use with multi-compartmented, concentrated field ampules. The entire dose of medication is contained in the ampule loaded. This gives the FMD-200 a larger capacity than its field counterpart. It is just as versatile when sufficient ampules are on hand, but frequently changing ampules can be inefficient and cumbersome.

7.08.7 FMD-200A2 Field Hypospray

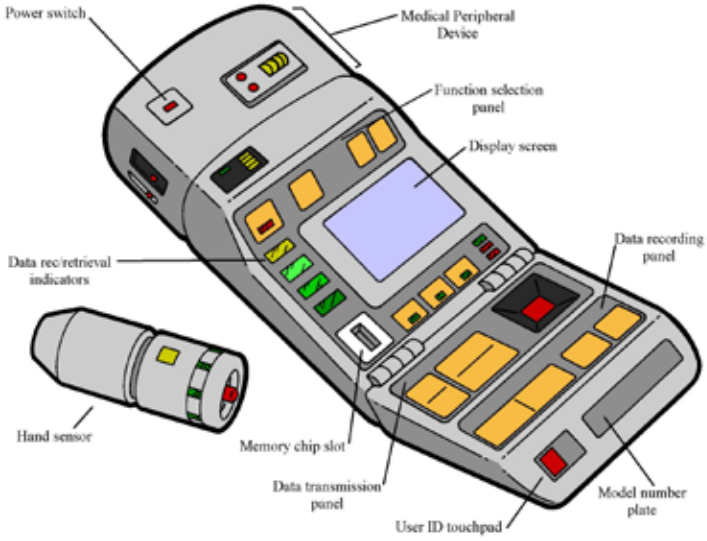
The quintessential "doo-dad" of modern medicine is undoubtedly the hypospray. It delivers subcutaneous (sub Q), intramuscular (IM) and intravenous (IV) meds, using a pinpoint high-pressure, low-volume microscopic aerosuspension stream.

Hyposprays accept standard drug ampules which can be changed as needed. *Field* hyposprays are loaded with a saline solution which serves to dilute any of the five concentrated meds in the Emergency Medical Service (EMS) field ampule:

- tricordrazine (an autonomic nervous system stimulant)
- tri-ox (a respiratory aid)
- terakine (an analgesic)
- sterilite (a broad-spectrum antibiotic/ antiinfective)
- dobutamine hydrochloride (a direct-acting inotropic agent)

7.08.8 FMD-250A1 Medical Tricorder

The medical tricorder is composed of a standard Starfleet tricorder with a medical peripheral device attachment. It is capable of obtaining detailed readings of total body mechanical processes, organ system function, disease organism infiltration, and body electromagnetic conditions.



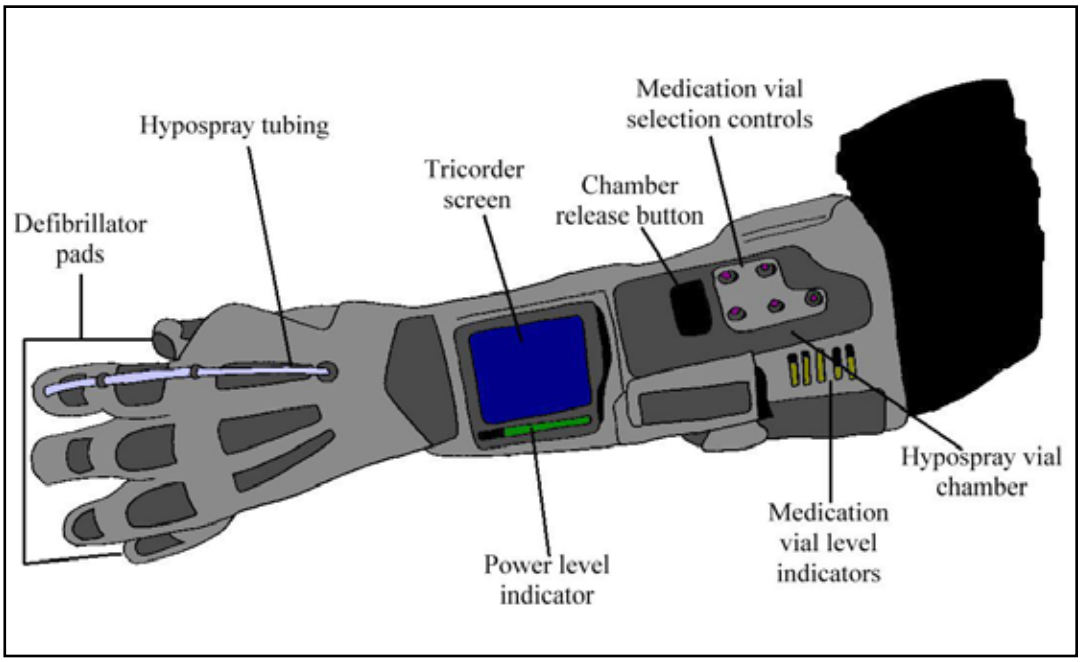
7.08.8.1 The Medical Peripheral Device

The medical peripheral adds a variety of powerful sensor and analysis functions. The peripheral is made up of two main components: the computing section and the analysis functions. This device measures 8.5 X 3.0 X 3.0 cm and weighs 80 g. This brings the overall measurements of the medical tricorder to a length of 15 cm and a mass of 430 g. The case of the peripheral is composed of the same micromilled duranium foam as the rest of the tricorder. The major components of the medical peripheral are the auxiliary sarium krellide power cell, sensor assemblies, peripheral processing block, and memory storage units. Total operation time without recharging is 18 hours. The hand sensor incorporates 15 high-resolution devices which are used for reading down to 30 seconds of arc (arc seconds are a measure of plane angle).

7.08.8.2 Medical Peripheral Computer

The medical peripheral computer is contained in the database comparator/analysis subsection (MDC/AS) which is attached to 101 sensors. The MDC/AS manages incoming data, prioritizes processing tasks, routes processed data, and manages control and power systems. It is rated at 1.5 X 10^{10} calculations per second. When in the field, the MDC/AS database can draw from the updatable file of known medical conditions for most humanoid races and 217 DNA-based non-humanoids.

7.09 FMD-260A3 Combat Medglove



The Medglove is a combination tricorder, hypospray, defibrillator unit which is worn rather than carried. It gives the combat medic great maneuverability in the field and frees their hands for other tasks. The Medglove doesn't have the full capabilities that each of its components would have separately if the full-size version of each were carried, but on the front lines efficiency can be more important. The Medglove also includes two remote medical scanners in a compartment under the forearm which can be used to monitor patients not currently being worked on.

7.09.1 Medglove Tricorder

The main component of the Medglove is its medical tricorder which is enclosed in the portion covering the forearm. Its displays and controls are on a flat, touch-sensitive panel. This tricorder unit has only about 85% of the processing and memory capacity of the standard medical tricorder, but is faster in performing primary assessments. The scanner for the tricorder is in the palm of the glove. It is activated by flattening the palm completely. Scanning can be done one-handed by simply waving the flattened palm over the area to be scanned, freeing the opposite hand for other tasks.

7.09.2 Medglove Defibrillator

The tips of the glove's thumb and fourth finger have leads for the defibrillator. (The glove itself is insulated against the defibrillator charge.) To perform defibrillation, the medic selects the charge via the tricorder control panel, then places the leads in the appropriate positions on the chest. A push then delivers the charge to the patient's heart.

7.09.3 Medglove Hypospray

The index finger of the glove has a hypospray sprayhead on the tip of the finger. This is connected via a small tube to the forearm unit, which houses compartments for the five standard EMS meds (about 20 doses each). The proper med is selected by buttons on the forearm unit, and a gentle push of the fingertip into the skin delivers the medication.

7.09.4 Deployment

The Medglove is a relatively new innovation for the Combat Medic, but it is being very warmly received. Medics like the fact that many of the jobs they once had to perform with two hands can now be more quickly done with one. They also like having the hypospray function so readily available. (The defibrillator function has been regarded as handy, but it is not used nearly as often.) Of course, the unit is not perfect. When meds other than the standard "Fab Five" (see Pharmacopeia) are needed, the field hypospray must be broken out of the med kit. And detailed secondary assessments are not done nearly as well by the smaller tricorder. But the trade-offs in speed and convenience are well worth it to most Combat Medics.

7.10 FMD-629 Microventilator

This small device uses a micropump to collect outside air and force it into a mask, combitube or endotracheal tube (and into a the lungs). It serves the purpose of the manually-squeezed ambu-bag without requiring a person to operate it. It is preset with a respiration rate of 18 per minute, but other settings can be easily entered. It has a back-pressure sensor which can alert medical personnel to problems if air does not flow evenly into the lungs.

7.11 FMD-668 Blood Gas Infuser

The BGI bypasses the lungs by directly infusing the blood with oxygen. It is a large and complex device which is usually only used in larger medical units. It usually must be attached to a SSF for proper operation. Depending on the species, the BGI can only support life for a few hours to a few days until suitable repairs can be made to the patient's pulmonary system.

7.12 FMD-708 Dermal Regenerator

This hand-held device uses a complex combination of lasers, topical neural stimulators, field manipulation beams, and sterile field inducers to stimulate the rapid regeneration of dermal tissue (skin). In a few passes of the beam, it can effectively "erase" most superficial lacerations and abrasions.

Its clinical action is quite complex, but generally works as follows: First, lasers seal severed blood vessels and nerve endings, and vaporize small pieces of skin that won't heal properly due to damage, leaving a clean-edged wound. Then topical neural force fields stimulate the patient's anabolism (constructive metabolism or tissue regeneration). Lasers sweep back through the area simultaneously to join open skin edges resulting in an impressive scarless graft. A sterile field is constantly maintained to prevent contaminants from being trapped under or inside the newly-grown skin.

7.13 FMD-717 Tissue Regenerators

These devices are larger and much more complex than the 708. They generally have a deeper penetrating beam and can stimulate growth in a wide variety of tissues. They come in a variety of sizes, depths, and types, but all have the FMD-717 prefix. Tissue Regenerators are only rarely used in the field, most being used strictly in MSHs and Hospital ships. The FMD-717 group exists mainly for use in Field Hospitals.

7.14 FMD-720 Laser Scalpels

Another set of small devices is described by the FMD-720 prefix. These are small, hand-held, beam cutters of varying thickness and depths. Most have an auto-stabilizing feature which keeps the beam steady despite minor movement of the hand, and will disengage the beam if suddenly and violently moved. The major advantages of beam scalpels as opposed to mechanical scalpels are that they cut precisely and have a cauterizing effect to reduce subsequent bleeding.

7.15 FMD-801 Portable Defibrillator

The 801 is used by Medics in the field to correct a cardiac condition known as ventricular fibrillation or "V-fib". As opposed to the normal electrical rhythm of the heart that produce a steady stream of blood flowing throughout the body, V-fib is random electrical stimulation of the muscle that produces no blood flow. The defibrillator attempts to electrically reset the heart's electrical "thermostat" by jolting it out of its lethal arrhythmia.

The 801 consists of a charging unit, power pack, display screen, and delivery unit. The power pack is a standard W-2 which, incidentally, powers the M-116A2 phaser rifle, so they are in ready supply on the battlefield. The unit top is two carrying handles which, with a quick 1/4 turn, release to become the two paddles comprising the delivery unit.

To use the 801, the paddles are pressed gently to the chest. Their surface is covered with a soft metallic conductor which conforms to the chest and transmits electrical impulses to and from the unit. It can read the electrical output of the heart through the paddles and provides a readout on the unit's display screen. It will also scan the patient's physiology and interpret the arrythmia to prescribe a preset electrical charge (for humans, the most common is 200 joules). The Medic can override the setting if need be, but the machine usually provides the most appropriate charge.

7.16 FMD-824A Portable Neural Stimulator

This is a complex medical device that can be potentially and quickly fatal in inexperienced hands. Generally only doctors and I-Medics are allowed to use a Neural Stimulator (which is sometimes referred to as a Cortical Stimulator). It uses a complex electrical field in an attempt to stimulate normal electrical activity in the Central Nervous System (CNS).

7.17 FMD-826B Neural Caliper

This handy device selectively suppresses neuroelectrical activity in the brain to induce a deep unconsciousness indistinguishable from general chemical anesthesia, but with none of the potential side effects. It is not compatible with all species' brain patterns, and is occasionally ineffective even on members of species which are usually quite susceptible to its effects. In these cases, chemical anesthesia may be indicated.

7.18 FMD-827 Alpha Wave Inducer

This device is used to stimulate the brain to produce alpha waves--the electroencephalogram (EEG) pattern characteristic of REM sleep.

Occasional use can help a patient achieve a restful state of sleep. Use of the AWI is much preferred to chemical means of assisting restful sleep. However, chronic use may lead to an inability to reach REM sleep without assistance from an alpha wave inducer.

7.19 FMD-833A3 Motor Assist Bands

These 4 cm wide straps are commonly used by PTs to retrain the muscles of neurologically damaged patients. These devices are frequently used to strengthen and regain coordination in the muscles of reattached limbs, severe lacerations with deep tissue damage, and in deep phaser burns.

7.20 FMD-835A1 Neural Transducers

These bioelectric implants receive nerve impulses from the brain and transmit them to the voluntary muscle groups which have been affected by any number of injuries. Unlike 833 bands which merely assist neural conduction, 835s completely replace the body's ability to conduct motor impulses when the body's own capacity to do so has failed. PTs often teach patients how to use these devices after significant spinal cord injuries to regain some degree of control over their affected extremities.

7.21 Pharmacopeia

The complete SFMC Medical Pharmacopeia is over 15,000 pages long, and reading it is often prescribed to overstressed Academy students to help them sleep. Here is a short list of the most common drugs used in trauma medicine, but be sure to consult the official pharmacopeia for exact indications, actions, incompatibilities, warnings and adverse reactions.

7.21.1 The Fab Five

The five most common emergency meds are known collectively as the Fabulous Five. They are the drugs found in the EMS field ampule:

7.21.1.1 Dobutamine Hydrochloride

Also known as Dobutrex, this is a direct-acting inotropic agent which increases blood pressure and heart rate, and constricts blood vessels. It is used to treat hypovolemic shock and certain cardiac disorders.

7.21.1.2 Sterilite
Sterilite is a broad-spectrum antiinfective which has antibiotic, antifungal, and antiviral properties. It is popular because it is tolerated well by most species, works against a large number of infectives, and has few adverse reactions (save rare allergic reactions in Humans, Bajorans, and Klingons).

7.21.1.3 Terakine
Terakine is an analgesic which is not as powerful as powerful as the once-common melanex, but has far fewer side effects. It is the drug of choice for Vulcans when pain management drugs are called for, since Melanex has the embarrassing side-effect in Vulcans of turning the skin bright yellow.

7.21.1.4 Tricordrazine
This is a powerful cardiac and autonomic nervous system stimulant which increases cardiac output and O_2 consumption, and stimulates production of naturally occurring epinephrine and norepinephrine. It has fewer adverse reactions than cordrazine (which it has largely replaced), but many patients still have allergies/hypersensitivities, and must use polyadrenaline instead.

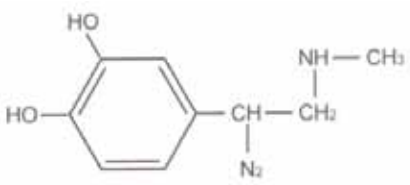
7.21.1.5 Tri-Ox Compound
Tri-Ox breaks down into O_2 in the blood, rapidly delivering oxygen to all parts of the body. Unlike conventional O_2 gas, Tri-Ox is noncombustible and liquid at room temperature so it is easy to transport, store, and administer.

7.21.2 The Dirty Dozen
Out of the thousands of drugs available to SFMC Medical, 17 account for nearly 30% of all drug orders in the branch. In addition to the Fab Five above, the remaining meds comprise what is known as the Dirty Dozen.

7.21.2.1 Anesthizine
This is a fast-acting, long-lasting general anesthetic with a relatively low incidence of side effects. It is employed on starships as part of the anti-intruder system. Anesthizine is the agent of choice for humanoid chemical anesthesia should neural calipers be contraindicated.

7.21.2.2 Corophizine
Corophizine is a broad-spectrum antibiotic which has also exhibited an undetermined antiviral action in some cases (though it is not generally relied upon for viral infections). It does not have the antifungal and antiviral properties of sterilite, but it is effective against the few bacterial strains resistant to sterilite, and can be used on most patients allergic to sterilite.

7.21.2.3 Hemosynthelite
This drug can stimulate rapid generation of new blood cells in those species which manufacture their colored blood cells in their bone marrow. This can greatly benefit patients suffering from high blood loss. Although work continues, equivalent drugs for species which generate blood cells from other sites or organs are not yet available.

7.21.2.4 Hyronalin


Hyronalin constricts blood vessels, thereby stopping capillary bleeding. This vasoconstrictor ability helps relieve congestion in allergic reactions. Its isoproterenol effect leads to alertness and respiratory stimulation. It also is used as a cardiovascular stimulant, and is very effective in the treatment of most radiation poisoning.

7.21.2.5 Inaprovaline
Inaprovaline has widely replaced lidocaine in suppressing cardiac arrhythmias. It doesn't have the topical anesthetic effects of lidocaine, but is better in the treatment of arrhythmias, as evidenced by a large decrease in the use of beryllium (the fall-back drug when lidocaine is ineffective) since inaprov-aline's introduction. It also has fewer adverse reactions than lidocaine.

7.21.2.6 Lasix
Lasix is the SFMC's most commonly used diuretic. It is powerful, can be given orally and IV, and is easy to replicate. It draws all the excess fluid out of the body and especially out of the lungs.

7.21.2.7 Masiform D
Originally developed as a stimulant, Masiform D was later found to have antitoxin properties against saplin and saplin-like poisons. It combines with the poison on the molecular level and prevents absorption into the bloodstream. Larger doses can aid in the removal of the poison as well.

7.21.2.8 Meperidine Hydrochloride
Meperidine Hydrochloride is a narcotic analgesic that is highly effective in the management of severe pain for most carbon-based life forms. Unfortunately, it can be highly addictive, with addiction susceptibility varying widely by species. Care should be used in administering this drug.

7.21.2.9Metropan
Used in fracture management to increase the rate of healing and for pain, Metropan stimulates rapid bone cell growth. Since it can interfere with the action of many stimulants, it should not be given when cardiac or neural problems exist or may be impending. Fractures can wait in these cases.

7.21.2.10 Norep
A synthetic hormone based on norepinephrine, norep is used to restore blood pressure in certain acute hypotensive states, and in the treatment of cardiac arrest. Norep should not be used for treating hypotension due to blood volume deficits, except as an emergency measure, until blood volume replacement therapy can be completed.

7.21.2.11 Polyadrenaline
A synthetic autonomic nervous system stimulant that can be used in place of hyronalin or tricordrazine. Polyadrenaline is not as strong or fast-acting, but has fewer adverse reactions and is better tolerated in life forms with cobalt-based blood like Andorians or Bolians.

7.21.2.12 Vertazine
Vertazine counteracts combat fatigue and stops vertigo induced by being in close proximity to a explosion. It is also administered via sub-Q patch to prevent vertigo or disorientation in zero-g combat personnel.

7.21.3 Four in the Field
These are the four popular medications in the pharmacopeia that are distributed to Marines in the field for self-administration as part of their personal med kit, or as part of their standard field pack.

7.21.3.1 Acetaminophen 5
Often referred to as "Infantry Candy", this fifth-generation acetaminophen is a fairly innocuous analgesic which is often distributed to troops in the field for self-administration in oral caplets. It is contraindicated for life forms with cobalt-based blood such as Andorians or Bolians.

7.21.3.2 Atropine
Atropine increases heart rate, provides vasoconstrictive effects, and slows sweat and salivary gland secretions. It is useful as a broad-based antidote for nerve-agents. Marines in the field carry an atropine self-injector which also holds a dose of Masiform-D for non-nerve-agent chemical weapons.

7.21.3.3 Cortropine
This is a nonaddictive central nervous system stimulant which, in low doses, can fortify a person for prolonged physical and mental exertion. It is taken orally by Marines in the field if prolonged periods of activity with little time for sleep are anticipated. Cortropine, by the way, is also used to treat hyperkinetic behavior in children, and narcolepsy.

7.21.3.4 Retentinol

Known to Marines in the field as "stop-up pills", retentinol combines an antidiuretic with an antidiarrheal, promoting water reabsorption and fecal retention simultaneously. It is used by personnel in sealed environmental or powered armor suits to decrease waste output while enclosed in the garment. Normal functioning in waste excretion returns with discontinued use of the drug. Use of retentinol for more than 24 hours is discouraged.

7.21.4 Fluid Therapy

For trauma use, IV solutions are usually supplied as a microfine powder inside a flexible IV bag of 1000ml capacity. They are reconstituted with sterile water which can be easily supplied by a medical-grade water sterilizer. Using this equipment, canteen water can become lactated ringers in less than a minute. The most commonly used solutions (listed on the following page) are isotonic, meaning they maintain the balance between intracellular and extracellular fluid levels.

7.21.4.1 D5W

D5W stands for Dextrose 5% in Water. Although D5W was phased out long ago for emergency treatment of humans (many have problems with the dextrose), Andorians, Vulcans, and Bolians all seem to do fabulously on the solution. Since these species' electrolyte balance can be negatively impacted by common IV electrolyte solutions, D5W is the first choice for fluid replacement in these species in the absence of species-specific electrolyte solutions.

7.21.4.2 Lactated Ringers (LR)

Also known as Ringer's Lactate, this is the fluid of choice for treating acute blood loss in species with iron-based blood. The electrolyte composition of LR is very similar to that of human plasma, except that LR does not contain magnesium. It is contraindicated for copper-based or cobalt-based blood.

7.21.4.3 Micatropha

Micatropha is a water and electrolyte solution formulated for cobalt-based blood. It also contains the synthetic hormone aktatropha which aids circulation in cobalt-based blood, making it the solution most likely to produce drug-incompatibilities (see "Starting an IV" in Part 5).

7.21.4.4 Normal Saline (NS)

NS (0.9% saline in water) provides fluid volume with some sodium and chloride. It is the most commonly used fluid for blood volume expansion across most humanoid species. Most humanoid blood is saline, and the lack of extra electrolytes found in species-specific solutions like LR make NS a great alternative when treating many different species. It is also used for fluid resuscitation in treating burns, and for wound irrigation.

7.21.4.5 PRF

Pseudohematic Replacement Fluid or "artificial blood" is the fluid of choice to combat excessive blood loss in patients who tolerate it. Its fluorocarbon hemoglobin analog works with iron, copper, or cobalt-based blood. It has a thin consistency so it can be more rapidly infused than plasma or whole blood. It need not be type-specific, and it transports oxygen nearly as well as whole blood. On the down side, about 25% of any given population of humanoids will exhibit SEVERE allergic reactions or hypersensitivity to PRF—so it should not be given if the patient's allergy status is unknown.

7.21.4.6 Sterile Water

As the name implies, a pretty plain solution for IV fluid therapy. It doesn't do much for the patient except add fluid volume, but for some physiologies, that's the best you can hope for. It is the first choice for unknown physiologies, and can also be used for wound irrigation. It is most commonly used for reconstituting micropowdered IV solutions.

7.21.4.7 Vulcanoid Ringers

A solution similar to Ringer's Lactate, but with electrolyte levels specifically adjusted to copper-based blood. In dire emergencies, patient's with Iron-based blood can usually tolerate Vulcanoid Ringers if diluted 70% with sterile water. Additional electrolyte therapy may be required in these cases.

SECTION 8 - Electronic/Communications/ Datawarfare Equipment

8.01 Combat Equipment Management Systems (CEMS)

Due to the sheer volume of sensors, communications devices, fire control data from carried weapons, and other information that must be handled and/or equipment that must be controlled, Marine infantry make use of the CEMS system in order to optimize their handling of it all in the confusing environment of the battlefield.

Tricorders, communications, fire control, transporter calls, attack signals, and any other function requiring the manipulation of a control can be pre-programmed into the CEMS arm and belt units for quick use on the battlefield with a minimum of equipment handling. CEMS has a separate computer control which will also respond to common voice commands issued from the operator's throat mic. The CEMS can also put displays on the inside of the operator's MIPPA helmet visor.

CEMS is standard in every PI suit, with the interface being keyed through the combat tricorder panel on the forearm.

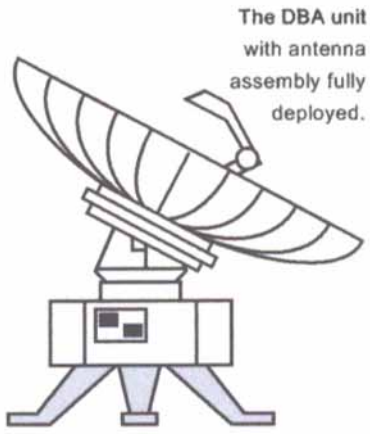
8.02 Special Operations Combat Equipment Management Systems (CEMS)

The goal of the SpecOps CEMS is the same as its Infantry counterpart: to make sense of all the information (incoming and outgoing) that a Marine must deal with. However, as alluded to earlier, the special operator is trained to do more with that information, so the SpecOp CEMS is capable of processing more and doing more with it.

One of its unique capabilities is its output functions: it can actually process sensor data and coordinate it with weapon data to produce real time aim points for weapons on the TVD. In other words, the operator can see through his helmet visor where his weapon is pointed without having to use the weapon's sights. As the weapon moves, the aim point (known by operators as the 'death dot') moves with it. Of course, to use this function, the weapon must have a position sensor that plugs into the CEMS system. This has proved invaluable for CQB where "rapid aim fire" situations are the norm.

The SpecOp CEMS also has an archive function that stores all incoming data in raw form for later analysis. This unit can also be set to burst download and core-wipe in the event of imminent capture.

8.02.1 ANS/P-45A2 Digital Burst Antenna (DBA)



The DBA unit with antenna assembly fully deployed.

This small, lightweight collapsible antenna assembly is a necessity for special operators, particularly recon and foreign assistance teams. The antenna set is designed to operate in concert with a Force Recon Tricorder. It can receive frequency hopping, encoded transmissions of up to 400 gigabytes from the tricorder in the field from as far away as 140km. It then packages the data for burst transmission to a distant receiver. This burst averages less than 2.5 nanoseconds and is itself triple-encrypted.

The transmission can be made in one of two ways. First is unidirectional burst straight to a remote station: either a distant ground unit, a comm buoy or satellite, or a starship. The second uses a technique perfected by the Maquis called subspace signal riding. The antenna holds the burst in a buffer and waits for the next transmission anywhere within high orbital range of the planet. It then attaches the burst to the signal's carrier wave, essentially "riding" the signal out of the atmosphere without the enemy's knowledge. This method works only with omnidirectional transmissions however, unless the receiver is the same party receiving the ridden signal—you can't only ride a signal part way and then change direction.

The antenna set can be programmed for autonomous operation, or can be controlled remotely from a Force Recon Tricorder with the proper code keys. To protect the technology and the crypto information associated with the set, it can be programmed to self-destruct if moved without a proper code transmission from a tricorder, or it can be remotely detonated with a tricorder.

One of the most unique features of the set is an optional homing antigrav which can be attached to the bottom of the set. With this, the antenna can literally be flown back to the team that emplaced it. This antigrav unit is very heavy, though, and has the distinctive energy signature antigravs are famous for, which may make operation of the unit undesirable in many circumstances.

8.02.2 ANS/B-1450 Field Signal Relay Beacon

This 1450 extends a combat unit's communications range by receiving the signal from their normal transmitter, boosting it, and retransmitting it to either another relay or directly to a receiver. It can broadcast in either a tight unidirectional beam, or in a wide omnidirectional signal. It has a range of 5,000 km under standard Class M atmospheric conditions. (An I-LINK 105 has a range of only 800m under similar conditions.)

At least one 1450 is usually carried by a platoon's signal operator. They are lightweight and take up less room than a phaser rifle, so several more can be easily carried by platoon members if need be. Each 1450 is tube-shaped and has a self-contained tripod. They can be deposited in the field as a unit travels, and each has a self-destruct mechanism in case of compromise or capture.

8.02.3 ANS/B-1880 Orbital Signal Relay Beacon

This satellite is about the size and shape of a class I probe, and can be launched by starship or SFMC aerospace craft. It operates on the same principle as the 1450, but on a much larger scale. It is capable of beaming transmissions from planet-to-planet, although it is limited to lightspeed transmission.

8.02.4 ANS/P-65 Series Antennae

This series of general-purpose antennae are used to mix and match to suit a Signal Unit's needs. P-65s exist for microwave, RF, laser, and tachyon transmission systems. The type of system is identified by the unit's suffix designation. For example, the ANS/P-65MW is a microwave antenna.

8.02.5 ANS/P-100 Series Transceivers

These are man-portable transmitter/receiver units that operate in the same range of media as the 65-Series antennae. Each 100-Series transceiver has a built-in antennae, but their respective ranges can be boosted enormously with a 65-Series antennae and a 105-Series signal booster.

8.02.6 ANS/SS-2000 Orbital Subspace Relay Beacon

A bit larger than the 1880, this unit is actually capable of FTL signal transmission via subspace radio. Its operating principles are the same.

8.02.7 ANS/SS-2010 Deep Space Subspace Relay Beacon

This is a much larger relay unit with self-contained power and life support systems. It is actually manned by a crew of three, and has thrusters for limited maneuvering and station-keeping. It could actually be considered a vehicle by many definitions, or a portable structure by others, but no one who's ever crewed one would consider it either.

8.02.8 ANS/W-660 Manpack Weather Sensor Suite

The 660 is a backpack unit that breaks out into a keyboard/display unit which includes a computer processing module, and a collapsible radar antenna. The system is carried by Artillery Meteorologists so that they can analyze meteorological data in the field. The terminal unit can be linked to satellites or other data collectors in addition to the onboard radar unit. The radar has a long range, but it has the drawback of easily revealing its position since it is an omnidirectional long-rage emitter. Therefore, circumstances do not always allow for active weather scanning. In this case, the meteorologist must rely on passive measurements, starship or satellite data if available, and their experience in predicting weather conditions.

8.02.9 EWD-007 "Hack Pack" Portable Datawarfare Terminal

This is a man-portable LCARS terminal which has been modified with interfaces for all known computer systems. It comes in a field pack with I/O connection hardware and adapters which enable the trained user to "hack" into enemy databases and operating systems either through a hard connection, wireless modem, or through the GOEIS system above.

If the datawarfare specialist can avoid or defeat his trained counterparts defending the enemy computer system, he can extract valuable information, deny the enemy access to their own information, or even insert false information. This is insidiously effective warfighting even though shots may never be exchanged. A great deal of technology and effort are put into securing battlefield computer systems, but if the EWD-007 and a talented operator can crack through, they can wreak havoc on the enemy.

Of course, the enemy can do the same to us, so highly trained datawarfare specialists are maintained on our own computer systems to defend them from such attacks.

8.02.10 EWD-007SO "Super Hack Pack" Special Operations Portable Datawarfare Terminal

This is essentially a vanilla EWD-007 with more powerful RF capabilities for longer range wireless hacking. It also has a unique interfacing component sequence that makes it highly adaptable for nonstandard interfaces. It can also be preprogrammed with instructions and set to burst upload or burst download when a short-time connection is anticipated.

8.02.11 EWD-010A2 "Big Black Hack Pack" Crew Portable Datawarfare Terminal

The pride and joy of the Signal Corps' computer systems department is this huge remote datawarfare terminal. It is so large it is actually transported in two pieces: the terminal itself (which folds into a backpack) and the antenna (which collapses into a crate carried by a second operator). This large-capacity terminal and long-range wireless modem allow battlefield and theatre datawarfare specialists the best and biggest computer assets on the modern battlefield. Usually connected to an LCARS core (via hardwire or wireless datalink), this terminal protects computer assets on the battlefield, or attacks enemy systems through a variety of sophisticated interfaces.

One insidious hacking tactic is a team approach between a SpecOps Datawarfare Team and a Signal Corps Computer Systems Unit. The Datafighters break into a facility and establish a hardwired intrusion into an enemy information system, then create a wireless datalink with the battlefield datawarfare Signal Corps team. From their EWD-010A2, the Signal Corps team can wreak havoc on the enemy system, using the Datafighters' EWD-007SO as a remote interface.

8.02.12 EWD-189J "Eloflage" Personal Electronic Interdiction System

Camouflage clothing, paints, and adhesives as well as field craft have been the traditional method of avoiding detection throughout the history of infantry warfare. However, the threat from enemy sensors, which have little trouble seeing through these simple measures, cannot be ignored. To make the Marine less visible to these sensors, the SFMC issues each infantry soldier a personal dampening system. It consists of a slip-over, lightweight, soft filament suit worn as an undergarment (the suit must be worn underneath other articles so it does not tangle in surrounding vegetation or other matter). The standard-issue helmet also has an integral eloflage mesh between the helmet cover and helmet.

Eloflage fibers are coated with elements that disrupt sensors (although the exact ingredients are classified, it is known that kelvanite and fistrium are both capable of this). The 189J uses several other countermeasures to thwart sensors, including dampening the thermal signature of a Marine, and scanning incoming sensor pulses and retransmitting them unchanged.
As handy as eloflage turns out to be, it does lead to tactical problems on the battlefield. As one LI platoon leader lamented:

"What it amounts to is everyone goes back to visual aiming on most stuff, because they don't trust their rangefinders or tracking systems to see through our 'flage, and of course most infantry types don't want Robbie the Robot aiming their weapon for them anyway. At a certain point in the battle, everyone gives up trying to unscrew the sensors and it just goes stone age: everyone looks for the other guy and throws something at him."

8.02.13 EWD-202B "Holoflage" Squad Holographic Generator

If visual scanning is the primary threat, the EWD-202B is the absolute ultimate in camouflage. A portable holographic generator, it is capable of projecting a holographic image of surrounding terrain over an entire squad of LI troops (or about three Phalanx suits if they stand close together).

Of course, the 202's energy signal as it generates the field is obvious to passive energy sensitive devices. However, if the battlefield is already cluttered with energy signatures, it can still be useful. The energy output, and subsequently the hologram size, can be turned down to a very minimal signature if the hologram needs only to cover one or two LI troops close together (say a scout/sniper team).

The unit itself, though, is large and difficult for one man to carry if he must carry other field equipment as well. For this reason it is usually disassembled into two parts (generator and emitter) and carried by two men in a squad, then reassembled when ready to use. The assembled unit can be fitted on one back station of any powered armor suit.

8.02.14 EWD-303A3 Field HQ Networking Unit

This is essentially a large-scale MULTI-LINK which is crew portable and is setup in the HQ or Communications tent of a field headquarters. It can coordinate I-LINK communications as well as connecting with ships via subspace relay. It can handle voice, data, video, or just about any other signal; and can operate under highly encrypted modes. Like all sensitive communications equipment that can't be easily removed from the field in case of quick withdrawal, it is fitted with self-destruct devices.

8.02.15 EWD-480 Focused Electronic Jamming System

GOEIS provides the mechanism for Marine infantry to interdict most any enemy system, but occasionally a specialized jamming system is needed for a hardened or very important electronic target. The EWD-480 is the most powerful man-portable electronic warfare device in existence.
The EWD-480 uses a light soliton pulse in concert with various forms of radiation to send a jamming field onto a target that can penetrate most any defense barrier, be it electronic or physical, due to the soliton pulse's temporal variance. The only way to jam the EWD-480 is to match it's soliton variances with another jamming field or stay out of it's influence cone. The EWD-480 has a variable pulse algorithmic patterner that can be configured to confuse an enemy countermeasure, but care must be taken to keep the 480 operating within the band that will influence the target.

Two disadvantages exist with the EWD-480 when working with ground troops. Due to it's solition carrier pulse and high energy output, the system has effects on equipment and people that are somewhat akin to that of an energy weapon, particularly when the energy pressure is applied for more than a few seconds. Further, the soliton pulse is so penetrative that it can actually go through geographical features. The pulse will disrupt communications signals passing through it's arc as well. Care must be taken to ensure that friendly units aren't "in the way" of this device.

The exact range of this device is dependent upon the characteristics of the target. However, the closer the target is to the EWD-480 the more energy pressure can be applied. Contact needs to be maintained with the unit spotting the target (if any) to ensure that the target is being affected.

8.02.16 EWD-505 Overlapping Bubble Electronic Jamming System (OBEJS)

Aside from jamming hostile equipment, the other electronic parameter that must be addressed is keeping the enemy's own sensor systems from detecting the infantry. Eloflage systems help to a certain extent, but are limited by their size, thus the OBEJS system is carried to supplement them.

The EWD-505 is carried by two infantryman; one carries the system and a basic powerpack, with the second one carries a dedicated auxiliary powerpack that can be hooked together in tandem for use during heavy operations. It broadcasts a continuous "snow" of electronic jamming on all frequencies not being used by friendly units. The entire relevant sensor band can also be scanned and coverage modified on an ongoing basis as needed. Range is 10km.

8.02.17 EWD-507 Ground Offensive Electronic Interdiction System (GOEIS)

Electronic impulses are fundamental to every common military system in use by any known government today. Almost as soon as any culture discovers electronic weapons, methods are sought to interfere with the electrons causing the device to operate. The GOEIS (pronounced, "goes") system is the most advanced portable electronic warfare system in the known galaxy today, incorporating focused and area effect transmissions in a web that will severely impair any combat force approaching a SFMC infantry unit.

GOEIS consists of a one-meter long transmission/reception assembly, a backpack power battery, and two "user boards" that comprise the core system. It uses 34 separate emission systems and 46 reception systems that work to identify enemy equipment in the area, determine it's electronic vulnerabilities, and then attack those vulnerabilities using powerful jamming transmissions and relational database offensive instructional assault. The system is designed for carrying and use by two dedicated operators.

Typically, the GOEIS operators will be put in a secure area, sometimes with security elements to protect them, within the battle area and will work if possible from a stationary point. GOEIS can be effective against any device in the battle area that is dependent upon transmission or reception for it's effectiveness and also against sealed systems that can accept transmitted material if adequate time is had to "hack through" whatever onboard safeguards are present. The transmission assembly also has an LOS aiming feature that can maximize the transmission power brought to bear on a given area of the battlefield, although this does require the operators to be more exposed and closer to the enemy many times.

8.02.18 EWD-8450 Special Operations Extraction Beacon

This special long-range beacon sends an encrypted homing signal that extraction elements can use to find SpecOps teams in remote areas. The beacon can be set for omnidirectional transmission in an emergency, or unidirectional transmission when the location of the extraction force is known by the team.

8.02.19 FTA-402 Multipurpose Beacon

This device is, as it's name implies, a signalling device that can be used for many purposes. These include designating landing or beaming zones, maintaining a fix on a location, or even calling in weapons fire. It can operate by infrared or visible spectrum illumination, wide or narrow angle electromagnetic signal, or passive response signalling that requires the reception of a "trigger" signal. It is a pocket-sized cylinder.

8.02.20 I-LINK 105 Communications Equipment

While in the field, the individual Marine foregoes the standard uniform combadge for the I-LINK 105 personal communications system. It is normally worn inside the MIPPA helmet, but can be worn without any other equipment if desired.

The I-LINK consists of an earpiece which contains an earphone speaker/microphone which is inserted into the outer ear canal; and a transceiver assembly which wraps

over the top of the ear, with the bulk of the unit resting behind the ear against the head.
The I-LINK has a transponder inside it that duplicates the function of the combadge transponder worn by Starfleet and Marine personnel during normal operations. A pressure switch permits an open channel by pressing and holding for one second. Another pressure switch will block the set's transmitter, which is important to prevent the exertions, frustrations, and murmurs of the Marine wearing the device from clogging the traffic. Other channel options are cycled through by changing one or more times and then holding for a second. A computer voice names the channel inside the earpiece and the channel is also displayed on the inside of the MIPPA visor for the Marine for one second after selection. The use of the earpiece mic enables transmission to be done with a very low voice tone.

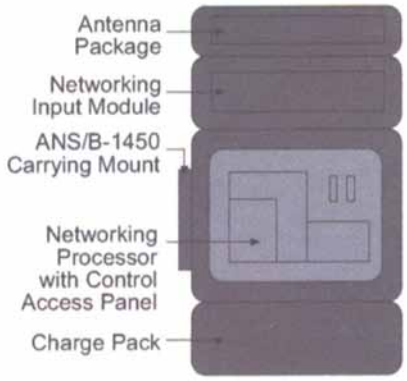
The I-LINK has a rated range of 800 kilometers in a Class M magnetosphere. The actual range of communications will vary depending on specific local conditions. For surface to ship operations, the I-LINK is dependent upon the signal boosters and enhancers of the host vessel. With no computer control over the transmissions, it is not possible for the I-LINK to contact one or more specific receivers at the exclusion of others-- it operates on a straight channel system. The unit automatically adjusts signals it receives to set parameters as it is able.

PI troopers use the same unit, however, the I-LINK inside a suit simply acts as a relay to the suit's communications gear.

8.02.21 I-LINK 106 Communications Equipment

In outward appearance, this unit looks exactly like it's Infantry counterpart, the I-LINK 105. However, the SpecOps version has more channels and a physical interface for SpecOps comm gear. It also has a slightly larger range. To compensate for the added space taken up by the added components, the I-LINK 106 has no transponder. Therefore, the SpecOps helmet also carries the operator's transporter-lock and location transponder. Most operators also have subcutaneous transponders.

8.02.22 MULTI-LINK 200 Combat Net Coordinator



This backpack unit allows a signal operator to coordinate a network of I-LINK 105 or 106 communicators on the battlefield. For instance, he can set up each squad of an Infantry platoon on a separate net, while making sure each squad leader can still communicate with their platoon leader, that each can be patched in to the Fire Support net for directing fires or air support, and that each can talk to the Field Medic(s) assigned to the platoon. He can also link the Platoon Leader to Company, or directly to Battalion or Brigade if need be.

The MULTI-LINK is a lightweight backpack. While it stretches from hips to shoulders, it is rather thin, so a lightly-packed rucksack can be worn over the MULTI-LINK. An access panel in the antenna package can be slid open to reveal connections for an external antennae to boost range. The side carries a magnatomic mount for an ANS/B-1450 relay. The mount can be worn on either side to keep the operator's rifle arm clear. The backpack is wired to a rectangular PADD which is worn on the operator's non-dominant forearm.

8.02.23 SFE/EWD-810B1 Man Portable Computer Core

This backpack unit is actually a microcore, containing only one megaquad of memory and processing capability with no FTL processors. It is a force multiplier of computing power on the ground, however, and is frequently fielded with the Big Black Hack Pack as well as other, more pedestrian, portable LCARS interfaces. It can also be used to control several pieces of field equipment simultaneously, and a slightly larger version is used in many portable structures for life support control and equipment package operation.

8.02.24 SFE/EWD-800B5 Crew Portable Computer Core

No one who regularly serves aboard a starship would actually mistake this 5-meter cube for a real computer core, but the computer-capability that this five-man-crew-served mini-core gives a field unit is irreplaceable. The core breaks down into four memory/subprocessor modules that are carried on built-in antigravs, and one central processor with limited FTL sub-processors on another built-in antigrav. With the AGs, the unit just barely fits the definition of “crew portable”. Without them, it would take nearly two squads to move the hulking computer units.

When fully assembled and operational, the mini-core posses 60 banks of chromopolymer processing and storage sheets, for a total capacity of 25 megaquads. The system requires a great deal of power and should not be deployed without a dedicated power unit. Attempting to share power with any other sizable system will result in severely degraded performance.

Each component can function separately if need be, but the four memory/processor modules are each much slower when separated as they do not possess any FTL processor capability without the CPU. On the other hand, the CPU runs much faster when separated, but does not, of course, have anywhere near the memory capacity.

SECTION 9 - Special Equipment

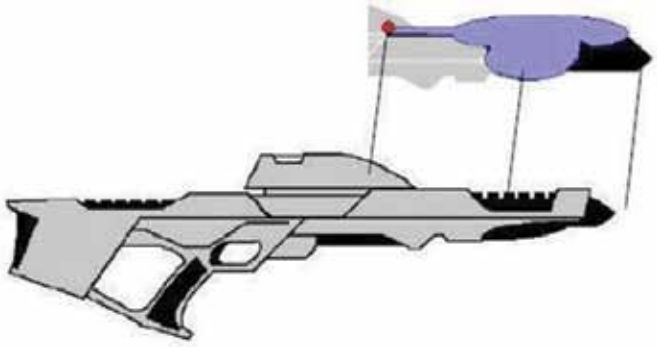
Marines have specialist shops in their operational areas and ships that can manufacture special equipment on short notice for use in an unusual operation. Marine units also borrow equipment from Starfleet units, or from other Federation agencies. Civilian equipment can be purchased by strike groups using purchase orders, although they must go through the strike group leader for approval. Once again, the total list of special equipment that the Marine Corps uses, has used, might use, or could use, is far too extensive to cover in this manual. But below are some of the most common items that find their way down to a planet's surface during operations.

9.01 ALA-4 Anti-Laser Aerosols

This chemical solution is the 24th Century version of the traditional vehicle smoke screen. It consists of a combination of prismatic microcrystals of duranium, transparent aluminum, and other energy resistant materials suspended in a liquid base. When heated and then dispensed under pressure, this solution forms a thick white cloud of vapors that obscures vision throughout the infrared and visible light spectrum.

It also disrupts standard sensor scanning, dramatically reducing accurate information gathering on objects within the cloud. Lasers, masers, phasers and other energy weapons that rely on focused energy are disrupted and scattered by the prismatic crystalline particles in the cloud. Although repeated phaser blasts will vaporize portions of the cloud, much of the weapons energy is wasted in the process. The length of time and area of effect of such a cloud of vapors is dependent on many factors. Wind, cold temperatures, precipitation, gravity, weapons firing, movement through the cloud and terrain features all reduce the time and protective effect of the vapors. Eventually the cloud will thin out and the particles inside will settle to the ground, eliminating the cloud. In an area with few of these factors at work (inside of a building that has limited ventilation, etc.) the cloud will remain for up to a half hour before settling out due to gravity. The cloud is semi-toxic, and has an effect similar to tear gas on unprotected personnel (respirators have no difficulty filtering it). ALA Solution comes in bulk liquid form (for vehicle dispensing systems), artillery shells, RAM grenades, hand held sprayers and disposable hand thrown units similar to grenades (commonly called "foggers"). Sprayers weigh 5 kg and will make a cloud 15 meters in diameter. Foggers weigh 1 kg and will make a cloud 3 meters in diameter. A standard 4 unit vehicle dispenser will make a cloud 30 to 50 meters in diameter, based on the arrangement of the dispensers, and will use 1 liter of solution per dispenser per minute to create a smoke screen.

9.02 Clark -M31A AV Inhibiting Suppressor



The M31A is a revolutionary technology that allows nearly any energy shoulder weapon, or larger, to silence not only its audio report but also make its trademark energy beam less visible. Energy weapons have always been unwelcome in situations that required stealth movement or attacks because of their highly detectable signatures as compared to even a basic projectile weapon. The Clark model Inhibiting Suppressor attempts to correct this deficiency.

The Clark is an add-on addition to any energy weapon, but requires qualified Gunsmiths to properly fit and maintain. Along with this increased personnel requirement, the weapon also uses artificial dilithium crystals that are impossible to replicate in the field. Therefore, its use has been restricted to Special Operations Forces and select Infantry Units for the time being.

The device consists of three components: a Logic Circuit, a Sonic Inhibitor, and a Beam Wave Controller. The Sonic Inhibitor provides both the audio silencing capability and a large majority of the power to operate the device. This first component fits over the exhaust ports for the phase generator coils; where the waste energy from the phase generation is usually vented out of the weapon as sound and gas. The Inhibitor's collection manifold absorbs this sound and exhaust gases through densely packed, advanced audio receivers which then trap the sound in an artificial foam polymer. The polymer is porous enough to completely deaden the sound waves but is also highly reactive with the hot exhaust gases. The reaction between the artificial polymer and the gases produce an electrical current that is channeled into the

portion of the device that requires a power source to operate.
The next component of the Suppressor is the Beam Wave Controller, which is powered by the energy generated by the Sonic Inhibitor. The Controller uses artificial dilithium crystals to alter the electromagnetic wavelength of the emitted phased energy beam. These crystals are placed inside the primary focusing chamber, where the charged energy plasma is condensed into a beam or bolt. By adjusting the relationship between the artificial crystals and focusing assembly, the weapon's operator is able control the beam's electromagnetic wavelength. However since the beam still has to have the physical form of high energy light particles to be effective, the range of wavelengths is limited to the visual electromagnetic spectrum. However, since this range includes every wavelength from the High Infrared to the Ultra Violet, the operator can customize the fired beam to whatever setting would be the most invisible to threat sensors, both artificial and personnel.

The Logic Circuit uses nanite level multitronic processors to control the artificial dilithium crystals in the Beam Wave Converter and the energy generated by the Sonic Inhibitor. Having the performance of a 4.5 terabyte computer is necessary in order to preciously adjust the relationships between the crystals and the focusing assembly in increments measured by fractions of an Angstrom. While the operation of the Logic Circuit, and a majority of this device, is highly classified beyond public release; an interesting side feature can be described. When a phaser beam strikes a target, a small amount of energy is normally reflected back through the beam itself. The Logic Circuit can analyze this feedback in order to continually update itself and maintain the desired electromagnetic frequency of the beam.

9.03 FMG-10 Mountaineering Rig

This is actually a set of equipment which includes harnesses, ropes, tools and accessories an operator needs to scale rock or ice formations. Although these types of operations are usually left to so-called "alpine" units, all operators are trained in alpine ops and may make use of the FMG-10 kit.

9.04 FMG-22A3 Mountaineering Boots

These boots are similar to the jet boots worn by recreational climbers throughout the Federation. However, the 22A3 boot jets are up to 88% quieter, produce 50% lower infrared emissions, and have 29% more lifting capacity. They can also be linked to an external fuel source for extended operations. While the boots do still emit noise and IR signatures; they still run less risk of detection then energy-hogging, signature-blaring antigravs. They are murder to walk in and heavy to carry, however.

9.05 GPM General Purpose Moulding Foam

When constructing improvised positions in the field, repairing damage to a stormed area so that personnel can move around, damming small waterways, or performing any other task that involves construction, it can be hard for Marines to find indigenous materials that are suitable for the task or that are readily available. GPM foam solves this problem. The foam comes in one-kilogram cans and expands to five hundred times it's compressed volume upon being sprayed out. Within one minute it hardens to a tensile strength almost as high as MIPPA armor. Its color can be modified by injecting special dies into the cans prior to use, in order to blend in with indigenous terrain. GPM foam is normally carried by Infantry only when specifically mandated by the unit leader. It is standard equipment in most Combat Engineer units.

9.06 OT-10A Orbital Entry Parachute

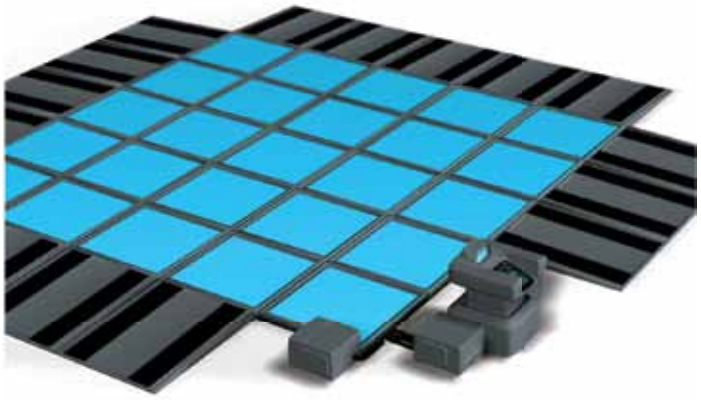
Parachuting into forward areas continues to be an important method of infiltration/insertion for special operators. Today, however, the airborne insertion may start from somewhere high above a planet's atmosphere. With personal shields and protective suits, surviving reentry heat is no longer a problem, but hitting a target on another side of a planet is. At orbital speeds, one doesn't simply fall straight down to a Drop Zone (DZ).

For this important aspect of orbital entry, the OT-10A is fitted with an orbital stabilization rig which emits a low-level suspensor field for the rig to follow into the atmosphere. It is quite a rough ride, but the field prevents excessive force on the body during entry. It also lines up the jumper's trajectory properly for the target DZ. Once safely through the upper atmosphere, the concept of terminal velocity governs the ride and all that is needed is a simple parachute.

The OT-10A features a state-of -the art orbital stabilization rig along with a heat-shielded parachute envelope. The chute itself is a standard T-14 chute as shown below. The rig has both radar and barometric altimeters and can bet set to deploy the chute automatically at a preset altitude. It also has an antigrav reserve unit. Antigravs are effective for this type of insertion, but at low altitudes they emit a definitive

energy signature, so they are used for emergencies or low/no atmosphere drops only.

9.07 MTU-200 Extensible Temporary Transporter Platform



The MTU-200 Extensible Temporary Transporter Unit (ETTU) was designed to solve the short fall of truly large industrial transporters available for deployment of SFMC forces from Starfleet vessels. This device is specifically envisioned to handle the rolling stock, or vehicular assets, of the SFMC units aboard and to be able to place them either planetside, or into a holding position off ship for pickup by any of the SFMC Heavy Lifters. Though it can do so in an absolute emergency situation, the MTU-200 is not designed to transport living organisms. Under no circumstances should this system be considered as main force invasion device.

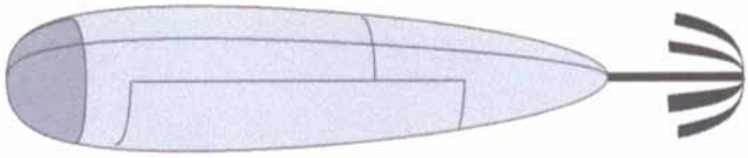
The MTU-200 is a deployment aid device. Designed to be temporarily installed in a large open space aboard ship, the MTU-200 can convert, for instance, a shuttlebay into an industrial transporter system capable of deploying rolling stock either directly to a planet, or into position to be picked up by a waiting landing craft. Panels can be added or removed from the floor and ceiling units to allow the MTU-200 to occupy as much or as little space as is available. This is what gives it its extensibility. The MTU-200 operates in all other ways as any other industrial grade transporter unit, so any person rated to operate such a device should have no difficulty whatsoever using this system. It should be noted that, as with any industrial transporter unit, it is not recommended for the transportation of living organisms. This means that marines whose equipment is deployed in this fashion will need to take time to mate up with their equipment. This is specifically NOT an invasion tool.

The Control Console telecopes up and down from the pedestal base. The Height listed is the nominal. Operator's may adjust the height of the control console +/- 10cm for comfort. For packing, the control console retracts all the way to rest on the top of the pedestal base. The control panel itself is designed with larger than normal touch points to allow operations by individuals with gloved hands.

The system boxes are designed to be stacked and, once stacked, will lock in position to avoid shifting. The system boxes contain the necessary buffer units, power convertors/amplifiers, various required compensators, and filters.
The floor panels are the key to the MTU-200's extensibility. The floor panels can be locked together to accommodate any available space and almost any configuration. The floor panels strength, combined with the availability of sloped ramps, allows the roll on/roll off transport of vehicular units. The entire system is designed to be disassembled when not in use and stored in minimal cargo space.

Performance of the MTU-200 system has been tested to be functionally identical to that of other Starfleet standard shipboard cargo transporter units. Durability is the potential failure issue envisioned by the designers. The components of the MTU-200 have all been tested to survive, with full function, 1G drops from 250 meters. At 300 meters, one floor panel of 50 showed breakage in the crystalline substructure. This was deemed to be more than satisfactory for SFMC operation aboard ship. Similarly, the tested system each withstood assembly, use, and disassembly cycles of 1000 repetitions without failure or need for unusual adjustment.

9.08 OT-100 Transatmospheric Drop Capsule



The OT-100 capsule. The orbital stabilization boom (black above) deploys after the capsule clears the launcher.

Smaller than a Powered Infantry drop capsule, the OT-100 allows humanoid operators to transit the upper atmosphere in the safety of a tripolymer ablative cocoon rather than a heat-shielded jumpsuit. The capsule has its own stabilization rig, and the ablative heat shielding protects the occupant, slows the capsule, and creates multiple sensor images to ground based systems as it breaks up, confusing the location of the operator. Once safely inside the atmosphere the capsule jettisons in several pieces, further cluttering enemy sensors. The operator can then descend with a standard T-14 chute or T-42 antigrav.

9.09 PPG-275 Diving Rig

This is another equipment set which includes a high-capacity rebreather, a buoyancy control device, a protective mask (although the MIPPA helmet can be sealed to either diving suit), swim fins, and various other accessories needed for underwater diving. The rebreather provides nearly two hours of air for an average humanoid, and since it is a rebreather there are no exhaust gases to form telltale bubbles which may give away a diver's presence.

9.010 SFE-100 Hand-held Antigrav

In an SFMC warehouse, cargo bay, or supply tent, you can't swing a dead cat around you one time without hitting an antigrav unit of some sort. The most common of the hand-held versions (often referred to as "dollies") is the SFE-100.

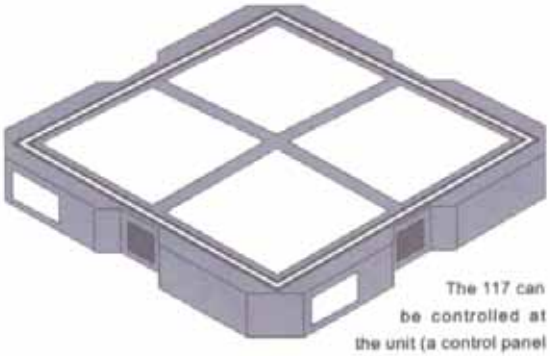
About half a meter long by 10cm wide by 10cm high, the unit has two handles which can be moved to almost any part of the unit for ease of movement depending on the load. The load is attached to the unit with magnatomic grapples that can conform to just about any shape.

To operate the SFE-100, all one needs to do is put the grapple up to a box or barrel, hit the thumb switch to activate the unit and the grapple engages and the antigraviton generator kicks in. The unit's microprocessors compensate for load mass and asymmetry, making any load easy to handle.

9.11 SFE-117 Antigrav Pallet

When moving large pieces of equipment or several items simultaneously, an antigrav pallet is often used. The most common is the SFE-117 which is a standard sized pallet capable of holding several hundred kilos of material. When turned off, the pallet is simply an inert platform. However, it has two powered operating stages that make it ideal for most storage and movement applications.

Stage 1 operation of the SFE-117 involves the engaging of a confinement force field which extends perfectly upward from all four edges of the pallet. This keeps whatever is loaded onto the pallet from falling off of the pallet. If any part of the load extends over the edge, the confinement field will support the item in question, but cannot be relied upon to keep it from falling, nor will it support or confine anything stacked on top of the protruding item. The confinement field extends about 2 meters up from the top edge of the pallet.



The 117 can be controlled at the unit (a control panel is centered on each side of the pallet for easy access), or via PADD by calling up the pallet's serial number.

Stage 2 operation of the pallet engages the antigraviton generator in the bottom of the pallet. The pallets processors compensate for load shifting and asymmetry. The pallet is self-propelled with microthrusters. It is steered with an interface

which can be called up on any full-sized PADD by entering the pallet's operating code (printed on the right-hand side of all four sides of the pallet).

Older antigrav pallets prior to the SFE-117 are still in use and do not have the confinement field and microthruster features. These pallets must be carefully loaded and moved by pushing, or with hand-held pallet jacks.

9.12 SFE-146C3 and SFE-149A1 Field Replicators

These are crew-portable replicators capable of materializing parts and supplies of all types. The 146 is a light duty replicator capable of producing items no larger than 75cm in any dimension. The 149 is a heavy-duty replicator capable of producing items up to two meters in any dimension.

The 146 is easily carried by two people fully assembled. The 149 is a bit more of a chore: It is only crew portable because it breaks down into four units which can stow into rucksack-sized cases. Most often, though, the 149 is beamed, flown, or trucked into an operating area in deployed configuration.

9.13 SFE-151 Emplaced Replicator

Nothing about this behemoth replicator unit is portable. Given the time, raw material, and energy supply, it could probably replicate a small village. The 151 is a heavy-duty replicator used primarily for parts and portable structures. It requires a small cargo bay's worth of room to operate, and is usually employed only by permanent bases and/or capital ships. With heavy-duty cargo transporters or T-8 Albatross aerospace craft, however, they can be deployed in the field if needed.

9.14 SFE/FB-88 Portable Fuel Cell

Transporting fuel out in the field can be a dicey proposition, which is why the Fuels & Power section uses the FB-88 portable fuel cell. This inflatable/ deflatable bladder is made from dozens of layers of nylex and soft body armor components, with an outer shell of kevlex and an inner shell of collapsible plasteel. It has collapsible baffles inside to prevent fuel surge and prevent fire from spreading in case of a catastrophic shell failure in one area.

When empty, the FB-88 folds into a transit package, much like a portable structure. It easily fits into the back of a Type 7 shuttle, any of several SFMC Aerospace craft, or onto the back of a Mule or similar ground vehicle. When full, it can expand to a holding capacity of several thousand liters (models are available in 10, 20, and 30 thousand litres). Versions are available to hold slush deuterium, Reaction Control System fuel, and other volatile liquids.

9.15 SFE/FB-109 Recharging Station

The 109 attaches to any microfusion generator or field warp core in the SFMC inventory, and gives the Fuels & Power section the capability to recharge just about any type of power pack in the SFMC. It has cable feeds for large vehicle-mounted charge packs, and receptacles for smaller hand-held units. It is packaged with dozens of adapters to accommodate just about any power need.

9.16 SFE/MA-177A5 Portable Morgue Unit

Somewhat similar in appearance to the FMD-108 Portable Stasis Unit, the 177A5 is a semi-stasis assembly of two tubes stacked atop one another. The term semi-stasis is used to describe the function of the tube which cannot hold a live person in suspended animation, but can prevent untimely decay of a deceased one. It is used by the Mortuary Affairs section for field pickup of the deceased.

9.17 SFE/OT-7B3 Cargo Oribital Air Delivery System

The OT-7 system includes the T-5 parachute system, but also provides an ablative reentry shell for the load as well as an orbital stabilization rig. These elements make it possible to drop enormous loads of cargo from high orbit of a planet. Ejection of the shell and deployment of the chute are done via harness altimeter in combination with the orbital stabilization rig's computer. A variety of sizes and shapes of chutes and shells exist for various cargos, but the OT-7 is the most common.

9.18 SFE/OT-28 Cargo Orbital Delivery System

When aero-dropping cargo on planets with no appreciable atmosphere, the OT-28 antigrav pallet decelerates the load to a soft landing in the absence of a parachute. Most other aspects of the system work the same way as the OT-7 delivery system. Of course, the OT-28's antigravs do emit the characteristic energy signature that can announce their arrival to enemy sensors if adequate jamming is not undertaken, so the unit is used sparingly.

9.19 SFE/S-200A Water Distribution System

The heart of the SFE/S-200 is a collapsible bladder very similar to, if not nearly as shielded as, the FB-88. This can be used to transport water into an Operating Area, or it can be filled on-site with collected and purified water. The second principal component of the system is the water purification and pumping unit which can purify thousands of liters of collected water per hour, and pump it back out as easily? A series of hoses and fittings completes the distribution system, allowing water to be pumped to several units' camps simultaneously. The bladder can be filled by replicator if needed and coupling adapters are available to connect any replicator directly to the storage bladder.

9.20 SFE/T-5A1 Cargo Air Delivery System

This is a parachute rig capable of air dropping over 1000 kilos through a Class M atmosphere to a soft landing. For larger loads, multiple T-5s can be used, but for much larger loads, there is a variety of heavier parachutes. Most operate identically to the T-5 so they are not individually covered in this guidebook. The T-5 is relatively low-tech. It is attached to the cargo with a nylex harness that can be adjusted and tightened in a variety of configurations based on the particular load. The chute is a round, non-steerable canopy which can be opened by static line, or at a preset altitude by an altimeter on the harness. SpecOps cargo chutes are available with steerable canopies which can be guided from the drop craft or from the ground, but the non-steerable version is much more common.

9.21 T-14 Free-fall Parachute

The T-14 is the same chute used in the OT-10A rig. It is a square, steerable, four-riser with a 2.7 second deployment time. It is highly maneuverable and made from clear nylex, which makes it extremely difficult to detect as most any active scanning beam (including visible light) goes right through it. The material even has a non-reflective coating to eliminate glint. Nylex is also extremely strong, so the chute can handle rapid deceleration of fairly heavy loads. Like the OT-10A it has radar and barometric altimeters.

Although airborne Infantry chutes (T-12s) are constructed for preset descent rates, the T-14s descent rate is controlled by the jumper according to conditions. The T-14 may be fitted with an emergency antigrav or a reserve chute as circumstances warrant.

9.22 T-42 Personal Antigraviton Decelerator

Parachutes don't work when there is not sufficient atmosphere—no getting around it. So even though antigraviton generators have many undesirable characteristics; they are needed for airborne drops on certain worlds. The T-42 is a backpack unit slightly larger and more powerful than the T-30 which is usually used as a parachute reserve. A computer controls the descent rate and angle for the operator since the delicate balance on the antigraviton beam can be easily upset by many factors (including the operator). Larger units are also available for equipment drops. The computer-controlled descent and definitive energy signature of antigravs make them undesirable for use unless no other insertion method runs as great a chance of success.

9.23 TDRS-29 Advanced Target Designation/Illumination System

An even more powerful version of the TDRS-44, this unit includes an extended-range target designator/illuminator. The illuminator is equipped with a particle gun which can leave a residual energy signature on a target for up to 30 minutes. Weapons which home on this decaying particle signature can find enough useful signature in clear air for about the first 20 of those minutes.

This makes the 29 a “fire-and-forget” target illuminator whereby a scout can “spot” a target and be long gone before the weapon arrives. This also negates target movement somewhat: as long as the target stays out in the open it is a sitting duck, and the spotter needn’t stay with the target during its movement.

9.24 TDRS-44 Target Designator and Rangefinder

This is one of the most used pieces of special equipment in the inventory. It utilizes laser, EM, and reticular differential imaging to enable a Marine to gauge the distance and azimuth of a point from them. Utilizing its laser and EM systems, it also can be used to point a target out for a weapon. This device can be quickly adapted for suit mounting.

SECTION 10 - Portable Structures

The largest items of Med Branch equipment are the portable structures it deploys, and in which much of its medicine is practiced. These structures travel in compact containers, known as transit packages, that can easily be carried in aerospace craft and shuttles. In the field, they expand into large structures that house a good amount of equipment and personnel.

The Support Branch is the single largest user of portable structures in the Federation. Everything from tents to portable aerospace hangars are deployed by the Branch, and many are listed below. However, a quick review of the portable structure concept may be called for first.

For something to be considered a portable structure, it must meet two criteria. The first and most obvious is that it must be portable, which means it has to be transportable by shuttle or cargo transporter, and be deliverable by parachute or antigrav. The second is that it must provide interior space for more than five humanoids (anything smaller is considered a simple “tent” whether or not it bears any resemblance to the old canvas and pole archetype).

Most portable structures in the SFMC inventory are constructed similarly. These structures travel in compact containers, known as transit packages. In the field, they expand (usually inflated) into large structures that house a good amount of equipment and personnel. They are usually packaged in a plasteel container which can be delivered by parachute or cargo transporter, and most can be easily carried by two people with hand-held antigravs.

The shell is usually composed of multiple layers of nylex, kevlar webbing, puncture-sealing foam, and mylar. In one demonstration, such a shell stopped a ball-bearing shot at a speed of more than 24,000kph; the bearing left a large hole in a 5cm-thick steel plate. The shell is fully functional in a zero or hostile atmosphere environment. The 30cm-thick walls compress to about 3cm for transport. Positive pressure is maintained inside the structure by the life support system.
Also housed in the transit package are duralloy “shelves” that become the inner walls and beams that maintain the outer shell’s shape. A microfusion generator supplies power, and a 5-way generator provides fields for structural integrity, gravity, defense, eloflage and holoflage. A replicator, LCARS microcore, and other purpose-specific equipment kits complete the transit package.

SFMC portable structures are designed to be a modular system, so more than one can be connected together. Hatches are standardized units which are found on all SFMC portable structures and can interconnect any structure to any other structure in the inventory. In this manner, entire towns can be set up on a planet with no atmosphere and little gravity.

10.01 The Work Horses

Two types of structures in particular are in heavier use by the SFMC by far. These are the Standardized Portable Structure Large & Small (SPSL “Special” & SPSS “Space” respectively). Used for everything from offices to storage to field HQs to crew quarters and everything else imaginable, these are the work horses of the portable structure inventory.

10.01.1 Portable Advanced Command and Control structure (PACC)

The PACC (pronounced PAK) serves as a field headquarters for larger units. Its transit package is loaded with communications and battlefield surveillance gear. Originally developed for the Medical Branch, the PACC has been so successful that it is commonly used by most large units in the field today.

10.01.2 Rapidly Deployable C3 Structure (RDCS)

This unit is known by the Marines in the field simply as “an HQ in a box”. It is lighter on equipment than the PACC, but has a much smaller transit package. In fact, this structure is unique in that it can be further broken down into two smaller transit packages, each of which can be carried by a single Marine. The two halves are then joined together before deployment, which takes only a few minutes. Units around company size, sometimes smaller, will usually take an HQ-in-a-box along for command and control purpose once their operating area is secured. It usually winds up being where the OIC and signal operator sleep as well.

10.01.3 Computers And Signals Tent (CAST)

A CAST is filled with radio and computer equipment and has a very large transit package—despite the colloquial name, it is much more than a tent. The particular equipment included will vary by mission, but most are either primarily communications facilities with very little computer systems support (known as "Signal Heavy"); or else have extensive computer support and little in the way of radios and the like (known as "Data Heavy").

It is about the same size as a SPSL, but whereas the SPSL can hold up to 30, 10 would be lucky to fit into a CAST with all the equipment. They must be deployed by heavy aerospace craft and a rarely dropped via parachute. CASTs serve as combat network relay stations and switchboards, satellite uplink facilities, data processing facilities, datawarfare headquarters, or any of a hundred other uses.

10.01.4 Hangars & Garages

By far the largest portable structures in the SFMC inventory, this class of structure is reserved for truly extended deployments. They are meant as a stopgap measure until more permanent facilities can be erected by the Combat Engineer ing Branch. They come in all shapes and sizes to accommodate a variety of vehicles, but are all essentially the same in material and composition. The defining characteristic of a portable hangar or garage is the size (and shape) of the vehicle it is designed to support. This will dictate the size of the door, and since the door is a semirigid structure that can only fold so many times, this is the factor which most influences the size of the transit package.

Most hangars and garages also include a tool kit in their transit package which is the standard SFMC tool kit for the vehicle in question. Most structures only accommodate one vehicle, so only one tool kit is included—but Transportation and Maintenance personnel can be quite creative in getting a second vehicle inside the shell. The structure will have a standard hatch at the end opposite the vehicle door so the it can be attached to an airlock, corridor, or other structure.

10.01.5 Emergency Medical Unit (EMU)

The most utilitarian structure in the inventory is the venerable EMU (pronounced EE-moo). The EMU is packaged in a plasteel container which fits easily inside an aerospace craft or shuttle down to the size of a STARFLEET Type 6. The transit package can be delivered by parachute or cargo transporter, and is easily carried by two people with hand-held antigravs.

To deploy the structure, the transit package is opened and the exterior shell inflated. The shell is composed of multiple layers of nylex, kevlar webbing, puncture-sealing foam, and mylar. In one demonstration, this shell stopped a ball-bearing shot at a speed of more than 24,000kph; the bearing left a large hole in a 5cm-thick steel plate. The shell is fully functional in a zero or hostile atmosphere environment. The 30cm-thick walls compress to about 3cm for transport. Positive pressure is maintained inside the structure by the life support system so that whenever the structure is opened, air flows out rather than in, reducing the chance of contaminants entering the EMU.

Also housed in the transit package are duralloy "shelves" that become the inner walls and beams that maintain the outer shell's shape. A microfusion generator supplies power to the EMU. A 5-way generator provides fields for structural integrity, gravity, defense, eloflage and holoflage. A replicator, computer micro-core, and Aid Station med kit complete the transit package. This equipment set makes the EMU

self-contained and rapidly deployable.

The EMU is designed to be a modular system, so that more than one can be connected together. The hatch is a standardized unit which is found on all SFMC portable structures and can interconnect the EMU to any other structure in the SFMC inventory.

10.01.6 Mobile Operating Room Equipment (MORE)

Structurally, the MORE is just a smaller version of the EMU. It has a larger transit package, though, because of its expanded equipment complement. In addition to all the equipment employed in the EMU, the MORE also carries a biobed equipped with a Surgical Support Frame (SSF). This is the familiar clam shell affair that deploys from the sides of the bed when needed. Above the biobed is an overhead sensor cluster for diagnostics and monitoring. This fully equipped biobed requires its own computer micro-core as well, and a much larger med kit is used.

10.01.7 Standardized Portable Structure, Large (SPSL)

The SPSL (pronounced SPEH-shul) is a standard throughout the SFMC. Operating on the same principles as the EMU, it is basically a high tech tent which can house 20 to 30 people for an extended period (although not comfortably—15 is a more reasonable figure for extended deployments). It can also serve as a mess tent, supply tent, etc. It has a small transit package as it houses very little in the way of equipment.

10.01.8 Standardized Portable Structure, Small (SPSS)

The lightweight counterpart to the SPSL, the SPSS (pronounced SPACE) is an eight-man affair that can also serve as a storage space. It is identical to its big brother except for size. It has the smallest transit package of any portable structure and can easily be carried by one man. A Field Aid Station will often carry a SPSS to provide quarters for the Medics.

10.01.9 Field Stasis Tube (FST) unit

What makes a portable structure “portable” is that it has to be transportable by shuttle or cargo transporter, and be deliverable by parachute or antigrav. What makes it a “structure” is that it must provide interior space for more than five humanoids. FST units barely qualify on either account.

FST units are ungainly and large. They are difficult to maneuver on the ground, they only barely fit in a cargo shuttle (they are usually transported in the larger T-4 or T-6 aerospace craft), and they require a complex parachute package if they are to land in operable order. While they hold up to 25 humanoids each, the accommodations are stasis tubes that are barely large enough to hold them. But these units can literally be life savers.

Sometimes a soldier is wounded so badly that they are not likely to survive emergency surgery even if they could get it right away. If they could be treated while they’re body functions were slowed or stopped; or if they could receive highly sophisticated and advanced medical care, they would probably make it. With stasis tubes, casualties can be put “on ice,” temporarily suspending all body functions—including their impending death. They can then be “thawed” later and in stages. This allows surgeons to work at a more relaxed pace, or allows transport to a medical facility with the proper treatment facilities.

Despite the “chilly” terminology, stasis patients are not truly frozen or thawed, but placed in suspended animation through a complex package of neural calipers, artificial fluids, forcefields, and a reduced internal temperature (although nowhere near freezing).

10.02 Accessories

While not themselves considered portable structures, these accessory systems are critical to an efficient use of structures in the field.

10.02.1 SFE/PS-001A Hatch

This is the standard SFMC portable structure hatch which can fold into eight panels for storage and transport. It is used to replace worn hatches in the field, or to add an additional entrance or egress from a structure.

10.02.2 SFE/PS-043 Airlock

A hatch and short section of corridor that come packaged with atmosphere pumps and indicator panels. When deployed, the unit attaches to a 001A hatch to form an efficient airlock in little time. Several 043s can be attached in series to provide gradual step-down for large pressure differentials.

10.02.3 SFE/PS-055A, B, C, D Corridors

These are essentially two hatch frames with a section of shell material between them in a tube fashion. The frames attach with an airtight seal to any 001A hatch, thus linking two structures with a corridor. The 055A is about two meters long, the 055B four meters, the 055C eight meters, and the 055D ten meters.

SECTION 11 - General Vehicles

Operation of all aerospace vehicles is the purview of the Aerospace Branch, and all Support activity involving aerospace craft must be coordinated with them. Ground transportation is a different matter. Although the most common vehicle in the inventory is the CHGP/97 "Mule" other vehicles exist and are operated by the various Branches of the SFMC.

11.01 Conventional Ambulances

Conventional ground ambulances are rarely used these days—aero ambulances and transporters being faster and more available. However, there are some environments too hostile for transporters and too unstable for flight operations. In these cases ground ambulances may be called for. They are used so infrequently, though, that they are seldom assigned to a medical units' TO&E. Instead, a few are carried in storage onboard hospital ships, or are broken out of Starbase storage and ferried to an Op Area as needed.

11.01.1 ALSA/98 Mercy

The Mercy is an Advanced Life Support ground vehicle capable of carrying one ALSTTAR and three litters. It is propelled either by two antigrav lift/thrust systems, or by armored wheels. It is powered by a charge pack good for nearly 12 continuous operating hours. It is difficult to work in because of its low ceiling, but the low profile of the vehicle provides for better battlefield survival. The low profile also prevents stasis tubes being carried as the space under the ALSTTAR is not large enough for the tubes. Instead, one litter is placed under the ALSTTAR, with two on the opposite wall.

11.01.2 HALSA/98 Nightingale

The Nightingale is a larger ground ambulance capable of carrying nearly 40 wounded over great distances. Based on the chassis of the Combat Engineer Branch's Mule, the Nightingale has four antigravs for a lifting capacity of nearly 10 tons. It houses three ALSTTARs on three FMD-108s, 12 litters, and a forward compartment that can hold either 18 seats, or 10 litters. The Nightingale is a large and ungainly ground vehicle which avoids the front lines whenever possible. When they are used, it is most frequently for ferrying noncritical casualties between Field Hospitals and MSHs.

11.02 SFMC Vehicles

11.02.1 ABLV/97 "Troll" Armored Bridge Laying Vehicle

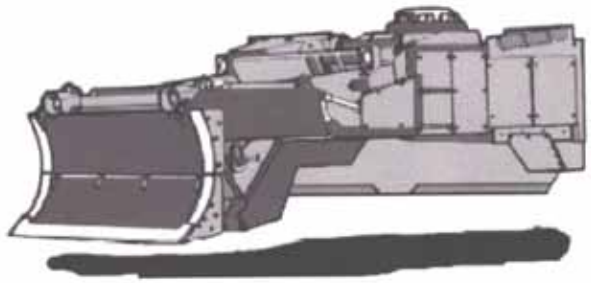
Armored Bridge Laying Vehicle

Primary Purpose: Assault bridging of short span obstacles
Secondary Purpose: None
Armor: Yes, Heavy
Force Field: None
CBR Life Support: Yes, standard life support for 2 men; 72 hour endurance
Power Source: Fusion plant
Endurance: 4 weeks at normal load..
Propulsion Method: 8 Antigrav (AG) modules
Maximum Altitude: 100 meters
Maximum Speed: 120 kph (75 mph)
Crew: (2) Driver, Commander
Passengers: None
Weapons: None
Special Equipment: Two piece extensible span bridge platform. 4 Anti-laser Aerosol Dispensers (2 each front and rear of chassis)

Overview: The ABLV provides the SFMC with a mobile, rapid bridging capability. This high mobility vehicle can bridge gaps of up to 50 meters in length (assuming firm foundations on either end) or 44 meters in length (assuming unprepared/soft foundations at either end). It's bridge platform is horizontally deployed, reducing it's visibility to enemy observers and requiring only 3 meters overhead clearance. The bridge can be deployed via automatic sequencing from either of the two crew stations, and is fully installed in under three minutes. It can be detached from the carrier vehicle and left in place indefinitely, and later recovered from either end in less than fifteen minutes. In certain cases, the carrier vehicle may remain attached to the bridge platform (remaining submerged in a river, for example) and then picking up the bridge and following the advancing force. In such cases, the bridge can be recovered and the vehicle ready to move in under five minutes. The ABLV is not armed, so it must operate in close proximity to covering forces. The bridge platform is made of composite polymers and a duranium endoskeleton, and can support loads of up to 150 tons at a time.

The vehicle carries an internal 100 liter capacity tank of Anti-laser Aerosol Solution, for use defensive use as an obscurant and passive defense against directed energy weapons.

11.02.2 ACE/97 "Groundhog" Armored Combat Earthmover



Armored Combat Earthmover

Primary Purpose: Earthmoving and excavation at ground level
Secondary Purpose: Clearing of obstacles
Armor: Yes, Medium
Force Field: None
CBR Life Support: Yes, standard life support for 2 men; 72 hour endurance
Power Source: Fusion plant
Endurance: 4 weeks at normal load
Propulsion Method: 8 Antigrav (AG) modules
Maximum Altitude: 100 meters
Maximum Speed: 120 kph (75 mph)
Crew: (1) Driver
Passengers: The drivers cabin has room for one passenger, riding in the jump seat
Weapons: None standard, however a pintle mounted grenade launcher or machine-gun may mounted above and in front of the passenger area on some models
Special Equipment: Dozer blade on front chassis, ripper and winch on rear of chassis. 4 Anti-laser Aerosol Dispensers (2 each front and rear of chassis)

Overview: The ACE is the heavy duty earthmover in the Combat Engineer vehicle inventory. It has an electrohydraulic dozer blade on the front of the vehicle, a ripper attachment at the rear for breaking up packed soil, and a winch for pulling stumps or recovering vehicles. It has a drawbar pull of 50,000 kg and is the heaviest rated earthmover available, even more powerful than the CEV. It has a sealed cabin for the driver and provides good protection through it's layered armor. The AG units are the same models used in the CEV, and so the ACE has limited altitude and maneuvering capability, but is extremely powerful and stable.

The vehicle carries an internal 100 liter capacity tank of Anti-laser Aerosol Solution, for use defensive use as an obscurant and passive defense against directed energy weapons.

11.02.3 CEV/97 "Wolverine" Combat Engineer Vehicle

Combat Engineer Vehicle plowing suspected minefield.

Primary Purpose: Destruction of obstacles, bunkers and fortifications
Secondary Purpose: Construction of same
Armor: Yes, Very Heavy
Force Field: None
CBR Life Support: Yes, standard life support for 4 men; 72 hour endurance
Power Source: Fusion plant
Endurance: 4 weeks at normal load
Propulsion Method: 8 Antigrav (AG) modules
Maximum Altitude: 100 meters
Maximum Speed: 120 kph (75 mph)
Crew: (3) Commander, Driver, Rigger
Passengers: Jump seat available for carrying one extra passenger, usually an extra Rigger
Weapons: 175mm Demolition Gun (main turret), Beam Phaser (main turret), Automatic Grenade Launcher (small turret mounted at rear roof of main turret), Special Equipment - 2 extensible booms mounted on either side of turret. Right boom has manipulator claw, cutting tools and spray nozzle. Left boom has digging scoop, drill head and jackhammer. Winch (rated 20,000 kg) and A-frame with pulley mounted to rear of chassis and turret. Dozer blade mounted on front of chassis. 5 Aerosol Dispensers mounted on vehicle (2 each front and rear of chassis, one on turret). Power tap and welding equipment mounted in chassis at right rear of vehicle. Three hatches for crew egress; two in front top of chassis, one in top of turret (left of center).

Overview: The Combat Engineer Vehicle is the best piece of equipment ever built by the Federation for the purpose of breaching or destroying obstacles. The combination of the demolition gun, phaser and multipurpose booms can reduce or destroy obstacles in a matter of minutes. While not especially well armed, it has excellent armor and engine power. It's AG units are high torque models, designed to move extremely heavy loads; this limits the vehicles altitude and maneuvering capability, but was deemed acceptable for the extra power and stability they gave. Only four of the units are needed under normal operation, the other four are energized during very heavy lifting or towing. This also makes the vehicles propulsion system very damage resistant, an important feature considering the possibility of mines. Under normal conditions, the driver and rigger sit in the forward compartment, while the vehicle commander (who serves as the Operator) rides in the turret. In the case of an extra passenger aboard, they ride in the turret's jump seat, beside the commander. The rigger is the person who gets out of the vehicle and manually hooks up the winch, performs welding tasks, guides the driver into a tight parking spot, etc. He is also the vehicle mechanic, whenever normal technical support is not available. The operator's seat in the turret gives him a clear view of the work area of the two booms, using sophisticated imaging systems. If necessary, he can open the top hatch and stand up for a first hand look at the situation. In an extremely hazardous situation, he can control the turret and it's equipment from a remote, allowing the entire crew to stand off at a safe distance.

Ammunition stores carried for the various weapons include: 40 - 175mm HEP, 20 - 175mm HEAP, 50 - 40mm HE RAM Grenades, 50 - 40mm Incendiary RAM Grenades, one 150 liter capacity tank of Anti-laser Aerosol Solution. In addition, there is a set of vehicle tools in a locker
below the winch as well as a pair of TL-66 hand welders.

11.02.4 CHBF/97 "Gas Hog" Cargo Hauler, Bulk Fuels

Primary Purpose: Transportation of volatile liquids or slush fuels, especially deuterium
Armor/Force Field: Heavy/Level 1
CBR Life Support; For 2 people in cabin only; 24 hour endurance
Power Source: Charge pack
Endurance: 48 hours at normal load
Propulsion Method: 4 Antigrav (AG) modules
Maximum Altitude: 25 meters
Maximum Speed: 240 kph (150 mph) empty, 160 kph (100 mph) loaded
Crew: (1) Motor Transport Specialist; (1) Fuels Supply Specialist
Passengers: None
Weapons: None
Special Equipment: Fuel distribution system and hose reels

Overview: Everything from Powered Suit leg thrusters to microfusion generators run on liquid or slush fuels that must continually be supplied to the front lines. The Gas Hog's distribution node has up to ten hoses with a wide variety of nozzle ends to make refueling just about any SFMC system a breeze. The 4000-litre tank is heavily armored, as well as being lined with eight 500-litre collapsible fuel bladders. Having multiple bladders inside the tank not only increases safety, but allows multiple fuel types to be carried simultaneously. Tank chillers around each bladder keep each fuel at its ideal storage temperature. Baffles between the bladders promote safety as well as insulating each bladder from its neighbors.

11.02.5 CHBL/97 "Water Buffalo" Cargo Hauler, Bulk Liquids

Primary Purpose: Transportation of nonvolatile liquids, especially water
Armor/Force Field: None
CBR Life Support: For 2 people in cabin only; 24 hour endurance
Power Source: Charge pack
Endurance: 48 hours at normal load
Propulsion Method: 4 Antigrav (AG) modules
Maximum Altitude: 25 meters
Maximum Speed: 240 kph (150 mph) empty, 160 kph (100 mph) loaded
Crew: (1) Motor Transport Specialist; (1) Water Supply Specialist
Passengers: None
Weapons: None
Special Equipment: Liquid distribution system and hose reels

Overview: The Water Buffalo is the bulk-liquids version of the flatbed Mule. It carries a 5000 liter tank in place of the flat platform. This is normally the quickest way to get potable water to ground troops when transporters cannot be used. Hoses can be run from the distribution system to fill storage tanks, or troops can get water directly from the truck. Regular spigots are provided, but there are also connections for refilling powered suit, Mecha, or environment suit water supplies. Water is not the only liquid carried by the Water Buffalo—despite the name—but it is by far the most common.

11.02.6 CHGP/97 "Mule" Cargo Hauler, General Purpose

Primary Purpose: General transportation of cargo and personnel
Secondary Purpose: None
Armor: None
Force Field: None
CBR Life Support: Driver cabin only, standard CBR life support for 1 person; 24 hour endurance
Power Source: Charge pack
Endurance: 48 hours at normal load
Propulsion Method: 4 Antigrav (AG) modules
Maximum Altitude: 25 meters
Maximum Speed: 120 kph (75 mph) empty, 80 kph (50 mph) loaded
Crew: (1) Driver
Passengers: None
Weapons: None
Special Equipment: Cargo crane (behind driver's cabin)

Overview: The Mule was designed as a simple, but rugged cargo hauler. It consists of a flat platform, a sealed driver's cabin and a remotely operated cargo crane. The vehicle's 4 AG units can support cargo loads of up to 10 tons normally, and up to 20 tons maximum (this reduces the charge pack endurance to 12 hours). The platform has a series of holes around the edges, allowing the use of tie down straps, side boards and other accessories to customize the carrying capacity. A common variation of the Mule is a bulk liquids version, utilizing a 5000 liter tank in place of the flat platform. The charge pack can be replaced by a charged one (about 5 minutes), recharged off of any standard fusion plant (15 minutes) or by an integral solar panel on the roof of the driver's cabin (18 light-hours required).

11.02.7 CHWH/89 "Six-By" Cargo Hauler, Wheeled, Heavy

Primary Purpose: General transportation of cargo & personnel.
Armor/Force Field: Light/None
CBR Life Support: For 2 to 3 people in cabin only; 24 hour endurance.
Power Source: Charge pack.
Endurance: 200 hours at normal load.
Propulsion Method: Twelve-Wheel Drive
Maximum Speed: 160 kph (100 mph) empty; 130 kph (80 mph) loaded
Crew: (1) Motor Transport Specialist; (1) Cargo Handler (doubles as gunner)
Passengers: Up to 2 in cabin; up to 40 in truck bed
Weapons: Vehicle-mounted Compression Phaser

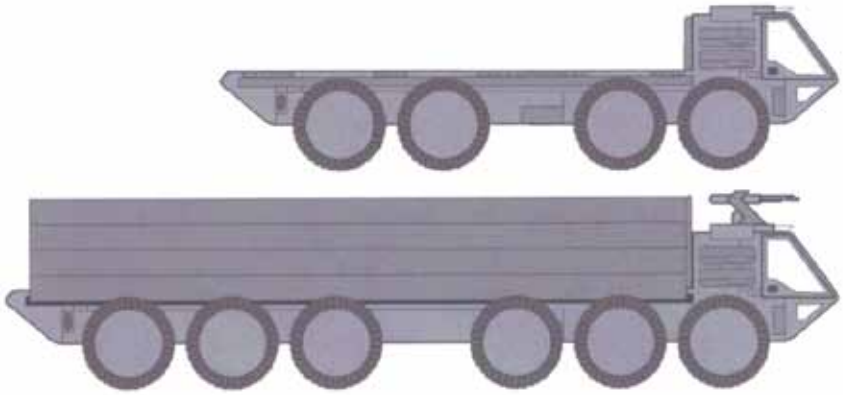
Overview: The Six-by is the "Monster Truck" of the SFMC. With the exception of the Heavy Armored Fighting Vehicle in the Armor Branch, this is the largest wheeled vehicle in the SFMC inventory used on a regular basis. It very much resembles the Deuce-and-a-Half, but is larger, has an additional axle to carry the heavier load, and is usually armed with a phaser atop the cab. It, too, gets its name from an Old Earth counterpart, although few today even know what "Six- By" originally meant. It can carry a full platoon of Light Infantry, provided they are not too heavily loaded, and has a cargo capacity nearly the same as a Mule.

11.02.8 CHWL/89 "Deuce-and-a-Half" Cargo Hauler, Wheeled, Light

Primary Purpose: General transportation of cargo & personnel
Armor/Force Field: Light/None
CBR Life Support: For 2 to 3 people in cabin only; 24 hour endurance
Power Source: Charge pack
Endurance: 240 hours at normal load
Propulsion Method: Eight-Wheel Drive
Maximum Speed: 160 kph (100 mph) empty, 130 kph (80 mph) loaded
Crew: (1) Motor Transport Specialist
Passengers: Up to 2 in cabin; up to 20 in truck bed
Weapons: None

Overview: Sometimes antigravs cause problems. They can emit easily detectable energy profiles that are hard to mask, they break down, and they use lots of power. The Deuce-and-a-Half rides on eight huge wheels instead. It can roll over even rugged terrain, emits little in the way of an energy signature, is highly

reliable, and can run for ten days on the same energy a Mule would use up in two. The name comes from an Old Earth term for a widely-used general purpose vehicle for armed forces. Today's Deuce-and-a-Half is much larger than that old version, but it is just as ubiquitous. Each of the eight large wheels are independently driven to provide outstanding traction, and they are extremely wide-tracked to distribute the weight of the vehicle almost as well as tractor treads (without the same maintenance problems). The tires are a multicellular kevlex compound that it is not truly solid, but rather riddled-through with bubbles or pockets of gas that give the tire a smooth ride and good shock resistance without needling to be hollow. It cannot be flattened since it is not, in the conventional sense, inflated. The kevlex is extremely puncture resistant, but even with 45% of the tread or sidewall surface damaged, the tire will still retain its shape. Depending on which tires are damaged, the vehicle is capable of carrying a full load with up to half of the wheels disabled (although the speed and maneuverability will naturally suffer)..



The Deuce-and-a-Half in flatbed configuration (top), with its big brother the Six-By in personnel transport configuration (bottom). Benches for personnel fold up from the flatbed floor and the personnel cover deploys from a compartment running the length of the truck just under the tie-down brackets on the bed edge. Converting from flatbed to personnel transport takes about two minutes and requires no outside assistance or parts.

11.02.9 DCN-5 Trailer, Decontamination (Light Duty)

Primary Purpose: Decontamination of personnel
Secondary Purpose: Bulk cleaning of personal equipment
Type: Chemical
Power Source: Charge pack
Endurance: 12 hours at standard load
Capacity: 12 men per decontamination cycle or 500 kg of personal equipment per cleaning cycle
Special Equipment: Cleaning solutions, medical scanning equipment, 6 internal replicator modules, internal force field generator, dual localized internal transporter arrays

Overview: The DCN-5 is a trailer mounted decontamination unit used to decontaminate personnel who may have been exposed to chemical, biological, or radiological agents and microweapons like nanites. There are two modes of personal decontamination, depending on whether the personnel have been exposed to external agents (on clothing, etc.) or internally (inhaled, ingested, etc.). For external decontamination the troops enter the trailer's main decontamination chamber and remove their uniforms, placing them in a separate compartment for automatic destruction. While they are doing this, the trailer seals itself and activates a complete force field around the chamber as it scans the occupants for active microweapons. If any are detected, a specially programmed transporter beams the microweapons off/out of the occupants, destroying them harmlessly. This operation takes less than five seconds from the time the last man enters the room, and is completely automatic. Once the scan and microweapons cleansing is

completed, the force field shuts down and the process continues. The troops don a respirator mask which is connected by an overhead hose to a positive pressure, filtered airflow system. The respirator covers the face completely, providing clean filtered air to breath, while simultaneously monitoring the individual's pulse, blood pressure, breathing and temperature. A pair of special sensors examine the wearer's eyes for contaminants, flushing them with neutralizing solutions as necessary. While this is underway, the occupants of the chamber are rinsed with a series of 5 chemical solutions, designed to neutralize and then flush away contaminants. A complete sensor scan of the room completes the procedure and fresh personal clothing is issued from replicators in the next chamber, as the occupants move through a door into it. Once they have emptied the main chamber, the process can repeat itself with the next group of troops. The entire process takes about 10 minutes. For internal decontamination, the process is similar, except that the respirator provides a blended mixture of healing medications in gaseous form, while a hypospray built into the face mask injects the necessary medications that cannot be delivered via the breathing mixture. If severe internal injuries exist, a set of preprogrammed nanites (non-malignant medical versions) are released into the individual's bloodstream and/or eyes to seal damaged blood vessels, clear blocked arteries and repair tissue to stabilize the victim. Open wounds that may be aggravated by the cleansing solutions are covered by pinpoint force fields while the rest of the body is washed and the areas under the force field are subjected to multiple sensor and transporter scans to remove contaminants. For standard bulk cleaning, the equipment is loaded by the operator, then exposed to a series of chemical baths, sonic scrubbing and transporter sweeps. This removes contaminants, dirt, and oils. In some cases this means the equipment will have to be re-oiled and inspected for serviceability, but that is better than the alternative.

Fresh chemical solutions are loaded by the operator at the front and top of the trailer, while contaminated solutions are collected for reprocessing and/or destruction in a tank below the trailer.

11.02.10 DCN-7 Trailer, Decontamination (Heavy Duty)

Primary Purpose: Decontamination of vehicles
Secondary Purpose: Cleaning of vehicles
Type: Chemical
Power Source: Fusion Plant
Endurance: 4 weeks at standard load
Capacity: 2 large vehicles per cycle or 8 small vehicles
Special Equipment: Cleaning solutions, topographical scanning equipment, 8 internal force field generators, 8 localized internal transporter arrays, 24 wide beam phaser heating elements

Overview: The DCN-7 provides roll in/roll out decontamination capability for vehicles. It can accommodate two vehicles as large as the CEV, or 8 vehicles as small as Flitters or Hoppers. Vehicles drive into the trailer via a loading ramp, parking at the designated spots marked on the floors. The trailer seals itself and a force field is engaged around each vehicle. Five complete sensor scans are conducted of each vehicle, using two different sensor probes during each scan. The scanning frequencies are different for each probe during each scan. This provides near perfect reliability in detection of microweapons. Transporters then remove the microweapons, destroying them harmlessly. The process is repeated to ensure total cleansing of microweapons, then the force fields are dropped. A series of 5 high pressure chemical washes are then used neutralize and wash away contaminants. The vehicles are then steam cleaned and flash sterilized by wide beam phaser elements. Finally a topographic survey of the vehicle's surface is conducted, scanning for areas that are below or above the normal thickness for that vehicle's standard specifications. These areas are marked with paint for maintenance inspection and the trailer unseals itself, ready for another cycle. the entire process takes between 15 and thirty minutes, depending on the number and type of vehicles in the decontamination chamber.

11.02.11 DGTN/97 "Mole" Digger/Tunneler

Primary Purpose: Excavation of trenches, ditches, and tunnels
Secondary Purpose: None
Armor: Yes, Heavy
Force Field: None
CBR Life Support: Yes, standard life support for 2 men; 72 hour endurance
Power Source: Fusion plant
Endurance: 4 weeks at normal load
Propulsion Method: 4 Antigrav (AG) modules, Crawler treads
Maximum Altitude: 25 meters
Maximum Speed: 80 kph (50 mph) on AG units, 20 kph (12.5 mph) on crawler treads
Crew: (2) Driver, Commander
Passengers: None.
Weapons: While the Mole is not armed, per se, it's cutting arms and pulse phasers can severely damage even the most heavily armored vehicles
Special Equipment: 4 cutting assemblies (front of chassis, on arms), 4 short range pulse phasers (behind arms, on chassis), induction module (below phasers, on front of chassis), short range internal transporter array (emitter at rear of chassis)

Overview: The Mole is a special purpose vehicle, derived from the Materials Processor Platform. It is designed to cut trenches or ditches on the surface and excavate tunnels below the surface. It's four cutting assemblies are mounted on short, moveable arms at the front of the chassis. Behind them, four short range pulse phasers are mounted in a fixed hardpoint. Below the phasers is an induction module similar to the one found on the Materials Processor Platform.

Operating on the surface, the cutting arms are swung down into a horizontal line and the vehicle cuts a trench up to 6 meters wide and 1.5 meters deep in a single pass. Material that is broken up by the cutting assemblies is scooped into the induction module and converted into one of several forms (gravel, sand, etc.). The material is then ejected to either or both sides of the vehicle, depending on the operator's choice. For especially hard materials the phasers are engaged, softening or vaporizing the materials to be moved. Average time to construct a 100 meter length of standard size trench is approximately two minutes. Surface operations are normally conducted in AG mode, with the crawler treads used below the surface. This is because of the higher energy costs involved in below surface operation. In this case, the center two cutting arms pivot upwards and the outer two slide inwards, forming a box pattern. During operation, the Mole will create a tunnel approximately 3 meters on a side. Material that is broken up by the cutters (and/or phasers) is again scooped into the induction module. However, because of the limited area for ejected matter, the material is broken up into it component atoms and stored as ingots (in the case of metals, etc.) or ejected as gases to the rear of the machine (in the case of oxygen, nitrogen, etc.). The digger can hold a maximum capacity of 50 tons of material. This is the usual amount of material in a tunnel 100 meters in length (the denser the material, however, the more material in given length of tunnel). At this point, the digger pauses and digs a pocket below itself and deposits the ingots inside the pocket, then reseals the pocket and continues onward until it has stored another 50 tons of material. As an alternative, a cargo vehicle (like the Mule) may follow a Mole in the tunnel. When the Tunneler is fully loaded, it uses it's internal transporter array to beam the stored contents to the cargo vehicle. The Tunneler continues onward while the cargo vehicle returns to the surface to unload. With a series of cargo vehicles, it is possible to move the Tunneler continuously.

11.02.12 FLTR/97 Flitter

Primary Purpose: Dispensing razor tape and other cable type materials
Secondary Purpose: Light duty reconnaissance
Armor: None
Force Field: None
CBR Life Support: None
Power Source: Charge pack
Endurance: 48 hours at normal load
Propulsion Method: 2 AG modules
Maximum Altitude: 100 meters
Maximum Speed: 120 kph (75 mph) loaded, 160 kph (100 mph) unloaded
Crew: (1) Driver
Passengers: By removing the cable dispenser assembly, one passenger may ride behind the driver
Weapons: None
Special Equipment: Cable dispenser assembly, modular saddlebags

Overview: This vehicle is used in conjunction with the Hopper to rapidly emplace flexible obstacles like razor tape, although it can be modified for other materials like antipersonnel mines as well. The flitter is a modified AG skimmer similar to a civilian AG sport cycle. However, the frame has been strengthened and a larger charge pack installed, making it a bit more muscular looking than it's recreational cousins. The driver sits astride the flitter in an open air cockpit, behind the windscreen. Directly behind and below the driver, on either side of the flitter, are a pair of modular saddlebags used for stowing special and/or personal equipment. The space directly behind the driver is the cable dispensing system, which can hold spools of various materials and dispense them in preprogrammed patterns. A short ranged molecular welder automatically tack welds the dispensed materials to the pickets, placed earlier by a Hopper. The length of a spool is dependent on the material being used. Metallic ribbon comes in 500 meter spools, simple polymer barbed line comes in 400 meter spools. Molecuwire comes in 200 meter spools; the extra room that would normally be used to hold more material on the spool is used for special magnetic baffles and guides. These prevent tangling and accidental injury when dispensing this very dangerous material. On occasion, Flitters are modified to carry mine dispensing units (holding 100 AP or 40 AV mines) and used to sow hasty protective minefields. By removing the dispensing apparatus altogether, a flitter can carry one extra passenger (standing or crouching behind the driver).

11.02.13 GPVH/99 "Hummer" General Purpose Vehicle, Heavy

Primary Purpose: General transportation of cargo & personnel
Armor/Force Field: Light/None
CBR Life Support: For 6 to 8 people; 24 hour endurance
Power Source: Charge pack
Endurance: 96 hours at normal load
Propulsion Method: 2 Antigrav (AG) modules or Four-Wheel Drive
Max. Speed (w/avg. load): 200 kph (125 mph) wheeled; 350 kph (220mph) AG
Crew: (1) Motor Transport Specialist; up to (1) Gunner
Passengers: Up to 7
Weapons: Varies

Overview: The Hummer is a heavier version of the Jeep. Like the lighter vehicle, it can run on two AG modules, or on its four wheels. A flip of a switch in the cabin changes drive options. The wheels stay in place (they do not retract). This makes both the Jeep and Hummer very versatile on the battlefield. The Hummer has several configurations thanks to an interchangeable roll-cage pod which can carry either a heavy phaser, a missile launcher (a vehicle-mounted MAPLIML-see Infantry Guidebook), a communications or EW rig, or nothing at all. This also makes the Hummer quite versatile, and has lead to it being one of the most common ground vehicles in the SFMC today.

11.02.14 GPVL/99 "Jeep" General Purpose Vehicle, Light

Primary Purpose: General transportation of cargo & personnel
Armor/Force Field: None/None
CBR Life Support: For 4 to 6 people; 24 hour endurance
Power Source: Charge pack
Endurance: 96 hours at normal load
Propulsion Method: 2 Antigrav (AG) modules or Four-Wheel Drive
Max. Speed (w/avg. load): 240 kph (150 mph) wheeled; 370 kph (230mph) AG
Crew: (1) Motor Transport Specialist
Passengers: Up to 5 in cabin
Weapons: None

Overview: The fastest wheeled vehicle in the SFMC, the Jeep is a venerable workhorse for quick trips with small loads of cargo or just a few personnel. Most officers use Jeeps for transportation when they are issued drivers. The Jeep takes its name from an Old Earth vehicle which was so-called as a play on "GP" which stood for "General Purpose" just as it does today.

11.02.15 HPPR/97 Hopper

Primary Purpose: Emplacing pickets and/or other post style obstacles
Secondary Purpose: Planting cratering charges
Armor: None
Force Field: None
CBR Life Support: None
Power Source: Charge pack
Endurance: 48 hours at normal load
Propulsion Method: 1 AG module
Maximum Altitude: 100 meters
Maximum Speed: 80 kph (50 mph) loaded, 120 kph (75 mph) unloaded
Crew: (1) Driver
Passengers: None
Weapons: None
Special Equipment: Picket/post dispenser system, modular equipment bin

Overview: The hopper is the smallest of the Combat Engineer vehicles, and the simplest. It is usually used in conjunction with the Flitter to install flexible obstacles. A single AG unit supports a small platform that holds the driver's seat and a vertical firing picket/post dispenser. The dispenser holds up to 150 plastalloy pickets (up to 2 meters in length). The driver maneuvers the hopper along, firing the pickets into the ground through a simple magnetic accelerator. The depth of the picket may be set from .5 meters to 2 meters (completely buried). The dispenser may be used to emplace post style obstacles in the same fashion, although it will only hold 50 posts of up to 3 meters in length and 15 cm in diameter; the depth on post obstacles can be set from .5 meters to 2 meters maximum. Pickets and posts cannot be loaded in the same dispenser at the same time. Preloaded dispensers can be used however, and changing a dispenser canister takes about 3 minutes. Loading a canister takes an average of 15 minutes for pickets and 25 minutes for posts. A modified dispenser is used to emplace cratering charges. This device holds 30 cratering charges and can place them up to 1 meter below the ground surface, setting the timers on the charges it does so. The timers are automatically staggered to produce either a ripple effect or a simultaneous explosion, at the discretion of the operator. Pickets and posts may not be loaded into a cratering charge dispenser.

11.02.16 MWV/97 "Badger" Mine Warfare Vehicle

Primary Purpose: Emplacement and breaching of minefields
Secondary Purpose: Limited excavation (foxholes, etc.)
Armor: Yes, Heavy
Force Field: Yes, rated at level 5
CBR Life Support: Yes, standard life support for 4 men; 72 hour endurance
Power Source: Fusion plant
Endurance: 2 weeks at normal load
Propulsion Method: 8 Antigrav (AG) modules
Maximum Altitude: 100 meters
Maximum Speed: 120 kph (75 mph)
Crew: (3) Driver, Commander, Systems Officer
Passengers: None
Weapons: Twin Automatic Grenade Launchers (forward turret), Mine Dispenser (rear turret)
Special Equipment: Charge line launcher (forward turret), two winches (one front chassis, one rear chassis), 4 short range transporter arrays, sensor probe (under chassis), Dozer blade (front of chassis). 4 Anti-laser Aerosol Dispensers (2 each front and rear of chassis)

Overview: The Badger is the premiere mine laying and clearance vehicle of the 24th century. It's two turrets each have a 210 degree arc of fire (with built in limiters to prevent damaging the other turret). The grenade launchers can be used to blow a path through a surface laid minefield, or the charge line launcher can be used to lay a flexible explosive charge through a mine field. The charge line has a maximum length of 120 meters, and will blow a path 10 meters wide and 1.5 meters deep when detonated. The launcher carries 4 charge lines but can only dispense them one at a time. The four transporter arrays are used to locate and remove subsurface mines that may be difficult to remove otherwise. The sensor probe is extended into the ground below the vehicle, to a depth of 1 or 2 meters. The sensor probe has a range of only fifty meters, but is not detectable to above ground sensors when activated. Once the mines are located, the systems officer uses the transporter arrays to render them safe (either by moving them out of position, or converting them into inert matter and replacing them). The emitters for the transporters are located in the chassis, one on either side of the vehicle and two in the front. The transporter pattern buffers are high capacitance models, and are well armored and insulated from the rest of the vehicle systems, to prevent feedback explosions from anti-transporter mines. The transporter arrays have a maximum range of 500 meters. The mine dispensing turret can scatter either antipersonnel or antivehicular mines up to 100 meters from its position, in a belt 30 or 60 meters wide. The length of such a belt of mines is determined by the width of the belt and the density of mines required (see chart that follows). The vehicle carries 1000 scatterable mines (usually at a ratio of 1 AV to every 4 AP mines, which equates to 250 AV and 750 AP mines). It has storage capacity for up to one ton (3 cubic meters displacement) of other mine types.

The vehicle carries an internal 100 liter capacity tank of Anti-laser Aerosol Solution, for use defensive use as an obscurant and passive defense against directed energy weapons.

11.02.17 MPP/97 "Woodchuck" Materials Processor Platform

Primary Purpose: Provide necessary materials to mission specifications by converting raw materials
Secondary Purpose: Purification of water or atmosphere
Armor: Yes, Light
Force Field: None
CBR Life Support: Yes, standard life support for 2 men; 72 hour endurance
Power Source: Fusion plant
Endurance: 4 weeks at normal load
Propulsion Method: 4 Antigrav (AG) modules
Maximum Altitude: 100 meters
Maximum Speed: 120 kph (75 mph)
Crew: (2) Driver, Commander
Passengers: None
Weapons: None
Special Equipment: Induction module (front of chassis), 2 heavy duty replicator arrays (chassis, left and right of center), 2 light duty extruder arrays (left and right rear of chassis), 2 short range transporter arrays (internal), cargo crane (center chassis, between replicator bays), winch (front of chassis, below induction module), molecular welding equipment (rear of chassis, between extruders)

Overview: The processor platform fills a critical need in Combat Engineer operations, by creating whatever materials are needed for the mission from locally available raw material. Ore, plant matter, scrap materials and even water can be broken down by the processor and reconstructed into useful material via replicator. The induction module is a large hopper with a reprocessor in the bottom. It may be swung into a horizontal position, allowing heavy materials to be winched into place for conversion. The reprocessor (a modified stage one transporter assembly) converts the material into it's component atoms, storing the useful ones as ingots of raw material and releasing the harmless byproducts into the atmosphere. Toxic materials are placed into a special holding tank for disposal in a secure location. The operator enters in the specifications for the desired product (or enters the code for one of the 10,000 plus common items stored in the computer's memory) and the item is replicated immediately. The processor platform can store up to 35 tons of raw material internally (plus up to five tons of toxic material). Finished products are created in the heavy duty replicator bays (1.5 meter x 1.5 meter x 6 meters size capacity) and then unloaded with the integral crane or transported up to 500 meters away.

Wire, cable, and other long but limited diameter materials are extruded from the modified replicators, usually onto spools. Molecular welding equipment is available for modifying or connecting different materials that are created. Water can be purified by diverting the water source into the induction module, where everything except pure water (consisting of hydrogen and oxygen) is filtered out by the reprocessor and allowing the purified water to accumulate in the replicator bays or be pumped into external holding tanks. The nickname for this vehicle comes from an ancient Earth tongue twister "How much wood would a woodchuck chuck, if a woodchuck could chuck wood?"

11.02.18 RPV-A "Spy Eye" RPV Survey Drone (Aerial)

Primary Purpose: Tactical Aerial Reconnaissance
Secondary Purpose: None
Armor: Yes, Light
Force Field: None
CBR Life Support: N/A
Power Source: Charge pack
Endurance: 4 hour
Propulsion Method: 2 AG modules
Maximum Altitude: 5000 meters
Maximum Speed: 320 kph (200 mph)
Crew: N/A. One remote operator possible
Passengers: None
Weapons: None
Special Equipment: Sensor package, flare/chaff dispenser with 10 units of flares/chaff

Overview: This Remotely Piloted Vehicle is actually a hybrid of an controlled drone and a self-guiding vehicle. The operator can either program a destination and route then launch the RPV for a fully automatic run, or control it's flight completely from his remote terminal. The RPV is very agile and fast, and can hover while rotating 360 degrees for scanning. It's spherical body, light armor and high speed combine to make it very resistant to direct fire weapons. It can dispense electrochemical flares and chaff to help it evade missile attacks. It carries an advanced sensor package that scans in the same manner as a tricorder, but at longer ranges. For a 360 degree scan, the range is limited to 1000 meters; for a 90 degree scan, the range is limited to 5000 meters. The sensors record the information on removable isolinear data chips and can be set to transmit them in real time or at preset intervals. If the preset intervals are selected, the drone will compress the data and send it as a rapid pulse communications burst as it changes position. This limits the enemy ability to jam it's signal and triangulate it's position. All RPVs are programmed to self destruct if damaged beyond a certain limit (loss of mobility, etc.) or detection of certain conditions (transporter beamout, etc.) They may also be destroyed remotely by the operator at any time; the self destruction explosion is equivalent to a hand grenade in effect.

11.02.19 RPV-B "Tunnel Rat" RPV Survey Drone (Subsurface)

Primary Purpose: Tactical Subterranean Reconnaissance
Secondary Purpose: None
Armor: Yes, Medium
Force Field: None
CBR Life Support: N/A
Power Source: Charge pack
Endurance: 12 hours
Propulsion Method: Walking primarily, equipped with a limited use AG unit
Maximum Altitude: 1 meter using AG unit
Maximum Speed: 40 kph (25 mph)
Crew: N/A. One remote operator possible
Passengers: None
Weapons: None
Special Equipment: 20 communication relay pods, inertial navigation module, sensor package, spotlight

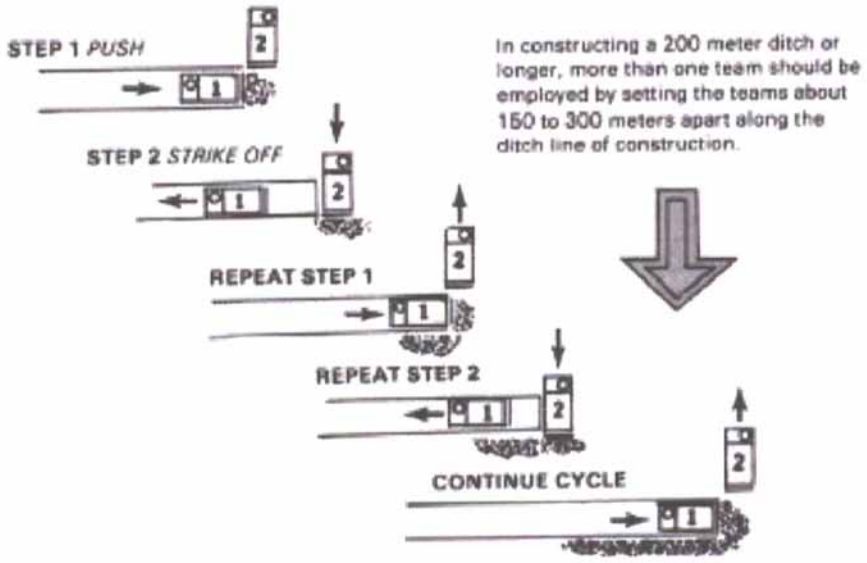
Overview: This RPV is a hybrid like the RPVA, in that it can be either controlled remotely or preprogrammed to explore an area. The drone looks more like a spider than a rat, but the nickname has stood the test of time and remains. Tunnel Rats are used to explore underground or limited space areas, where it may be dangerous to send personnel. The feet have microdrills built into them, allowing the unit to walk on walls and ceilings. The RPV has magnetic grapples on its feet, as well as a limited use AG unit for crossing chasms and negotiation of airshafts and such. In certain situations (near enemy, etc.) the unit may switch over to AG mode entirely, making the unit completely silent. The sensor pod is a modified tricorder, which scans in the usual spectrums and ranges for such a device. The information is stored on isolinear data chips for later retrieval, or can be sent real time through the use of relay pods. As the RPV maneuvers through an area, it attaches these pods in locations that allow it to relay it's communication signal back to the surface. The inertial navigation module keeps track of the units location relative to it's start point, allowing it to retrace it's steps back out or calculate a probable exit path if the return route is blocked by a cave-in, etc. All RPVs are programmed to self destruct if damaged beyond a certain limit (loss of mobility, etc.) or detection of certain conditions (transporter beamout, etc.) They may also be destroyed remotely by the operator at any time; the self destruction explosion is equivalent to a hand grenade in effect.

11.02.20 SGHD/97 Scraper/Grader

Primary Purpose: Leveling and excavation of earth
Secondary Purpose: Creating trenches and ditches
Armor: Yes, Light
Force Field: None
CBR Life Support: Yes, standard life support for 2 men; 72 hour endurance
Power Source: Fusion plant
Endurance: 4 weeks at normal load
Propulsion Method: 4 Antigrav (AG) modules
Maximum Altitude: 100 meters
Maximum Speed: 120 kph (75 mph)
Crew: (1) Driver
Passengers: The driver's cabin has room for one passenger, riding in the jump seat
Weapons: None
Special Equipment: Scraper/grader assembly (mounted below center of front chassis), sensor mast

Overview: The scraper/grader is designed to level an area in a precision manner. It does this by driving over the area to be leveled, scraping off the extra layer of earth and storing it in an internal cargo area (which can hold up to 25 tons of material). After the cargo area is filled the material can be unloaded into a waiting dump truck; as an alternative, it may scattered to one side of the vehicle as it is removed from the surface directly beneath the scraper/grader. The scraper/grader is able to create perfectly flat surfaces through the use of it's sensor mast, which communicates with a reference beacon placed by the survey teams. As the vehicle travels over the working surface, sensors measure changes in height as small as 1 cm. By comparing these measurements to the standard given by the survey beacon, the vehicle automatically adjusts the depth of cut to maintain the perfectly flat surface. The operation is basically automatic, needing only decisions by the operator on desired depth and how to dispose of the accumulated earth. The sensor mast can monitor the survey probe up to 5000 meters away, so a very

large area can be scraped/graded by a single vehicle.



Using ACE and/or Scraper/Grader in tandem to create a ditch

11.02.21 TDHD/97 Truck, Dump (Heavy Duty)

Primary Purpose: Hauling earth, rubble, or other dry bulk materials
Secondary Purpose: None
Armor: Yes, Light
Force Field: None
CBR Life Support: Driver's cabin only, standard life support for 2 men; 72 hour endurance
Power Source: Fusion plant
Endurance: 4 weeks at normal load
Propulsion Method: 8 Antigrav (AG) modules
Maximum Altitude: 25 meters
Maximum Speed: 120 kph (75 mph) empty, 80 kph (50 mph) loaded
Crew: (1) Driver
Passengers: The driver's cabin has room for 1 extra passenger, riding in the jump seat
Weapons: None
Special Equipment: High capacity dump body, winch (front of chassis)

Overview: This is the heavy duty bulk carrier used by the Combat Engineers. The spacious driver's cabin is located at the front of the chassis, in front of the large dump body that covers the rest of the vehicle. The controls are fully automated, and do not require the driver to leave the vehicle to empty the dump body. The dimensions of the dump body are 5m x 12m x 4m, giving it a volume capacity of 240 cubic meters. The maximum cargo weight is 80 tons.

11.02.22 TDLD/97 "Tonka" Truck, Dump (Light Duty)

Primary Purpose: Hauling earth, rubble, or other dry bulk materials
Secondary Purpose: None
Armor: Yes, Light
Force Field: None
CBR Life Support: Driver's cabin only, standard life support for 2 men; 72 hour endurance
Power Source: Charge pack
Endurance: 48 hours at normal load
Propulsion Method: 4 Antigrav (AG) modules
Maximum Altitude: 25 meters
Maximum Speed: 120 kph (75 mph) empty, 80 kph (50 mph) loaded
Crew: (1) Driver
Passengers: The driver's cabin has room for 1 extra passenger, riding in the jump seat

Weapons: None
Special Equipment: High capacity dump body, winch (front of chassis)

Overview: This is the light duty bulk carrier used by the SFMC, operating on a charge pack instead of a fusion plant. The driver's cabin is fully automated in a fashion similar to the Dump Truck (Heavy Duty), except on a smaller scale. The dimensions of the dump body are 3m x 6m x 3m, giving it a volume capacity of 54 cubic meters. The maximum cargo weight is 18 tons.

SECTION 12 - Aerospace Vehicles

12.01 Aerospace Craft Designation

Marine planes are of two main categories: “aircraft” and “spacecraft.” BOTH are technically aerospace craft. That is to say, any craft in the SFMC inventory is capable, to some extent, of operation in space and operation in atmosphere. The main difference, then, is where the craft primarily operates. Generally, spacecraft operate primarily in space, while aircraft operate primarily in atmosphere. In terms of gross oversimplification: aircraft have wings, spacecraft don’t.

The purpose of an aerospace craft designation in letters and numbers is simply to identify the craft and its primary mission. At the root of it all is a simple letter/number combination. A-18, for example, indicates a Fire Bolt attack aircraft. The A stands for attack and the 18 is the design number. Spacecraft generally have *odd numbers*, aircraft generally have *even numbers*.

12.01.1 Basic Mission and Type Symbols

Below is a list of the basic letter designators for Marine craft:

A - Attack
E - Electronic Warfare/Early Warning
F - Fighter
I - Instructor/Training
S - Support/Amphibious Operation
T - Transport/Cargo
U - Utility
X - Research/Experimental

12.01.2 Series Symbol

Follow-on changes to the A-18 would call for a series symbol, indicating an improvement on, or change to, the same design; A-18A or A-18C, for example.

12.01.3 Modified Mission Symbol

When the basic mission of an aerospace craft has been considerably modified for other than the original or intended purpose, a modified mission symbol is added. For example, an A-18A modified to be principally a reconnaissance aircraft would become an RA-18A. Modified Mission symbols are:

A - Attack
E - Special Electronics
H - SAR/Medivac
K - Tanker
M - Special Operations
Q - Drone/Remotely Piloted Vehicle
R - Reconnaissance
V - Staff
X - Experimental/Long Term Test
Y - Prototype

12.02 Types of Aerospace Craft Currently in the SFMC Inventory

The most common aerospace craft in the SFMC are discussed briefly below and are categorized by mission. Each mission name is followed by a letter designator which indicates the type of squadron in which the craft would normally serve. Remember that even-numbered craft are usually aircraft and odd numbered are usually spacecraft. Please note that the vehicles shown in this section are all currently entering the retirement phase of their airframe lifecycle. Current estimates are that it will take roughly a year to rotate out the entire current inventory for the newer craft.

12.02.1 Attack (VMA)

The attack craft’s main job is to destroy enemy targets in space and on the ground, with missiles, torpedoes, mines, bombs, and guns. Since the primary function of Marine Aerospace is to support the Marines on the ground, the attack mission is the Branch’s most crucial. Because of this, the Corps has a wider variety of attack craft than any other specialty type.

12.02.1.1 A-20E Harrier

Crew: 1
Armor Rating: 4
Force Field Rating: 5
Deflector Shield Rating: 0
Airframe Durability: 4
Agility Factor: 5
Acceleration Factor: 6
Endurance: 10hrs @ std cruise
Sensor Level: 2
Computer Level: 3

Offensive Systems
Guns:
2 - Mk/4 Pulse Phasers
2 - EMPW-12 Guns, with 1800 25mm rounds
Internal Hardpoints:
1 - 300 kg capacity, centerline ordnance bay
External Hardpoints:
2 - Light pylons, under wing mount, outboard station
2 - Medium pylons, under wing mount, inboard station

Defensive Systems
ECM Capability: 4
Flare Packs: 18
Chaff Packs: 18
Decoys: 0

The Harrier is a light, all-weather, multi-role attack aircraft which is extremely stable in flight. It has exceptional endurance which allows it to loiter over a battlefield for extended periods of time, providing precision fire support with its cannon. One of its principal strengths, however, can easily become its main drawback: its inherent stability results in reduced maneuverability compared to other, more “unstable” aircraft (although the new E does attempt to address this liability).

The Harrier has been around the Corps for quite some time. The original A-20A entered service nearly thirty years ago. Since then, design revisions and software upgrades have made the A-20 increasingly capable in the light attack role. The Harrier looks familiar to both marine and naval student pilots, since a stripped-down version (the I-20 Kestrel) is used for initial flight training in both the Corps and the Fleet. Starfleet also owns a great number of F/A-8 Peregrines which are strike-fighter naval variants of the basic A-20 design.

Generally speaking, aircraft would not be used to attack targets situated on planets with no atmosphere, spacecraft generally handling the environment better. However, the A-20 and its cousin the F/A-8 both seem as comfortable in space as in the air, and both handle missions in each environment equally well. This makes the Harrier extremely versatile, which only adds to its popularity and longevity in Marine Air.

12.02.1.2 A-33D Stingray

Crew: 1
Armor Rating: 4
Force Field Rating: 0
Deflector Shield Rating: 5
Airframe Durability: 5
Agility Factor: 5
Acceleration Factor: 6
Endurance: 8 hrs at Warp 9.6
Sensor Level: 3
Computer Level: 4

Offensive Systems
Guns:
2 - Mk/7 Beam Phasers
2 - Mk/6 Pulse Phasers (aft turret mount)
Internal Hardpoints:
1 - 300 kg capacity centerline ordnance bay
External Hardpoints:
4 - Light rails, wing mount (2 port, 2 starboard)

Defensive Systems
ECM Capability: 4
Flare Packs: 6
Chaff Packs: 12
Decoys: 0

The A-33 Stingray is unique among spacecraft used by the SFMC, because it is equipped with a rear firing turret. Fast, agile and capable of defending itself from nearly any angle, the Stingray is very popular with its pilots. Equipped with extra countermeasures, including ECM modules (mounted in place of two missiles), the EA-33 Manta Ray variant functions as a more manuverable replacement for the E-3 Guardian.

The Stingray is the lightest and fastest warp-capable bomber in the Federation, and so is particularly useful for “hit-and-run” missions against ships, stations, outposts, etc. It is usually the attack craft of choice for planetary attack when no atmosphere is present over the battlefield. Being a spaceborne platform, there is very little that is aerodynamic about the Stingray, and any apparent streamlining is strictly for stealth effects.

12.02.1.3 F/A-35 Barracuda

Crew: 2
Armor Rating: 5
Force Field Rating: 0
Deflector Shield Rating: 5
Airframe Durability: 6
Agility Factor: 6
Acceleration Factor: 7
Endurance: 12 hrs at Warp 9.6
Sensor Level: 3
Computer Level: 4

Offensive Systems
Mk/2 Microtorpedo launcher, centerline under nose, with 12 133mm microtorpedoes
Guns:
2 - Mk/7 Beam Phasers
2 - Mk/6 Pulse Phasers
Internal Hardpoints:
1 - 500 kg capacity centerline ordnance bay
External Hardpoints:
4 - Medium rails, wing mount (2 port, 2 starboard)

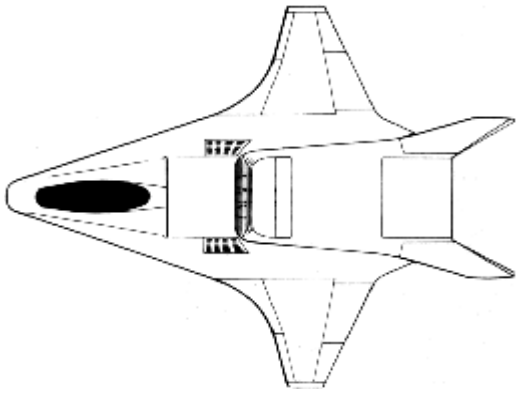
Defensive Systems
ECM Capability: 4
Flare Packs: 6
Chaff Packs: 18
Decoys: 0

The F/A-35 Barracuda replaces its older namesake (the A-35F) as well as the F-7 Mako as a dual-role heavy strike fighter. It is now the standard attack spacecraft for most Marine Aerospace applications. It's heavy ordnance capacity, versatile weapons-management software, and high agility make it as well-suited to orbital bombardment as it is to starship interdiction.

The strike fighter version of the Barracuda fields a new Mk3 microtorpedo launcher which is capable of damaging or destroying starships. Combined with its external stores, direct fire energy weapons and internal payload capacity, the F/A-35 poses a real threat to its targets.

12.02.1.4 A-60T Super Havoc

Crew: 1
Armor Rating: 6
Force Field Rating: 6
Deflector Shield Rating: 0
Airframe Durability: 6
Agility Factor: 3
Acceleration Factor: 4
Endurance: 6hrs @ std cruise
Sensor Level: 3
Computer Level: 4



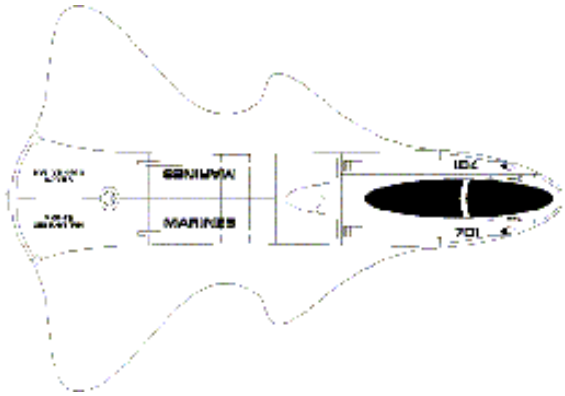
Offensive Systems
Guns:
1 - Mk/7 Beam Phaser
2 - Mk/6 Pulse Phasers
Internal Hardpoints:
2 - 500 kg capacity, under fuselage, mounted either side of centerline
External Hardpoints:
2 - Heavy pylons, under wing mount, outboard station
2 - Heavy pylons, under wing mount, inboard station
1 - Heavy pylon, under fuselage mount along centerline (between bays)

Defensive Systems
ECM Capability: 4
Flare Packs: 24
Chaff Packs: 24
Decoys: 0

The only attack craft in the inventory with a longer history than the Harrier is the Havoc. The YA-60 prototype was undergoing flight testing when the Federation and Klingon Empire were meeting at Camp Khitomer! Nearly completely revamped for the coming decade, the A-60T has been dubbed the Super Havoc and has replaced the A-60R in all but reserve units.

The Super Havoc is the hardest hitting aircraft available to the Corps. It is an all-weather interdiction aircraft which has the range to penetrate deep behind enemy lines, and the carrying capacity to take a large amount of ordnance with it. The Havoc's biggest disadvantage has traditionally been its low maneuverability, so the Super Havoc package includes additional thrusters to supplement the aircraft's sluggish control surfaces. Other upgrades include targeting and defense systems, and a fusion engine which replaces twin charge pack units.

12.02.1.5 A-78A Dragon



Crew: 2
Armor Rating: 7
Force Field Rating: 5
Deflector Shield Rating: 0
Airframe Durability: 7
Agility Factor: 8
Acceleration Factor: 4
Endurance: 7hrs @ std cruise
Sensor Level: 2
Computer Level: 5

Offensive Systems
Guns:
1 - Mk/5 Beam Phaser w/2 emitters (ventral/dorsal)
2 - EMPW-33 Guns with 12090 30mm rounds
Internal Hardpoints:
4 - 500 kg capacity, in two centerline ordnance bays
External Hardpoints: none

Defensive Systems
ECM Capability: 4
Flare Packs: 20
Chaff Packs: 20
Decoys: 5

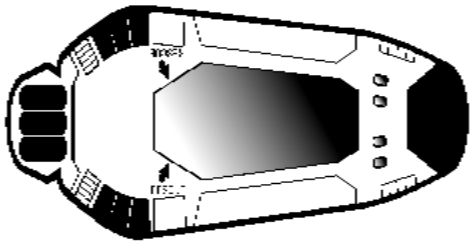
The Dragon is the newest attack aircraft in the Marine Corps. It was the first aircraft in several decades to be designed solely for the Close Air Support mission, and as such it has unprecedented low-speed maneuverability and survivability. Its single-minded design initially led to low production numbers and limited missions; however, the Dragon has acquitted itself well in interdiction and low-level bombing missions as well as CAS, and has held its own quite well in limited air-to-air engagements. This has led the Corps to exercise its contract option to purchase 700 more units, and the A-78 has largely replaced the aging A-44 Hurricane throughout the Federation.

The Dragon has a low-profile cross section that is very stealthy, and a new technology TVG (Totally Variable Geometry) wing that can radically alter its shape. In fact, it has no control surfaces, but rather flexes parts of it wings to accomplish maneuvers. All its ordnance is carried internally to increase stealth and aerodynamics without relying on power-consuming shields. The Dragon also has the largest caliber gun and magazine capacity of any aircraft in the Federation.

12.02.2 Fighter (VMF)

Fighters are faster and more maneuverable than attack aircraft. They intercept and engage enemy aircraft; defend surface forces from air attack; and escort attack, reconnaissance, electronic warfare, and support craft.

12.02.2.1 F-3A Piranha



Crew: 1
Armor Rating: 1
Force Field Rating: 0
Deflector Shield Rating: 3
Airframe Durability: 4
Agility Factor: 8
Acceleration Factor: 8
Endurance: 4hrs at Warp 9.6
Sensor Level: 2
Computer Level: 4

Offensive Systems
Guns:
4 - Mk/5 Pulse Phasers
Internal Hardpoints:
2 - Light missile bays (1 port, 1 starboard)
External Hardpoints: None

Defensive Systems
ECM Capability: 2
Flare Packs: 6
Chaff Packs: 6

The smallest and most maneuverable spacecraft fielded by the SFMC, the Piranha is only slightly larger than a standard probe. This allows it to be deployed rapidly (and in large numbers) via a photon torpedo launcher, then recovered later through the shuttle bay. For this reason, the F-3 is commonly used by smaller Federation vessels which want a fighter capability, but do not have the space for larger dedicated fighter launch and recovery facilities. Both the Fleet and the Corps have purchased large quantities of F-3s for this very reason. While the naval applications of the F-3 are self-evident, many criticized the Marine Corps for buying such large numbers of F-3s (the SFMC traditionally uses fighters only to cover it's attack and support craft—rarely for starship defense or interception). Then, Amphibious Assault Carriers (which traditionally had room for only attack craft and drop shuttles, requiring outside fighter cover) started embarking squadrons of F-3s, which quickly answered critics of the buy.

12.02.2.2 F-5D Tigershark
Crew: 1
Armor Rating: 2
Force Field Rating: 0
Deflector Shield Rating: 4
Airframe Durability: 5
Agility Factor: 6
Acceleration Factor: 7
Endurance: 20 hrs at Warp 9.6
Sensor Level: 3
Computer Level: 4

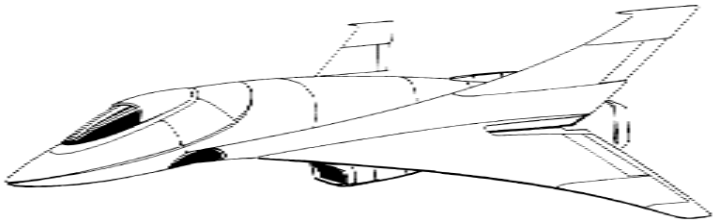
Offensive Systems
Guns:
2 - Mk/7 Beam Phasers
2 - Mk/6 Pulse Phasers
Internal Hardpoints: None
External Hardpoints:
4 - Medium rails (2 port, 2 starboard)

Defensive Systems
ECM Capability: 3
Flare Packs: 6
Chaff Packs: 12
Decoys: 0

The Tigershark is the standard spaceborne fighter of the SFMC, and is an excellent long-range patrol craft. It is based on the same spaceframe as the Fleet's Type 9A shuttle and outwardly appears similar. Inside, however, is a more robust propulsion package and an impressive weapons selection. The combination of these has allowed the F-5D to expand beyond the role of the F-5A and to replace the aging F-7 Mako heavy fighter as well (in conjunction with the F/A 35 Barracuda). The few heavy-fighter missions which cannot be adequately tackled by the Tigershark or the Barracuda have been handed over to naval air which still fields the F-7M in large numbers.

A common habit (some say obsession) among F-5 pilots is painting of teeth and sometimes eyes on the nose of their fighter, following an obscure tradition started in the 20th century. Some units also paint "tigerstripes" on the fuselage.

12.02.2.3 F-24B Hawk



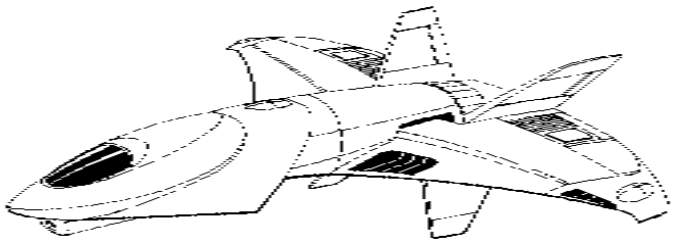
Crew: 1
Armor Rating: 4
Force Field Rating: 4
Deflector Shield Rating: 0
Airframe Durability: 6
Agility Factor: 6
Acceleration Factor: 6
Endurance: 6hrs @ std cruise
Sensor Level: 2
Computer Level: 3

Offensive Systems
Guns:
2 - MK/5 Beam Phasers
Internal Hardpoints: None
External Hardpoints:
2 - Light rails, wingtip
2 - Medium pylons, wing
1 - Heavy pylon, centerline under fuselage (missile launcher)

Defensive Systems
ECM Capability: 3
Flare Packs: 8
Chaff Packs: 8
Decoys: 0

From the same manufacturer as the venerable F-26 Eagle, the Hawk is a well balanced fighter, able to carry a wide variety of armament. The success of the Hawk has led many to speculate that it will be the Corps' mainstay multi-role fighter into the next century. Already it has edged-out the lighter, faster, but inadequately armed F-22 Falcon, as well as replacing its predecessor (the F-18 Wasp) as designed. It's solid handling qualities and dual-beam weapons make it a good all-weather fighter, but what has endeared it to the pilots is its legendary ability to take damage and keep flying.

12.02.2.4 F-26F Eagle



Crew: 1
Armor Rating: 3
Force Field Rating: 5
Deflector Shield Rating: 0
Airframe Durability: 5
Agility Factor: 6
Acceleration Factor: 6
Endurance: 8hrs @ std cruise
Sensor Level: 3
Computer Level: 4

Offensive Systems
Guns:
1 - Mk/7 Beam Phaser
2 - Mk/5 Beam Phasers
Internal Hardpoints:
2 - Low-profile missile launchers at wing root
External Hardpoints:
2 - Light rails, wingtip
2 - Medium pylons, wing mount, outboard stations
2 - Heavy pylons, wing mount, inboard stations
1 - Heavy pylon, centerline under fuselage

Defensive Systems
ECM Capability: 3
Flare Packs: 12
Chaff Packs: 12
Decoys: 0

The Eagle is the Corp's premier long-range interceptor and air-superiority fighter. It is also the largest and most heavily armed tactical fighter fielded by the SFMC. It's ability to carry large amounts of standoff ordnance, coupled with it's heavy phaser, make it ideal for long range combat. Another mission the Eagle is well suited for is interdiction of low orbit vessels such as drop ships and scout vessels. Properly equipped, a flight of Eagles is capable of seriously damaging a starship in orbit, even a large one. Against drop ships and shuttles, the Eagle is a deadly aerial predator, like it's namesake.

One consistent complaint of early model F-26 pilots was its deplorable lack of rearward visibility. Models since the D version, however, have integrated the "look-through" capability of the Through-Visor Display's (TVD) Virtual Mode to alleviate the problem. A rearview mirror system is also installed as a backup system should the TVD fail.

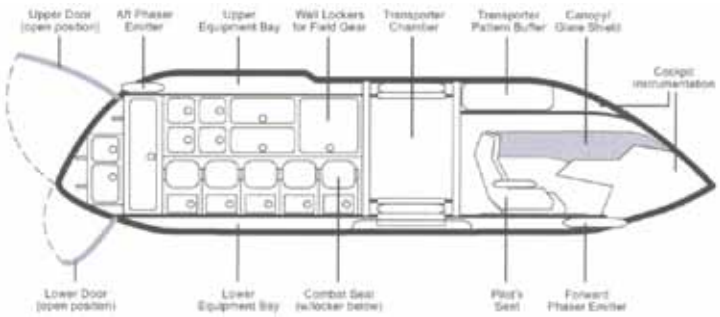
12.02.3 Drop Ships (VMS)

Officially, craft used to transport personnel and equipment from orbit to ground are known as amphibious assault craft, but most everyone in the branch simply calls them drop ships or shuttles. Drop ships are some of the most unique aerospace craft in the Corps inventory: spacecraft with an even-numbered "aircraft" designation.

A common method of amphibious assault when surprise is desired, or orbital superiority has not been established, is to begin the assault from outside the target star system. Therefore, drop ships must be warp-capable. However, they must also make rapid atmospheric entry on arrival with a minimum of shield flare-up and energy bleed, so they must be highly aerodynamic as well. This has led to warp-capable ships which use the "lifting body" concept in which the body of the craft itself provides aerodynamic lift and a smooth reentry surface. Additionally, some drop ships have retractable wings and control surfaces which are used in atmosphere, but stowed during atmospheric entry to minimize drag and entry heat.

12.02.3.1 S-10D Intruder

Crew: 1
Armor Rating: 5
Force Field Rating: 5
Deflector Shield Rating: 2
Airframe Durability: 6
Agility Factor: 5
Acceleration Factor: 5
Endurance: 6hrs @ std cruise
Sensor Level: 3
Computer Level: 3



Offensive Systems
Guns:
1 - Mk/6 Pulse Phaser, turret mounted
Internal Hardpoints: None
External Hardpoints: None

Defensive Systems
ECM Capability: 3
Flare Packs: 12
Chaff Packs: 12
Decoys: 0

The Intruder is the primary drop ship for dismounted infantry. Well armored, and equipped with a good selection of defensive countermeasures, the S-10 has little trouble getting cargo to the planet in one piece. Once there, it can deploy a light infantry squad or a powered infantry fire team and then dig itself in, providing close range fire support with its phasers. When configured without a transporter, the S-10 can carry 14 combat-equipped light infantrymen. With a two-person transporter installed for insertion/

extraction, only 10 can be carried comfortably (12 uncomfortably).

Human marines have taken to informally referring to the Intruder as the “Huey” after the first aircraft (a rotary-winged helicopter) in large numbers to really provide air mobility to the infantry squad on Earth during the Vietnam War. Like that ancient aircraft, the S-10 operates in large numbers or individually depending on the size of the ground force required.

An even stealthier version of the Intruder, the MS-10 Prowler is used extensively in covert insertion and extraction missions for Special Operations teams. Though the Prowler lacks the special navigational arrays to earn the “Pave” designation of most SpecOps craft, the MS-10D has a capable enough array to give it all-weather/all-terrain approach and landing capability.

12.02.3.2 S-12 Gladiator

Crew: 2 (Pilot, Systems Ofc)
Armor Rating: 7
Force Field Rating: 5
Deflector Shield Rating: 3
Airframe Durability: 7
Agility Factor: 4
Acceleration Factor: 4
Endurance: 6hrs @ std cruise
Sensor Level: 3
Computer Level: 3

Offensive Systems
Guns:
2 - Mk/6 Heavy Pulse Phasers, turret mounted
Internal Hardpoints: None
External Hardpoints: None

Defensive Systems
ECM Capability: 4
Flare Packs: 24
Chaff Packs: 24
Decoys: 0

The Gladiator is the primary drop ship for SFMC ground vehicles and mounted infantry. Well armored, and equipped with a good selection of defensive countermeasures, the S-12 is able to weather enemy fire and deliver it’s cargo to the combat area. Once there, it can rapidly deploy its cargo to either side of the vehicle, while simultaneously providing heavy fire support with it’s turret. When carrying antigravity-equipped vehicles, the Gladiator can even release its cargo at altitude—providing the vehicles have the power reserves for the deceleration. The Gladiator can also carry a fully-equipped platoon of dismounted light infantry when rigged for personnel instead of equipment. A small number of MS-12 Gladiators are available for SpecOps work for supporting larger insertions/extractions than the MS-10 can handle (which are rare events indeed).

12.02.3.3 S-22 Darkhorse

Crew: 3 (Pilot, Systems Ofc, Loadmaster)
Armor Rating: 8
Force Field Rating: 6
Deflector Shield Rating: 4
Airframe Durability: 8
Agility Factor: 3
Acceleration Factor: 3
Endurance: 6hrs @ std cruise
Sensor Level: 4
Computer Level: 4

Offensive Systems
Guns:
4- Mk/6 Pulse Phasers

Internal Hardpoints: None
External Hardpoints: None

Defensive Systems
ECM Capability: 5
Flare Packs: 36
Chaff Packs: 36
Decoys: 0

Until recently, the largest drop ship in the Corps was the S-14 Invader, a modified version of the Danube-class Runabout. While its modular design made it versatile, the Invader simply was not cut out for frequent, rapid, energy-efficient/stealthy atmospheric entries. The lack of aerodynamics and the protrusion of warp nacelles lead to extremely high atmospheric drag which had to be compensated for by shields and SIFs. This caused huge flare-ups on entry, making the Invader extremely visible on instruments and naked-eye. It also consumed large quantities of power that were often needed in the landing zone for defense. Therefore, the SFMC put out the call for a replacement.

What they got in return was simply the finest heavy drop ship in the known galaxy. Andavia Aircraft (manufacturers of the T-4 Titan) won the competition with a scaled-down version of the T-4 lifting body modified with an aft-mounted warp system similar to those used on Klingon Bird-of-Preys. Roll-on, roll-off capability compensated for the lack of the Invader's modularity, and a nearly twofold increase in payload capacity meant fewer craft were needed to accomplish the same task as its predecessor.

12.02.4 Transport (VMS)

The mission for transport aircraft may seem similar to that of drop ships to the uninitiated, but they are as different as day and night. Unlike the drop ship, transports fill a much heavier lifting role. And also unlike drop ships, transports will most often carry in their larger loads after the drop ships and their embarked forces have entered and secured landing zones for them. Therefore, the need for warp power and rapid-entry capabilities do not exist for transport craft.

Transports instead spend most of their time in space ferrying loads from starships to a planetary surface below. After that, they undertake site-to-site transport on the planet itself and therefore relay heavily on aerodynamic principles. Without a doubt, the largest fixed-wing aircraft in the Federation are the transports of the Marine Corps' Aerospace Mobility Command.

12.02.4.1 T-2K Hercules

Crew: 3 (Pilot, Systems Ofc, Loadmaster)
Armor Rating: 2
Force Field Rating: 3
Deflector Shield Rating: 0
Airframe Durability: 3
Agility Factor: 6
Acceleration Factor: 3
Endurance: 18hrs @ std cruise
Sensor Level: 1
Computer Level: 2

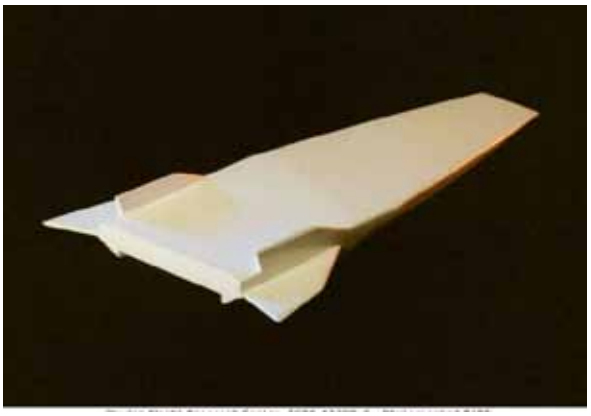
Offensive Systems: None

Defensive Systems
ECM Capability: 1
Flare Packs: 6
Chaff Packs: 6
Decoys: 5

The Hercules is ubiquitous to the average marine: if you have been deployed in an aircraft, chances are very good you rode a "Herky Bird." The T-2K is the Marine Corps' primary tactical transport and also serves a host of secondary functions. The standard T-2 can carry over 50,000kg of cargo, 100 passengers, or 40 wounded on litters. The KT-2 Provider can carry and distribute fuel and power to fighters and attack craft, and the MT-2 Pave Hercules can support special operations with covert airdrops and special sensors and communications. Overhead cover for SpecOps teams can be handled by the unique AT-2 Spectre, a heavily armed gunship version with a tremendous loiter time on station.

12.02.4.2 T-4C Titan

Crew: 3 (Pilot, Systems Ofc, Loadmaster)
Armor Rating: 2
Force Field Rating: 3
Deflector Shield Rating: 0
Airframe Durability: 4
Agility Factor: 4
Acceleration Factor: 2
Endurance: 18hrs @ std cruise
Sensor Level: 1
Computer Level: 2



Offensive Systems: None

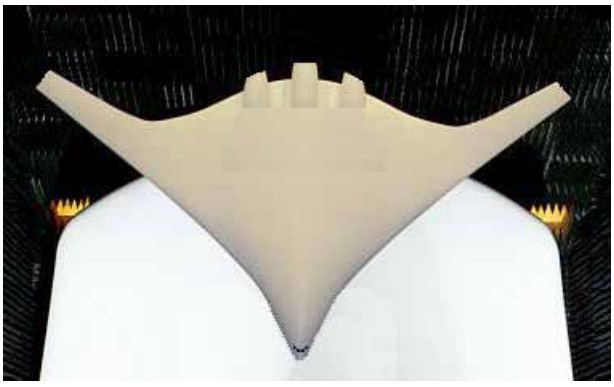
Defensive Systems
ECM Capability: 1
Flare Packs: 6
Chaff Packs: 6
Decoys: 5

The T-4 is a roll-on/roll-off cargo carrier, able to carry containerized cargo or vehicles. The Titan is the Corps' main Strategic airlifter, with a capacity of well over 100,000kg. Entire companies of ground units and their equipment can be deployed using the T-4C. The Titan has also spawned two important variants: a strategic tanker known as the KT-4 Extender, and an airborne command and control variant known as the ET-4 Air Marshal.

The T-4's body shape provides its aerodynamic lift, which gives it fantastic transatmopsheric performance without IDF and SIF enhancement and making the Titan equally at home in the air or in low orbit. In fact, much of its flight regime involves atmospheric "skipping" wherein large parts of the flight are actually outside the bulk of the atmosphere to increase speed and reduce drag.

12.02.4.3 T-6E Atlas

Crew: 3 (Pilot, Systems Ofc, Loadmaster)
Armor Rating: 2
Force Field Rating: 3
Deflector Shield Rating: 0
Airframe Durability: 5
Agility Factor: 2
Acceleration Factor: 1
Endurance: 24hrs @ std cruise
Sensor Level: 1
Computer Level: 2



Offensive Systems: None

Defensive Systems
ECM Capability: 1
Flare Packs: 6
Chaff Packs: 6
Decoys: 5

The Atlas is the largest transport used by the SFMC. Using a blended-wing-body (BWB) configuration, its cargo compartment is extremely wide, enabling the Atlas to take on loads that would normally have to be

disassembled and carried in pieces on smaller aircraft.

The Atlas provides the Corps with heavy strategic airlift capacity, and is normally used for heavy supply missions, carrying large quantities of material wherever it is needed. Normal rated capacities of the Atlas are nearly 500,000kg of cargo, 800 passengers, or 300 litters. Despite its ungainly appearance, the Atlas is actually quite graceful in the air and much faster than it looks. Lifting her large bulk with antigravs, though, is a costly proposition where energy is concerned, so the Atlas is provided with wheeled landing gear for rolling takeoffs and landings wherever space permits. An additional fusion generator can also be fitted on the cargo deck for use in supplementing antigrav and SIF/IDF generation when needed.

12.02.5 Medivac (VMS)

Air ambulances have been around far longer than the matter transporter. And although transporters are now much more heavily used, there are times when matter transport is dangerous or even impossible. Then it is up to these old workhorses of battlefield evacuation.

12.02.5.1 S-30 Valkyrie

Crew: 3 (Pilot, 2 Medics)
Armor Rating: 3
Force Field Rating: 5
Deflector Shield Rating: 0
Airframe Durability: 4
Agility Factor: 6
Acceleration Factor: 4
Endurance: 8hrs @ std cruise
Sensor Level: 2
Computer Level: 3

Offensive Systems: None

Defensive Systems
ECM Capability: 3
Flare Packs: 12
Chaff Packs: 12
Decoys: 0

The Valkyrie is a sublight Tactical Medical Transport with a crew of three (pilot, I-Medic and E-Medic). It has no weapons, but has a good armor rating and is fast and maneuverable. It can sustain normal cruise for eight hours before replenishing its charge packs. It houses an ALSTTAR atop an FMD-108, emergency medical supplies, spots for an additional three litters, and has seats forward for six 'walking wounded' for a total carrying capacity of twelve casualties.

The Aerospace Branch Guidebook has this to say about the S-30:
To wounded Marines, this vehicle is the most welcome sight on the battlefield. Carrying a pair of Medics and able to evacuate up to a dozen wounded in a single trip, the Valkyrie is a vital part of SFMC operations. With it's excellent agility, good armor and defensive countermeasures, the S-30 is a very durable vehicle. Valkyrie pilots are known for their skill and determination in getting to the wounded, regardless of personal risk. For this reason, Infantry and other ground forces will go to extreme lengths to rescue a downed Valkyrie crew.

12.02.5.2 S-34 Valor

Crew: 8 (Pilot, Systems Ofc, 6 man Field Medical Team)
Armor Rating: 3
Force Field Rating: 5
Deflector Shield Rating: 2
Airframe Durability: 7
Agility Factor: 3
Acceleration Factor: 2
Endurance: 12hrs @ std cruise
Sensor Level: 2
Computer Level: 4

Offensive Systems: None

Defensive Systems
ECM Capability: 5
Flare Packs: 24
Chaff Packs: 24

The Valor is the larger, warp capable version of the Valkyrie. Like its smaller cousin, the Valor started out as a variant of the S-34 drop ship which has since been replaced, so the medivac craft is normally referred to simply as the S-34. The Valor is a Strategic Medical Transport which is capable of Warp travel. Unlike the S-30, which must usually be ferried to an Op Area by a Starship, the Valor can move itself into its Op Area.

The original S-34 Shire was the Corps' medium drop ship until replaced by the Gladiator, so the Valor is a warp-capable spacecraft designed to rapidly enter atmosphere and fly aerodynamically. Thus, like a drop ship, the Valor retains an even number, even though it is a spacecraft. It is also uniquely suited to use as a tactical medivac platform, *and* for emergency recovery in space or other hazardous environments. The MS-34 Pave Valor, the medivac craft flown by SpecOps Pararescue Teams, is fitted with sophisticated navigation and scanning/sensing systems for locating and rescuing downed pilots.

The Valor carries a crew of eight (pilot, systems officer, two I-Medics and four E-Medics). It is fast and durable, and can operate at Warp 9.6 for 12 hours. It has three ALSTTARs stacked atop three FMD-108s, nine litters, and seating for 18 walking wounded, for a total of 36 casualties capacity.

The S-34 Valor is equipped with two important pieces of hardware. First, a pressurized docking collar can be extended up to 2 meters from the bottom center of the vehicle, sealing itself to a standard airlock door or even to the flat surface of a hull. Cutting torches can then be used to effect an entry into a disabled vessel. Second, the interior of the vehicle can be divided into compartments via force fields and bulkheads into separate and self-contained areas. This prevents the spread of biohazards or microweapons like nanites. Carrying six stasis units and a complete Field Medical Team, the Valor is capable of evacuating and treating up to 36 wounded personnel at a time. Pilots who fly this vehicle must rely heavily on countermeasures and armed escorts, as there are often surgical operations being conducted aboard during flight.

12.02.6 Electronic Warfare (VME)

Electronic warfare craft serve two main purposes. The first is to detect and suppress enemy sensors and scanners. The second is early warning and control of air traffic through active and passive sensors.

12.02.6.1 E-2D Crusader

Crew: 2 (Pilot, Systems Ofc)
Armor Rating: 3
Force Field Rating: 5
Deflector Shield Rating: 0
Airframe Durability: 6
Agility Factor: 6
Acceleration Factor: 6
Endurance: 8hrs @ std cruise
Sensor Level: 5
Computer Level: 5

Offensive Systems
External Hardpoints:
2 light rails

Defensive Systems
ECM Capability: 7
Flare Packs: 18
Chaff Packs: 18
Decoys: 0

The Crusader is designed to provide in-flight protection to friendly aerospace craft, through extensive use of ECM and other countermeasures. A typical mission for an E-2 would be to fly as the spearhead for an attack squadron, suppressing and jamming enemy sensors and scanners to mask the presence of the attackers. The Crusader can carry two anti-radiation missiles to destroy enemy scanner emitters if applicable, though it much more commonly designates targets for it's "buddies" flying along behind.

Tactical reconnaissance missions are most frequently flown in the SFMC by the RE-2 version of the Crusader. The Photo Crusader replaces its jamming and weapons equipment with elaborate active and passive sensors and imagers.

The older, larger E-3F Guardian, was a warp-capable craft with an identical mission. However, in practice, scout starships were much better in the role of task-force scouting and long range EW, so Guardians have been largely phased out of service (though a few remain in extremely remote sectors).

12.02.6.2 E-5B Paladin

Crew: 10 (Pilot, Plane's Systems Ofc, 7 assorted EW Systems Crew, Gunner)
Armor Rating: 3
Force Field Rating: 6
Deflector Shield Rating: 4
Airframe Durability: 8
Agility Factor: 3
Acceleration Factor: 5
Endurance: 36hrs @ std cruise
Sensor Level: 8
Computer Level: 8

Offensive Systems
Guns:
1 - Mk/5 Beam Phaser w/2 emitters (ventral/dorsal)

Defensive Systems
ECM Capability: 8
Flare Packs: 36
Chaff Packs: 36
Decoys: 6

The E-5 Paladin is the most sophisticated aerospace command/control/communications craft ever built. This vehicle is rarely seen near the forward edge of battle, being unarmed and practically defenseless. However, it's true strength lies in it's ability to communicate with and coordinate the actions of up to 120 other aerospace craft and starships.

The Paladin provides protection to other friendly aerospace craft and starships by jamming enemy sensors, identifying enemy missiles and vehicles during combat, maintaining clear communications between widely separated units and tracking the hundreds of moving objects found in a typical large scale aerospace engagement. When other facilities are unavailable, the E-5 can function as a space borne command post, directing and coordinating a planetary defense if necessary. It's communications capabilities allow it to transmit to any or all points on a planetary surface, acting as a communications relay center if needed.

The E-5A was completely unarmed and required many escorts to protect it as it loitered in its operations area. Even then, the high-priority targets they were, many were lost. The new E-5B provides self-defense for the Paladin in the form of dorsal and ventral phaser emitters and an onboard gunner to direct their fire.

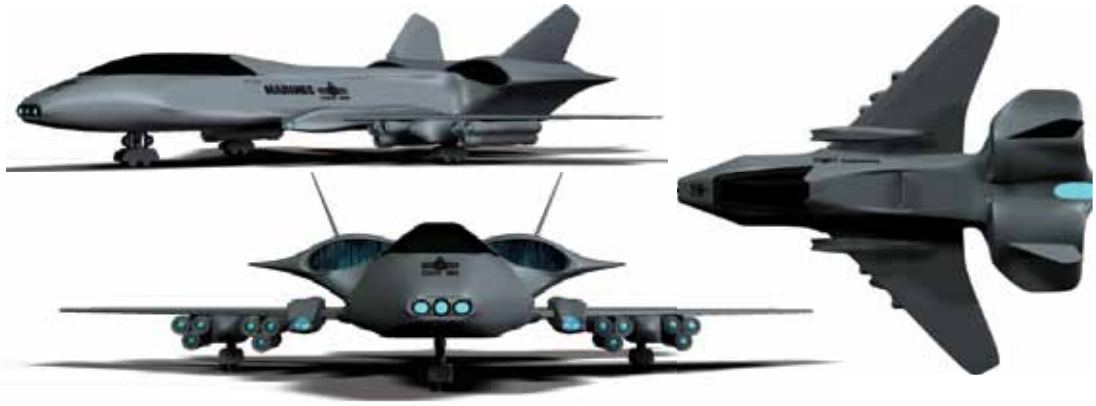
12.03 Types of Aerospace Craft Entering the SFMC Inventory

The most common aerospace craft in the SFMC are discussed briefly below and are categorized by mission. Each mission name is followed by a letter designator which indicates the type of squadron in which the craft would normally serve. Remember that even-numbered craft are *usually* aircraft and odd numbered are *usually* spacecraft. The craft in this section are replacing the craft listed in Section 12.02.

12.03.1 Attack (VMA)

The attack craft's main job is to destroy enemy targets in space and on the ground, with missiles, torpedoes, mines, bombs, and guns. Since the primary function of Marine Aerospace is to support the Marines on the ground, the attack mission is the Branch's most crucial. Because of this, the Corps has a wider variety of attack craft than any other specialty type.

12.03.1.1 A-18 Firebolt Close Air Support Craft



Role: Close Air Support Aerospace Fighter
Crew: 1 (a 2-seat training variant, designated A-18B, exists)
Physical Attributes:

Length: 14.2 m (46' 7")
Wingspan (deployed): 12.8 m (42' 1")
Wingspan (folded): 8.6 m (28' 4")
Height (airframe): 2.9 m (9' 7")
Mass: 16,133 kg empty (35,492lbs)

Performance Characteristics:

Atmospheric Performance (Terran atmospheric standard)

Maximum Velocity: 3,413 km/hr (1,843kts) @ 20,000 meters (Mach 3)
Maximum Acceleration: 300kph/sec (162.1kts/sec) (8.5 G)
Time to max velocity: 11.38 seconds
Stall Velocity: 274 km/hr (148kts)
Duration at max power: 7.5 hours
Takeoff Distance (full load): 441 meters @ 1G
Landing Rollout (empty): 300 meters

Extra Atmospheric Performance

Maximum Impulse Speed: .99c (Maneuverability achieved through ARCS thrusters located at tips of wings, stabilators, nose and tail.)
Endurance at cruising speed (internal fuel): 12 hours

Combat Systems (Integrated):

Offensive Systems:

1 M-481 Heavy Cannon (30mm EMPW) mounted forward centerline w/10000rds (nose)
2 M-1368 Very Rapid Pulse Cannons mounted 1@ in wing root pods port and starboard
Internal ordnance bay. Bay can be outfitted with bombs or rotary missile launcher.
Target designator system
4 under wing hardpoints for external weapon stores
TDRS-29 Advanced Target Designator/Illumination System

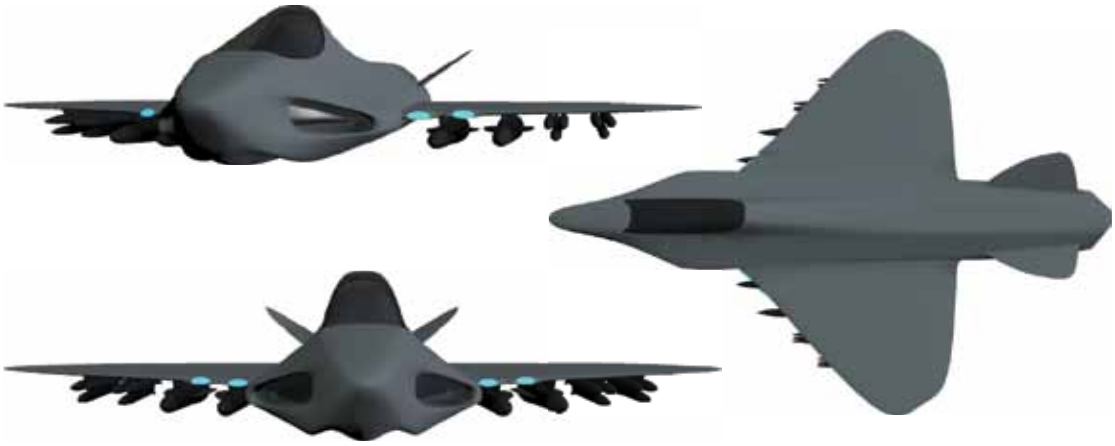
Defensive Systems:

1 Flare dispenser mounted aft with 250 flare magazine.
1 "Chaff" dispenser mounted aft with 250 sensor deception packs.
1 Decoy dispensor mounted aft with 10 Mk3 Decoys
1 Class Four Force Shield generator which can, for short periods, be reinforced to Class Five.
1 PSU-1403 Pilot Safety Module (2 in 2-seat training variant)

The A-18 Firebolt is envisioned as the SFMC's Close Air Support solution for the next half century, and is the first aerospace craft to be designed incorporating the lessons learned during the Dominion War. Its primary weapon is a nose mounted heavy EMPW cannon that can eliminate hard armored targets with a ½ second burst. Secondary weapons consisting of a versatile combination of carried ordnance and secondary energy weapons can provide for a full range of offensive missions. Having large wing surfaces allows for aerodynamic stability at low speeds as well as a short takeoff rollout when in certain planetary conditions. Its upgraded maneuvering systems allow the A-18 to be equally nimble in both atmospheric and deep space flight, giving this model the performance of a fighter craft. It was in a planetary atmosphere, however, that the design really displayed its impressive capabilities. The A-18 was able to deliver ordnance against mobile targets 99% of the time at speeds that greatly exceeded traditional surface engagement doctrines. Pilots routinely displayed the ability to eliminate tank-sized targets from over 3 kilometers away while conducting terrain masking flight profiles.

Though possessing the ability to use Anti-Gravity generators to take off and land vertically, it is also capable of using aerodynamic flight to take off and land in the traditional manner. It carries up to 22000 kilograms of ordnance, which gives it the ability to be a fearsome craft when conducting its primary mission of Close Air Support of ground forces. In this role, the A-18 will primarily engage armored vehicles; and it is anticipated that threat units will quickly learn to fear its appearance in the skies above the battlefield.

12.03.1.2 F/A-55 Le-Matya Strike Craft



Role: Aerospace Strike Fighter
Crew: 1 (a 2-seat training variant, designated F/A-55B, exists)
Physical Attributes:

Length: 15.18 m (49' 9")
Wingspan (deployed): 10.15 m (33' 4")
Wingspan (folded): 6.2 m (20' 4")
Height (airframe): 2.04 m (6' 8")
Mass: 15,920 kg empty (35,097lbs)

Performance Characteristics:

Atmospheric Performance (Terran atmospheric standard)

Maximum Velocity: 3,413 km/hr (1,843kts) @ 20,000 meters (Mach 3)
Maximum Acceleration: 300kph/sec (162.1kts/sec) (8.5 G)
Time to max velocity: 11.38 seconds
Stall Velocity: 319 km/hr (172kts)
Duration at max power: 8.8 hours
Takeoff Distance (full load): 500 meters @ 1G
Landing Rollout (empty): 418 meters

Extra Atmospheric Performance

Maximum Impulse Speed: .99c (Maneuverability achieved through ARCS thrusters located at tips of wings, nose and tail.)
Warp Cruising Speed: Warp 4
Maximum Emergency Warp Speed: Warp 7.2
Endurance at cruising speed (internal fuel): 12 hours

Combat Systems (Integrated):

Offensive Systems:

4 M-1368 Very Rapid Pulse Cannons mounted 2@ in leading wing edge port and starboard
Target designator system
4 conformal fuselage hardpoints (2@ port and starboard)
8 under wing hardpoints for external weapon stores
TDRS-29 Advanced Target Designator/Illumination System

Defensive Systems:

1 Flare dispenser mounted aft with 250 flare magazine.
1 "Chaff" dispenser mounted aft with 250 sensor deception packs.
1 Decoy dispenser mounted aft with 10 Mk3 Decoys
1 Class Four Force Shield generator which can, for short periods, be reinforced to Class Five.
1 PSU-1403 Pilot Safety Module (2 in 2-seat training variant)

The F/A-55 Le-Matya, named for one of the most dangerous beasts of the Vulcan deep desert, is designed to both engage spaceborne targets and crush hardened ground defenses. The F/A-55 can carry a massive amount of ordnance. Though aerodynamically STOL in clean configuration, utilizing heavy or very heavy loadouts will require either a much longer takeoff run or the use of an antigrav launch. The F/A-55 is capable of delivering a withering attack on its any assigned target while still being able to defend itself from any perceivable threat. Able to carry the entire range of ordnance in the SFMC arsenal; it is expected to provide a large part of the Aerospace Branch's offensive punch for the foreseeable future.

12.03.2 Fighter (VMF)

Fighters are faster and more maneuverable than attack aircraft. They intercept and engage enemy aircraft; defend surface forces from air attack; and escort attack, reconnaissance, electronic warfare, and support craft.

12.03.2.1 F-82 Phantasm Superiority Craft

Role: Aerospace Superiority Fighter
Crew: 1 (a 2-seat training variant, designated F-82B, exists)
Physical Attributes:

Length: 17.5 m (57' 4")
Wingspan (deployed): 12.5 m (41' 3")
Wingspan (folded): 4.7 m (15' 6")
Height (airframe): 2.13 m (6' 11")
Mass: 16,870 kg empty (37,192lbs)

Performance Characteristics:

Atmospheric Performance (Terran atmospheric standard)

Maximum Velocity: 3,413 km/hr (1,843kts) @ 20,000 meters (Mach 3)
Maximum Acceleration: 300kph/sec (162.1kts/sec) (8.5 G)
Time to max velocity: 11.38 seconds
Stall Velocity: 310 km/hr (167kts)
Duration at max power: 8.8 hours
Takeoff Distance (full load): 490 meters @ 1G
Landing Rollout (empty): 400 meters

Extra Atmospheric Performance

Maximum Impulse Speed: .99c (Maneuverability achieved through ARCS thrusters located at tips of wings, nose and tail.)
Endurance at cruising speed (internal fuel): 12 hours

Combat Systems (Integrated):

Offensive Systems:

4 M-1368 Very Rapid Pulse Cannons mounted 4@ in leading wing edge mounts # 1, 2, 5, & 6
2 M-464 Medium EMPW Cannons with 9600rnds@ in leading wing edge mounts # 3, & 4
Internal ordnance bay. Bay can be outfitted with bombs or rotary missile launcher.
Target designator system
8 under wing hardpoints for external air-to-air weapon stores
TDRS-29 Advanced Target Designator/Illumination System

Defensive Systems:

1 Flare dispenser mounted aft with 250 flare magazine.
1 "Chaff" dispenser mounted aft with 250 sensor deception packs.
1 Decoy dispensor mounted aft with 10 Mk3 Decoys
1 Class Four Force Shield generator which can, for short periods, be reinforced to Class Five.
1 PSU-1403 Pilot Safety Module (2 in 2-seat training variant)

The F-82 Phantasm is designed to be the SFMC's premiere ground launched aerospace superiority craft for the foreseeable future. It provides a heavy offensive punch with a wide array of ordnance loadouts as well as six leading edge weapon mounts. These mounts may be filled with phasers or projectile weapons, or a symmetrical combination of the two. The F-82 also benefits from a design incorporating the latest in Low Observable Technologies which allow it, in clean configuration, to engage high value targets using a stealth flight profile. It is designed to engage in close combat maneuvering against enemy aerospace craft, as well as engage them at long ranges with advanced sensor and offensive systems. Extensive testing, including simulated combat maneuvers, has shown that the F-82 is easily among the most agile aerospace designs in either the Aerospace Branch's inventory or those of known threat forces.

Though possessing the ability to use Anti-Gravity generators to take off and land vertically, it is also capable of using aerodynamic flight to take off and land in the traditional manner on short runways.

12.03.3 Transport (VMS)

Transports spend most of their time in space ferrying loads from starships to a planetary surface below. After that, they undertake site-to-site transport on the planet itself and therefore rely heavily on aerodynamic principles. Without a doubt, the largest fixed-wing aircraft in the Federation are the transports of the Marine Corps' Aerospace Mobility Command.

12.03.3.1 T-17 Loon Tactical Transport Craft

Role: Tactical Transport
Crew: 2 (Pilot, Cargomaster)
Physical Attributes:
Length: 10.88 m (35' 8")
Wingspan (deployed): 12.80 m (33' 0")
Wingspan (folded): 7.25 m (23' 9")
Height (airframe): 3.92 m (12' 10")
Mass: 19,270 kg empty (42,483 lbs)
Performance Characteristics:
Atmospheric Performance (Terran atmospheric standard)
Maximum Velocity: 740 km/hr (400kts) @ 20,000 meters (Mach .65)
Maximum Acceleration: 90kph/sec (48.6kts/sec)
Time to max velocity: 10 seconds
Stall Velocity: N/A
Duration at max power: 8.8 hours
Takeoff Distance (full load): N/A
Landing Rollout (empty): N/A
Extra Atmospheric Performance
Maximum Impulse Speed: .99c
Endurance at cruising speed (internal fuel): 12 hours
Combat Systems (Integrated):
Offensive Systems:
None in standard model
Defensive Systems:
1 Flare dispenser mounted aft with 125 flare magazine.
1 "Chaff" dispenser mounted aft with 125 sensor deception packs.
1 Decoy dispenser mounted aft with 5 Mk3 Decoys
1 Class Four Force Shield generator which can, for short periods, be reinforced to Class Five.
Onboard Systems:
VF-437 Structural Integrity Field for Small Craft with redundancy
VF-917 Inertial Dampening Field for Small Craft with redundancy

The T-17 Loon is designed to provide the SFMC with tactical level transport. The T-17 can carry for its size, a staggering amount of cargo, 6,800kg (15,000lbs) or an equipped squad or a light vehicle and crew. Though the T-17 possesses an antigrav launch and land capability, such is rarely used. The T-17 has large nacelles located at the end of each wing and winglet containing both impulse engines and massive ARCS thrusters. These nacelles are capable of pivoting on the axis of the wing, which allow the T-17 to vector the trust provided to take off and land vertically. In space, these nacelles can be used to allow for phenomenal roll rates and maneuverability for a craft of such size.

The T-17 can be equipped to carry two M-1056 Heavy Infantry Support Pulse Phasers in the loading doors. However, since these doors are normally only opened when in low speed atmospheric flight, the utility of such weapons has been questioned. The T-17 is also being studied for the following possible variants: an E-17 Pathfinder Electronic Warfare Craft, a MT-17 Nightingale Medical Evacuation Transport, and an AT-17 Dragon Airborne Fire Support Craft.

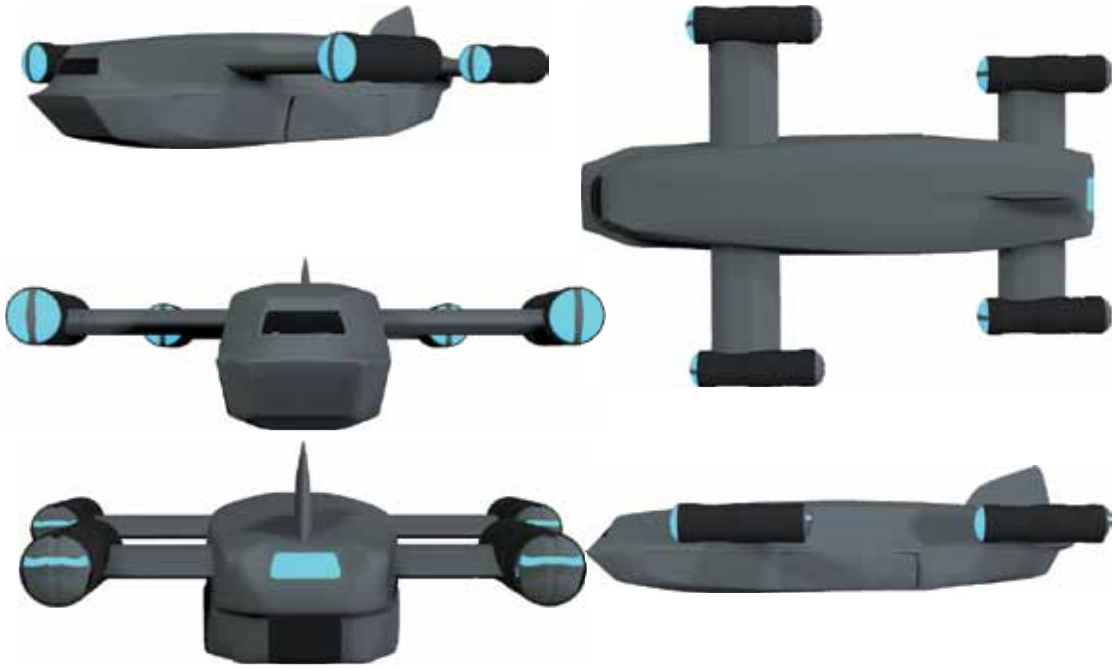
12.03.3.2 T-39 Pelican Medium Transport Craft

Role: Medium Lift Transport
Crew: 5 (Pilot, Copilot, Flight Engineer, Cargomaster, and 1 Cargo Handler)
Physical Attributes:
Length: 18.45 m (60' 6")
Wingspan: 10.06 m (33' 0")
Height (airframe): 5.30 m (17' 5")
Mass: 48,000 kg empty (105,600lbs)
Performance Characteristics:
Atmospheric Performance (Terran atmospheric standard)
Maximum Velocity: 740 km/hr (400kts) @ 20,000 meters (Mach .65)
Maximum Acceleration: 90kph/sec (48.6kts/sec)
Time to max velocity: 10 seconds
Stall Velocity: N/A
Duration at max power: 8.8 hours
Takeoff Distance (full load): N/A
Landing Rollout (empty): N/A
Extra Atmospheric Performance
Maximum Impulse Speed: .99c
Warp Cruising Speed: Warp 4
Maximum Emergency Warp Speed: Warp 7.2
Endurance at cruising speed (internal fuel): 12 hours
Combat Systems (Integrated):
Offensive Systems:
None in standard model
Defensive Systems:
1 Flare dispenser mounted aft with 125 flare magazine.
1 "Chaff" dispenser mounted aft with 125 sensor deception packs.
1 Decoy dispensor mounted aft with 5 Mk3 Decoys
1 Class Four Force Shield generator which can, for short periods, be reinforced to Class Five.
Onboard Systems
VF-437 Structural Integrity Field for Small Craft with redundancy
VF-917 Inertial Dampening Field for Small Craft with redundancy

The T-39 Pelican is designed to provide the SFMC with medium capacity lift transport. The T-39 can carry a up to 20,000 kg (44,000 lbs) or an equipped platoon, or a light armored vehicle and crew or up to 3 light vehicles and crews. Unlike the other current members of the T- Class the T-39 has fixed nacelles. It is piloted as a large shuttlecraft. Though a more conventional craft, it has a high payload rating and is well protected from enemy fire making it a potent system for the SFMC's airlift groups.

The T-39 can be equipped to carry two M-1056 Heavy Infantry Support Pulse Phasers in the loading doors. However, since these doors are normally only opened when in low speed atmospheric flight, the utility of such weapons has been questioned. The T-39 is also being studied for the following possible variants: a MT-39 Valkyrie II Medical Evacuation Transport, E-39 Explorer Electronic Warfare Craft, a KT-39 Extender Aerospace Refueler and Support Craft, an AT-39 Thunderstorm Aerospace Fire Support Craft. The T-39 is a becoming a versatile airframe capable of being modified for many other mission profiles, many of which are likely to be seen in the future.

12.03.3.3 T-8 Albatross Heavy Transport Craft



Role: Heavy Lift Transport
Crew: 7 (Pilot, Copilot, Flight Engineer, Cargomaster, and 3 Cargo Handlers)
Physical Attributes:

Length: 50.94 m (167' 1")
Wingspan: 38.21 m (125' 4")
Height (airframe): 13.15 m (43' 2")
Mass: 158,757 kg empty (350,000lbs)

Performance Characteristics:

Atmospheric Performance (Terran atmospheric standard)

Maximum Velocity: 926 km/hr (500kts) @ 20,000 meters (Mach .81)
Maximum Acceleration: 85kph/sec (45.9kts/sec)
Time to max velocity: 11 seconds
Stall Velocity: N/A
Duration at max power: 8.8 hours
Takeoff Distance (full load): N/A
Landing Rollout (empty): N/A

Extra Atmospheric Performance

Maximum Impulse Speed: .99c
Warp Cruising Speed: Warp 4
Maximum Emergency Warp Speed: Warp 7.2
Endurance at cruising speed (internal fuel): 12 hours

Combat Systems (Integrated):

Offensive Systems:

None in standard model

Defensive Systems:

1 Flare dispenser mounted aft with 250 flare magazine.
1 "Chaff" dispenser mounted aft with 250 sensor deception packs.
1 Decoy dispenser mounted aft with 10 Mk3 Decoys
1 Class Four Force Shield generator which can, for short periods, be reinforced to Class Five.

Onboard Systems

VF-437 Structural Integrity Field for Small Craft with redundancy
VF-917 Inertial Dampening Field for Small Craft with redundancy
4 Cargo Tractors 2@ mounted at each cargo door
144 Troop Seats on upper deck

The T-8 Albatross is designed to provide the SFMC with Theater-to-Theater heavy lift transport. The T-8 can carry a staggering amount of cargo, 131,995kg. This can be an equipped infantry company or several light vehicles and crews, or up to 2 light armored vehicles and crews, or a single Main or Heavy Battle Tank and crew. Though the T-8 possesses an antigrav launch and land capability, such is rarely used. The T-8, like the T-17 cargo transports of the SFMC inventory, has large nacelles located at the end of each wing and winglet containing both impulse engines and massive ARCS thrusters. These nacelles are capable of pivoting on the axis of the wing, which allow the T-17 to vector the trust provided to take off and land vertically. In space, these nacelles can be used to allow for phenomenal roll rates and maneuverability for a craft of such size.

The T-8 can be equipped to carry four M-1056 Heavy Infantry Support Pulse Phasers in the loading doors. However, since these doors are normally only opened when in low speed atmospheric flight, the utility of such weapons has been questioned. The T-8 is also being studied for the following possible variants: a T-8M Archangel Medical Evacuation Transport, K-8 Cormorant Aerospace Refueler and Support Craft, and a T-8V Luxury Transport for diplomatic and other selected personnel. The T-8 is a versatile airframe capable of any number of different missions, many of which we are likely to see in the future.

12.03.4 Utility Craft (VMS)

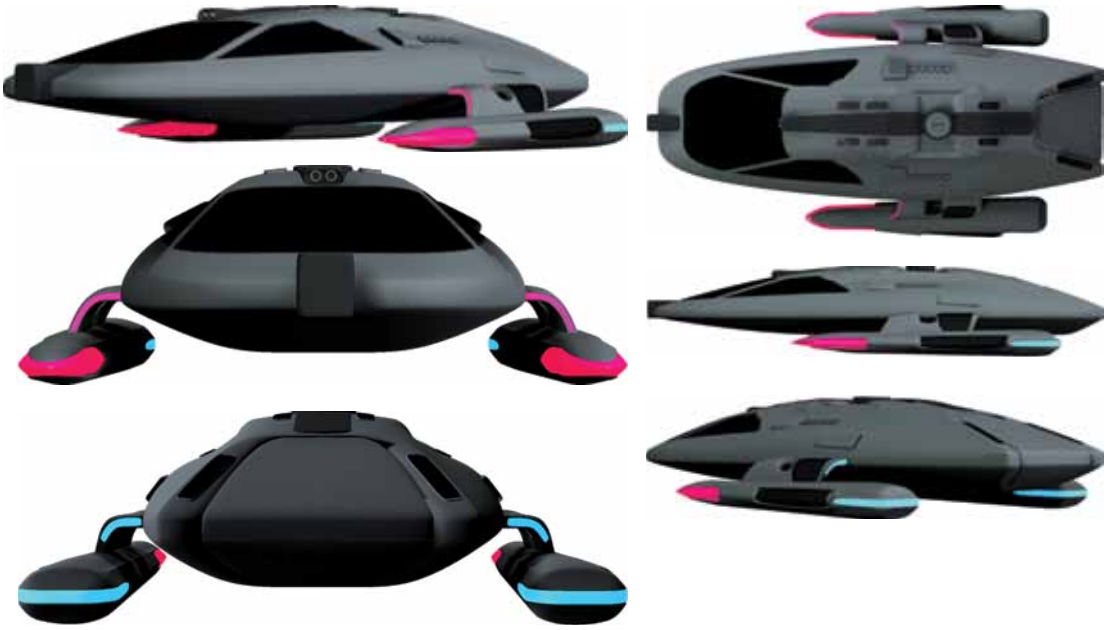
12.03.4.1 U-3 Aztec Light Utility Craft

Role: Multi-role Light Utility Craft
Crew: 1
Physical Attributes: (base model)
Length: 2.74 m (9' 0")
Width: 2.74 m (9' 0")
Height: 2.74 m (9' 0")
Mass: 1,400 kg empty (3,080 lbs)
Performance Characteristics:
Atmospheric Performance (Terran atmospheric standard)
Maximum Velocity: 574 km/hr (310kts)
Maximum Acceleration: 85kph/sec (45.9kts/sec)
Time to max velocity: 7 seconds
Stall Velocity: N/A
Duration at max power: 8.8 hours
Takeoff Distance (full load): N/A
Landing Rollout (empty): N/A
Extra Atmospheric Performance
Maximum Impulse Speed: .99c
Endurance at cruising speed (internal fuel): 12 hours
Combat Systems (Integrated):
Offensive Systems:
None in standard model
Defensive Systems:
1 Class Three Force Shield generator which can, for short periods, be reinforced to Class Four.

The U-3 Aztec was designed as a multi-role light utility craft. Shown is the U-3 with Medivac Litters. In its base configuration, the U-3 Aztec consists of a chassis, cockpit and engines along with the attendant subsystems allowing them all to work together. The utility of this craft come into play when it is set up for a particular role. As a utility cargo hauler, it can lift its own weight in a cargo sling hung below. As a Utility Attack Craft, the A-3 Aztec Warrior, it can carry up to four M-1137 Light Infantry Support Pulse Phasers and two M-326 20mm grenade launchers. As a medivac unit (*as shown above*), the U-3 can carry 2 patients in stasis litters directly from the battlefield to Battalion Aid Stations or MSH units. The full range of capabilities of this unique little craft continue to be explored by the SFMC both in R&D and in the field.

12.03.5 Special Operations Craft (VMM)

12.03.5.1 MS-65 Pave Zodiac - Special Operations Insertion Craft



Role: Medium Lift Special Operations Aerospace Craft
Crew: 4 (Pilot, Copilot, Flight Engineer/Loadmaster, Electronic Systems Chief)
Physical Attributes: (base model)

Length: 16.5 m (54' 0")
Width: 3.5 m (11' 6")
Height: 4.7 m (15' 6")
Mass: 29,400 kg empty (63,934 lbs)

Performance Characteristics:

Cargo Capacity

Max. Personnel Carried: 8
*Max. Medivac:*4 litters
Max. Internal Cargo: 4,000 kg (8,818 lbs)
Max. External Cargo: 20,000kg (44,092 lbs)

Atmospheric Performance (Terran atmospheric standard)

Maximum Velocity: 3600 km/hr (1944kts)
Maximum Acceleration: 85kph/sec (45.9kts/sec)
Time to max velocity: 7 seconds
Stall Velocity: N/A
Duration at max power: 8.8 hours
Takeoff Distance (full load): N/A
Landing Rollout (empty): N/A

Extra Atmospheric Performance

Maximum Impulse Speed: .99c
Warp Cruising Speed: Warp 4
Maximum Emergency Warp Speed: Warp 6
Endurance at cruising speed (internal fuel): 12 hours

Combat Systems (Integrated):

Offensive Systems:

2 – Fore Mounted EMPW-12 25mm Guns with 1000 rounds each
Type-IV Phaser Generator with 2 Emitters (Port and Starboard)

Defensive Systems:

Class 5 Force Shield
EWD/AE-74 Short-of-Cloak Active Stealth System
EWD-202SO “Holoflage” Special Operations Holographic Generator
Mk3 Decoy Launcher with 20 Decoys

Other Systems (Integrated):

Power plants:

600 Cochrane Matter/Anti-Matter Reactor
2 - 900 Millicochrane Plasma Impulse Reactors
Auxiliary 500 Millicochrane Fusion Reactor

Computers:

M-3 Isolinear IV with LCARS Interface Software

Navigation Systems:

Mark 6 Warp Celestial Guidance System
FDS-89P Planetary Internal Guidance Package
FDS-100 Auxiliary Map/Directional System
Nose Mounted ODIN Visual Enhancement System

Communications Systems:

ANS/P-45A2 Digital Burst Antenna (Multi-Function)
ANS/B-1880 Communications System
ANS/SS-2000 Subspace Communications System

Sensor Systems:

EQW-2B Advanced Battlefield Surveillance System
EQW-622 Passive Observation Collector
EQW-804 Air Defense System
ANS/W-660 Weather Sensor Suite

Electronic Warfare Systems:

EWD-507 Ground Offensive Electronic Interdiction System (GOEIS)
EWD-480 Focused Electronic Jamming System
EWD-010A2 “Big Black Hack” Datwarfare Suite
TDRS-29 Advanced Target Designator/Illumination System

The Pave Zodiac was designed to replace the MS-10D Intruder in Special Operations Missions requiring medium lift capabilities. The Intruder was never designed for Special Operations and its use in such missions had always been a stop gap measure until a more permanent solution could be found.

Any solution for the Special Operations Medium Lift Project had to conform to a singular fact; many SpecOps Teams are forward deployed on Star Fleet vessels away from many Marine Aerospace assets. This puts a premium on interoperability and commonality with Star Fleet equipment in order for the proposed craft to function and stay operational. Therefore all proposed designs were required to have at least 60% of their components interchangeable with Star Fleet equipment and no more than 15% of the components could require specialized skills or materials to maintain. Any proposed craft was also required to be warp capable and equally effective in both the vacuum of space and a planet’s atmosphere.

In response to these guidelines, the majority of the submissions were simply modified Star Fleet shuttlecraft. While strictly adhering to the rules, many of these proposed craft also failed to distinguish themselves as anything more than glorified shuttles. The winning design was eventually submitted by a retired Star Fleet Engineer and USS Enterprise-E veteran. In a barely concealed attempt to impress one Lieutenant Commander Geordi La Forge, he decided to base his design off the successful Type-11 Long Range Shuttle stationed on Sovereign-class Cruisers.

The MS-65 Pave Zodiac does bear more than a passing resemblance to the Type-11 Shuttle and many of the flight systems are the same as well; however, several key external differences are present. The most glaring addition is the housing for the ODIN System’s optical receivers mounted on the nose. This housing does change the atmospheric performance of the craft, but since the missions of the Pave Zodiac do not require high performance, the differences are rarely noticeable. Also the Type-IV phaser emitter has been removed from the nose and replaced with two complimentary emitters mounted just aft of the

ventral docking collar on both the port and starboard sides. These emitters are identical to the ones found on the Danube-class Runabouts and provide the crew with a greatly increased radius of fire. In addition to the modified phaser system, the forward Micro-Torpedo launcher has been replaced with twin EMPW-12 guns placed on either side of and underneath the cockpit. All the other major differences are found at the rear of the craft, where the aft section has been expanded to accommodate more specialized operating equipment while still having the same internal space as a typical Type-11.

Both propulsion systems have also undergone changes in external appearance and redesigned operations. The warp nacelles are operationally identical to those on the Star Fleet base model, but the shells have been hardened against rough handling at the hands of brazen Marine pilots and the inevitable combat damage. This hardening has also reduced the energy signature of the warp coils by 12% giving a boost to the stealth characteristics of the craft.

The Pave Zodiac uses slightly more powerful impulse driver coils than the Type-11, as indicated by the larger housings located at the aft of the craft. While these upgraded coils are indeed 25% bigger than the original coils, the larger housings also belie the fact that the entire impulse system has also been moved to an exterior positioning in order to free up more room inside the craft. All of this extra space, along with the space created by the larger aft section, is used for the EWD/AE-74 Active Stealth System's generators and coordinating computer system.

The interior spaces are a stark contrast to the overall Star Fleet look of the exterior, being completely Marine oriented. The primary entry method is through a large clamshell door at the rear, and unlike the Type-11 a person can see out the cockpit windows when standing in this aft door. The interior appears to have been completely stripped; it has been replaced with bare bulkheads, a heavy duty cargo deck, and tie down points everywhere. Any personnel being transported will find themselves sitting on removable benches along either side of the interior; barely comfortable but the Marines using them rarely notice. It also seems impossible that 8 combat loaded Special Forces Marines can be jammed into this space, but they can be with a little room to spare.

The cockpit has also undergone the same radical changes from its Star Fleet doppelganger as the rest of the interior. The Commander and Operations Officer still sit side by side, but with less space between them. The Engineering Chief and Electrical Systems Chief sit directly behind their officers at stations located along the outside bulkheads. None of the seats can move more than a few degrees of rotation, and while the two Chiefs can easily side into their stations, the officers need to all but climb over the two enlisted men to get their seats. The whole feel of the cockpit is radically different than a Star Fleet shuttle as well; multi-function interfaces are still used in many places but they look bulkier and less advanced than the norm. There are also enough tactile buttons and switches scattered around to make a person think that they had regressed about two hundred years. The control stick and throttle assembly placed at the Commander's and Operation Officer's stations are also never found on Star Fleet Shuttles, and are rare just about anywhere outside the Marine Corps Aerospace Branch. Along with the rest of the interior, this cockpit makes no excuses for being good for almost nothing other than getting a Special Operations Team into position and supporting them during missions.

Besides the aft cargo door, there are two other ways of entering or exiting the interior of the craft. The first is the dorsal docking collar, which is used primarily to transit to another ship that doesn't have a shuttle bay. The second is an unsuspecting panel on the cargo deck about a meter and a half square; it's actually a hatch through the dorsal side of the shuttle. The panel can only be accessed in flight by the shuttle's Loadmaster Station and is used by Marines to repel or fast rope to the ground without the shuttle landing. This gives Marines another way to enter combat quickly or into situations where having the craft land would be risky or ill-advised.

12.03.6 Medivac (VMS)

Air ambulances have been around far longer than the matter transporter. And although transporters are now much more heavily used, there are times when matter transport is dangerous or even impossible. Then it is up to these old workhorses of battlefield evacuation.

12.03.6.1 MT-17 Nightingale

The MT-17 medical evacuation transport has a crew of three (pilot, I-Medic and E-Medic). It has no weapons but is fast and maneuverable. It houses an ALSTTAR atop an FMD-108, emergency medical supplies, spots for an additional three litters, and has seats forward for six 'walking wounded' for a total carrying capacity of twelve casualties.

12.03.6.2 MT-39 Valkyrie II

The MT-39 Valkyrie II medical evacuation transport has a crew of eight (pilot, systems officer, two I-Medics and four E-Medics). It has three ALSTTARs stacked atop three FMD-108s, nine litters, and seating for 18 walking wounded, for a total of 36 casualties capacity. It is equipped with two important pieces of hardware. First, a pressurized docking collar can be extended up to 2 meters from the bottom center of the vehicle, sealing itself to a standard airlock door or even to the flat surface of a hull. Cutting torches can then be used to effect an entry into a disabled vessel. Second, the interior of the vehicle can be divided into compartments via force fields and bulkheads into separate and self-contained areas. This prevents the spread of biohazards or microweapons like nanites.

12.03.6.3 T-8M Archangel

The T-8M Archangel medical evacuation transport provides transportation for a forward surgical team with three Emergency Medical Units (EMUs) and a MORE (Mobile Operating Room Equipment). It is capable of handling a caseload of 25 critical patients for up to 72 hours and surgery for 18 total operating hours.

12.03.7 Electronic Warfare (VME)

12.03.7.1 E-17 Pathfinder

The E-17 Pathfinder electronic warfare craft is designed to provide in-flight protection to friendly aerospace craft through the extensive use of electronic countermeasures. A typical mission for an E-17 would be to fly as the spearhead for an attack squadron, suppressing and jamming enemy sensors and scanners to mask the presence of the attackers. The Pathfinder can be equipped with anti-radiation missiles to destroy enemy scanner emitters but it much more commonly designates targets for its buddies flying along behind.

Tactical reconnaissance missions are most frequently flown in the SFMC by the RE-17 version of the Pathfinder. The Photo Pathfinder replaces most of its jamming and weapons equipment with elaborate active and passive sensors and imagers.

12.03.7.2 E-39 Explorer

The E-39 Explorer electronic warfare craft is the most sophisticated aerospace command/control/communications craft ever built. This vehicle is rarely seen near the forward edge of battle, being unarmed and practically defenseless. However, its true strength lies in its ability to communicate with and coordinate the actions of up to 120 other aerospace craft and starships.

The Explorer provides protection to other friendly aerospace craft and starships by jamming enemy sensors, identifying enemy missiles and vehicles during combat, maintaining clear communications between widely separated units and tracking the hundreds of moving objects found in a typical large scale aerospace engagement. When other facilities are unavailable, the E-39 can function as a space borne command post, directing and coordinating a planetary defense if necessary.

12.04 Offensive Systems - Projectile Weapons

SFMC Aerospace Craft make use of a wide variety of projectile weapons including missiles, torpedoes, bombs and guns.

12.04.1 Airborne Gunnery

Gauss Guns use superconducting electromagnets in series to launch projectiles at incredible muzzle velocities. This velocity is a key component in airborne gunnery. The pilot has neither the means nor the time to consider the ballistic drop of the projectile with distance. Therefore, the gun's effective range becomes the range at which ballistic drop can be ignored: "point blank" shooting in its original definition.

This range is proportional to muzzle velocity.

Why contend with the problem of ballistic drop, when targeting computers exist to compensate for it? Within the normal maximum range of the EMPW, zero ballistic drop means the trajectory of the projectile is a straight line in front of the aircraft, represented by a fixed dot on the forward canopy. The absence of rangefinders and inertial platforms from the weapon-aiming loop simplifies the aircraft, increases weapon-system reliability, reduces pilot workload, and makes the system invulnerable to target-lock-jamming (TLJ) countermeasures.

Extremely high muzzle velocities also take from the adversary their one effective countermeasure: maneuver. At normal engagement ranges, the EMPW's muzzle velocity means the projectile has practically a zero flight time, so the target is incapable of moving fast enough to get out of the way. Combine this characteristic with the gun's high firing rate, and kills are assured. A one-second burst from an M-595 Heavy Rotary Cannon from 2,000 meters away will put fifty 30 mm rounds into a circle smaller than a main battle tank, when twelve are considered a lethal strike.

12.04.2 Gun Placement

Guns are usually carried and fired in pairs so that their massive recoil force (a function of their incredible muzzle velocity) do not impart unnecessary yaw moment to the craft. When only one gun is carried or fired, it is normally on the aircraft's centerline for the same reason. If one gun is carried off the centerline, thrusters on the opposite side of the aircraft are fired to compensate for the yaw forces. This recoil is a force to contend with, and must often be compensated for with thrusters and/or antigravs at low speeds. Sustained firing of guns can actually stall an aircraft at lower speeds.

12.05 Defensive Systems

12.05.1 Force Fields vs. Deflector Shields

There is a great difference between a force field and a deflector shield. Deflector shields are used by starships and other space going vessels as a defense against physical and energy based weapons. They do this by altering the gravity level (along a plane perpendicular to the incoming force) to extreme levels, bending the energy waves away from the hull and completely destroying physical objects like missiles, etc. Obviously, doing this inside of a planet's atmosphere would be a bad thing.

This is why force fields are used by ground units and in-atmosphere aerospace craft. A force field is a barrier to incoming energy (kinetic, electromagnetic, heat, etc.) that distorts, absorbs or deflects that energy away from the unit generating the field. A sufficient amount of energy is capable of overcoming any force field, regardless of the source of that energy. This is why force fields are not as useful as deflector shields—a physical object traveling at high enough speeds carries a tremendous amount of kinetic energy, and may penetrate a force field. Against a deflector shield, that same object has absolutely no chance of penetrating. However, the technology to create and maintain a force field is much simpler and cheaper to produce than that used to create deflector shields, which is why force fields are so common. From the simple personal weather shelter to the active defense system on a Grav tank, the force field is extremely useful. And for that same reason, you will find them in use by the SFMC on many vehicles and equipment.

12.05.2 Armor

Armor is the last defense of any vehicle, after an enemy has penetrated any deflectors or force fields. All SFMC aerospace craft have various levels of armoring, from light to very heavy. For more on armor ratings and composition, see the Armor Branch Guidebook.

12.05.3 Countermeasures

As any modern combat vehicle in the 24th century, SFMC aerospace craft have a wide range of countermeasures designed to distract incoming threat weapons, destroy them, or confuse their launchers by defeating enemy sensors.

12.05.3.1 Electronic Countermeasures

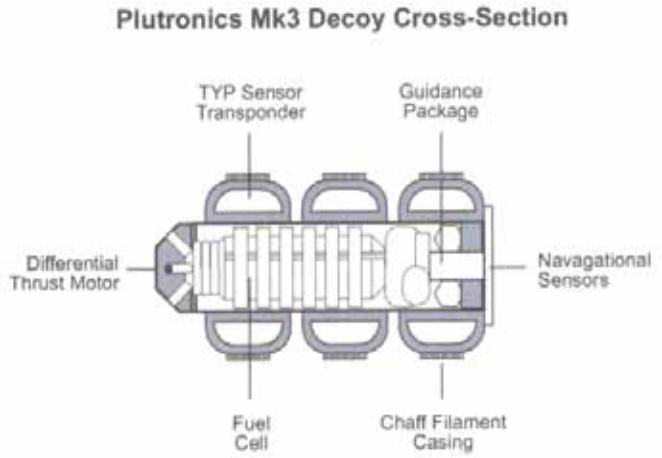
Nearly every craft in the Marine inventory employs one or more of three common types of Electronic Countermeasures (ECM). The first and most common is the broadband jammer. This broadcasts a signal across multiple bands in multiple directions to confuse any and all sensors in the area. It is an indiscriminate, "brute force" concept that can be highly effective at close range.

The second type of ECM is a pinpoint jamming beam that can be directed at one or more specific sensor sights. This method is advantageous when friendly and enemy sensors are in close proximity (as in

many Close Air Support scenarios) because you can jam enemy sensors without affecting friendly ones. However, the craft needs positive identification of all applicable enemy sensor emplacements for this method to be effective. Beam aiming and tracking is done by the computer.

Thirdly, some ECM units are capable of projecting a sensor echo to create the impression of more than one aircraft in the area. The projection can also be of any vehicle type up to a runabout, providing enemy antiaircraft with more tempting targets. This option has limited range and draws a great deal of power, however. And it is, of course, completely ineffective once within visual range.

12.05.3.2 Launched Countermeasures



SFMC Aerospace Craft carry three types of launched countermeasures: flares, chaff, and decoys. Flares are small incendiary devices capable of generating an intense amount of heat in order to distract or retarget thermal seeking threats. The flares' effectiveness with some aerospace craft is further enhanced by the craft's ability to kill its engine instantaneously for short periods. In this scenario the engine is killed simultaneously with the launch of the flare. The incoming threat then has only one target choice: the flare.

Chaff describes packets of small particles of various alloys, some charged and some not. These particles radiate in the same range of frequencies as most known enemy sensor packages, thus creating a large and confusing sensor return. If a threat weapon is guided by sensor return, chaff can be effective in distracting it from its objective, or at least covering the target's escape like an electromagnetic smoke screen.

Decoys are active launched countermeasures. Rather than simply drifting from the craft, a decoy can be preprogrammed with a course. (Some can be programmed to change course up to three times.) The most commonly used decoy is the Plutronics Systems' Mk3. It is a small unit with a solid propellant engine which burns extraordinarily hot for its size. This is the first way in which it serves as a decoy—to thermal sensors.

Just behind the nose of the Mk3 is a toroidal chamber tightly packed with chaff material on a series of microfilament lines. The Mk3 rotates as it is fired from its launcher (just like a bullet from a rifle) and the centrifugal force of the spinning deploys the chaff lines, thus creating a much larger sensor return than the launching craft. This can defeat conventional sensors and scanning systems of adversaries or threat weapons. The Mk3 also houses a toroidal sensor transponder around the nose which can create ghost impulse signatures, navigation beams, even false radio communications. This can actually present the quite-convincing profile of another craft.

Fitted around the body of the decoy are two more toroidal packages that go around the engine housing. Each of these also contain a chaff package and sensor transponder. These can be ejected from the main decoy body at intervals or with each course change, further complicating the sensor picture.

12.05.3.3 Signature Reduction Systems

12.05.3.3.1 EWD/AE-74 Short-of-Cloak Active Stealth Suite

This suite consists of four interconnected systems that work to deaden or reduce the electronic signature of any aerospace craft in order to make the craft stealthier. Even with the most dedicated and skilled power management, eliminating a ship's passive electronic signature is a losing battle; nothing short of a complete shutdown of all the ship's systems will completely solve the problem. While it is possible to marginalize the emissions by intelligent use of the systems in question, the three greatest producers of stray emissions are also the three systems that are in constant use: Propulsion, Power Generation, and Anti-Gravity systems.

In all three cases, the solution is as simple in concept as it is complex in application; White Noise

Generators. White Noise Generators don't eliminate offending electronic emissions but attempt to disguise or hide them in plain sight. The first part of the process is to attempt to hide the offending emissions; this is accomplished by transmitting an active signature the exact inverse of the emissions attempting to be hidden. This requires three of the four parts of the entire suite; one emissions generator for the Warp Nacelles and Anti-Gravity systems, Impulse Engines, and the Power Distribution Network. While every generator is identical in operation and design, the need to continuously produce the inverse emissions requires three separate systems. The same generator is used for both the Warp Nacelles and the Anti-Gravity system because when one system is active the other is normally powered down.

The second part of the process is to retransmit background noise or electronic static. This uses the fourth generator which is linked to the craft's passive sensor systems. The generator slightly amplifies and retransmits this random noise attempting to wash out the emissions given off by the other three generators and the offending systems. However, keeping all four generators in sync with each other and with the offending systems is a Herculean task even for the most advanced computer system, therefore some bleed through and imperfect synchronization occurs. These imperfections are marginal and rarely present a problem for skilled crews using good flight tactics and proper planning.

To better understand the concept of White Noise Generators, their imperfections, and effects the following exercise is offered. Place three people in a lighted room with white walls. Each person has a powerful flashlight with a colored filter; one red filter, one blue filter, and one yellow filter. When each person aims their flashlight at the wall; the red and blue colored lights will be clearly visible, and the yellow should be visible but barely in comparison to the red and blue lights. Now aim all three lights at the same place on the wall; when combined the lights produce a single point of white light, nearly lost on the wall of the lighted room. This is the result that the EWD/AE-74 is attempting to accomplish with electronic emissions; but there are two problems. One, the place at which all three lights are pointed is slightly brighter than the rest of the wall; this is the bleed through effect. This is the smaller problem since an uninformed third party observer might miss it on casual inspection or simply overlook it as an anomaly in the painting of the wall. The bigger problem is keeping all three lights pointed at the exact same place; this is the problem of synchronizing. Even with the coordinated efforts of all three people, occasionally a glimpse of red, blue, or yellow light is going to drift off the aim point. This, at best, attracts the observer's attention to the point of aim and at worst allows him to identify the exact placement of the lights. However if the three light bearers keep the point of aim as far from the observer as possible, or in unusual and incontinent locations it is possible to completely avoid detection. This last set of actions illustrates the need for good tactics and planning.

12.06 Flight Management Systems

FMSs are avionics and computer packages which help the pilot fly the plane. Modern aerospace craft cannot function without them. Most aircraft in the SFMC inventory are so inherently unstable (hence their maneuverability) that they cannot be flown without computer aid. Obviously, such systems have redundancy and reliability built-in.

12.06.1 Autopilot

An autopilot is the colloquial expression for a computer system which is completely capable of flying the craft on its own. Autopilots have come a long way since their introduction centuries ago when all they did was hold a preset course. Today's autopilots can conduct the entire flight following the filed flight plan, including approach and landing phases, launches, and mid-flight course corrections to compensate for weather or other unexpected factors.

Use of the autopilot relegates the pilot to the role of monitor, simply making sure that the computer does not vary from its programmed instructions. This flight mode can be suddenly and unexpectedly dangerous when problems occur—after long hours of relative inactivity, pilots can be caught short by emergencies, and must quickly overcome surprise and move into action.

Autopilots are frequently used for long transit portions of a mission, and may be used sporadically or only partially during the actual combat maneuvering phase. The autopilot can be easily overridden by the pilot, and this frequently becomes necessary in combat. Normally, the autopilot will not allow maneuvering, speeds, attitudes, etc. that are considered unsafe for the craft or crew. However, it is just such maneuvers that may be needed to avoid destruction by the enemy when the shooting starts.

12.06.2 Flight Control Computers

FCCs are "black boxes", usually in at least triple-redundant systems, which keep the plane trimmed for flight whether the pilot or autopilot flies the plane. The inherent instability of today's craft demand constant computer monitoring and correction of control surfaces, fuel states and positions, center-of-gravity changes due to fuel use or stores deployment, etc. FCCs see to these tasks hundreds of times a second and invisibly to the crew, calling their attention only when anomalies are found. This not only makes the craft flyable, but also reduces crew workload.

12.06.3 Safety Equipment

Safety is of paramount importance in peacetime and second only to mission accomplishment in war. Marine Aviators and aircraft have an outstanding safety record, in part due to some of the systems and equipment listed below.

12.06.3.1 ATC Transponder

All Federation aerospace craft are fitted with a transponder which helps to identify the craft to Air Traffic Control (ATC) sensors. The transponder provides an enhanced sensor return, making it easier for ATC to track the craft. It also repeats to ATC the aircraft's position, heading, speed and altitude (if applicable). Military aircraft are identified by their transponder code of SFMCXXXX where "XXXX" is the craft's fuselage number. Controllers, both military and civilian will address the craft as "Marine XXXX" unless the ATC is specifically the tactical ATC for the craft's military mission, in which case the pilot's callsign or squadron designation can be used.

12.06.3.2 CATS

CATS stands for Collision Avoidance and Traffic System. The CATS computer uses the aircraft's sensors to search for other air traffic and examine each craft's potential to pose a collision threat to the operating aircraft. It is aided a great deal in normal operations by reading other aircrafts' transponder signals. Of course, in wartime, such transponders are turned off or nonexistent and the craft's own sensors must suffice.

When traffic within a certain preset limit is detected, the pilot receives an aural advisory of "Traffic" followed by bearing, range, course, speed, and closure rate if applicable. When traffic presents a collision threat, the computer will provide a "resolution advisory" or RA which includes corrective action for the pilot to take. Corrective RA aural warnings include, "Climb, Starboard. Climb, Starboard"; "Descend, Descend"; etc. If no corrective action is needed, the computer may still issue a preventative RA such as "Monitor Vertical Speed". Once the threat aircraft is no longer a hazard, the computer will issue the message "Clear of Conflict."

The ranges and course/speed solutions used by CATS to determine threats are different for each aircraft, operating environment, speed, terrain under the aircraft, etc. When the autopilot is engaged, CATS will still issue warnings to keep the pilot apprised of the situation, but the autopilot will automatically follow the corrective RA instructions unless overridden by the pilot.

12.06.3.3 TAS

Similar in function to CATS, the Terrain Avoidance System uses the craft's sensors to avoid running into the ground when flying in planetary operations. TAS has two modes: TAS NAV and TAS GPW. In TAS NAV the system is used in navigating the aircraft. A course and speed are entered into the system along with a desired altitude "above ground level" (AGL). The TAS will then fly the aircraft at precisely that height above ground no matter how much the ground raises or declines under the plane. This can make for some real interesting rides, obviously. If the pilot must correct course and speed en route, the TAS will compensate automatically.

In TAS GPW mode, TAS functions only as a "ground proximity warning" device. In this capacity, TAS provides the pilot with aural alarms similar to CATS. At a predetermined level outside a normal landing cycle, TAS will warn the pilot, "Terrain, Terrain." If the craft continues to descend, the warning becomes more urgent with "Pull Up! Pull Up!" If the craft is configured for descent as in landing, but then deviates from the glidepath, TAS will advise "Glidepath Low. Add Power," or alternatively, "Glidepath High. Decrease Power." If the vertical speed is dropping too quickly, TAS will warn "Sink Rate. Sink Rate."

12.06.3.4 IFF Transponder

IFF stands for Identification Friend/Foe. This useful little device sends out encrypted signals, identifying the vehicle to which it is attached as "friendly" to other SFMC vehicles and Starfleet vessels. This

prevents mistaken identity problems that lead to shooting situations (known as “Blue on Blue” or more dispassionately “fratricide”).

Like starships, all SFMC aerospace craft have IFF transponders, as do all of its ground combat vehicles, such as tanks and artillery. Pirates have been known to modify their ATC transponder to mimic an IFF transponder, allowing them to send out signals identifying themselves as “friendly” to convoys and merchant vessels. The first warning the merchant gets is usually a hole blasted into her hull by the pirate vessel. For this reason, aerospace fighters are often dispatched to get a visual ID on a suspicious IFF transponder. (This is known as “carding the bogeys” by pilots).

12.06.3.5 Ejection Pods

All aerospace craft are equipped with ejection modules (called ‘Pods’ by the pilots). These allow for rapid emergency egress from the vehicle in case of danger. Linked to dedicated high speed processors, automatic sensors can detect certain types of danger and initiate an eject sequence automatically. This is especially useful if the pilot has been rendered unconscious through a blackout or other injury and the vehicle is in danger of crashing. The pods are “zero/zero” systems capable of safe ejection at zero altitude and zero ground speed in the rare case that problems erupt on the ground.

In the presence of a gravitational field, the pods use self-righting mechanisms, assuring a correct orientation during landing. Landing is accomplished by a single use antigrav module, smaller but similar to the ones used to drop Mecha from orbit. Free falling or descending via parachute (depending on type and presence of atmosphere) until they are 30 meters from the ground, the pod activates the AG module, which burns out as it lands the unit (relatively) gently. Pods remain pressurized with approximately 20 minutes of air, allowing a pilot time to completely seal his suit and activate his personal survival equipment. Once ready, the pilot has the option of discarding the pod by activating a manual release.

Pods are equipped with rudimentary thrusters for simple maneuvering when ejecting in space. However, for all intents and purposes the pod must simply drift until its ELT can be picked up by rescue crews. If extended periods in the pod are anticipated, the pilot can, with the computer’s help, place himself in artificial hibernation to reduce the amount of air he uses. While not totally suspended animation, demands on resources are greatly curtailed, and the computer can rouse the pilot when arriving help is detected.

12.06.3.6 ELT Unit

Each craft has a “black box” buoy mounted to the aft end of the ejection pod. This buoy will emit a repeating beacon on a subspace frequency reserved specifically for emergency only. This beacon can be used for locating the craft at a distance of 3 light-years for a period of 28 standard days. The beacon is not operational until activated by computer command (sensing the pilot incapacitated) or by ejection of the pod from the craft.

12.06.3.7 Flight Data Recorder (FDR)

The companion to the ELT is the FDR, an extremely durable sensor unit which records all communications, instrument readings, control settings and actuations, gun camera images, etc. If the vehicle should crash or otherwise meet an untimely end, the Flight Recorder will offer valuable information to investigators as to the cause.

The FDR is usually magnetically bonded to the ELT so that it can be found easily in a crash. The ELT/FDR unit can usually survive conditions and impacts that the surrounding craft cannot. Upon activation of the ELT, the FDR will conduct a burst download of its data to the controlling aircraft, ship, or base if the craft is under positive ATC. In this way, data can be recovered even if the ELT/FDR unit is eventually destroyed.

12.07 Miscellaneous Support Systems

12.07.1 Gun Camera

Actually a sophisticated and modular sensor, this item has retained the traditional name of “Gun Camera” throughout the history of Aerospace. Mounted in the nose of a fighter or attack craft, this sensor records the results of firing from the vehicle. This is useful for later review of performance and to confirm kills and successful attack runs with ordnance. There are usually two different cameras mounted along the centerline of the vehicle, one facing ahead (mounted below the nose) and one facing ahead and down (mounted in the top of the tail assembly).

12.07.2 Guidance Packages

12.07.2.1 FDS-89P Planetary Internal Guidance Package

The FDS-89P is a compilation system used to provide a flight crew with accurate, real-time positioning data for their craft. Using data garnered from the craft's flight data system, electro-gyroscopes, and certain passive sensor systems the FDS-89P then combines this data with any information on the area of operations uploaded before the mission. The result is that the flight crew always knows where they are on a planet no matter how out of the way or unusual that place might be. The system also has an interesting side job of being used as a planetary surveillance system. While most planetary surface surveys are accurate for hundreds of years, no matter how primitive the survey might be, drastic or unforeseen events can drastically change the landscape. The processor of this system will not become confused or fooled by a new or changed landscape but will instead record the differences and inform the crew of the inconsistency. Most of the time the inconsistency is minor and politely ignored by the crew until after the mission; however, in a few cases the system has revealed the use of elaborate camouflage.

One example is from the Dominion War. The Cardassians had built an underground staging facility on a planet about to be invaded by the Federation. The facility was carefully shielded and all above ground facilities were concealed into a mountain range. The deception was a complete success, all normal surface scans of the area failed to locate the facilities until a FDS-89P equipped Aerospace fighter noticed a 15 meter size difference between its stored information about the mountain in question and the readings from the sensor altimeter of the fighter. The inconsistency was noted by the pilot but promptly forgotten because of the needs of combat. The on-board computer system however flagged the data and, once the fighter was back at its base, forwarded it to the Squadron's Intelligence Section in order to update all other systems. A cartographer logged the change but then noticed that the last complete survey was conducted just the previous year. After talking to the Squadron Intelligence Officer the area was targeted for more extensive sensor scans and processing by Deception Experts. Shortly thereafter the facility was discovered and destroyed thanks to a curious cartographer and a simple positioning system that doesn't forget even the smallest thing.

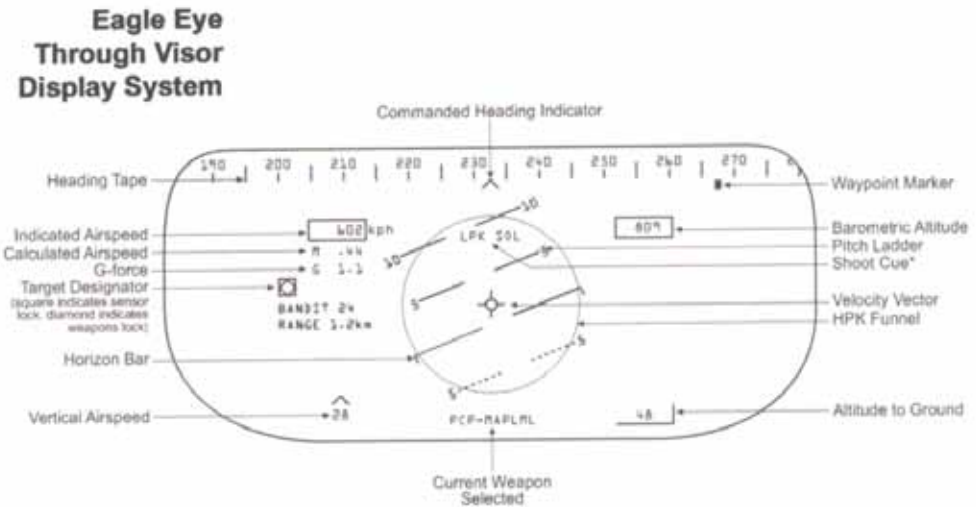
12.07.3 Sensor Systems

12.07.3.1 Optically Directed Intra-Wave Negotiator (ODIN) Visual Enhancement System

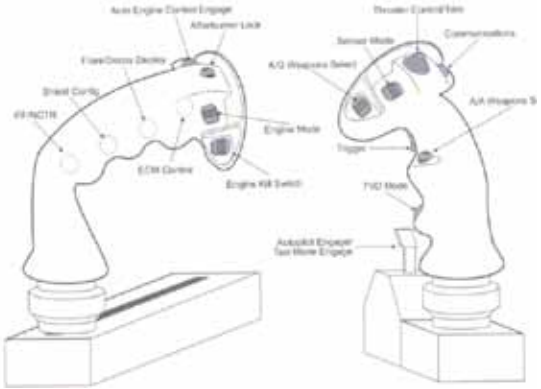
ODIN is a passive optical sensor system designed to assist visual navigation in poor lighting and limited visibility conditions. Standard visible light has a range of 380-750 nanometers, in comparison; the ODIN system has a detectable range of 5 nanometers to 5 millimeters. This means that the system can detect electromagnetic wavelengths from just inside the Soft X-Ray Radiation range to just into the Extremely High Frequency Radio Wave range. The system is coupled with a small computer core and can take the vast amount of wavelengths and composite them into a true to life picture. The end result is an image seemingly taken under the best lighting conditions.

However, the computer core is limited in the amount of information it can process at one time; as a result the system's optical receivers are only given a 90° cone of visibility. This limited visibility is augmented by turret mounting the receivers with a variable amount of movement. Typically the turret is given a 180° of movement in both the X- and Y-axis's. These limits prohibit the system from being mounted on every possible aerospace craft as a standard light amplification system. The ODIN is typically mounted on aerospace craft that require extensive periods of stealth operation such as Special Operations and Attack craft.

12.08 Heads Up Display



12.09 Typical Controls



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SECTION 13 - The SFMC Modular Vehicle System

In the early 2200s, the SFMC Armor branch fielded no less than 52 separate types of fighting vehicles. Logistics, resupply, and maintenance were growing nightmares. It became nearly impossible to keep an armored division on the advance. The maintenance crew for one tank was twice the size of the tank's crew!

Something had to give. As the problem reached its zenith, SFMC Armor planners introduced a bold new scheme: It was to be a system of standardization that would drastically simplify logistics, while still leaving the flexibility to assemble a highly-specialized mission force. It was dubbed the Modular Vehicle System (MVS).

Under the MVS, 52 vehicles were reduced to two basic chassis. Each chassis can accept a variety of weapons and propulsion modules that could configure the vehicle for a specific role. On the next mission, a simple swapping of modules makes the same vehicle ideal for a new role.
After a few false starts, the program eventually took off, and within a decade nearly all of the old fighting vehicles had been replaced by the new MVS vehicles. Today, MVS vehicles rule the SFMC battlefield. The system has proven so successful that planners have sought a way to implement the same type of system in Aerospace. The idea has had a hard time winning support in the aerospace community, however, and will likely not catch on anytime soon.

13.01 Performance Requirements

When it decided to implement the MVS, the Starfleet Materiel Command (which handles procurements for the SFMC with the input of SFMC Research & Development Command) also made another crucial decision: for the first time in one hundred years, all SFMC Armored Vehicles would have *identical* minimum performance standards. Finally, armored units would be able to truly maneuver as one, since all vehicles could negotiate the same terrain, maintain the same speed and altitude, and operate for the same period of time on one charge. Maximum performance of both chassis (with all their various and sundry module combinations) do vary greatly, but all configurations have the same *minimum* values.

13.01.1 Life Support

Since SFMC Armor often fight on non-Class M worlds, every vehicle must be capable of self-contained life support for 24 hours without re-gassing. Additionally, an overpressure NBC system in the vehicle can use outside air (when available) for life support. It scrubs the air of toxins (natural or of NBC origin) and maintains a slightly higher pressure inside the vehicle than outside it. This way open hatches can leak good air out, but won't let bad air in.

AFVs, IFVs and all IFV rear hulls have the capacity to "airlock" their crew compartments by suctioning out the interior atmosphere and storing it for later use, replacing the inside environment with the ambient so that the hatch can be opened without losing air. On crew reentry, the process is reversed.

13.01.2 Terrain Negotiation

On wheels or air-cushioned hover (ACH), all SFMC armored vehicles must be able to climb a slope of 75°, cross a transverse incline of 60°, and maintain minimum top speed of 120 kph (75mph). On antigravs (AGs), each vehicle must have a minimum NUCO of 100m, and a minimum top speed of 120kph (75mph). Both chassis can significantly better these figures to varying extents depending on their configuration, but the low minimums reflect the Corps' desire for them to be able to travel with other SFMC ground vehicles (most vehicles in the SFMC inventory can accomplish these basic values).

13.01.3 Range/Duration
All SFMC Armored vehicles must be able to maintain nominal operations for at least 24 hours without recharging. That being said, no one has yet discovered what "nominal operations" are. Sitting at minimal power in a revetment, an AFV can last for a week. On a full-speed movement-to-contact, 15 hours might be pushing it.

13.02 Camouflage & Stealth
The shallow angles that help deflect away hostile weapons can do the same for scanning beams; thus most armored vehicles are already pretty stealthy as far as their sensor return goes. However, all modern fighting vehicles make use of several systems to further reduce their observability. Sensor absorbent coatings (SACS), polychromatic coatings, exhaust scrubbers, camouflage, eloflage and holoflage all play a part.

13.02.1 Polychromatic Coating
Polychromatic paint contains pigmentation particles in all visible light frequencies that can be selectively polarized to match the surrounding terrain. The result is a chameleon effect, with the exterior of the vehicle blending almost seamlessly into it's surroundings. Sensors all around the vehicle feed information to the paint controller so that it can constantly update the paint to match changes in the background. If a tree is lazily swaying behind the vehicle, the paint on the front of the vehicle will reproduce the swaying trunk to the last millimeter. As the vehicle moves, the paint controller instantaneously changes the color pattern to match the surrounding terrain. This makes it quite difficult to see a vehicle, and even when seen, it can be nearly impossible to discern enough of the outline to determine the vehicle's type.

13.02.2 Holoflage
Holoflage works on nearly the same principal as polychromatic paint, but it produces an even more convincing illusion by projecting a hologram around the vehicle. Drawbacks to this system include a significant energy signature, and an inability to successfully update the hologram "on the fly" as the vehicle moves. Too many computing cycles are required to keep the hologram updated and there is usually a characteristic lag when the vehicle moves at top speed.

13.02.3 Eloflage
Polychromatic paint and holoflage may trick the eye, but they won't do a thing for other types of sensors. That's where eloflage and SACs come into play. Eloflage for a vehicle is a relatively simple affair. A permanently-installed eloflage netting is embedded into the armor topcoat along with the kelbonite crystals, with several connector leads located around the vehicle for linking into the eloflage system. For a complete description of how eloflage functions, see the Infantry Branch Guidebook.

13.02.4 SAC
Sensor-absorbent coatings are highly classified paint-like substances that are layered on underneath the polychromatic paint (which is invisible to radio-frequency energy and tachyonic scans). These coatings absorb an impressive range and intensity of active scanning beams, as well as serving double-duty by suppressing the natural energy signature generated by and inside the vehicle.

13.02.5 Exhaust Scrubbers
Heat generated by maneuvering thrusters can make a vehicle a glowing target on an infrared (IR) display. Despite the ability of eloflage and SACs to mask the heat of the vehicle itself, the thruster exhaust must leave this protective envelope in order to work. Therefore, all nozzles are fitted with exhaust scrubbers which combine gas diffusers with a supercooling element which reduces the temperature of the exhaust and minimizes its IR signature. Similar supercooling elements are placed on the underside of propulsion modules to help keep the traversed terrain from showing signs of friction or residual vehicle heat.

13.03 Control Systems

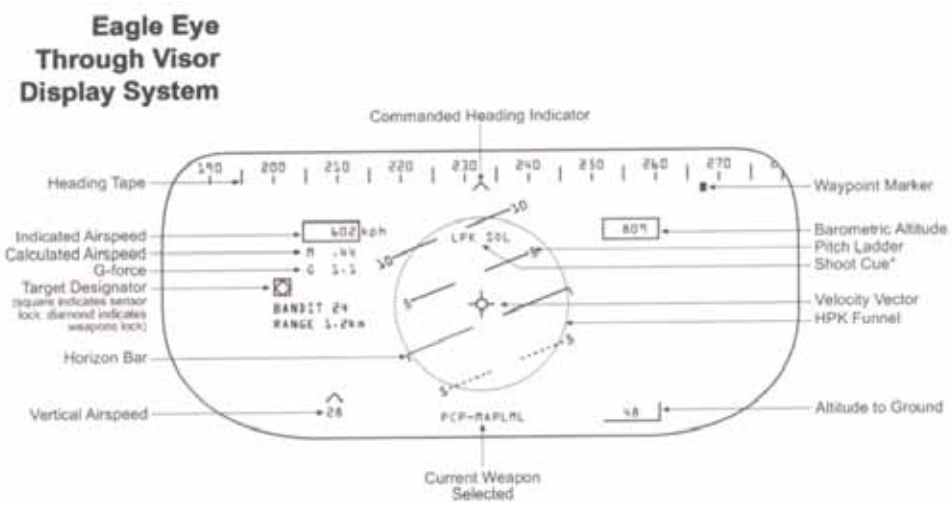
13.03.1 Control Inputs
The control of armored vehicles is very similar to aerospace craft—a stick-and-throttle approach is used for control inputs. Most critical vehicle controls can be operated via buttons or switches located on the sticks or throttle so that the crew needn't take their hands off the controls to select a weapon, designate a target, etc. This philosophy is known as HOTAS (Hands On Throttle And Stick).

The HOTAS units are interchangeable "plug-and-play" modules, and each crewmember has controls

appropriate for their species' extremities and number of digits, as well as for their dominant hand (right handed pilots use right stick and left throttle for instance). The crew can carry their own controls with them and then simply plug them in to the control ports on any vehicle they may operate. This is very helpful when crews must change vehicles.

Voice inputs are also used extensively. The vehicle's computer is set to recognize the crew's voiceprint when the vehicle is first started up (which saves confusion when incoming audio signals are loud enough to be picked up by the crew's microphones). During flight, the pilot and SysOp can ask the computer to do any number of tasks. For instance, when carrying a 72mm EMPW (see "200-Series Weapons Modules"), the pilot can ask the computer to load a specific type of round for the gun from the turret's ammo store.

13.03.2 Visual Displays: the HM-10B "Eagle Eye" TVD



Very little of the exterior environment can be seen through the emergency periscope of an armored vehicle. In fact, barely enough to maneuver the vehicle. So the vehicle's sensors, computer, and displays combine to form a virtual picture of what's outside. This gives crews unparalleled visibility while safely inside their vehicles.

The Through-Visor Display (TVD) is nothing new to the SFMC. Projecting critical performance and target data on a helmet visor has been around for 100 years (and for 300 years before it was projected on cockpit glass or into the operator's eye). However, the HM-10 series is the first TVD system to incorporate an important new feature: The ability to look "through" the vehicle.
This is accomplished by linking into the vehicle's sensors to produce a holographic image of what is outside the vehicle. When the pilot puts the TVD on virtual mode, he can then look completely around him and instead of seeing the interior of the vehicle, he can actually see what he is flying or driving over or through, along with all his standard navigation information projected onto the image.

Normally, this view is only given in a wide swath that runs below the overhead controls and LCARS displays and above the forward and side control panels. This way, the pilot can still see and operate his instruments. However, by depressing a thumb switch on the throttle, the pilot can increase his view to a complete picture all around. When he releases his thumb, the picture returns to the smaller swath so that he can see his instruments when he needs to.

The principle complaint made by this system's critics is that if your sensors are being jammed, or your electrical systems are down, you have only the tiny periscope to see through. This is true to some extent, but consider the following. While the system uses all the sensors to form its hologram, it can supply a simple two-dimensional picture using only the optical sensors. These can only be "jammed" by smoke and other such measures that would render the periscope just as useless. And if your electrical systems have failed to such an extent that you no longer have optical sensors or display capability, your vehicle is likely not in any shape to fight or maneuver anyway!

SECTION 14 - SFMC Armored Vehicle Systems

14.01 Vehicle Chassis

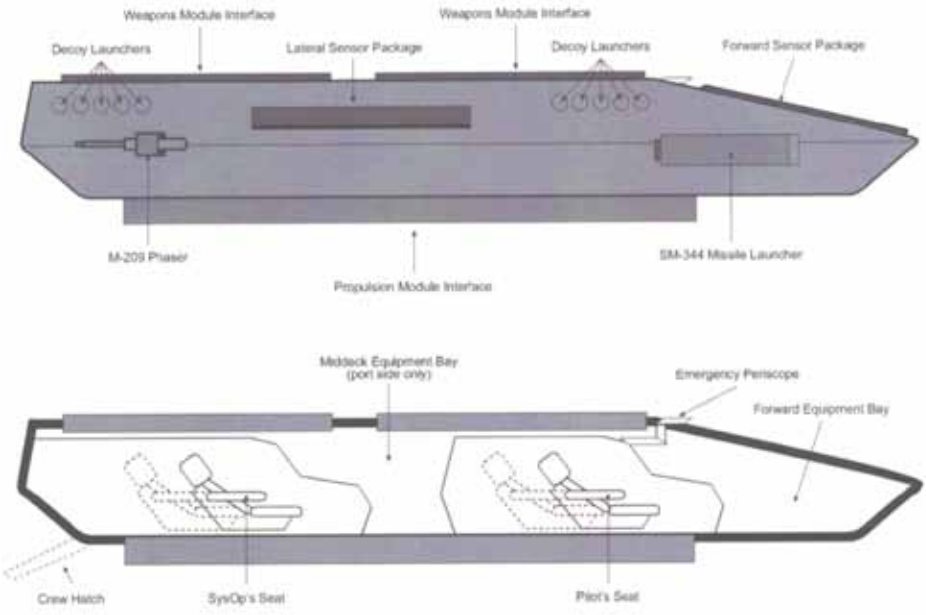
The two basic chassis of the SFMC Armor branch are perhaps unfortunately named, for they are not true chassis. Chassis implies that these items are merely basic frameworks when in fact they are complete vehicle hulls awaiting only propulsion and weapons pods. Nonetheless, the name has stuck.

Below are the standard performance characteristics listed for the two basic chassis. It should be noted that all speeds and altitudes are assumed to be under antigravity (AG) propulsion with no weapons modules fitted. Performance characteristics vary widely with propulsion and weapons load-out choices, so a fair estimate of vehicle performance can not really be given. However, the data is useful for comparing the performance of the two chassis to each other.

14.01.1 AFV/99 "Patton" Armored Fighting Vehicle Chassis

Purpose: Base chassis for tanks, self-propelled artillery, and armored recovery vehicles.
Physical Armor Rating: Overall hull structure rated at VH; frontal armor rated at 3VH (a triple-thickness of Very Heavy armor).
Force Field Rating: 6
Power Source: 4 charge packs
Propulsion: Interface for 100-series propulsion modules
Emergency Maximum Altitude (Class M planet): 500 meters
Normal Upper Ceiling of Operation (Class M planet): 100 meters
Maximum Speed: 960 kph (600 mph) empty on antigravs, other speeds vary with modules used.
Crew: (1) Pilot; (1) SysOp
Passengers: None
Weapons: Interface for two 200-series weapons modules; four external hardpoints for secondary weapon mounting (two port, two starboard).

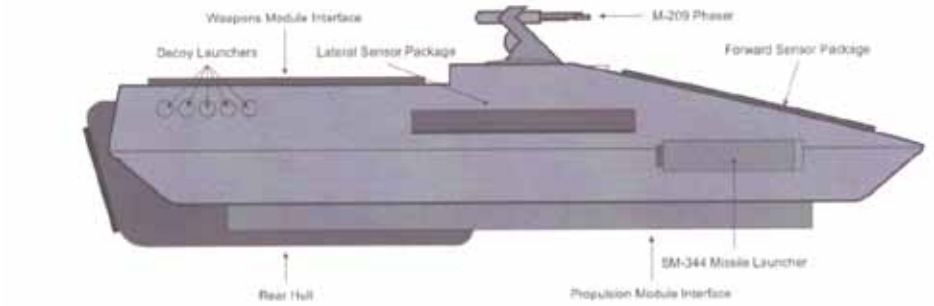
Overview: On antigravs, the Patton is fast and highly maneuverable, and has an extremely low profile (less than two meters high). These performance characteristics correspondingly degrade when thicker and slower propulsion modules are used, but even with the 126 combo pack (see below), it can still outmaneuver any other ground vehicle in the SFMC inventory.

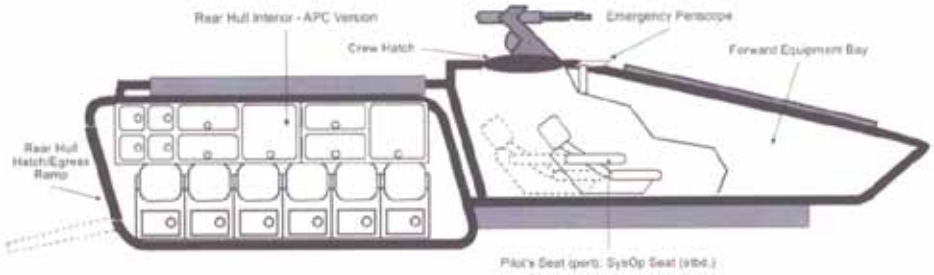


14.01.2 IFV/99 "Puller" Infantry Fighting Vehicle Chassis

Purpose: Base chassis for Infantry Fighting Vehicle and variants.
Physical Armor Rating: Overall hull structure rated at VH; frontal armor rated at 2VH (a double-thickness of Very Heavy Armor). Rear hull rated HV.
Force Field Rating: 5
Power Source: 2 charge packs
Propulsion: Interface for 100-series propulsion modules
Emergency Maximum Altitude (Class M planet): 500 meters
Normal Upper Ceiling of Operation (Class M planet): 100 meters
Maximum Speed: 800 kph (500mph)
Crew: (1) Pilot; (1) SysOp
Passengers: Up to 12 Light Infantry seated (APC Version)
Weapons: Interface for one 200-series weapons module; three external hardpoints for secondary weapon mounting (one port, one starboard, one top to port of crew hatch).

Overview: The Puller is the star of the SFMC's Modular Vehicle System. Not only are its weapons and propulsion modules interchangeable, but there are several variants of the rear hull as well, enabling the IFV to serve as APC, Command Post, Scout, Sensor Platform, or Ambulance. The rear hull can also be dropped into position by the IFV if tactical doctrine indicates. Using Sensor Platform rear hulls, one IFV can set up a series of listening stations in a couple of hours. Myriad combinations of equipment and operational doctrine exist.





14.02 IFV Rear Hull Variants

14.02.1 FV/RH-300 "APC" Armored Personnel Carrier

By far the most heavily used rear hull in the inventory, the APC provides combat seating for 12 light infantrymen. Two additional infantrymen could stand between the seats in an emergency, but no one could move until the rear hatch was opened. There are storage lockers on the walls for additional infantry equipment, and a fast-opening ramp for rapid entry and egress. The squad can fight from the IFV through firing ports in rear hatch. Like all rear hulls, floor armor is reinforced as an anti-mine measure.

14.02.2 FV/RH-303 "T'var" Command Post

Second in usage to the APC is the T'var CP. Nearly all armored units use this IFV variant for headquarters and C3 purposes. The CP hull seats three and contains battlefield surveillance and communications equipment. It also has an attachable kevlex awning and tent to provide area at the rear to set up commander meetings and briefings. The entire CP can be dropped into position as necessary to provide a stationary tactical command post.

14.02.3 FV/RH-305 "Scout" Reconnaissance Module

With a 305 installed, and IFV is officially considered a Scout IFV. With a Scout hull, the vehicle's sensor/computer rating comes up enormously. The hull is crammed with battlefield surveillance gear and long-range sensors to provide the Cavalry the eyes and ears to carry out their mission. The hull is normally manned by only one crewmember, but has seating for up to three.

14.02.4 FV/RH-306 "Seeker" Sensor Control Module

This hull actually has several sub-variants. It is designed to act as the control center for any of the specialized sensor suites that can be mounted on the IFV in place of its weapons module. They usually have seating for two as well as a microfusion generator to supply power to the sensor suite.

14.02.5 FV/RH-311 "Samaritan" Armored Ambulance

Medics assigned to armored units travel in specially equipped IFVs containing these rear hulls. The hull has seating for up to two medics, one ALSTTAR unit (see Medical Branch Guidebook) and space for up to two litters.

14.02.6 FV/RH-315 "Caisson" Artillery Ammunition Carrier

For the Caisson, the rear hull holds two artillery specialists who operate the autoloading systems (installed in place of the weapons module) to resupply artillery units. Artillery Batteries are usually assigned at least one platoon of ammunition carriers so that they can reload in the field. In the case of the Artillery Torpedo Launcher, one Caisson is dedicated to every launcher since the launch vehicle can carry no torpedoes save the one in the tube.

14.03 100-Series Propulsion Modules

Each chassis in the MVS can accept any of the following propulsion modules. Each takes electrical power from the chassis, but those with thrusters carry their own supply of thruster fuel.

14.03.1 FV/PM-100 Antigrav Module

This is an extremely low-profile propulsion unit which consists of six third-generation antigraviton generators distributed evenly under the vehicle, propulsion thrusters in the rear, and maneuvering thrusters around the perimeter. The high power-consumption of AG units means shorter chassis power duration when using AGs (minimum power duration for chassis is calculated on AGs).

14.03.2 FV/PM-110 Air Cushion Hover Module

This module operates in theory the same way the AG module does. However, the lift with the 110 is generated with a cushion of air trapped under the vehicle by a bullet-resistant kevlex skirt (propulsion is still accomplished with thrusters). The ACH module cannot provide anything like the lift of an AG module (NUCO with the ACH is only a meter or two), but the ACH requires much less power, and has a much lower energy signature than the AG. It is audibly louder than any other propulsion method, but provides a good all-terrain alternative when AGs are contraindicated.

14.03.3 FV/PM-122 Wheel Module

This module is relatively thick in comparison to the 100 and 110 modules, thus raising the profile of the fighting vehicle. However, in environments where AGs are ineffective, or a low-tech solution is called for, wheels still get the job done. On the 122, a series of eight wheels are used in an independent drive system. Extra-wide puncture-proof tires are used on the wheels which distribute weight nearly as evenly as tractor treads without the liabilities of tread maintenance and operation complexity. With treads, if one tread is damaged, the vehicle is incapacitated, but with the eight-wheel-drive system, the loss of up to three wheels on a side can be tolerated (and the tires can lose up to 45% of their tread surface and still

work). Performance will naturally be degraded under these conditions, but the vehicle can still maneuver and fight--thus increasing its chances of survival.

14.03.4 FV/PM-126 Combo Pack

This module is the thickest of all and results in the highest overall vehicle profile. The Combo Pack combines both a six-generator AG lift unit with an eight-wheel-drive wheel module, so that either option may be used depending on the tactical situation. A simple flip of a switch on the pilot's throttle changes from one propulsion method to the other. This module is a very popular choice for Armor units that will be deployed for an extended period as they can use low-energy-consumption wheels for transit and patrol, then lift to AGs for combat.

14.04 200-Series Weapons Modules

Each chassis can fit at least one 200 series module. The AFV can fit two. Not just any two, however: two turret-mounted weapons modules cannot be used simultaneously since the turrets would interfere with each other. Non-turreted weapons systems are designed to fit under rotating turret systems so there is no interference; however, the turret may have to be rotated into a specific position before all weapons can be launched from the secondary module. 250-series Artillery Modules take up both weapons module spaces on an AFV, so an artillery AFV fields only one main weapon system.

14.04.1 FV/WM-200 Heavy Phaser Module

This module consists of a turret-mounted Type V phaser emitter, roughly equivalent to the phaser mounted on most larger Starfleet shuttles. It is more than capable of dispatching vehicular and building targets up to the size of a typical Threat main battle tank.

14.04.2 FV/WM-202A 72mm EMPW

This turret-mounted Electromagnetic Projectile Weapon (EMPW) fires a 72mm-diameter round via a gauss cannon which quite resembles its chemically-fired ancestors. It can fire a variety of caseless projectile types including HIVAP, personnel suppression rounds, high-explosive, incendiary, and beacon/marking rounds. Also available are rounds which can deploy surveilance equipment and/or mines. Most rounds can be fitted with laser or tachyon guidance equipment for precision guidance to target.

14.04.3 FV/WM-205 Microtorpedo Launcher

The new 133mm-long microtorpedoes are finding many new applications. Originally introduced for light starships like the Danube-class runabout, these little gems have proven outstanding indirect-fire weapons on the planetary battlefield. A microtorpedo mortar is under development for the infantry, and the vehicle-mounted version has just been introduced in the Armor Branch.

As opposed to a turret-mounted single-barrel launcher, a vertical launch system is used where dozens of microtorpedoes are each mounted in single-use launchers scattered across the module (see picture). Each torpedo can be assigned its own target regardless of the initial direction its fixed launcher is pointing. This approach eliminates loading time and makes launcher failure a minimal problem. One drawback is the lower initial velocities of the microtorps due to the extremely short barrel length—this leads to longer overall time to target, making interception or interference more likely.

14.04.4 FV/WM-207B High-Volume MAPLIML

Colloquially known as the Big Mapper, this vertical launcher holds 18 standard six-round MAPLIML cannisters. The launcher is rigged so that it could fire all 108 missiles nearly simultaneously. Use of the standard Infantry missiles make ammunition logistics much easier, and means that Armor and Infantry units can actually resupply each other if necessary. In fact, entire six-round cannisters can be removed from the launcher, fitted with grips, and used by Infantry in a pinch. The Big Mapper can fire any of the standard Infantry mapper rounds, including the small-but-powerful matter/antimatter round. For more information on this weapon system, consult the Infantry Branch Guidebook.

14.04.5 FV/WM-250 Artillery Phaser Module, Beam

This phaser module is a beam emitter roughly equivalent in power to those found on smaller starships. This is a lot of power, but the occasions on which artillery can engage targets on a direct line of sight are even more infrequent than those for AFVs and IFVs. It is a good option to have, though.

14.04.6 FV/WM-251 Artillery Phaser Module, Pulse

This pulse phaser is nearly the size of the units used aboard Defiant-class ships. The layered phaser pulse they produce is harder for a target to disperse than a standard phaser beam, however, the beam wins out for long-term attrition by staying on target longer than the pulse can. Both have their applications on the modern battlefield.

14.04.7 FV/XWM-254 Artillery Disruptor Module

As the result of a limited technology exchange with the Klingon Empire, SFMC R&D Command was able to engineer a disruptor cannon suitable for use in the MVS. This large and ungainly weapon is quite powerful, but difficult to operate and maneuver. There are currently no further plans to adapt disruptor technology to SFMC armament until the bugs are worked out of this artillery system.

14.04.8 FV/WM-257 Artillery Torpedo Launcher

This full-size photon torpedo launcher is the single largest ordnance system deployed by SFMC ground forces. The launcher is so large in respect to the AFV chassis, that the entire vehicle must be repositioned in order to aim the launcher. Fortunately, torpedoes can be programmed to fly their own trajectory like missiles, so launcher aiming is of little concern. Torpedoes are transported in a separate IFV chassis modified for the task, and loading is accomplished through a purpose-built device which sits in the weapons-module spot on the IFV. This is obviously not a weapons system utilized lightly, and continued usage of matter/antimatter weapons this size against planetary targets can lead to severe environmental damage to the planet itself.

14.04.9 FV/WM-259 Artillery Missile System (AMS)

This steerable box launcher is capable of firing up to 28 guided missiles depending on the type of missile chosen. Through the use of launching and loading adaptors, a wide variety of Mecha and Aerospace missiles can be used, further simplifying ordnance logistics. With the wide choice of missiles, the AMS can be used as a field artillery piece or an air defense artillery piece.

The most popular missile used in the system at the moment is the new RL-55 “Dragon Fire” missile system originally developed for the A-78 Dragon Tactical Attack Craft. Twenty-eight Dragon Fires can be held in the box launcher. With the variety of warheads available for the RL-55, 28 missiles equals a pretty serious punch.

The AMS is reloaded by the use of a Caisson Artillery Ammunition Carrier which simply places another fully-loaded box launcher into position with its autoloading antigrav crane.

14.04.10 FV/WM-255 105mm Artillery EMPW

This is the largest EMPW in the SFMC inventory. It has rightly been accused of being a mass driver, and it is, in fact, capable of placing projectiles into low planetary orbit depending on the intensity of the local gravitational field. It has the ability to vary it’s muzzle speed through an impressive range of values, the largest of which is nearly 5000 meters/second. Few targets can withstand a constant barrage of fire from such a weapon without extensive energy drains on shields and/or forcefields.

14.05 400-Series Special-Purpose Modules

Special Purpose modules cover one or two 200-Series module interfaces depending on the unit. They provide extra mission capabilities for the Armor Branch.

14.05.1 FV/SPM-406 Vehicle Mounted Scanner Suite

This is the enormous scanner suite used by the Artillery for target range and fire effectiveness scanning. With this long-range scanning and sensor suite, targets can be located at extreme range, and the BDA of artillery fire can be determined. Line-of-sight limitations, even on these powerful units, mean that much

artillery fire is still directed and BDA'd by forward spotters, though. The 196 is mounted on an IFV chassis in place of the weapons module. The scanners in the suite include tachyon, radio-frequency (RF), infrared (IR), and microwave scanners; passive systems include optical, IR, RF, and gravitational sensors.

14.05.2 FV/SPM-418A Sensor Suppression System

These huge jamming units are mounted on an IFV chassis, covering the entire top of the unit (an access hatch is built into the system package so the IFV crew can get in and out of their vehicle). A special control module with two operators is installed in the IFV's rear hull along with a microfusion generator. The huge antenna and dedicated generator make for incredibly powerful jamming capacity to suppress enemy sensors and scanners while friendly vehicles and troops maneuver in the area. The unit is very effective when specific enemy frequencies are known and jammed. When broad-based jamming must be used, the signal also jams friendly units as effectively (more so in fact since it is closer to them), so care must be used. 88As are used by nearly all Fields of Service.

14.05.3 FV/SPM-420 Armored Recovery Vehicle

This unit covers both module spots on a Patton chassis, effectively converting the AFV into a powerful and well-protected tow truck. Armored vehicles break down... sometimes a lot. When they do, it is imperative that the Branch has the capacity to get them back to the maintenance section where repairs can be made. This is where the ARV comes in. It has a retractable boom crane for towing, but more frequently uses it's integral tractor beam. It also has a plow shield on the front to push vehicles off congested paths if necessary to keep traffic moving.

14.05.4 FV/SPM-421B Artillery Autoloader

These ammunition loaders can handle any missile or torpedo in the SFMC inventory with a variety of adapters and inserts. The rear of the unit holds the extra ammunition, and the loading mandibles fold over the front of the IFV. The exact mechanics of loading vary by weapons module type, but in all cases the loading process can be accomplished without anyone leaving their vehicle.

14.05.5 FV/SPM-430 Ammunition Carrier

This module is designed to fit on the rear module interface of an AFV and carry extra ammunition for the weapons module on the forward spot. This reduces the variety of weapons an AFV carries, but substantially increases the amount of ammunition that can be carried for the forward weapon. The 430 can hold rounds for the 72mm gun or missiles for the high volume MAPLIML based on the racks and adaptors fitted inside. The front of the module has an autoloader so that dismounting the vehicle for reloading the forward turret is not necessary.

14.06 Secondary Vehicular Weapons

14.06.1 M-249 Vehicle Mounted Compression Phaser

This phaser is for engaging primarily personnel or light vehicle targets off the main firing axis. Most AFVs and many IFVs have at least one M-249 mounted on a remotely-controlled firing gimbal. In terms of beam energy, the M-249 would be roughly equivalent to an Infantry crew-served phaser. It is the same unit found atop the Support Branch's Six-By cargo trucks.

14.06.2 P-626 15mm EMPW

Operated from the same firing gimbals as the M-249, the P-626 provides a projectile-weapon option for vehicle crews. The P-626 fires the same projectile types as the Infantry Branch's 15mm guns, again simplifying ordnance logistics. This weapon is designed to engage similar targets to the M-249, and both are secondary weapons systems usually operated by the SysOp.

14.06.3 SM-344C LI Missile Launcher

The same MAPLIML-variant launcher mounted on powered infantry suits can be mounted to hardpoints on the sides of AFVs and IFVs. The fixed firing arc means that success of the missile shot can be dependent on vehicle attitude. This adds 12 missiles of any MAPLIML type to the arsenal fielded by each vehicle—a real force multiplier on the battlefield.

SECTION 15 - Maritime Operations Vessels

15.01 Surface Vessels

Each of the three Categories of Maritime Combat Vessels is subdivided into one of four classifications and each of these fulfills a specific role in their specific battle-zone. These categories are similar for each battle-zone be it Surface, Semi-Submersible or totally Submersible. These are: Combatant Ships, Power Projection Ships, Amphibious Warfare Ships, and Auxiliary Support Ships.

15.01.1 Combatant Ships

There are three major classes of combatants: Arsenal Ships, Projector Mount Ships, and Command & Control Ships. Each in turn fills a special role in the surface battles, as well as having limited ability to cross into each other-s roles as well as serve in the other categories of surface ships.

Arsenal ships, like the Osprey Class Surface Combatant are primarily missile launching platforms. Each ship (normally of a trimaran design) will have a Type IV phaser projector, a vertical launch system with 25 launcher ports, and an aft-deck landing platform for two to four assigned aerospace craft for spotting, rescue, or transport. Each of the launcher ports is above a rotating magazine of 10 missiles with various warhead for mission varying from aerospace defense, to anti-submarine warfare, to anti-ship wave skimming missiles, to long range ballistic trajectory missiles that can attack land bases thousands of kilometers away. Once completely fired and empty, a missile magazine can be refilled in about 5 minutes, and each arsenal ship carries 4 full reloads for each magazine, providing each arsenal ship, 1000 missiles that can be completely fired off in less than one half hour.

Projector Mount Ships, like the Talon Class Surface Combatant replace the VLS with three to six bank of Phaser Projectors. These however are unlike the point-to-point beam weapons aboard starships. Instead each bank of projectors is composed of from one to six hundred mini projectors. Each Bank can produce the same total on target power as a Starship Type V mount, but with a greatly reduced range. However, since we are dealing with planetary surface, ranges of less than a thousand kilometers are still more than enough for the surface battlefield. The advantage gained however is immense. By varying the power to the individual projectors, beam “lobes” are created, as the beams combined along a vector model, they can actually “bend” the beam to go over the horizon, and act like a direct fired ballistic weapon. This allows the Projector Mount Ship to target enemy vessels that are not in a direct line of sight.

Finally the Command & Control Ship is the brain of a maritime flotilla. For surface engagements the SFMC uses the semi-submersible Bull-Halsey class. Equipped with reinforced shields, a vast array of communications equipments and an anti-aerospace 8 box launcher and a type IV Phaser projector, the Halsey can defend it self, while controlling the surface battle. It can also take control of up to 3000 different guided missiles in case the launching ships lose control, are damaged/sunk, or are already controlling more missiles than their computers can handle. In addition, the Halsey can remotely control up to 100 RPVs, which will be discussed next.

15.01.2 Power Projection Ships

This is essentially a one-type category. Remotely Piloted Vehicle carriers, have the ability to launch small, unmanned aircraft, each with a variety of payloads available to them. Some of the RPVs are equipped with a small fusion generator and a simple Type III Phaser Projector, for direct attacks on other vessels, ground attacks, or dog fighting against aerospace craft or enemy RPVs. Other RPVs are equipped with sub-munitions packages that can be either bombs/bomblets, or micro torpedoes/missiles. Finally there

are reconnaissance craft, with cameras, sensors, or even holo-projectors that can be used for scanning the enemy, or projecting false images unto their scanners. The standard carrier has twenty-four control stations for the RPVs, while the larger carriers like the Osprey Coastal Air Superiority Carrier has control stations and launch capabilities for ninety-six different RPVs at one time. While each of these sophisticated craft are a large investment of resources, their loss is inconsequential compared to the lives save by having their pilots remote from the craft in case of fatal damage to that craft.

15.01.3 Amphibious Warfare Ships

The Surface version of this type of ship is the Crocodile Class Amphibious Warfare Ship. A very shallow draft ship, able to approach the shore with depths of only three meters, and still maintain maneuverability the Crocodile can also work in the deep ocean. With a docking well that can be flooded and hold up to six LCAC (Landing Craft Air Cushion) and a landing platform for four aerospace craft. The Crocodile is as a type one of the most traditional of maritime Marine ships. Able to transport 300 marines and twenty armored vehicles from fifteen kilometers from the shore, to that shore in less than ten minutes. In addition to twin type IV Phaser Projectors, the Crocodile is also equipped with six 105mm mortars that can throw smoke, illuminations or even explosive rounds all the way to the shore, and are design to walk rounds ahead of the landing forces all the way to the shore.

15.01.4 Auxiliary Support Ships

Auxiliary Support Ships come in several different types, fulfilling different roles for theMaritime Branch needs. Underway Replenishment Ships, Supply Ships, Repair Tenders, Hospital Ships, Recovery Ships, and even Dredges and Tugs are part of this group. Since perfected by the US Navy during and after Earth's World War II, nothing has increased the mobility and range of the Maritime Branch then the Underway Replenishment. These ships once known as Combat Oilers or Fast Combat Support Ships, are built both for speed, and for transporting fuel and supplies over to the pure combat ships, while sailing at speeds of 25-100 knots at distances of a mere 20 to 40 yards. The Replenishment ships will sail into a flotilla, re-supply it, fall back to the supply ships outside of the combat zone, re-supply themselves and then catch back up with the combatants and start the process over again. The supply ships are built for endurance and cargo capacity and will remain 100's of kilometers outside of the combat zone usually in convoys protected by Arsenal Ships and Submarines. The Repair Tenders will likewise remain in the protected convoy, but will then steam to the flotilla after a battle, to begin "onsite" repairs of the ships. The Hospital Ships unfortunately have the same task but for the wounded maritime marines. Specialty Ships like Recovery Ships will work to extract a sunken vessel from the sea bottom, while Dredges work on opening or deepening channels at friendly ports, while tugs help escort/nudge deep draft vessels to the correct piers in those ports.

15.02 Semi-Submersible Vessels

15.02.1 Combatant Ships

As with Surface Vessels, Semi-Submersible vessels are divided into Combatant Ships, Power Projection Ships, Amphibious Warfare Ships, and Auxiliary Support Ships. Combatant Ships Like the Surface Class there are three major classes of combatants: Arsenal Ships, Projector Mount Ships, and Command & Control Ships. Each in turn fills a special role in the surface battles, as well as having limited ability to cross into each other's roles as well as serve in the other categories of surface ships.

Arsenal ships, like the El-Sharak Class Semi-Submersible Combatant are primarily missile launching platforms. Each ship (normally of a single hull design) will have a Type IV phaser projector, a vertical launch system with 25 launcher ports, and an aftdeck landing platform for two to four assigned aerospace craft for spotting, rescue, or transport. Each of the launcher ports is above a rotating magazine of 10 missiles with various warhead for mission varying from aerospace defense, to anti-submarine warfare, to anti-ship wave skimming missiles, to long range ballistic trajectory missiles that can attack land bases thousands of kilometers away. Once completely fired and empty, a missile magazine can be refilled in about 5 minutes, and each arsenal

ship carries 4 full reloads for each magazine, providing each arsenal ship, 1000 missiles that can be completely fired off in less than one half hour.

Projector Mount Ships, like the El-Cid Semi-Submersible Combatant replace the VLS with three to six bank of Phaser Projectors. These however are unlike the point-to-point beam weapons aboard starships. Instead each bank of projectors is composed of from one to six hundred mini projectors. Each Bank can produce the same total on target power as a Starship Type V mount, but with a greatly reduced range. However, since we are dealing with planetary surface, ranges of less than a thousand kilometers are still more than enough for the surface battlefield. The advantage gained however is immense. By varying the power to the individual projectors, beam “lobes” are created, as the beams combined along a vector model, they can actually “bend” the beam to go over the horizon, and act like a direct fired ballistic weapon. This allows the Projector Mount Ship to target enemy vessels that are not in a direct line of sight.

Finally the Command & Control Ship is the brain of a maritime flotilla. For semisubmersible engagements the SFMC uses the semi-submersible Bull-Halsey class C&C ship. Described about the Bull-Halsey is equipped with reinforced shields, a vast array of communications equipments and an anti-aerospace 8 box launcher and a type IV Phaser projector, the Halsey can defend it self, while controlling the surface battle. It can also take control of up to 3000 different guided missiles in case the launching ships lose control, are damaged/sunk, or are already controlling more missiles than their computers can handle. In addition, the Halsey can remotely control up to 100 RPVs, which will be discussed next.

15.02.2 Power Projection Ships

This is essentially a one-type category. Remotely Piloted Vehicle carriers, have the ability to launch small, unmanned aircraft, each with a variety of payloads available to them. Some of the RPVs are equipped with a small fusion generator and a simple Type III Phaser Projector, for direct attacks on other vessels, ground attacks, or dog fighting against aerospace craft or enemy RPVs. Other RPVs are equipped with sub-munitions packages that can be either bombs/bomblets, or micro torpedoes/missiles. Finally there are reconnaissance craft, with cameras, sensors, or even holo-projectors that can be used for scanning the enemy, or projecting false images unto their scanners. The standard carrier has twenty-four control stations for the, while the larger carriers like the Osprey Coastal Air Superiority Carrier has control stations and launch capabilities for ninety-six different RPVs at one time. While each of these sophisticated craft are a large investment of resources, their loss is inconsequential compared to the lives save by having their pilots remote from the craft in case of fatal damage to that craft.

15.02.3 Amphibious Warfare Ships

The Semi Submersible version of this type of ship is the Alligator Class Amphibious Warfare Ship. Sister class to the Crocodile is almost as shallow of a draft ship, able to approach the shore with depths of only five meters, and still maintain maneuverability the Alligator can also work in the deep ocean. With a docking well that can be flooded and hold up to six LCAC (Landing Craft Air Cushion) and a landing platform for four aerospace craft. The Alligator is as a type one of the most traditional of maritime Marine ships. Able to transport 300 marines and twenty armored vehicles from fifteen kilometers from the shore, to that shore in less than ten minutes. In addition to twin type IV Phaser Projectors, the Alligator is also equipped with six 105mm mortars that can throw smoke, illuminations or even explosive rounds all the way to the shore, and are design to walk rounds ahead of the landing forces all the way to the shore.

15.02.4 Auxiliary Support Ships

The major new class of Auxiliary in the semi-submersible family of vessels is the Aerie Class, Aerospace Tender. With only two meters of freeboard above the surface, this moving spaceport provides up to twenty-four standard sized Aerospace Craft a home on the planets surface. In situations where there is no land, or no ready landing zone, the Aerie Tender can provide landing, support, refuel/supply, and rest for the pilots of Aerospace Craft which have had to be left behind without orbital support. Needless to say, few AE Pilots choose to go to an aquatic planet battle zone without an Aerie Tender nearby.

15.03 Submersible Vessels

As with Surface Vessels and Semi-Submersible vessels are divided into Combatant Ships, Power Projection Ships, Amphibious Warfare Ships but not Auxiliary Support Ships. Extended operations that must remain completely remain underneath the surface preclude underway replenishments by the their very nature.

15.03.1 Combatant Ships

Unlike the Surface Class there is only one major class of combatants and that is the fully submersible Arsenal Ships or Fast Attack Submarine. Because of the underwater nature of this family of vessels Projector Mount Ships are nearly useless, and the Command & Control roles is relegated to the Power Projection classes.

The Arsenal submarines, like the Shark Class Fully Submersible Cruiser are primarily missile/torpedo launching platforms. Each ship (of a organic hull design) will have two Type G close in defense phaser projectors, a vertical launch system with 16 launcher ports, and a torpedo launch tube system with 8 tube doors forward and aft. Each of the launcher ports/doors is above/alongside a rotating magazine of 10 missiles/torpedoes with various warhead for mission varying from aerospace defense, to anti-submarine warfare, to anti-ship wave skimming missiles, to long range ballistic trajectory missiles that can attack land bases thousands of kilometers away. Once completely fired and empty, a missile magazine can be refilled in about 5 minutes, and each arsenal ship carries 4 full reloads for each magazine, providing each arsenal ship, 960 missiles that can be completely fired off in less than one half hour.

15.03.2 Power Projection Ships

This is essentially a two-type category. Like their surface brethren there are Remotely Piloted Vehicle carriers, which have the ability to launch small, unmanned aircraft, often called “Whiskers”, each with a variety of payloads available to them. Some of the RPVs are equipped with a small fusion generator and a simple Type III Phaser Projector, for direct attacks on other vessels, or dog fighting against enemy RPVs. Other RPVs are equipped with sub-munitions packages that are micro torpedoes/missiles. Finally there are reconnaissance craft, with cameras, sensors, or even holo-projectors that can be used for scanning the enemy, or projecting false images unto their scanners. The standard carrier has twenty-four control stations for the, while the larger carriers like the Remora Deep Sea Superiority Carrier has control stations and launch capabilities for seventy-two different RPVs at one time. While each of these sophisticated craft are a large investment of resources, their loss is inconsequential compared to the lives save by having their pilots remote from the craft in case of fatal damage to that craft. The other type is the long range Ballistic Missile Platform, often referred to as “Boomers” capable of carrying up to 48 Missiles with up to 25 thousand kilometers of range, and each with a capability of 20 Multiple Independent Re-entry vehicles, giving the Boomer the ability to destroy 960 different targets, on the other side of most Class “M” type planets. Boomers also serve double duty as the Command and Control ships for the undersea flotillas. For submersible engagements the SFMC will use the Bart Mancuso class of Boomers, which are equipped a vast array of communications equipment and a sophisticated passive sensor system. The Bart Mancuso can defend itself, attack the enemy anywhere on the planet, while controlling the sub-surface battle. It can also take control of up to 2000 different guided missiles in case the launching ships lose control, are damaged/sunk, or are already controlling more missiles than their computers can handle.

15.03.3 Amphibious Warfare Ships

The Submersible version of this type of ship is the Gharial Class Amphibious Warfare Ship. Sister class to the Crocodile/Alligators, it is a much smaller and very low draft vessel, with only four meters of total height, and like most true submarines having deep ocean capability. An internal a docking well that can be flooded will hold up to eight twelve man mini-subs to deliver either ½ of a Marine Company to the shore, or two special operations units anywhere where there is a beach, with minimal depth with 5 kilometers. Unlike their larger brothers, the Gharials exist to deliver their payload of marines to the target zone, quietly, silently, and stealthily as possible.

SECTION 16 - MECHA Equipment

16.01 Weapons

For MECHA mounted weapons, please see Section 3.05 - MECHA Mounted Weapons.

16.02 Other Systems

Chameleon Skin Stealth System

The stealth system was a two-part project at Starfleet Tokyo R&D. It produced two separate components to the system. The first component, providing the majority of the stealth capability, is the chroniton field emitter device. This device is essentially a “Poor Man’s Cloak”, designed drastically different from a true chroniton-based cloaking device like the Romulans’ and Klingons’, but achieves the same, if somewhat lessened effect. The field only is capable of masking it from passing sensor scans, but not the naked eye. A starship also has to have multiple arrays placed on the outside of the hull to have an effective screen against sensors.

If someone does a more piercing scan in the direction of a ship bearing the stealth system, it may look anomalous, but would still look like normal background radiation. To further deter someone from discovering the ship, a remarkable silicon-based biological compound coats the ship’s hull, laced with special electrodes. These electrodes coax the compound to change its color. The ship’s computer can control the skin into matching its surrounding colors quite well. The Tokyo eggheads have dubbed the substance “Photo-adaptive Hull Coverings”, but the crews of ships equipped with the stealth system simply call it “Chameleon Skin”. The material must completely coat the ship, so any ship with it must be specially fitted to have deployable coverings over the exposed areas on the nacelles, over the deflector, over the lifeboat pods, and over all the windows.

Blowout Panels

Blowout panels are used to mitigate the damage that could be caused by an ammunition explosion on a Mecha. When ammo explodes in an area protected by blowout panels, the force of the explosion is blown out through specially designed panels directing the explosion away from critical systems.

Advanced Fire Control System

The Advanced Fire Control System improves the accuracy of standard missile launchers. Mounted near the missile launcher, the system locks on the target, fires the missiles, and provides constant course correction data to the missiles in flight.

Advanced Communication System

The main purpose of the Advanced Communications System is to help unit Commanders coordinate activities with all Mechas in their command. This allows any Mecha unit to also fire it’s weapons based off of the nearest Mecha’s targeting system, with the standard restrictions (line of sight, max/min ranges, etc).

Adamantium

SFMC R&D had developed a special type of “muscle” that becomes exceedingly strong when a Mecha unit is running hot. If a Mecha is running at 9 or greater on it’s Heat Index, the following effects take place:

- Damage is doubled for punch, kick, and club-like attacks.
- The Mecha’s lifting ability is doubled as well.
- The Mecha’s walking speed is increased by one, and the running speed is alos raised based on the new waling speed.

16.03 First Generation Mecha

Mecha Name:	Firefly
Mecha Designation Code:	FLR-1
Weight Class:	Light
Mass Displacement:	15 tons
Primary Purpose:	Recon
Secondary Purpose:	Forward Observer
Crew:	1 (Pilot)
Weapon Systems:	Phaser, Pulse (Center Torso) Phaser, Pulse (Center Torso) Autocannon, Light (Turret, above cockpit) Multi-frequency Spotting Laser (Turret, above cockpit) Flechette Pod (Left Leg) Flechette Pod (Right Leg)
Overview:	The Firefly was the smallest of the First Generation Mecha, and the fastest. Its legs were designed to allow this Mecha to lower it-self almost to the ground. This gave it the ability to use almost anything as cover, while providing the smallest possible target for the enemy. It acted as a forward observer, using its laser and/or autocannon to designate targets for missiles or other artillery weapons. The autocannon was almost always loaded with API ammunition, which would occasionally start fires in and around the target.
Mecha Name:	Cueball
Mecha Designation Code:	CLR-1
Weight Class:	Light
Mass Displacement:	20 tons
Primary Purpose:	Recon
Secondary Purpose:	N/A
Crew:	1 (Pilot)
Weapon Systems:	Phaser, Pulse (Center Torso) Phaser, Pulse (Center Torso) Autocannon, Light (Turret, above cockpit) Flechette Pod (Left Leg) Flechette Pod (Right Leg)
Overview:	This Mecha took its name from its distinctive spherical torso and lack of arms. Its shape would allow its armor to have the maximum deflective effect on incoming missiles, while its limited weapons were intended solely for defensive purposes. This Mecha's main advantage was speed, which helped it complete it's mission of gathering intelligence data and return to report it.

Mecha Name: Falcon

Mecha Designation Code: FLR-2

Weight Class: Light

Mass Displacement: 30 tons

Primary Purpose: Recon

Secondary Purpose: Short Range Fire Support

Crew: 1 (Pilot)

Weapon Systems:
Plasma Gun (Left Arm)
Plasma Gun (Right Arm)
Phaser, Pulse (Center Torso)
Phaser, Pulse (Center Torso)
Flechette Pod (Left Leg)
Flechette Pod (Right Leg)

Overview: This Mecha was designed to give short range fire support to its fellow platoon members. The arms had been replaced with a pair of plasma guns, giving this Mecha a tremendous punch for it's size. Although the plasma guns are not very accurate, they are capable of severely damaging electronic equipment and starting large fires in the impact area. The standard pulsed phasers were for defensive use. Falcon pilots were more aggressive than most other Recon Mecha pilots, using their Mecha's good speed and maneuverability to close the range to a target and then hammering it with plasma fire.

Mecha Name: Crossbow

Mecha Designation Code: CLR-2

Weight Class: Light

Mass Displacement: 30 tons

Primary Purpose: Recon

Secondary Purpose: Medium Range Fire Support

Crew: 1 (Pilot)

Weapon Systems:
Rocket Launcher, Light (Left Arm)
Rocket Launcher, Light (Right Arm)
Phaser, Pulse (Center Torso)
Phaser, Pulse (Center Torso)
Flechette Pod (Left Leg)
Flechette Pod (Right Leg)

Overview: This Mecha was designed to provide medium range fire support to its fellow Recon Platoon members, as well as perform standard reconnaissance duties. A pair of Rocket Launchers, which could elevate to 90 degrees from the horizontal, but had only a 15 degree arc of lateral movement replaced its arms. When working as part of a platoon mission, the Crossbow stood behind the other Mechas, ready to cover their retreat with a barrage of rockets. It's twin pulsed phasers were standard on all Recon Mecha, and were intended primarily for defensive use.

Mecha Name:	Bulldog
Mecha Designation Code:	BMS-1
Weight Class:	Medium
Mass Displacement:	40 tons
Primary Purpose:	Striker
Secondary Purpose:	N/A
Crew:	1 (Pilot)
Weapon Systems:	Autocannon, Medium (Left Torso) Autocannon, Medium (Right Torso) Phaser, Beam (Left Arm) Phaser, Beam (Right Arm) Phaser, Pulse (Left Arm) Phaser, Pulse (Right Arm) Flechette Pod (Left Leg) Flechette Pod (Right Leg)
Overview:	This was the standard medium Mecha, with a good mix of ballistic and energy weapons. It had good armor and maneuverability, which allowed it to perform any mission it was assigned - from fire support to striker missions, the Bulldog was tough enough to handle it.

Mecha Name:	Nemesis
Mecha Designation Code:	NMS-1
Weight Class:	Medium
Mass Displacement:	40 tons
Primary Purpose:	Striker
Secondary Purpose:	Precision Fire Support
Crew:	1 (Pilot)
Weapon Systems:	Fusion Beam (Left Arm) Autocannon, Medium (Right Torso) Phaser, Beam (Right Arm) Phaser, Pulse (Right Arm) Tac Missile Launcher, Medium (Left Torso) Tac Missile Launcher, Medium (Right Torso) Flechette Pod (Left Leg) Flechette Pod (Right Leg)
Overview:	The Nemesis was created as a precision fire support Mecha for Striker Platoons, although it often would see duty in other areas. Its rate of fire was not high, and it carried only 40 missiles, but the accuracy of these missiles would make up for its lack of endurance.

Mecha Name: Brutus

Mecha Designation Code: BMS-2

Weight Class: Medium

Mass Displacement: 50 tons

Primary Purpose: Striker

Secondary Purpose: N/A

Crew: 1 (Pilot)

Weapon Systems:
Phaser, Beam (Right Arm)
Phaser, Beam (Right Arm)
Phaser, Pulse (Left Arm)
Phaser, Pulse (Left Arm)
Plasma Gun (Center Torso)
Flechette Pod (Left Leg)
Flechette Pod (Right Leg)

Overview: The Brutus was a modified Bulldog, having removed its ballistic weapons and exchanged them for more energy based weapons. This Mecha was intended for prolonged combat missions, where ammunition resupply would pose a problem. One unique feature of the Brutus was the installation of jump packs which would allow it to "jump" up to 150 meters in distance or 60 meters upwards. These jump packs were antigravity unit's that were mounted in the Mecha's rear center torso, near the center of gravity. They would generate large amounts of heat, however, so their use was limited when combined with firing the Mecha's energy weapons.

Mecha Name: Talon

Mecha Designation Code: TMS-1

Weight Class: Medium

Mass Displacement: 60 tons

Primary Purpose: Striker

Secondary Purpose: N/A

Crew: 1 (Pilot)

Weapon Systems:
Gauss Cannon (Right Arm)
Phaser, Pulse (Left Arm)
Phaser, Pulse (Left Arm)
Phaser, Pulse (Left Arm)
Phaser, Pulse (Left Arm)
Rocket Launcher, Medium (Left Torso)
Rocket Launcher, Medium (Right Torso)
Flechette Pod (Left Leg)
Flechette Pod (Right Leg)

Overview: The Talon was one of the most heavily armed Mecha in this weight class. Its ballistic weapons gave it a solid long range punch, and its four pulsed phasers could do terrific damage at short range. Ammunition expenditure were a problem for all ballistic weapon systems, however, so the Talon pilot had to be careful of how he used his ammunition.

Mecha Name: Brahma

Mecha Designation Code: BHA-1

Weight Class: Heavy

Mass Displacement: 70 tons

Primary Purpose: Striker

Secondary Purpose: N/A

Crew: 1 (Pilot)

Weapon Systems:
Gauss Cannon (Right Arm)
Autocannon, Medium (Left Arm)
Autocannon, Medium (Right Arm)
Phaser, Pulse (Left Torso)
Phaser, Pulse (Left Torso)
Phaser, Pulse (Right Torso)
Phaser, Pulse (Right Torso)
Plasma Gun (Center Torso)
Flechette Pod (Left Leg)
Flechette Pod (Right Leg)

Overview: The standard Heavy Mecha, it was capable of taking on anything on the battlefield. The Brahma was to the Heavy weight class what the Bulldog was to the Medium weight class. It had better than average speed for it's weight class, was almost as fast as the best Medium Mecha, which made it well suited to it's role as a Striker.

Mecha Name: Quarrel

Mecha Designation Code: QHF-1

Weight Class: Heavy

Mass Displacement: 70 tons

Primary Purpose: Air Defense

Secondary Purpose: Fire Support

Crew: 2 (Pilot, Systems Officer)

Weapon Systems:
Tac Missile Launcher, Light (Left Arm)
Tac Missile Launcher, Light (Left Arm)
Tac Missile Launcher, Light (Right Arm)
Tac Missile Launcher, Light (Right Arm)
Tac Missile Launcher, Medium (Left Torso)
Tac Missile Launcher, Medium (Right Torso)
Gauss Cannon, Rapid Fire (Left Torso)
Gauss Cannon, Rapid Fire (Right Torso)
Plasma Gun (Center Torso)
Flechette Pod (Left Leg)
Flechette Pod (Right Leg)

Overview: This Mecha was an Air Defense unit, a function which it performed well. This Mecha looked similar to the Tsunami, in that it's arms have been removed and replaced with missile launchers. The Systems Officer sat above and behind the pilot, which allowed him an unrestricted view of incoming Aerospace threats. He controlled the missile systems normally, but had the ability to override the pilot's control of the other weapons if it became necessary.

Mecha Name: Thunder

Mecha Designation Code: THA-1

Weight Class: Heavy

Mass Displacement: 75 tons

Primary Purpose: Striker

Secondary Purpose: Fire Support

Crew: 1 (Pilot)

Weapon Systems:
Gauss Cannon (Left Arm)
Gauss Cannon (Right Arm)
Tac Missile Launcher, Light (Left Torso)
Tac Missile Launcher, Light (Right Torso)
Tac Missile Launcher, Medium (Left Torso)
Tac Missile Launcher, Medium (Right Torso)
Phaser, Pulse (Center Torso)
Phaser, Pulse (Center Torso)
Flechette Pod (Left Leg)
Flechette Pod (Right Leg)

Overview: This design was intended to give a Striker Platoon some organic fire support. However, after fielding it was discovered that it often would run out of ammunition in prolonged campaigns. Rather than redesign the Mecha or pull it from service, a different Mecha under development was altered to create a companion unit (the Lightning). These two Mecha were always paired together in a platoon, when prolonged combat endurance was a possibility. The Thunder was sometimes assigned to Air Defense Platoons, because of it's excellent volume of tactical missile fire against Aerospace fighters.

Mecha Name: Lightning

Mecha Designation Code: LHA-1

Weight Class: Heavy

Mass Displacement: 75 tons

Primary Purpose: Striker

Secondary Purpose: Fire Support

Crew: 1 (Pilot)

Weapon Systems:
Phaser, Heavy Duty Beam (Left Arm)
Phaser, Heavy Duty Beam (Right Arm)
Phaser, Beam (Left Torso)
Phaser, Beam (Right Torso)
Phaser, Pulse (Turret, above cockpit)
Phaser, Pulse (Turret, above cockpit)
Flechette Pod (Left Leg)
Flechette Pod (Right Leg)

Overview: This mecha was designed as a pure energy based weapons platform, intended to accompany the Thunder when deployed. Its heavy duty phasers were capable of near starship levels of destruction, while its turreted pulse phasers provided good all around defense.

Mecha Name:	Tsunami
Mecha Designation Code:	THF-1
Weight Class:	Heavy
Mass Displacement:	80 tons
Primary Purpose:	Fire Support
Secondary Purpose:	N/A
Crew:	2 (Pilot, Systems Officer)
Weapon Systems:	Rocket Launcher, Heavy (Left Arm) Rocket Launcher, Heavy (Left Arm) Rocket Launcher, Heavy (Right Arm) Rocket Launcher, Heavy (Right Arm) Gauss Cannon, Rapid Fire (Center Torso) Tac Missile Launcher, Heavy (Left Torso) Tac Missile Launcher, Heavy (Right Torso) Phaser, Pulse (Center Torso) Phaser, Pulse (Center Torso) Flechette Pod (Left Leg) Flechette Pod (Right Leg)
Overview:	This Mecha was designed as a heavy fire support unit. It's name comes from the sheer volume of rockets and missiles it could deliver on target in a single salvo. It was practically defenseless after its ammunition was expended, however, so the crew must be careful not to waste it. The systems officer controlled the missile and rocket launchers, while the pilot handled short range weapons and maneuvering. The computer system allowed for each missile launcher to be aimed at a separate target, independent of each other or the rocket launchers. All the rocket launchers fire on the same target, providing a tremendous barrage of firepower. Note that when a Tsunami fired all of it's rocket launchers at once, a huge cloud of smoke and exhaust gasses were vented behind and around it, instantly marking its position and posing a threat to unarmored infantry nearby.

Mecha Name: Archangel

Mecha Designation Code: AHC-1

Weight Class: Heavy

Mass Displacement: 85 tons

Primary Purpose: Electronic Warfare

Secondary Purpose: Communications

Crew: 2 (Pilot, Systems Officer)

Weapon Systems:
Phaser, Beam (Left Arm)
Phaser, Beam (Right Arm)
Phaser, Pulse (Left Arm)
Phaser, Pulse (Right Arm)
Automatic Grenade Launcher (Left Torso)
Automatic Grenade Launcher (Right Torso)
Autocannon, Light (Center Torso)
Phaser, Pulse (Center Torso)
Phaser, Pulse (Center Torso)
Flechette Pod (Left Leg)
Flechette Pod (Right Leg)

Overview: This was a Mecha designed for Electronic Warfare, Communications and Command functions. It's crew of two worked as a team to operate the Mecha, with the Systems Officer controlling the specialized functions while the pilot concentrates on maneuver and combat. As a Command Mecha, the pilot faught with the Mecha while the other officer coordinated the actions of the overall unit. This Mecha was often used as the master unit in a network of slaved Air Defense Mecha.

Mecha Name: Firelord

Mecha Designation Code: FLC-1

Weight Class: Assault

Mass Displacement: 90 tons

Primary Purpose: Assault

Secondary Purpose: N/A

Crew: 1 (Pilot)

Weapon Systems:
Phaser, Heavy Duty Beam (Left Arm)
Phaser, Heavy Duty Beam (Right Arm)
Phaser, Heavy Duty Pulse (Left Arm)
Phaser, Heavy Duty Pulse (Right Arm)
Fusion Beam (Left Torso)
Fusion Beam (Right Torso)
Plasma Gun (Left Torso)
Plasma Gun (Right Torso)
Flechette Pod (Left Leg)
Flechette Pod (Right Leg)

Overview:	The Firelord carried only energy weapons and they were all heavy duty, high damage ones. This gave it an excellent endurance in sustained combat operations, although at the cost of high levels of heat generation. Rarely would a Firelord pilot salvo all of it's weapons at a single target, since the resulting heat buildup would have a good chance of shutting the Mecha down. Instead, the shrewd pilot used the Mecha's longer range weapons as it closed in on the target, switching over to the shorter ranged ones once they came into range. This kept a steady barrage of energy on target, without overloading the Mecha's heat sinks.
Mecha Name:	Persuader
Mecha Designation Code:	PHA-1
Weight Class:	Assault
Mass Displacement:	90 tons
Primary Purpose:	Assault
Secondary Purpose:	N/A
Crew:	1 (Pilot)
Weapon Systems:	Phaser, Heavy Duty Beam (Left Arm) Phaser, Heavy Duty Beam (Right Arm) Phaser, Heavy Duty Pulse (Left Arm) Phaser, Heavy Duty Pulse (Right Arm) Plasma Gun (Center Torso) Gauss Cannon, Rapid Fire (Left Torso) Gauss Cannon, Rapid Fire (Right Torso) Flechette Pod (Left Leg) Flechette Pod (Right Leg)
Overview:	The Persuader was a good all purpose Assault Mecha, with a well-balanced weapons package. It's gauss cannons were excellent antipersonnel weapons, while it's energy weapons provided a serious threat to enemy vehicles and fortifications.

Mecha Name:	Devastator
Mecha Designation Code:	DVH-1
Weight Class:	Assault
Mass Displacement:	100 tons
Primary Purpose:	Assault
Secondary Purpose:	N/A
Crew:	2 (Pilot, Systems Officer)
Weapon Systems:	Gauss Cannon (Left Arm) Gauss Cannon (Right Arm) Gauss Cannon, Rapid Fire (Turret, above cockpit) Tac Missile Launcher, Light (Turret, above cockpit) Automatic Grenade Launcher (Turret, above cockpit) Phaser, Heavy Duty Beam (Left Torso) Phaser, Heavy Duty Beam (Right Torso) Phaser, Heavy Duty Pulse (Left Arm) Phaser, Heavy Duty Pulse (Right Arm) Plasma Gun (Center Torso) Flechette Pod (Left Leg) Flechette Pod (Right Leg) Chemical Discharger (Left Leg) Chemical Discharger (Right Leg)
Overview:	The largest of all Mecha, it was arguably the most dangerous. It carried an incredible amount of firepower, was able to engage targets at almost any range. It was the slowest of all Mecha as well, and could not outrun infantry; this is why it carried additional antipersonnel defenses. It's turret was equipped with a variety of weapons that allowed it to defend itself against aerospace fighters and other vehicles that it couldn't outmaneuver.

16.04 Second Generation Mecha

RMS-160 "Strider" Reconnaissance Mecha

Mass:	20 tons
Speed Index:	8/12
Armor Index:	64
Weapon Systems:	1 - Type V Phaser Emitter 2 - P-722 Anti-Infantry EPMW systems (200 bursts total)
Overview:	The Strider had a faster overland speed index than any other Mecha in the SFMC inventory at that time. It was ideal for scouting missions, and carried a light armament designed to deal with infantry and other light scout vehicles. It was more heavily armored than any of the other contenders for the light recon job, and fast enough on land for the SFMC to choose it over slower, but jump-capable Mecha. The Strider also lacked hands, making it one of the controversial designs that Mecha detractors said defeated the entire purpose of Mecha being more than legged tanks. Despite these handicaps, the Strider had proven itself to be agile, hard to hit, and quite adept at its job. One more fact of note when looking to the Strider was its total lack of overheating problems. Due to its light armament, the Strider had none of the overheating issues usually experienced by Mecha using the standard Micro-fusion reactors employed by SFMC Mecha. Only damage to the thermal shielding or heat exchangers could cause a Strider overheating problems in a normal combat environment.

RMS-190/195 "Wasp"/"Stinger" Reconnaissance Mecha

Mass: 20 tons

Speed Index: 6/9

Jump Jet Capability: 180 meters

Armor Index: 48

Weapon Systems:
1 - Type V Phaser Emitter
1 - 2-Tube Short Range Missile Launcher (50 flights) (Wasp)
2 - P-722 EMPW (200 bursts total) (Stinger)

Overview:

Nearly identical in design, the Wasp and Stinger were actually the prototypes for the Valkyrie Project, the efforts by SFMC researchers to develop Mecha that could convert into an aerospace fighter mode for ease of insertion and pickup. These two non-covertable prototypes were put into production as Reconnaissance Mecha when they performed beyond anyone's expectations in trials. Although they are not as fast as the Strider, they have an enormous jump capability, which allowed them to traverse difficult terrain with few problems. They were lightly armed, and lightly armored, but tended to prevail with a skilled pilot when assigned to a recon patrol. Both the Wasp and the Stinger had few overheat problems, mostly due to their light armament and excellent heat exchanger systems by SFMC Mecha. Only damage to the thermal shielding or heat exchangers could cause a Strider overheating problems in a normal combat environment.

MPMS-19 "Blockhead" Multi-Purpose Combat Mecha

Mass: 55 tons

Speed Index: 5/8

Jump Jet Capability: 150 meters

Armor Index: 152

Weapon Systems:
1 - Medium EM Rifle (20 bursts)
1 - Type V Phaser Emitter
1 - 6-tube Short-Range Missile Launcher (15 flights)

Overview:

Another contender for the `standard' Mecha slot, the Blockhead lost out to the Dougram only because of its lack of a long-range weapon, although the Medium EM Rifle nearly fulfilled that requirement. The Blockhead had a good support suite of close-in weapons, including an unique chin-turreted Type V Emitter suite and six tube SRM launcher. The Blockhead was quite maneuverable, jump-capable, and well armored for it's class.

The first Blockheads were delivered to the 505th Mecha Strike Group and the 109th Terran Militia at AR-558. These performed up to spec in every respect, holding the line where needed, keeping up with and even spearheading the SFMC advance at times. The Blockheads proved to be a perfect match for the SFMC tanks, with similar weapons range profiles, and the designs complimented each other well. The Blockhead was blessed with efficient weapons systems, and rarely overheats in a combat situation.

MPMS-20 "Roundfacer" Multi-Purpose Combat Mecha

Mass:	55 tons
Speed Index:	5/8
Jump Jet Capability:	150 meters
Armor Index:	152
Weapon Systems:	1 - Class X Particle Accelerator Cannon 1 -10-tube Long-Range Tactical Rocket Delivery System (24 flights)
Overview:	The Roundfacer was a contender for the standard SFMC Mecha unit, but was disqualified for it's lack of close-in weapons capability. Both the PAC and LRTRDS systems had difficulty with targeting close up, causing the Dougram to be selected due to its varied capabilities. The Roundfacer was found to excel at distance combat, where it had a very respectable punch. It's mobility on the ground and jump jet systems allowed it to open and close range at will, an ability put to good use in the closing months of the Dominion War. The impressive 152 Armor Index shows that the Roundfacer was designed to take punishment, albeit not as much as heavier units. This fortitude, combined with the long-rage fighting ability, allowed the SFMC's 230th Mecha Strike Group, the "Mechs in Black", to hold off an advance by a Cardassian light division during the Battle of Castellan Pass on Altan Tepes. The Danek Division of the Cardassian IX Corps was moving into the Karameikos valley through Castellan Pass. The 230th deployed their Roundfacers behind a hastily constructed pile of rock, and fired their PACs and rockets until their tubes were dry and barrels overheated. The result was a crucial delay in maneuver, which ultimately cost the Cardassians the planet. Roundfacer pilots had to keep an eye on their internal heat levels at all times during an engagement, as their ability to generate heat fat outstripped the integrated heat exchanger system.

MPMS-22 "Dougram" Multi-Purpose Combat Mecha

Mass:	55 tons
Speed Index:	5/8
Jump Jet Capability:	90 meters
Armor Index:	152
Weapon Systems:	1 - Medium EM Rifle (20 bursts) 1 - 5-tube Long Range Tactical Rocket Delivery System (24 flights) 1 - 2-tube Short Range Missile Launcher (50 flights) 1 - Type V Phaser Emitter
Overview:	The MPMS-22 was perhaps the finest example of multi-purpose Mecha design the SFMC had turned out of the Fokker Research Facility since it's doors opened. The Dougram had a weapon suite that allows it to strike at all ranges expected of a Mecha suit, as well as excellent mobility and generous armor coverage. The sole drawback of the Dougram is that none of its weapons would strike particularly hard, with its heaviest armament rated at 5 TSEs. Despite this possible flaw, the Dougram had been designated the standard Mecha suit of the SFMC, and was the first suit most pilots qualified with upon graduating past the Light Mecha training stage. Dougrams had an excellent heat exchanger system, and rarely overheated at all unless damaged.

FSMS-09 "Blizzard Gunner" Fire Support Mecha

Mass: 55 tons

Speed Index: 6/9

Armor Index: 112

Weapon Systems:
1 - Type X Particle Accelerator Cannon
1 - 6-Tube Short Range Missile Launcher (15 flights)

Overview:
The Blizzard Gunner was conceived as a fire support Mecha fast enough to keep up with the main body of a mobile force. It's unusual quadruped construction allowed it to walk sideways or backward and maintain a solid fire platform. It's single PAC may seem like light armament for a fire support vehicle, but the Blizzard Gunner excelled at getting this weapon into an advantageous position on the field and hammering enemy units with it. The SRM launcher protects the Blizzard Gunner when enemies get too close for the PAC to be effective. The drawback to the Blizzard Gunner was it's lighter than average armor for a Mecha it's size, but it's speed partially compensated for this. The Blizzard Gunner could also easily overheat if it fired all it's weapons on the move, pilots were advised to be aware of this and mind their rate of fire accordingly.

AAMC-IX "Defender" Air Defense Mecha

Mass: 60 tons

Speed Index: 4/6

Armor Index: 120

Weapon Systems:
2 - Type V Phaser Emitters
2 - Type VIII Phaser Emitters
2 - Medium EM Rifles (20 rounds total)

Overview:
The Defender, coupled with the Phalanx missile bombardment Mecha, comprised the best Air Defense units the SFMC had to offer. The Defender was designed to carry weapons that could seriously damage overhead aircraft in a single volley, and had been equipped with a special sensor suite specifically for this purpose. It's torso mounted searchlight pairs made it popular for night operations both in the antiaircraft arena and the search and destroy/search and rescue role. The Defender was extremely effective when paired with another Defender or a Phalanx and alternating fire against airborne or ground targets. Where the Defender's weakness was revealed was situations in which it had to operate alone, or was pressed by multiple targets. The heavy weapons systems used by the Defender vastly overtaxed it's heat exchange system, and often caused the Mecha to shut down. It's armor was less than many Medium weight designs, adding to it's unsuitability for front line combat.

Despite it's drawbacks, the firepower available to a Defender pilot made them curiously popular duty assignments, and the Defender pilots were in fierce competition for the coveted `Turkey Shoot Badge', a comical decoration unofficially presented to ADA crews upon confirmed kill of their fifth, tenth, and twenty-fifth enemy aircraft.

CEMS-VI "Bushman" Combat Engineer Mecha

Mass: 60 tons

Speed Index: 5/8

Armor Index: 192

Weapon Systems:
1 - Heavy EM Rifle (20 rounds)
1 - 4-Tube Short Range Missile Launcher (25 flights)

Overview:

The MPMS-VI was originally conceived as a Recon Mecha. It was designed to be quick and agile, but it's performance was beaten out by the sheer speed of the Strider. The Bushman was re-designated as a multipurpose Mecha and slated for use on the front lines, a decision that has been the subject of some debate, as the armor index of the Bushman is not any better than the Strider's. The SFMC Combat Engineer Branch took notice of this design, however, and made it their own. Special cross-trained Mecha Pilots serve with Engineer units and use the Bushman as a construction and civil defense Mecha, a role at which it excelled.

The unusually heavy armament carried by the Mecha caused the lack of armor on the Bushman. Unlike it's brethren the Dougram and Blockhead, the lighter Bushman actually carried a heavier EM Rifle, capable of dealing twice the damage. This fact, coupled with the faster ground speed of the Bushman, was responsible for the inexplicable success of the lightly armored Mecha on the battlefield. During the battles on Cardassia Prime in the final actions of the Dominion War, a company of Bushmen from the SFMC 5th Brigade used their superior mobility and firepower to rout a tank regiment of Cardassian armor, through the sheer confusion caused by the speed of their strike. The damage incurred by the SFMC units was telling, however, as the Bushmen that were hit by the Cardassian tanks tended to be put out of commission with a single shot, although the majority of the Mecha from the 550th were untouched thanks to the skill of their pilots and their vaunted mobility. On the bright side, Bushman pilots cannot overheat their Mecha, unless damage is done to the fusion shielding or heat exchangers.

HCMC-IIX "Crusader" Heavy Combat Mecha

Mass:	65 tons
Speed Index:	4/6
Armor Index:	120
Weapon Systems:	2 - 15-Tube Long Range Tactical Rockets Delivery Systems (16 flights total) 2 - 6-Tube Short Range Missile Launchers (15 flights total) 2 - P-722 Anti-Infantry EPMW (200 bursts total) 2 - Type V Phaser Emitters
Overview:	The Crusader was a very general purpose design, and an able companion to the Ironfoot, as it also was effective at all normal combat ranges. The Crusader could bombard with it's LRRTS system while closing, then switch to SRMS and medium phasers close-in, with a pair of anti-infantry EPMW's to boot. The design was fairly mobile, and well armored. Despite it's withering firepower, or more accurately because of it, the Crusader had a slight tendency to overheat when pressed during combat. On the Fokker test range, one Crusader was lost to an ammunition explosion when it's test pilot fired it's entire weapons compliment repeatedly and the ammunition cooked off due to reactor temperature. This flaw has not precluded the Crusader from it's share of heavy combat, and in the closing weeks of the Dominion War, the Crusader proved to be a valuable asset to the SFMC in several defensive actions against last-ditch JemHadar attacks.

HCMS-VI "Ironfoot" Heavy Combat Mecha

Mass: 65 tons

Speed Index: 4/6

Armor Index: 208

Weapon Systems:
1 - Type VIII Phaser Emitter
1 - 15-Tube Long Range Tactical Rocket Delivery System (16 flights)
3 - Type V Phaser Emitters
1 - 2-Tube Short Range Missile Launcher (50 flights)
2 - P-722 Anti-Infantry EPMW (200 bursts total)

Overview:

The Ironfoot, in it's short service life, had made for itself a reputation as an extremely hardy Mecha unit. With more armor than any other Heavy class unit, and more than the Phalanx, and Assault class Mecha, the Ironfoot proved very hard to kill in most combat situations. Of the 46 Ironfoot Mecha that participated in the Dominion War, none were lost in combat, despite the generally heavy losses in some engagements. Some Ironfoot pilots brought their machines home with limbs hanging on by myomer threads and shards of internal skeleton, with fusion cores visible through broken plastrons and Phaser emitters melted down from over firing, but not a single Ironfoot failed to return home at the end of a deployment.

The Ironfoot had a massive amount of firepower at it's command, some bombardment capability and a pair of P-722 EMPW systems for anti-infantry work. It's heat exchangers were adequate for most engagements when either the longer range, or the shorter range armaments would be fired exclusively, but in a more `hot' situation, requiring the fire of all weapons, the Ironfoot could run into overheating problems.

MBMS-IX "Spartan" Missile Bombardment Mecha

Mass:	70 tons
Speed Index:	4/6
Armor Index:	200
Weapon Systems:	2 - 20-Tube Long Range Tactical Rocket Delivery Systems (24 flights total) 4 - Type V Phaser Emitters (Two Aft Mounted)
Overview:	The Spartan was the standard SFMC Bombardment Mecha, although the Phalanx delivers 50% more missiles in a full volley. The Spartan was a less expensive unit, more adequately armored and equipped with better close-in defense systems. The Spartan was used for pouring fire onto a target with missile barrages at long ranges, crippling most modern units in one or two volleys. The Spartan was a popular Mecha for urban assignments and civil defense duties, as it had fully articulated hands. SUPCOM units often requested a detachment of Spartans to assist in setting up prefab bases and other structures thanks to the massive lifting capabilities of the Mecha. The Spartan had paired fore and aft Type V Phasers to protect it within it's missile range and from behind, as well as a respectable armor compliment. The Spartan could overheat if both missile racks were fired repeatedly, due to the power requirement of the magnetic accelerators which assisted the missiles in achieving supersonic flight out of their tubes.

HCMS-IV "Tomahawk" Heavy Combat Mecha

Mass: 70 tons

Speed Index: 4/6

Armor Index: 160

Weapon Systems:
2 - Class X Particle Accelerator Cannons
2 - Type V Phaser Emitters
2 - Type III Phaser Emitters
2 - P-722A4 EMPW (200 bursts total)
1 - 6-Tube Short Range Missile Launcher (15 flights)

Overview:
Some called the Tomahawk the `King of Mecha' and the title may not have been far from wrong. Although other Mecha are bigger, and more heavily armored, there weren't many with the firepower a Tomahawk carried, nor it's frightening appearance. The Tomahawk was the Mecha credited with breaking Breen morale at the liberation of Betazed, simply by being in the theater. The `lightning' throwing Mecha waded into the Breen camp, and most of their soldiers retreated or surrendered rather than face the machines which so closely resembled giants from Breen mythology. The Mecha had three major weaknesses, one of which is it's lack of hands, limiting it's utility outside combat. The armor plating on the Tomahawk was not as strong as that on the Glaug or Ironfoot, and sometimes caused the Tomahawk to retire from battle due to damage that would simply dent the ablative plate on an Ironfoot. The heat buildup caused by the paired PACs could not be ignored, and was only marginally handled by the heat exchangers native to the Tomahawk. Some pilots used a `One-Two Punch', meaning firing both PACs, the a single PAC, then both again to help regulate heat buildup.

HCMS-VII "Glaug" Heavy Combat Mecha Suit

Mass: 75 tons

Speed Index: 4/6

Armor Index: 168

Weapon Systems:
2 - Class X Particle Accelerator Cannons
2 - Type V Phaser Emitters
1 - Medium EM Rifle (20 bursts)

Overview:
The Glaug was an impressive sight, as it bounded across the landscape laying waste to opposing forces. Sharing the unique `chicken walker' design of the Strider, the Glaug was mobile for it's size and carried an impressive armament, rivaling even the Tomahawk's ironmongery. Like the Tomahawk, the twin PACs of the Glaug could cause heat issues, but the Glaug's heat exchangers were marginally more equipped to handle the buildup. The Glaug lacked the SRM and EPMW systems of the Tomahawk, but added a bit more armor and a Medium EMR to the mix, sacrificing short range and anti-infantry weapons for long range fire and staying power. The Glaug made an excellent command Mecha, second only to the dedicated Bigfoot unit in it's C3 systems and tactical gear.

FSMS-44B "Tequila Gunner"	
Mass:	80 tons
Speed Index:	4/6
Armor Index:	229
Weapon Systems:	1 - Class X Particle Accelerator Cannon 2 - Ten-Tube Long Range Tactical Rocket Delivery Systems (24 flights total) 2 - P-722A4 EM Guns (200 bursts total)
Overview:	The Tequila Gunner was perhaps the most strangely named Mecha in the SFMC inventory, but it was also one of the deadliest. Combining missile bombardment ability with a turret mounted PAC, this was one of the most fearsome fire support Mecha ever devised. With it's four-legged construction, it could provide a stable fire platform almost anywhere. The Tequila Gunner mounted a pair of anti-infantry EMPWs for close-in support, and had ample armor coverage. The TG was very heat efficient for an assault Mecha, needing minimal cool down time even after extended sustained fire of all it's weapons systems. The TG was famous for the accurate fire it's PAC was capable of under the direction of a talented pilot. The TG had been known to surgically remove turrets from Cardassian tanks at extreme ranges.

MBMS-85F "Phalanx" Missile Bombardment Mecha

Mass: 80 tons

Speed Index: 3/5

Armor Index: 168

Weapon Systems:
4 - Fifteen-Tube Long Range Tactical Rocket Delivery Systems (20 flights total)
2 - Type V Phaser Emitters

Overview:
The Phalanx was the Spartan's heavier, more expensive, nastier cousin. A platoon of Phalanx Mecha could reduce a Jem'Hadar field emplacement to rubble in seconds, and a single Phalanx could ground or destroy most Cardassian armor in a single volley. The four heavy rocket systems allowed the fire of massive volleys at long ranges, with the capability to suppress large formations of troops and armored vehicles with steady, persistent fire. The Phalanx pilot was aware not to travel too close to the front, or without escort due to the Phalanx's lack of heavy armor plating. The heat exchangers of the Phalanx allowed for the near steady fire of all tubes as they recycle. Tests indicate that if only two out of four systems are discharged every five volleys, that a detrimental overheat could be avoided completely.

CMMS-128 "Bigfoot" Command Mecha

Mass: 85 tons

Speed Index: 4/6

Armor Index: 232

Weapon Systems:
1 - Class X Particle Accelerator Cannon
1 - Six-Tube SRM Launcher (30 flights)
2 - P-722A4 EM Guns (200 bursts total)
6 - Type V Phaser Emitters (2 Aft Mounted)

Overview:
The Bigfoot was the Battalion and Regimental command Mecha design of choice. In reality, there were no full Regiments nor Battalions of Mecha concentrated anywhere in the Federation in peacetime, but the requirement was sent to the OMBD, and the design was laid out. The result was a hardy, mobile, well armed platform with the finest C3 gear ever mounted on a Mecha suit. The two-person cockpit allowed a formation commander to mind his strategic and tactical displays while a pilot cared for the Mecha's other functions. Only 20 of these massive machines had been constructed to date, all assigned to Colonels and above, and one each were earmarked as ceremonial Mecha for the Commandant and Deputy Commandant. The few engagements fought by Bigfoot Mecha in the Dominion War showed them to be exemplary command vehicles, if a bit under-gunned for their immense tonnage.

16.05 Third Generation Mecha

RMS-160-II "Strider" Reconnaissance Mecha

Mass: 20 tons

Speed Index: 12/18

Armor Index: 69

Weapon Systems:
1 - Type VI Vehicle Emitter
2 - Type IV Vehicle Emitters

Overview:
The Strider II redesign required a few design changes. The best attribute of the Strider was it's speed, so the SFMC R&D team decided to change the engine to a more powerful (yet smaller) engine, which increased it's speed by thirty-three percent. They also dropped the P-722 Anti-Infantry EPMW systems in favor of the Type IV Vehicle Emitters, giving the Strider II a better punch for the money. The armor was also increased by six percent.

RMS-190-II "Wasp II" Reconnaissance Mecha

Mass: 20 tons

Speed Index: 6/9

Jump Jet Capability: 180 meters

Armor Index: 64

Weapon Systems:
1 - Type VI Vehicle Emitter
1 - 10-Tube One Shot Long Range Tactical Rocket Delivery System
1 - ECM Suite

Overview:
The original Wasp was the first Recon Mecha ever to be mass-produced by SFMC. It had shown itself to be very useful on the battlefield, but there were a few problems with the original design, which would be taken care of it the "Wasp II" design.

The first thing that was looked at was its stealth capability. Although it was a light Mecha, it still produced quite a large signal that, while the Mecha hid, could still be picked up by enemy Mecha and ground troops. It was decided to add an ECM Suite to the Wasp II in hopes it would help hide it better.

Instead of having a 2-Tube Short Range Missile Launcher, it was decided to change it to a One Shot Long Range Tactical Rocket Delivery System, which would fire all ten of it's rockets at once, hopefully causing more damage in it's initial attach. This was the first time that SFMC R&D used a one-shot weapon system, but on the test Mecha it was shown to be very effective against, not only light, but medium Mechas. Combined with the ECM Suite to hide it, and the Type VI Vehicle Emitter, it would even have a chance of damaging a heavy or assault Mecha at close range. The last thing that was looked at was the armor. The armor was increased by a staggering thirty three percent.

RMS-199-II "Stinger II" Reconnaissance Mecha

Mass: 20 tons

Speed Index: 6/9

Jump Jet Capability: 180 meters

Armor Index: 54

Weapon Systems:
1 - Type VI Vehicle Emitter
2 - 15-Tube One Shot Long Range Tactical Rocket Delivery Systems

Overview:

The *Stinger* has not seen many changes since it was first built. With the new design, there would be a few changes that were overlooked in the original design. One of the first was a redesign of the cockpit. An ejection system was added, along with enlarging the cockpit area, since it was too small for most pilots.

The next change was the weapons. It was decided to give the *Stinger II* enough firepower to live up to its name. The Phaser was upgraded, along with removing both of the P-722 EMPWs and installing two One Shot Long Range Tactical Rocket Delivery Systems, both having 15 missiles in their racks. The last thing that was looked at was the armor, which was increased by a twelve and a half percent.

MPMS-19-II "Blockhead II" Multi-Purpose Combat Mecha

Mass: 55 tons

Speed Index: 5/8

Jump Jet Capability: 150 meters

Armor Index: 185

Weapon Systems:
1 - Class XI Particle Accelerator Cannon
1 - Type VI Vehicle Emitter
1 - Type VII Vehicle Emitter
1 - 6-Tube Computer Guided Short Range Missile Launcher (15 flights)
1 - Blow out panel for the Computer Guided Short Range Missile Ammo

Overview:

The first thing that was done was to remove the EM Rifle, and replace it with a Particle Accelerator Cannon. The Short Range Missile Launcher had its targeting system updated, along with the Vehicle Emitter located in the head. A new Vehicle Emitter was also added to the right arm. To give the Mecha a better chance of survival, blowout panels were added to the Short Range Missile Launcher's ammo compartment. The heat sinks were also updated from the original twelve to fifteen of the new double heat sinks, giving the Blockhead II a chance to dump a total of thirty heat points a turn. The last thing that was looked at was the armor, which was increased by just over twenty one percent.

MPMS-20-II "Roundfacer II" Multi-Purpose Combat Mecha	
Mass:	55 tons
Speed Index:	5/8
Jump Jet Capability:	150 meters
Armor Index:	185
Weapon Systems:	1 - Class XI Particle Accelerator Cannon 2 - Type VI Vehicle Emitters 1 - 15-tube Long Range Tactical Rocket Delivery System (8 flights) Blowout panels for the Long Range Tactical Rocket Delivery Ammo 1 - Advanced Fire Control System for the Long Range Tactical Rocket Delivery System
Overview:	First, the Particle Accelerator Cannon was updated, and two Vehicle emitters were added, giving the Mecha the ability to stay in a fight longer once it used up all of it's missiles. The Long Range Missile Launcher was increased to firing fifteen missiles a firing, and a Fire Control System was added to the Missile System, making its accuracy better. Finally, the Armor was increased by a little more than seventeen percent.

MPMS-22-II “Dougram II” Multi-Purpose Combat Mecha	
Mass:	55 tons
Speed Index:	5/8
Jump Jet Capability:	150 meters
Armor Index:	168
Weapon Systems:	2 - Type V Vehicle Emitters 1 - Rotary EM Rifle (20 bursts) 1 - 4-tube Computer Guided Short Range Missile Launcher (25 flights) 1 - Blowout Panel for the Rotary EM Rifle and Short Range Missile Ammo
Overview:	The Rotary EM Rifle was upgraded so that the Mecha pilot may, if he wishes, fire more than one shot with it. The Long Range Missile Launcher was removed, and the Short Range Missile Launcher was upgraded. Also, blowout panels were added to the ballistic weapon’s ammo compartments. Finally, the armor was increased by ten and a half percent.

FSMS-09-II "Blizzard Gunner II" Fire Support Mecha

Mass: 55 tons

Speed Index: 6/9

Armor Index: 144

Weapon Systems:
1 - LB EM Rifle (10 bursts)
1 - 6-tube Short Range Missile Launcher (15 flights)
1 - Blowout panel for LB EM Rifle and Short Range Missile Ammo

Overview: The Particle Accelerator Cannon was removed, and a LB EM Rifle was installed in it's place. The Short Range Missile Launcher was left in, but both weapons had blowout panels added to their ammo compartments. Finally, the armor was increased by twenty eight and a half percent.

AAMC-IX-II "Defender II" Air Defense Mecha

Mass: 60 tons

Speed Index: 4/6

Jump Jet Capability: 120 meters

Armor Index: 192

Weapon Systems:
2 - Type VI Vehicle Emitters
2 - Rotary EM Rifles (40 bursts total)

Overview: The first thing that was found out in the field with this Mecha was that, even though it's main purpose was air defense, it could not take an air attack. The armor was increased by a staggering sixty percent. The Type V Vehicle Emitters were updated, and the Type VII Vehicle Emitters were removed so the Medium EM Rifle could also be updated.

HCMC-IIX-II "Crusader II" Heavy Combat Mecha

Mass: 65 tons

Speed Index: 4/6

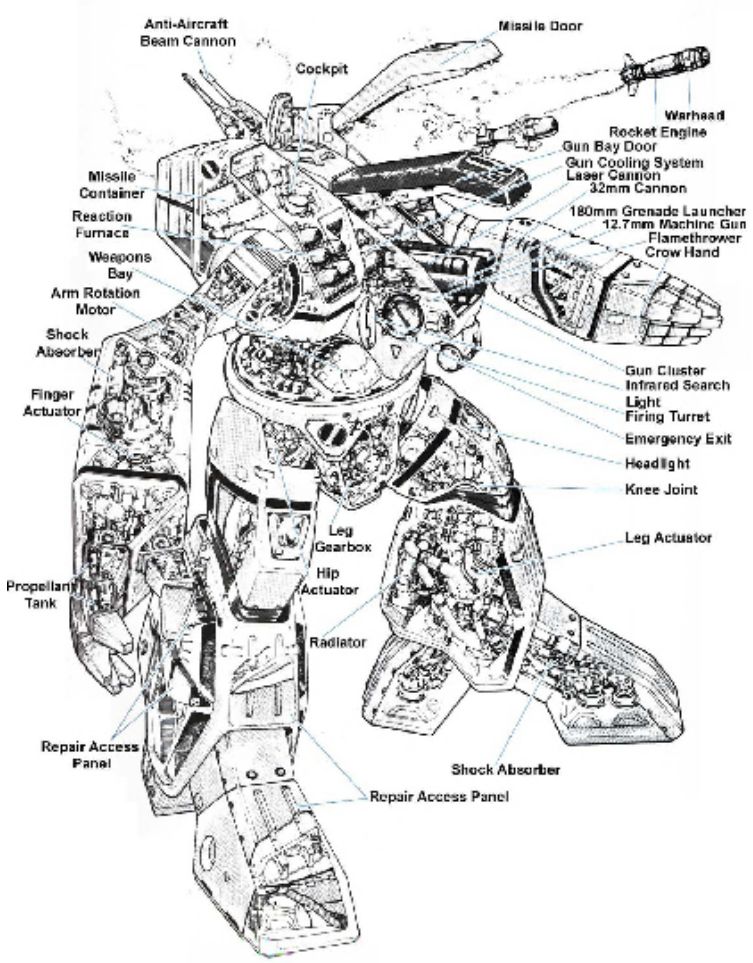
Jump Jet Capability: 120 meters

Armor Index: 192

Weapon Systems:
2 - Type V Vehicle Emitters
2 - Type VII Vehicle Emitters
2 - 30-tube Medium Range Missile Launcher (16 flights total)
Blowout Panels for the Medium Range Missile Ammo
Advanced Communications System

Overview: Again, like the Defender, it was found out in the field with this Mecha could not take a direct attack. The armor was increased by a staggering sixty percent. The original Vehicle Emitters were left in, plus tow more Type VII were added. The Short and Long Range Missiles were removed for the new Medium Range Missile Launcher. The Anti-Infantry EPMW was also completely removed.

HCMS-VI-II "Ironfoot II" Heavy Combat Mecha	
Mass:	65 tons
Speed Index:	4/6
Jump Jet Capability:	120 meters
Armor Index:	200
Weapon Systems:	1 - Light Photon Cannon (16 bursts) 1 - 15-tube Long Range Tactical Rocket Delivery System (8 flights) 3 - Type VI Vehicle Emitters Blowout Panels for the Light Photon Cannon and Long Range Tactical Rocket Ammo
Overview:	First, the Anti-Infantry EPMW, the Type VII Vehicle Emitter, and the Short Range Missile System were also completely removed. A light Photon Cannon was added. The rest of the weapons were left intact, since there had been no problems with the layout in the field. The armor was actually reduced by four percent.



MBMS-IX-II "Spartan II" Missile Bombardment Mecha

Mass:	70 tons
Speed Index:	4/6
Armor Index:	216
Weapon Systems:	1 - Type IX Vehicle Emitter 3 - Type VI Vehicle Emitters 2 - 15-tube Long Range Tactical Rocket Delivery System (16 flights total) Blowout panels for the Long Range Tactical Rocket Ammo 2 - Advanced Fire Control Systems for the Long Range Tactical Rocket Delivery System
Overview:	The four Type V Vehicle Emitters were removed, in favor of three Type VI Vehicle Emitters, and a Type XI Vehicle Emitter, all facing forward. The Long Range Missile System was downgraded to fifteen tubes each, with a Fire Control System added to both, along with blowout panels. Finally, the armor was increased by eight percent.

HCMS-IV-II "Tomahawk II" Heavy Combat Mecha	
Mass:	70 tons
Speed Index:	4/6
Armor Index:	216
Weapon Systems:	2 - Class XI Particle Accelerator Cannon 2 - Type VI Vehicle Emitters 2 - Type IV Vehicle Emitters 1 - 6-tube Computer Guided Short Range Missile Launcher (15 flights) Blowout Panels for the Short Range Missile Ammo Advanced Communication System
Overview:	Both of the Particle Accelerator Cannons were updated, along with the Type III and the Type V Vehicle Emitters. The Anti-Infantry EPMW was completely removed. Blowout Panels were added for the Short Range Missile ammo, and an Advanced Communications System was added as well. Finally, the armor was increased by thirty five percent.

HCMS-VII-II "Glaug II" Heavy Combat Mecha Suit

Mass: 75 tons

Speed Index: 4(5)/6(8)

Armor Index: 224

Weapon Systems:
1 - Class XI Particle Accelerator Cannon
2 - Type IX Vehicle Emitters
2 - Type VI Vehicle Emitters
Adamantium
Chameleon Skin Stealth System

Overview: First, the internal structure was updated to include Adamantium, so the Mecha could move a little faster while hot. The Particle Accelerator Cannon was updated, as was the Type V Vehicle Emitters. The Medium EM Rifle was removed, in favor of two Type IX Vehicle Emitters. A Stealth System was added.

FSMS-44B-II "Tequila Gunner II"

Mass: 80 tons

Speed Index: 4/6

Armor Index: 256

Weapon Systems:
2 - Type VI Vehicle Emitters
1 - 10-tube Long Range Tactical Rocket Delivery System (12 flights)
1 - Heavy Photon Cannon (4 bursts)
Blowout Panels for the Long Range Tactical Rocket and Heavy Photon Cannon Ammo

Overview: The armor was increased by almost twelve percent. The Long Range Missile System was left intact (although blowout panels were added), but the Anti-Infantry EPMW and the Particle Accelerator Cannon were also completely removed, in favor of two Type VI Vehicle Emitters and a Heavy Photon Cannon.

MBMS-85F-II "Phalanx II" Missile Bombardment Mecha

Mass: 85 tons

Speed Index: 3/5

Armor Index: 200

Weapon Systems:
2 - 20-tube Long Range Tactical Rocket Delivery System (12 flights total)
2 - 15-tube Long Range Tactical Rocket Delivery System (16 flights total)
3 - Type IV Vehicle Emitters
Blowout panels for the Long Range Tactical Rocket Ammo
Advanced Fire Control Systems on all of the Long Range Tactical Rocket Delivery System

Overview: Two of the fifteen tube Long Range Missile Systems were upgraded to twenty tubes each, plus an Advanced Fire Control System was added to each of the Missile Launchers, as well as blowout panels. The two Type V Vehicle Emitters were swapped out for three Type IV Vehicle Emitters. The armor was also increased by nineteen percent.

CMMS-128-II "Bigfoot II" Command Mecha

Mass:	85 tons
Speed Index:	4/6
Armor Index:	241
Weapon Systems:	1 - Medium Photon Cannon (16 bursts) 4 - Type VI Vehicle Emitters 2 - Type V Vehicle Emitters 2 - Type IV(A) Vehicle Emitters 1 - 6-tube Short Range Missile Launcher (15 flights) Advanced Fire Control System for the Short Range Missile Launcher Blowout Panels for the Short Range Missile Ammo
Overview:	First, the Anti-Infantry EPMWs were completely removed. Four of the Type V Vehicle Emitters were upgraded to Type VIs, and two additional Type IV(A)s were added. The Particle Accelerator Cannon was removed, in favor of the Medium Photon Cannon. The Short Range Missile System was left on (although a blowout panel and the Advanced Fire Control System was added), and the armor was increased by almost four percent.

16.06 MCP Data Sheet

Name: MCP MK I “Hellfire”

MOC: Artillery

MCL: CL-2

MDT: Assault

MAL: Command

Body Configuration: NMB-NBWL-A2/NMT-AM

Height: 12 meters (40 feet)

Width: 4.5 meters (15 feet)

Length: 6 meters (20 feet)
12 meters (40 feet) to cannon tip

Weight: 100 tons fully loaded

Speed: 32kph (20 mph)

Crew: 3
Commander
Pilot/Navigator
Weapon Systems

Primary Engine: CP-1500 Fusion Reactor

Secondary Engine: FT-800 Fusion Reactor

Weapons Systems:

Four (4) 40cm Mega-Phaser Cannons
Primary Purpose: Assault/Defense
Secondary Purpose: Anti-Aerospace
Range: Long – 12 miles, 600 feet minimum
DR: 15
HB: 5 per barrel
ROF: The rate of the gunner
Payload: Unlimited, energy based upon engine
ED: 7
Location: Top mounted

Two (2) Tri-CPE Barrels
Primary Purpose: Assault/Defense
Secondary Purpose: Anti-Aerospace
Range: Medium – 10 miles, allows for near close combat firing
DR: 24
HB: 12
ROF: The rate of the gunner
Payload: Unlimited, energy based upon engine
ED: 3
Location: Forearm mounted

Defensive Systems:

CHP Armor
DFR: 295
ED: None

Three (3) TSG-F131
DFR: 100
ED: 20

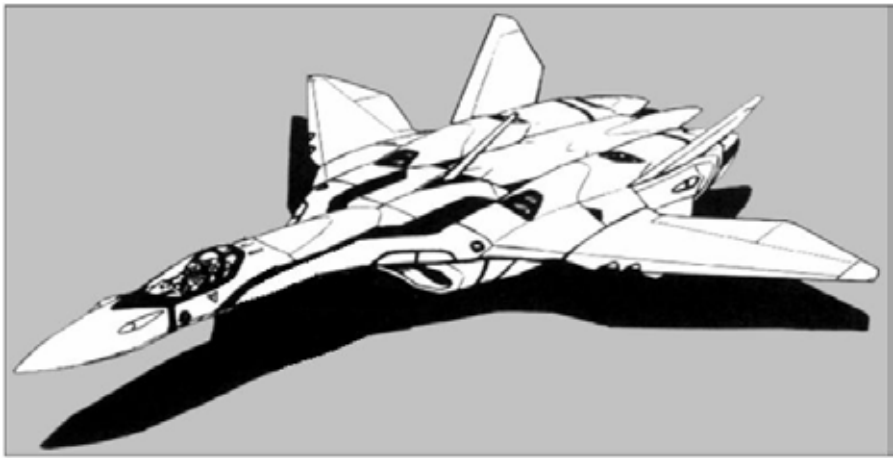
Subsystems:

Extended Sensor Package
Extended Communication Package

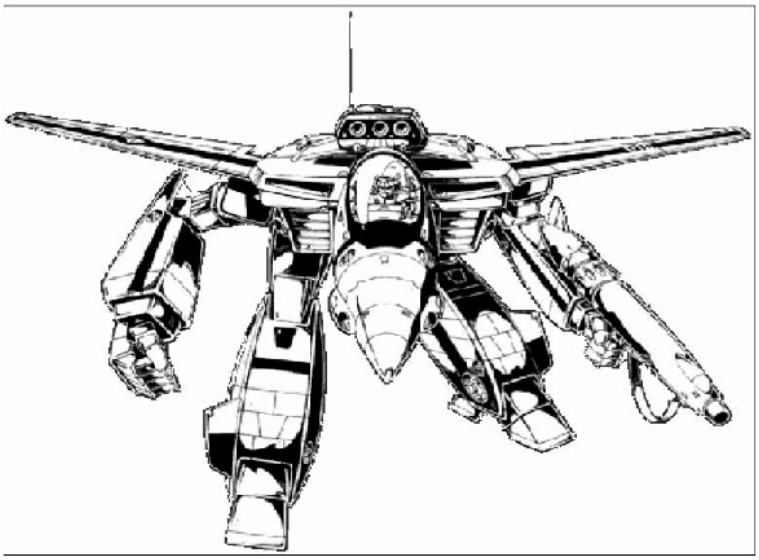
16.07 Project Valkyrie

AAFM-V-IX Valkyrie Variable Geometry Mecha

Mass:	30 tons
Speed Index:	6/9
Jump Jet Capability:	180 meters
Armor Index:	90
Weapon Systems:	1 - Type VI Vehicle Emitter 1 - 2-tube Short Range Missile Launcher 2 - P-722A4 Vehicle Mounted EM Gun



Above: Valkyrie in flight mode.

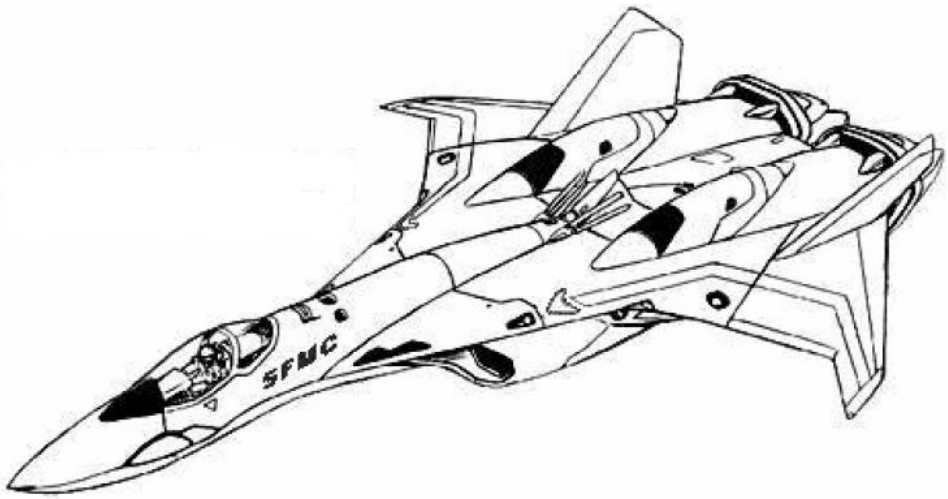


Above: Valkyrie in LAM mode.

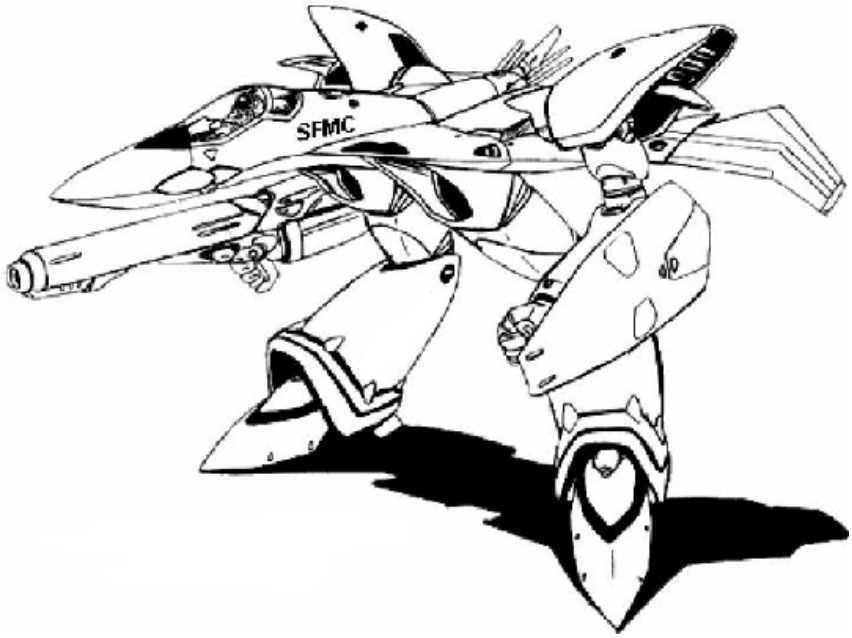
Above: Valkyrie in mecha mode.

AAFM-IX Excalibur Variable Geometry Mecha

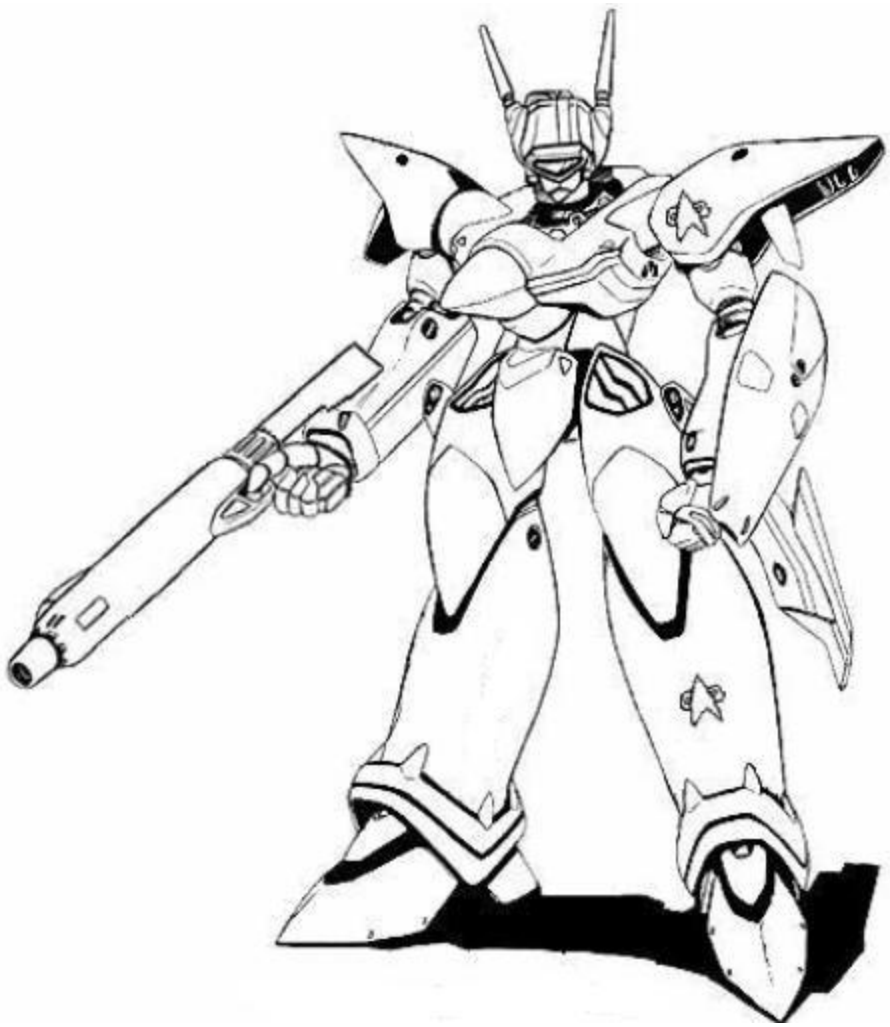
Mass:	55 tons
Speed Index:	6/9
Jump Jet Capability:	180 meters
Armor Index:	126
Weapon Systems:	1 - Type XI Particle Accelerator Cannon 2 - Type VI Vehicle Emitters



Above: Excalibur in flight mode.



Above: Excalibur in LAM mode.



Above: Excalibur in mecha mode.

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About the SFMC Academy

The Starfleet Marine Corps Academy was established by Commander Starfleet in 2164 when it was determined that Starfleet Academy could no longer adequately meet the needs of both services. The historical home of the United States' Navy and Marine Corps academies, Annapolis, was selected as the new home of the SFMCA. The head of the Academy, known as DCO-Academy, TRACOM, is still headquartered at the main campus in Annapolis. The motto of the SFMCA is "Facta Non Verba" or, in Federation Standard, "Deeds not Words." This is reflected in the more informal academy slogan, "We lead by example... whether we mean to or not." The DCO-Academy, TRACOM reports to the Commanding Officer of the Training Command (COTRACOM) who, in addition to the SFMCA, oversees branch schools, enlisted personnel training, advanced technical schools, and periodic skill re-fresher courses. Most of these courses are held either at one of the SFMCA facilities, or at one of the many training facilities in the New Valley Forge system which is home to TRACOM. These facilities, together with an Oberth-class spacedock serving as TRACOM headquarters, comprise Station Valley Forge. Today, the SFMCA consists of 5 campuses, 8 training worlds, and 42 ranges and field courses throughout the UFP. Together with Station Valley Forge, the SFMCA comprises one of the largest and most advanced military training organizations in the known universe.