Full Thrust- Warlords Edition

What follows is an expanded version of the Full Thrust miniature spaceship combat rules system, originally created by Ground Zero Games. This has been modified and extensively playtested by the Wellington Warlords in 2005 and 2006. The core rules of the game have been left largely intact, though numerous small modifications have been made for the purpose of continuity and game balance within the expanded rules set. The purpose of these many changes was to create a game with a much wider variety of tactical and strategic options, plus the addition of simple but workable campaign rules. The game is also designed to be fully modular, groups of rules (gunboats, fighters, spinal mounts, etc) can be dropped to better fit a themed universe without affecting the overall play of the game. I hope you enjoy them!

Stephen Mulholland April 1, 2007

Table of Contents

Ship Models and Playing Pieces

This game is designed for use with miniatures, though representative card counters can be used if necessary. Ship models from 20 to 100 mm in length are best for the scale of combat. Miniatures, markers or counters are also be required for any missiles, fighters, gunboats, mines or plasma bombs in use.

all terrain is placed randomly between the two fleets.

Dice

Six-sided dice are used in this game. These will often be referred to as a d6. In some cases a 3-sided dice (d3) is required, in this case simply roll a d6, with 1-2 =1, 3-4=2, and 5-6=3.

Die Roll Modifiers (DRMs)- some weapons, defensive systems, and terrain features can effect the outcome of a die roll. This is expressed as a DRM. A positive (+) DRM adds to the total of a die roll, while a negative (-) subtracts from the total. A DRM cannot increase the result of a die roll above 6 or decrease it below 1. In situations where a re-roll is allowed (such as after a penetrating hit with a Beam Weapon), the DRM is applied to the re-roll as well. A DRM can result in automatic hits or misses.

Other Equipment

A measuring tape or ruler will be required for both movement and weapons fire. A protractor or turning-arc template will be needed for maneuvering ships (which make turns in increments of 30 degrees) and for determining what lies within ship weapon arcs (which are 60 degrees wide). Turning/Firing templates are provided at the end of the document. These may be photocopied and glued to card-stock for ease of use.

Playing Area and Setup

This game has been designed and tested for use in a game area of at least of 48 mu by 72 mu. As inches are the recommended unit of distance, this equates to a 4-foot by 6-foot table. The fleet deploy along the "short" edges of the table, so that the fleets are about 72 mu apart at start. The ships may be placed up to 6 mu into the table, to allow fleet formations at start, and to move the models safely away from the table edge if necessary. Ships start facing the opposite table edge. If using a double table (8-foot by 6-foot) the fleets deploy with a "box" that is 48 mu wide and 6 mu deep in the center of the table, so that again the fleets are about 72 mu apart at start, but with much more maneuvering room on the flanks. Most battles are fought on "floating" maps, where the models can be shifted to keep them all on table if the direction of play carries one or both fleets off a table edge. Smaller areas can affect the play of game, as it may limit ship maneuverability and change the effectiveness of some weapons.

Ships typically start with a velocity between 1 and 10 mu/turn. Forts start at speed zero. Ships deployed along with forts can also start at speed zero.

In defensive scenarios the defender places their immobile assets (forts with any associated minefields) and pieces any terrain, the attacker then decides the approach angle for their fleet. In a meeting engagement in open space

Units of Distance

Throughout the game you will see reference to the term "mu." This stands for "measurement unit," and is the basis for all speed and range determinations. A mu can be anything you want, if you are playing on a small surface you can reduce mu down to centimeters, allowing a 48x72 mu tabletop to be much smaller. We use (and recommend) that 1mu = 1 inch. The inch scale works well, as it is more forgiving of exact placement of ships than the cm scale, and usually keeps ship-to-ship distances sufficiently great that ship models are unlikely to interfere with one another.
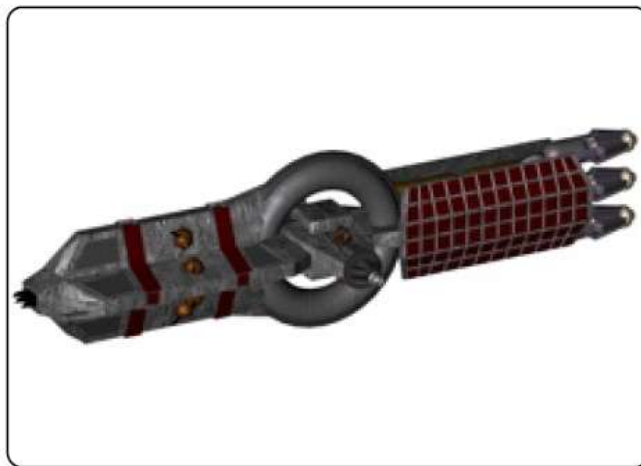
Terminology

Numerous terms are used throughout this work, and to prevent confusion many are defined here.

Ships are craft with both engines and a faster-then-light (FTL) system. They are the most flexible combat units, with good tactical and strategic mobility.

System Defense Boats/ Battle Riders are much like ships, but they lack a FTL drive. While the mass saved by removing the FTL does allow for more armor and weapons, these ships cannot cross the hypserspace wall on their own, and are thus limited in strategic mobility.

Fortresses have neither drives nor FTL systems. While immobile, they can turn to face in any direction during ship movement using their station-keeping thrusters. The mass saved by dropping all engines allows forts to mount very impressive arrays of weaponry.

Fighters are very small short-ranged craft that operate in groups of 6. Fighters have a tiny crew, some operate with only a single pilot. A fighter is fast, heavily armed and highly maneuverable, but they pay for these abilities with a limited combat endurance. Any ship or fort of sufficient size may mount launch tubes and hanger bays to carry fighters.

Gunboats are small armed craft that bridge the gap between fighters and small ships. They are carried in external racks on starships. They are large enough to mount starship-size weapons, allowing them to attack targets from further away than most fighters.

Carriers are ships that mount the launch tubes and hanger bays required to support fighters. Some carriers are specialized warships with large number of fighters, others might carry a single fighter wing on an otherwise conventional warship.

Jump Tenders are ships designed to tow other ships through the hyper wall. They are sometimes ingloriously referred to as tugs. Jump Tenders can bring squadrons of Battle Riders into combat in enemy star systems. They have over-sized FTL systems which allow them to carry the extra mass through the hyper-wall.

Missiles are self-guided projectiles with a small drive system. They can maneuver about the board until they expend all their endurance. If they come close to an enemy ship they attack, with the effect of the attack depending on the warhead mounted.

Mines are small remote weapon stations that are deployed to defend key strategic assets such as planets, shipping lanes and forts. If an enemy ship (or fighter or missile in the case of some mines) strays within 6 mu, the mine triggers/detonates. Some mines are one-use, others can fire over multiple turns if enemy units remains in range.

SSD is the abbreviation for Ship Systems Diagram. This shows all the systems, weapons, and armor on a ship. In combat the SSD provides an easy visual reference that shows the arcs and ammunition loads of weapons, and is used to record damage.

A Note on Movement and Physics

In this game ships move in a 2-dimensional plane (the tabletop), and maneuver in sweeping arcs. A student of basic physics will know that then universe has three spatial dimensions, and that Newtonian mechanics results in ships maneuvering along vectors, not making sweeping turns like ships at sea.

And this is entirely true, for ships that use rockets (reaction engines).

The engineers and physicists of the Full Thrust universe have found a different means of ship propulsion. The ship drive systems interacts with a universe parallel to our own. This universe has very different physical laws, most obviously it has only two spatial dimensions. The drive system interacts with this parallel universe, generating "traction" which can be used to accelerate the ship in this universe. This creates a reactionless drive, that is the ship (or

missile or fighter) does not need to eject rocket fuel to change speed or direction, all it need to do is pour energy into the drive system. And energy is cheap and easy, thanks to compact fusion reactors.

This parallel-universe 2-dimensional brane is folded and twisted in such a way that it fully occupies the 3-dimensional volume of our own universe. The scale of these folds is in light years, however, so within any particular region of space all of the ships, fighters and missiles must move within the same 2-dimensional plane. The flat table top is thus an accurate representation of how space battles are fought in this universe. The FTL drive allows a ship to "punch through" the local 2-dimensional brane, and access another distant fold, thus moving a large spatial distance in our universe in a relatively short period of time.

The space between the branes that ships pass through when making FTL jumps has even weirder physical laws. To survive in this vary alien universe ships use their own drive systems to generate a little bubble of "real space" around the ship. When different fleets meet in hyperspace their reality-bubbles overlap, forming a space-time cluster in which the ships do battle. Due to the interaction with the neighboring branes, this battle is also limited to a 2-dimension plane. The walls of the space-time bubble are unforgiving, so unlike a battle in real space, battles in hyperspace are constrained by the walls of the bubble, and any ship or unit striking this edge can sustain damage.

Technology Types

There are two basic types of technology at use in the universe, conventional and biological. Conventional technology is used to construct ships of metal and ceramic, with their builders/operators living and working within. The rules listed here are primarily for conventional technology ships. Organic technology ships are biologically grown, living ships. Many organic technology ships have no crew, as the ship itself is alive and aware. Organic technology ships have special rules for movement, power allocation, and some types of weapons fire. Special sections throughout on organic technology handle all the exceptions and special rules for this technology type.

This game also introduces the concept of "technology slots." There is a huge variety of technologies available for ship construction, and not every empire has developed every possible technology. Special, exotic technology costs more "slots" than conventional devices. When players are designing their ships they decide before hand how many slots-worth of technology each player may choose from, and if any technologies are banned. Scenarios involving civil war would see both sides using the same technology choices. 12 slots is sufficient to design a highly varied and capable fleet. Lower technology races may only have 4 slots worth to choose from, while a very high tech species could have 20 or more, resulting in highly advanced, and usually very expensive, warships.

Initial Deployment in Tactical Battles

For battles in real space (as opposed to hyperspace battles, described below in the "Hyperspace" section) fleets deploy along the short table edges, so that they are about 72 mu apart. Each player alternates placing a ship (or group of ships if one player has many more ships) on the table. Ships must be facing the opposite table edge and be within 6 mu of your edge. Ships start with a speed of 1 to 10 mu, forts can be stationary at start. No fighters, missiles or gunboats may be launched before the game begins, unless otherwise specified in a scenario description.

Sequence of Play

1) Write orders
2) Roll for initiative
    a) switchable systems turn on
    b) switchable systems turn off
3) Fighter/ ordnance primary move. Fighters within 3 mu may screen/escort
4) Missile secondary move. Robot Fighter secondary move.
5) Move ships and screening fighters
6) Fighter/Gunboat secondary move. Homing Missile secondary move. Fighters at their carrier may be recovered.
7) Determine Sensor Data
    a) Determine and resolve mine attacks (sweeper fire, detonation, damage effects)
8) Fighter and missiles declare attack runs against enemy *ships*
9) Ships fire: players alternate firing one ship at a time, including that ship's anti-fighter/ordnance fire. Apply damage after all fire.
10) Fighter and ordnance attacks:
    a) Fighter-vs-fighter/ordnance attacks: Those fighter groups that did NOT declare attack runs in phase 8 may fire at enemy fighter groups and ordnance markers. Gunboats Fire.
    b) Fighter-vs-ship attacks: Those fighter groups, which DID declare attack runs in phase 8 now execute those attack runs
    c) Plasma Bolts, AMT's detonate
    d) Surviving missiles attack
11) Turn end (ship repairs, remove markers, marine combat, etc.)

Sequence of Play Explained

Phase 1- writing orders
Each admiral must write orders for every ship and fort under their command every turn. These orders must include (a) the movement orders for the ship- any changes in speed and turns, (b) orders to launch any ordnance, fighters or gunboats, (c) turning on or off any fields or shields, and (d) activation of the FTL system.

Biotech fleets must also allocate their available power into their Attack, Defense, Repair and Movement pools, and then write orders for movement, launch, etc based on that power allocation.

Phase 2- Roll for Initiative
Each player rolls 2d6. The high roll wins initiative. The loser must move their ordnance and fighters first, which is a slight disadvantage allowing the winner more latitude to react.

Phase 2a- Turn on systems
Some systems can be toggled on and off. These include Fire Control, fields and shields, ECM, and Black Globes. Any system noted to turn on in orders phase does so now.

Phase 2b- Turn off systems
Any system noted to turn off does so now.

Phase 3- Fighter/ordnance primary move
Start by launching new fighters and ordnance. Players alternate, each launching a ship at a time. All fighters and ordnance from the launching ship are moved. Newly launched fighters, gunboats and other ordnance may make a full move on the turn of launch. If a player "passes" during the launch phase they may not return, and no more of their ships may launch.

A fighter or gunboat that carries ordnance cannot launch that ordnance on the same turn as it launched.

Once all new launches are done, the missiles, fighters and gunboats already in play are moved. Again alternate, with the loser of initiative moving the first piece. When moving ordnance in flight alternate by individual gunboat, missile or fighter, you do not alternate by ship. This is because in a large combat it can be very difficult to determine which ship every piece of ordnance originated from, or the launching ship might have been destroyed.

Fighters that begin their move within 3 mu of a ship may elect to fly in escort (friendly ship) or screen (enemy ship). The fighter will automatically follow the ship during its' movement. If the ship exceeds speed 24 by spending extra thrust, the fighters are considered to be "swept along", and remain with the ship. Fighters screening/escorting a ship are considered to be very close to the ship. When measuring range consider those fighters to be at the base stem of the ship. Fighters may also launch straight into escort mode, escorting the carrier they launched from. If fighters are screening an enemy ship that ship may fire on the fighters using weapons in every arc.

Phase 4- Missile Secondary Move
Missiles with more than one endurance may make an extra move during this phase. They burn an extra point of combat endurance, and may make a move of up to 12 mu in any direction. Robot fighters may also burn a point of endurance to make a second 12 mu move in any direction.

Phase 5- Move Ships

Each ship is moved according to their written orders. If a ship will strike a planet or moon, it may attempt emergency evasion (see "terrain", below).

Phase 6- Fighter/Gunboat Secondary Move

Fighters and Gunboats with remaining endurance may expend a point of endurance to make a second move. Fighters may move 12 mu in any direction, Gunboats may move 9 mu. Homing missiles may spend a point of endurance to move up to 12 mu in any direction.

Fighters that end this phase within 3 mu of their carriers may land, if sufficient Launch Tubes (landing bays) are available to accommodate them.

Phase 7- Determine Sensor Data

With all ship, fighter, gunboat and ordnance movement completed, ships can now use their sensors to learn about threats in their vicinity. Basic sensor range for ships is 24 mu. For fighters, gunboats and recon missiles the sensor range is 12 mu.

See the sensor rules below for a complete description of what your sensors can tell you.

Phase 7a- Mines attack

If a unit ends its' move within 6 mu of a mine, that mine will attack. If multiple eligible targets are within 6 mu of a mine, it attacks the closest. Damage from mine attacks is resolved immediately. Perform threshold tests as required. Mines capable of engaging fighters and missiles also fire at this time, engaging any that end their movement in their area of coverage.

Phase 8- Fighters and Missiles Declare Attack Runs

Fighters within 6 mu of an enemy ship may declare attack runs. The fighters swoops in to attack, before returning to the position from which it launched its attack. The fighter counter is turned to face the ship it is attacking, but the fighters are not moved.

Missiles within 6 mu of enemy ships must declare an attack run at the nearest enemy ship. They dive in towards the ship and detonate unless stopped by enemy point defense fire.

As the fighters and missiles performing the attack run are very close to the target ship, it limits the ability of allied ships and units to fire on them.

Phase 9- Ships Fire

The players alternate firing ships at one another, the loser of initiative firing first. All ship's fire is considered to be simultaneous for purposes of damage resolution, so a ship damaged or destroyed during phase 9 can still fire before that damage is applied.

During this phase the ship fires at enemy ships within range and also fires its own point-defense weapons against attacking missiles or fighters. A ship equipped with ADFC may fire at fighters or missiles making attack runs on nearby friendly ships.

After all ships have fired apply the damage and take any required threshold tests.

Phase 10- Fighter and ordnance Attacks

After all ships have fired fighters, gunboats and all other ordnance attack. Fire within each sub phase is resolved simultaneously, but at the end of the sub-phase the damage is applied. So an attacking fighter shot-down in 10a cannot fire on its target ship in 10b.

Phase 10a- Fighter vs Fighter/ordnance and Gunboat fire.

Fighters that are not making an attack run on an enemy ship fire now. They may target other fighters within 6 mu, including fighters making an attack run. They may target any piece of ordnance within 6 mu, again including missiles doing attack runs. Fighter may also fire upon Gunboats in range.

Gunboats fire their weapons, against ships, ordnance, fighters or other gunboats. Gunboats may not target fighters or missiles making attack runs unless they have ADFC-enabled weapons on board.

Phase 10b- Fighter vs Ship Attacks

Fighters which declared attack runs now attack their target ships. If the ship was destroyed in phase 9 the fighters may hold fire and not expend their weapons and combat endurance. Robot fighters will continue on and attack the wreckage, expending a combat endurance doing so.

Phase 10c- Plasma Bolts and Antimatter Missiles Detonate

These weapons detonate and damage all ships and units within their blast radius. Missiles are destroyed if in the blast radius. Fighters suffer a 1d6 losses (1d3 for heavy fighters) for every 1d6 of blast damage.

Damage is rolled separately for every model within the blast radius. Some may be lucky and escape with little damage, others will be less lucky.

Phase 10d- Surviving Missiles Attack

Missiles that have not been destroyed in an earlier phase now complete their attack runs, impacting on their target ships. Damage depends on the warhead carried.

Ships now take threshold tests for all damage incurred during phase 10.

Phase 11- End Turn

Ships now perform all end-of-turn activities. This includes damage control and attempts to repel boarders (a form of damage control).
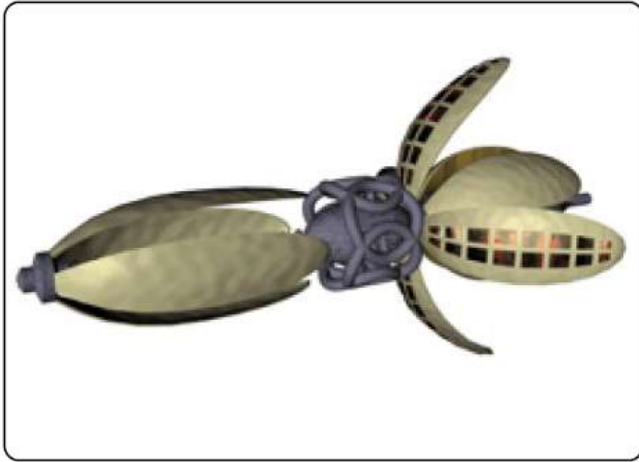
Core Rules

Movement

The movement of any ship is determined by the combination its initial vector and any maneuvers performed during that turn. The ships' vector is its heading and speed. If the ship does not use its engines it will continue to move in the same direction at the same speed indefinitely. A ship can use its engines to maneuver, that is to increase or decrease its speed, and to change direction of flight.

Ships have a drive rating shown on their SSD. The larger the rating, the more thrust the ship has available for maneuvering. A ship may make a number of turns equal to half its thrust rating, rounded down. So a ship of thrust 3 could make one turn, while a thrust 4 ship could make two. (Exception- a thrust 1 ship can still make a single turn.) Turns are in 30-degree increments, and split between the beginning and middle of the ship's movement, to simulate the sweeping arc a turning ship follows. Turns are either to the right or left, and a ship may combine both left and right turns in a single movement in order to "sideslip", that is move to one side while continuing on the same course. Ships can make turns of less than 30 degrees, this must be noted in the orders.

Thrust can also be used to increase or decrease ship speed in proportion to the thrust rating. A thrust 4 ship moving at speed 10 could use its thrust to increase its speed to 14, or decrease it to 6. Thrust used for maneuvering cannot be used for changing speed. So a thrust 4 ship could fly in a straight line and change its speed by 4, or it could make a single turn and change its speed by 3, or it could make two turns and change its speed by 2. A turning ship does not have to change its speed. A ship does not have to use all of its available thrust. A thrust 4 ship could make two turns without changing its speed.

If a ship makes a single turn, this is done half way through the movement. A ship moving at speed 10 would be moved 5 mu, turned 30 degrees, and moved the remaining 5 mu. A ship making two turns would be turned once before movement, then moved half its move, turned a second time, and then moved the remainder of its move. A ship making five turns would be turned twice (60 degrees), moved half its movement, turned three times (90 degrees) and then moved the remaining half of its move.

Advanced Gravity Drives (AGD) allow a ship to make a turn for every point of thrust. A thrust 4 AGD ship could therefore make 4 turns.

The reactionless drives operate by means of traction in a 2-dimensional universe that lies parallel to our own. The nature of this interaction places an effective speed limit on how quickly ships can travel for sustained periods- 24 mu per turn. Exceeding this speed is very difficult, and very energy intensive. A ship can exceed the speed 24 limit by spending thrust, but this does not raise the permanent speed of the ship. For example, a thrust 4 ship moving at speed 24 could expend 4 points of thrust to move a total of 28 mu, but at the end of the turn the ship's speed would still be 24. The extra thrust moved the ship a bit further, but did not result in a permanent speed increase. Some fighters and missiles have overpowered engines allowing them to reach speeds higher than 24.

Ships may not move backwards. Stationary ships may turn to face any direction, even if their engines have been destroyed. The direction of facing is written during the write-orders phase. In place of a single turn a ship may roll along its major axis by 180-degrees, inverting its left and right sides. This is most commonly done to bring intact weapons to bear if the batteries on one side have been disabled.

Movement orders are written to note the change in velocity and any turns. For example, a thrust 6 ship that was moving at speed 15 the previous turn writes the following orders [+3, L, 2R, 18]. The ship is accelerating by 3 up to speed 18 while making 3 turns. The ship is first turned 30 degrees to the left. It moves 9 mu and then makes a 60-degree turn to the right, and then moves the remaining 9 mu.

Some terrain can affect movement, this is detailed under the terrain section.

Sensors

All ships come with basic sensor packages which allow them to track opponent ships, missiles and fighters, and provide information as to the type and composition of enemy ships. The range of basic sensors is 24 mu. Outside of this range enemy ships and missiles can still be tracked and fired upon, but much more limited information is available. All you can determine is the position, velocity, and relative size of the target. Ships outside of 24 mu can be represented with "blips" to show the lack of good sensor information.

"Blips" are designated by size, with each size level corresponding to a range of 50 mass. So a "size 2 blip" would

mark a ship that is between 51 and 100 mass, while a size 4 blip would be used to mark a ship that is somewhere between 151 and 200 mass. Size 0 blips would denote fighters, missiles or gunboats.

Basic sensors reveal the following about an opponent ship within 24 mu:
(1) The exact mass of the target ship
(2) The ship class if it has been encountered before (campaign games)
(3) If a ship is streaming atmosphere (has suffered hull damage)
(4) When a ship is crippled (has lost 2 complete rows of hull boxes)
(5) Type of weapons mounts on target (Beam, K-gun, etc), but not size, number, or arc.
(6) Presence and number of active Fire Control systems, presence of ADFC.
(7) Distinguish Standard, Capital and Anti-Matter missiles
(8) Distinguish fighter and gunboat types if they have been encountered before (campaign game)

More advanced sensors can provide additional information about enemy ships. This is detailed in the technology description for those systems.

Fighters and Gunboats have a basic sensor range of 12 mu.

ECM and Stealth reduce the effective range of sensors. ECM reduces the sensor range by 6 mu per level of ECM installed. Likewise stealth reduces the sensor range by 6 mu for each level of stealth. No ship can be made completely invisible, so sensors (ship or fighter) will always work at a range of 6 mu.

Fire Control

The fire control systems on a ship provide the detailed targeting information required to fire weapons. Without fire control the ship cannot target enemy ships with its heavy anti-ship weapons. Point Defense and Area Defense installations, interceptor pods and scattergun packs have their own guidance systems, and do not require a fire control to defend the ship from fighters or ordnance or to target other ships if used in anti-ship mode. Beam-1's, EMP-1's, Gravitic-1's and K-1's have small backup guidance systems which allow them to fire against attacking fighters or ordnance without requiring Fire Control guidance from the ship.

One Fire Control is required for every ship you target with your weapons, though any number of weapons can be directed by a single Fire Control. When targeting fighters or missiles with anti-ship weapons in free-flight at long range, a Fire Control is required for each missile or fighter wing targeted.

A single fire control is required to direct the launching of ordnance.

Fire Control systems have a maximum detection range of 54 mu. No weapons, including missiles, can be accurately fired at greater than 54 mu.

Fire Arcs

The design, construction, and physics of many weapons limits their effective arcs. While some weapons can be mounted in such a way that they can fire in any directions, most are limited in their field of fire. There are six 60-degree arcs around a ship. These are normally situated so that the front 60-degree arc faces directly forward, extending 30-degrees to either side of the centerline. This is known as the front arc. To left left and right are the left-forward and right-forward arcs. Behind them are the left-rear and right-rear arcs. Directly behind the ship is the rear arc.

Fire arcs can be offset by 30 degrees. This is most often done in ships configured for broadside-combat, as opposed to front-assault combat.
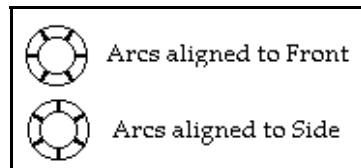
An area 60 degrees wide in the ship's rear is subject to significant distortions when the reactionless drive is used. This region is sometimes referred to as the baffles. If the ship uses its drive during the turn, either to change speed or turn, it cannot fire any weapons into this rear arc, even if the weapon's arcs would normally allow it to fire into the region. The one exception to this rule is dedicated point defense weapons (PDS, ADS, weapons that fire as PDS, scatterpacks, interceptor pods), which use small self-guided projectiles which can target enemy units in the baffles.

Weapon Varieties

There are five different basic types of weapon in wide use in the Full Thrust universe. These are beams, projectile launchers, missiles, gunboats and fighters. Here we describe the basic rules used for each of these systems. Specific sub rules or exceptions are listed in the complete description of each weapon type in the equipment section.

Note that there is a distinction between "hits" and "damage". Most weapons inflict 1 damage, so that the number of hits is equal to the damage caused. More powerful weapons can inflict multiple points of damage per hit. If not otherwise specified, assume that the weapon does 1 damage per hit.

Beams are systems that project beams of energy at the target. Beams usually take the form of lasers or particle

beams, but more exotic weapons can also fall into this category. The basic mechanic for these weapons is the Beam Die (BD*). The Beam Die inflicts one hit on a 4 or 5, and two hits on a 6. The "*" signifies that the beam die penetrates the enemies defenses on a roll of a 6, and is entitled to a reroll. The reroll is also a BD*, so another 6 would inflict another 2 hits, with yet another reroll. Penetrating damage inflicted by the reroll skips any remaining armor and is applied directly to the hull of the target. Die Roll Modifiers (DRMs) are applied to rerolls.

Beam Dice only get to penetrate and reroll on a natural roll of a 6. A beam being fired with a +1 DRM would inflict one hit on a roll of 3-4, 2 hits on a 5, and 2 hits with a reroll on a 6. Conversely a -1 DRM would mean that on a roll of a 5 the beam does 1 hit, and on a 6 it does 1 hit with a reroll.

Most beams are affected by shields. A level 1 shield will cause rolls of "4" to miss. a level 2 shield will cause rolls of "4" to miss, and will only permit one hit on a 5 or 6. A reroll is still allowed on the roll of a 6, and this penetrating hit will ignore the effects of the shields.

Beams tend to generate more dice at close range. Beam weapons have range brackets of 12 mu. They generate a number of beam dice equal to their beam-rating at their closest bracket, and one less die is each subsequent bracket. So a beam-3 would generate 3 BD* to 12mu, 2 BD*to 24 mu, and 1 BD* to 36 mu.

Projectile Launchers propel some kind of physical projectile towards the enemy. They are very accurate at close range, but their accuracy decreases with distance. Most projectile weapons have 6 mu range bands, though long and short-range versions are often available which use longer (9mu) or shorter (4 mu) range bands. At the shortest range (0 to 6 u) the launcher hits on a 2+, with the hit number dropping by one each range bracket further out. So from 6 to 12 mu it would hit on a 3+, and 24 to 30 mu it would only hit on a 6.

Projectiles ignore shields.

Common projectile launchers include pulse torpedoes and kinetic guns. Organic technology ships have pod launchers which function in a similar manner.

Missiles are self-guided micro-ships with a small drive unit, guidance system, and a warhead. While a Fire Control system is needed to feed initial data and launch a missile, once in flight no further Fire Control support is needed. Missiles come in three basic varieties, Capital Missiles, Standard Missiles and Salvo Missiles.

Capital Missiles move at a speed of 24 mu, and have an endurance of 1 to 5 depending on the type. Each turn in flight the missile can move up to 24 mu in any direction and consumes one point of endurance. If a missile ends its movement within 6 mu of an enemy ship, it attacks. If multiple enemy ships are within 6 mu, then the missiles will attack the closest enemy. Capital missiles may supercharge their drive systems to gain a bit of extra speed. By spending an extra point of endurance, the missile may move an additional 12 mu in any direction.

On the turn of launch Capital missiles must stay within the arc of the launcher for their initial 24 mu move, if they make a subsequent 12 mu secondary move this can take them out of the arc of the launcher.

If at the end of a turn a missile has no remaining endurance, it is destroyed. Missiles do not require a point of endurance to attack, they automatically attack the nearest enemy within 6 mu.

Standard Missiles are smaller versions of Capital missiles, and move in the same manner. Standard missiles have less endurance, and smaller warheads.

Salvo Missiles only have a single turns worth of endurance, but have a speed of 24 mu or 36 mu (ER versions). Like the Capital missile, they will attack the closest enemy ship that is within their 6 mu attack envelope. A Salvo Missile is a group of 6 small missiles that all attack the nearest target.

Fighters are very small ships with limited range and endurance. They operate in groups of six, and are carried within the hanger bays of larger ships. Fighters are fast and maneuverable. They may move in any direction each turn, and are not limited by facing, nor must they make segmented turns like ships. Most Fighters are limited to an attack radius of 6 mu. Fighters have limited combat endurance, this endurance is used by firing weapons, and by pushing the engines to attain extra speed. Unlike missiles, normal fighter movement does not consume endurance. Once a fighter runs out of endurance it may still move normally, but it may not fire any weapons.

Fighters are carried in Hanger Bays, and launched and recovered using Launch Tubes. A ship may launch as many squadrons of fighters per turn as it has launch tubes. It may recover a number of squadrons equal to half its number of launch tubes, rounded up. A launch tube may not both launch and recover fighters on the same turn, though a ship with multiple launch tubes it may have fighters launching and landing on the same turn.

Robot Fighters replace the pilot with a computer control system. This reduces the cost and complexity of the fighter. However, the computer is not as good as a living pilot at reacting during combat, thus robot fighters must make their secondary movement at the same time as missiles.

Gunboats are small ships. They are small enough to gain the many of maneuverability advantages of fighters, and large enough to mount weapons with a longer range than most fighters. Like fighters they fly in squadrons of six. Their heavy construction makes them very resistant to anti-fighter

weapons, they take damage like a plasma bolt (-2 DRM from PDS, scatterpacks inflict 1 BD* hits) from anti-fighter/ordnance weapons. Gunboats are large enough, however, that they can be tracked an engaged by regular anti-ship weapons quite effectively. One fire control is required for each Gunboat group engaged. When fighters engage gunboats they may use either their anti-ship or their anti-fighter (with a -2 DRM) weapons.

Gunboats will not trigger the homing system of Missiles. They can be engaged with rockets, however.

Ordnance

Ordnance is a major class of weapons that encompasses capital and standard missiles, salvo missiles, rockets, Anti-Matter missiles and Plasma Bolts. They are launched during phase 3- fighter & missile primary move.

Ordnance can move in two different ways. Missiles (anti-matter, salvo, standard and capital) and Plasma Bolts are moved up to their maximum range within the arc of the launcher and placed on the tabletop. They may not be moved through a planet and placed on the other side, but must have a line of sight from launch point to destination. They can be fired through dust clouds and meteors swarms, though they may be damaged by the meteors (see Terrain rules below). They have no facing. Every turn the missile consumes 1 point of endurance. If a missile runs out of endurance before it can attack a ship, it is destroyed. A point of endurance is not required to attack a ship.

Some ordnance launchers are fed by a magazine, and can fire one weapon per turn so long as ammunition remains. Each launcher can be linked to only one magazine, though multiple launchers can all link to a single large magazine. If the magazine is lost to a failed threshold test, none of the associated launchers may fire until the magazine is repaired.

Rockets are launched at the same time as other ordnance. They differ in that on launch the launching ship declares their target, and makes a roll to hit based on the range at time of launch. Every rocket that "hits" is placed next to its target, and is considered to be making an attack run. During phase 10d the rockets join any other missiles attacking that ship. Rockets can be engaged by the target's point defense weapons like a missile. Rockets, whether launched from a fighter or a rocket-pod, count as individual targets for point defense fire.

Salvo, Standard, Capital and Anti-Matter missiles attack the nearest enemy ship or fort within 6 mu. If their target ship is destroyed before missile impact (destroyed by ship's or fighter's fire) the missiles impact on the rubble of the ship, ruining the day of any survivors trapped within the wreckage.

Missiles may be engaged in two different ways. Ships may engage Capital and Standard missiles in free-flight with their anti-ship weapons. These weapons suffer a -2 DRM penalty to hit. Each missile targeted requires its own fire control, and is a separate target, even if two missiles are "right on top of each other." Missiles that have begun an Attack Run, that is attacking a ship or fort within 6 mu, can only be engaged by that ship/fort's own defenses, or by ADFC controlled PDS on ships within 6 mu. Scatterpacks and interceptor pods have integral ADFC capabilities and can be used to support allied ships within range.

Beam-1, EMP-1, Grav-1 and K-1 weapons can be used in self-defense against ordnance and fighters. They are less likely to hit such nimble targets, so they suffering a -1 DRM and do not get rerolls. Used in this mode, these weapons do not require a separate Fire Control per target. K-1's fire when the target is in the closest range band. PDS systems generate 1 BD* hits against incoming missiles. The rerolls are important when engaging fighter wings, salvo missiles and anti-matter missiles, where multiple hits are required to completely destroy them. Against capital and standard missiles and rockets rerolls are irrelevant, as one hit kills them.

Scatterpacks and Interceptor pods automatically destroy capital/standard missiles and rockets, and inflict 1d6 hits on salvo and anti-matter missiles.

Plasma bolts are especially difficult to target with point defense-type weapons. Beam-1, EMP-1, Grav-1, and K-1 systems may not be used. PDS suffers a -2 DRM, so only hits on a 6 (though it does get to reroll, again with a -2 DRM), and scatterpacks and interceptor pods inflict 1 BD* hits.

Fighters

Fighters are a weapon system that blend the rules of conventional ships and ordnance. Many fighters have weapons that can be used on multiple turns, and are capable of engaging ships, ordnance or other fighters. Fighters are carried into battle in Hanger Bays, and launched and recovered using Launch Tubes. Every fighter squadron starts with 6 fighters, though this size will drop as casualties accrue.

Fighters have limited endurance. Normal flight does not consume any endurance, but making secondary moves or attacking other units does. Fighters have 6 points of combat endurance, Long Range fighters have 9 points of combat endurance. Making a secondary move in phase 6 consumes 1 point of combat endurance. Fighter attacks during phase 10 consume one or more points of combat endurance. Most fighters use only 1 endurance to attack but some (Plasma, Needle) use two points of endurance every time they attack.

Fighters may only attack once per turn, even if they have remaining endurance. A fighter with no endurance remaining may still fly at its normal speed (24 for normal fighters, 36 for fast fighters), but they may not make secondary moves, and if attacked they cannot fire back.

Fighters are launched and recovered using Launch Tubes. Each launch tube can launch one squadron of fighters from an attached hanger bay each turn. Fighters are recovered using launch tubes, but this is a slower process. A carrier can recover a number of squadrons per turn equal to half its total number of launch tubes, rounded up. A launch tube cannot both launch and recover on the same turn, though a carrier with multiple launch tubes could split its activity between launching and recovering.

If a friendly fighter is within 3 mu of a carrier at the end of phase 6 it may be recovered. The fighter does not have to expend any endurance to land. Fighters may be recovered by any allied carrier that has a launch tube (landing bay) available.

Rearming and reloading fighters takes time. Under normal circumstances it takes one complete turn to prep the fighter for launch again, but the stress and confusion of combat is far from normal. Roll a d6 when the fighter wing is recovered. On a 1 something has gone wrong, and it will take an additional turn to prepare the fighters for launch. On a 2-5 it takes the normal 1 turns to prepare the fighters. On a roll of a 6 the maintenance crews have set new speed records, and the fighters are ready to go immediately.

So, if fighters were recovered on turn 4 they would normally be ready for launch again at the beginning of turn 6. On a roll of "1" they would not be available until the start of turn 7. On a "6" they would be ready to launch at the beginning of turn 5.

To rearm and refuel a fighter wing (restore its combat endurance back to maximum and replace any 1-shot weapons) the carrier must have the proper equipment. Carriers can rearm fighter wings from other carriers, so long as they are properly equipped. To be properly equipped, that carrier must have the same type of fighter as part of its normal combat wing. So a carrier that had two wings of standard fighters, a wing of interceptors, and a wing of torpedo fighters could rearm/refuel standard, interceptor or torpedo fighters from any allied carrier. The Robot, Fast, Long Range, and Heavy modifiers to not influence the ability of a carrier to rearm the fighters. Carriers cannot replace any losses suffered by the fighter wing during combat. Nor can fighter wings combined or re-amalgamated during combat.

If a fighter ends it movement within 6 mu of an eligible enemy ship or base, it may commence an Attack Run. The fighters do not move, they are simply turned to point towards the enemy unit they are attacking. Fighters may also fire on enemy fighters, mines, gunboats and ordnance within 6 mu, though they do not declare an attack run to do so, and thus remain in free-flight for targeting purposes. Fighters firing on other fighters, mines or ordnance do not receive a negative DRM for their opponents being in "free flight", as they designed for attacking such targets.

Ships may fire on fighters in free flight with their

anti-ship weapons. Because of the small size and maneuverability of fighters, these weapons suffer a -2 DRM. Fighters making an attack run against ships can only be engaged by that ships' defensive weapons (PDS, ADS, scatterpacks, B-1, EMP-1, Grav-1 or K-1), or by ADFC-directed point defense fire from allied ships within 6 mu. Fighters in free-flight (not making an attack run) that end their movement within 6 mu of an enemy ship may be engaged by the PDS on that ship, without the -2 DRM penalty.

Because of their speed and maneuverability, fighters are very well suited to shooting down other small craft and ordnance. All fighters count as having ADFC and can fire at enemy fighters or ordnance attacking a friendly ship within 6 mu.

Robot Fighters perform exactly like normal fighters with two exceptions. They make their secondary (endurance burning) move at the same time as missiles, before ships move and before piloted fighters. Also, if their target ship is destroyed before they fire, they complete their attack run on the wreckage like a missile, expending their endurance (and even their 1-shot weapons) on the debris.
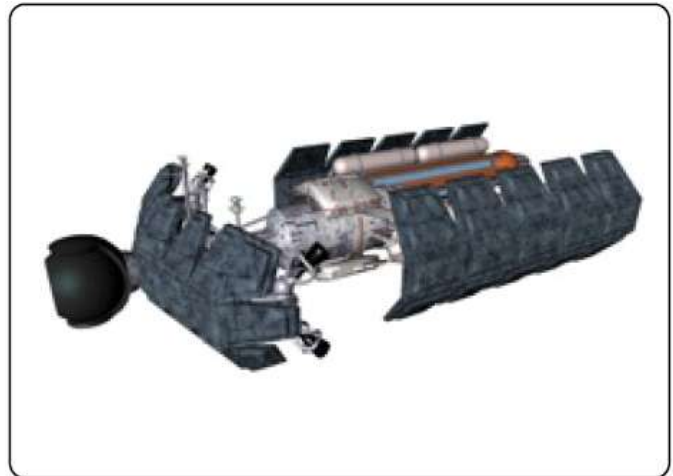
Gunboats

Gunboats are an interesting military unit. In design and tactical use they straddle the line between a very small ship, and a very large fighter. Gunboats are carried on hull-mounted racks, and are launched at the same time as other ordnance/fighters. They operate in squadrons of six, like fighters.

Gunboats have a speed of 18mu, and move like fighters. They can fly in escort of a ship like fighters. Gunboats have six points of combat endurance. This endurance is used to make attacks on enemy ships, fighters or ordnance. It can also be used to make a secondary move of 9 mu during the fighter second movement phase (phase 6).

The larger size of gunboats means that they are

engaged by anti-ship weaponry more easily than fighters. Anti-ship weapons may fire at Gunboats normally, with each hit destroying one gunboat. (A single point of damage is sufficient to destroy a gunboat.) Gunboats are well armored against the lighter PDS-type weapons. PDS weapons engage Gunboats like Plasma bolts, that is a -2 DRM for BD* attacks, and scatterguns/interceptor pods cause a BD* of hits.

Gunboats fire during phase 10a, the same time as fighter-vs-fighter fire. Gunboats mount slightly larger and more powerful fire control systems than those on fighters, allowing them to engage targets up to 12 mu away. The entire Gunboat squadron must all target the same enemy ship. If the gunboat squadron is engaging enemy fighters or ordnance, it may split its fire among eligible targets within range, just like fighters.

Gunboat armaments vary widely. The weapons in use on ships by the building empire may be modified to fit onto Gunboat hulls. See the Gunboat system description for options and costs.

FTL Gunboats can enter the table using its FTL like a ship. This does not consume a point of endurance. Like a ship the FTL Gunboat enters with a speed between 1 and 10, and makes a half-move straight ahead. The Gunboat can then use endurance to make a second move of 9 mu in any direction. FTL Gunboats are very vulnerable to distortion effects on their miniaturized drive systems, if they jump or arrive within 6 mu of a "massive object", they are automatically destroyed.

Marines

It is possible to deliver boarding parties (marines) onto enemy ships, either by means of boarding torpedoes or by using Transporter beams. Once on board the marines try to disable key systems, disrupt the ship's internal communication, kill the crew, and knock out power systems. Meanwhile the ship's own marines and crew are fighting back, trying to kill all the invaders.

A ship can attempt to destroy invading boarding parties as a damage control action. Each enemy boarder (marine) must be targeted separately. Like repairing systems, the chance of killing an enemy marine depends on how many crew units are assigned to the action. One will kill the boarder on a "6", two will kill it on a 5 or 6, and three will kill it on a 4+.

A ship with embarked marines or its own may may use them to destroy attacking boarders. They are much more effective at this role than the ship's own crew, as they have the training and equipment for close combat. Marines hit and kill attacking boarders on a 4+. Attacking boarders (who are also marines) can target defending marines in stead of doing damage to the ship. They hit and kill defending marines on a 4+. Marine on boarder fire is simultaneous. Attacking boarders cannot target and kill the ships crew, they can only reduce the crew by destroying hull boxes.

After all attempts to kill enemy boarders are completed inflict one point of damage on the ship for every enemy boarder that remains and did not spend the turn engaging ships ships' own marine defenders. This damage may require the ship to take threshold tests if a row of hull boxes is destroyed.

These actions all take place during phase 11.
First- crew can try and kill boarders as a damage control roll. Remove any casualties.
Second- Marines and boarders may fire on each other, inflicting kills on a 4+.
Third- Remaining boarders that did not attack the defending marines do one point of damage each to the ship.

Marines and boarders cannot be killed in a threshold test caused by boarder action. Both marines and boarders are vulnerable to being killed in threshold tests caused by weapons fire on the ship.

If a ship is "destroyed" by boarders it is considered captured. While the ship cannot be used in that combat (it is too badly shot-up to be of much use), if the boarder's side wins and holds the field they can take the ship home for study, or as a trophy. Captured ships can still be targeted by ships and ordnance, so an empire may fire upon and destroy their own captured ships to prevent them from falling into enemy hands. A single point of damage is sufficient to destroy the captured ship.

If a ship jumps away into FTL with enemy marines on board, the battle for control of the ship continues. Fight out the boarding action until either all the boarders are killed, or the ship is destroyed. Even if the boarders "win" in this circumstance their situation is dire, as the crippled ship will now drift off course and become lost forever in hyperspace.

Biotech ships must generate marines from the ships' biomass. This is the only way a biotech ship can fight against enemy boarders or make marines for transporter attacks on enemy ships. Power must be allocated to the repair pool during orders, and it requires 3 power and 2 biomass for each Marine created. Marines are created (and reabsorbed, if required) during phase 3. All biotech ships have the capability to generate marines, so long as they have sufficient biomass available. They cannot make damage control rolls like conventional technology ships to kill attacking boarders.

Mines

Mines are small, autonomous weapon platforms that are typically deployed to defend fixed strategic assets such as forts and valuable planets. There is a very wide variety of mine types, almost every weapon system has been adapted by some species for deployment in a mine. Some mines are one-shot weapons (missiles, plasma bombs) that fire off their weapon, and are destroyed in the process. Others have

multiple use weapons, usually coupled to a miniature power plant, that allow them to be used repeatedly. These mines may fire once per turn.

Mines all have low-power passive detection systems that limit their engagement range to 6 mu. The passive detection system does have a major advantage, it makes mines difficult to track and engage.

Mines can only be detected at half the normal sensor range. So ships with basic sensors detect mines at 12 mu, and fighters, gunboats and recon missiles detect mines at 6 mu. Ships with enhanced sensors can detect mines at greater range, their range being one-half the detection range against ships. Undetected mines are not placed on the table top. The player using the mines records the positions of the mines relative to a fixed object (usually a base). A fast moving ship can blunder deep into a mine field before it realizes it is in danger.

Mines are equipped with IFF systems that prevent them from attacking friendly ships.

Mines can be set in four different operation modes: anti-ship, anti-ordnance, combined, and command detonation. In anti-ship mode the mine will attack any enemy ships that enters range, but will ignore fighters, gunboats and other ordnance. In anti-ordnance mode it will ignore ships, but attack fighters, gunboats and ordnance. In combined mode the mine will attack any eligible target. Command detonation mode changes the mechanism of mine operation slightly. A command detonated mine must be with 24 mu of a controlling ship or fort with an operating fire control. The mine still has a 6 mu range, but now attacks during its normal fire phase. So direct fire mines would fire during phase 9, while ordnance mines would attack during the appropriate phase 10 subphase.

If a Beam, EMP, or K-gun mine engages ordnance, it does so as if they were in "free flight." So they suffer a -2 DRM, and cannot engage plasma bombs. They suffer the normal -1 DRM for engaging gunboats.

If a mine successfully strikes an ordnance that takes multiple hits to kill such as an anti matter missile or a large plasma bomb, each hit from mines degrades the warhead of the projectile, as it they were taking fire from a ship's defensive point defense fire.

Deploying mines is a slow process, done by specially modified freighters. Mines may not be deployed during a tactical game. They are used in strategic games, and may be purchased in a defense scenario where one player is defending a fixed asset (base, planet, wormhole, etc).

Because mines cannot be seen until they are quite close, it is best if they are not deployed on the table top. The attacker may or may not know if mines are present, depending on the scenario. The defender records the positions of the mines relative to the object the are deployed

to protect. For example: "a ring of 24 pulse torpedo mines 12 mu from the base, and a ring of 6 beam mines 3 mu from the base." Mines should be deployed around the object being defended, not simply in a line between attacker and defender, as the defender could not know the exact approach vector of the attacker before hand and thus must deploy mines all-around.

Mines activate and attack after the movement phase. Any eligible target that ends its move within 6 mu of a mine. Attacks from the mine, including ordnance attacks, are resolved immediately.

Ships can attempt to engage mines with their anti-ship weapons from out outside of mine detonation range. Maximum range for anti-mine fire is 12 mu. Anti-ship weapons suffer a -2 DRM when used against mines. Each mine is engaged separately, and requires its own Fire Control. Ships that end their movement within 6 mu of a mine may engage that mine with their PDS weapons. These hit as if engaging a normal fighter or missile (hit on a 4 for PDS, fire with -1 DRM for B-1, EMP-1, Grav-1 and K-1, hit automatically for scatterpack and interceptor pod), but fire during phase 9, after the mine has fired. Thus this is only effective for destroying mines that can fire over multiple turns.

A ship that is engaged by an ordnance mine (missiles, plasma bombs) may attempt to shoot down the ordnance with their PDS systems and other eligible anti-ordnance weapons. Those weapons used to engage the incoming mine-ordnance may not be used again later in the turn during phase 9, ships fire.

Ships equipped with a Minesweeper system can engage mines before they detonate. Only PDS-type weapons may be used in minesweeper-fire mode. These fire during phase 7a, before the mine detonates/triggers. Mines are hit normally as ordnance, as above. Weapons used in this fashion may not be used during phase 9. If an ordnance mine is not destroyed and attacks the minesweeper, any unused defensive weapons can then be used to defend against the ordnance.

The damage inflicted by mines is applied immediately. Ships that lose at least one row must take appropriate threshold tests at the end of the mine-attack phase.
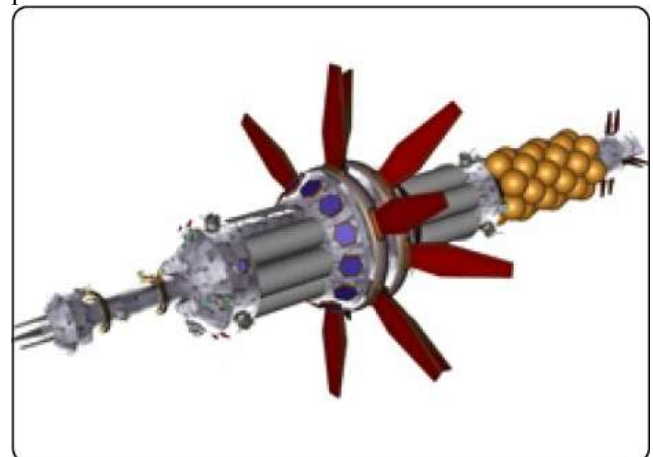
Ships' Fire

Phase 9, when ships fire their main armaments, is when most of the carnage is served out to the enemy. All fire is assumed to be simultaneous, so a ship destroyed by enemy fire may still fire back. Players alternate firing ships. This alternation is important, as you can adjust your firing priorities based on the success or failure of other ships to hit and destroy their targets.

During this phase a ship may:
-Fire its Beam-type and projectile weapons at any enemy ship within range and in-arc. Multiple enemy ships may be engaged, providing there is one Fire Control assigned to each target. The same weapon cannot be fired multiple times in a single turn. Nor can a weapon that generates multiple dice split those dice between two different targets.

-Fire it PDS-type weapons (PDS, Beam-1, EMP-1, Grav-1 and K-1 (all varieties), scatterpacks, interceptor pods) against enemy fighter and ordnance that are making an attack run against that ship.

-If the ship is equipped with Area Defense Fire Control (ADFC) it can fire its PDS or ADS at enemy fighters and ordnance that are making attack runs against an allied ship within 6 mu. A single ADFC allows the ship to support any number of allied ships within 6 mu, though each PDS-type weapon can only be fired once per turn. Scatterpacks and Interceptor Pods come equipped with ADFC, and can be used to support nearby allied ships.

-A ship may fire its point defense or scatterpacks at enemy ships within 6 mu. These do not require a fire control system, and may be fired into the "baffles" created by an active drive system.

Once all ships have fired, the effects of the damage are resolved. If a ship explodes due to antimatter detonation (failed threshold test on an antimatter weapon), apply the extra damage to any ships within the blast radius before they take their threshold tests.

Missile and Fighter Attacks

Play can become complicated when large numbers of missiles and fighters engage a battle line. To simplify matters the attacks have been split into a number of distinct sub-phases (10a through 10d). The effects of each sub-phase are applied before proceeding. So if an intact fighter wing making an attack run took two casualties during phase 10a, then only four fighters are available to fire in phase 10b. All fire within each sub-phase is considered simultaneous.

The Attack Run is a special combat maneuver performed by missiles and fighters. This is where they select a single target, and begin their final attack. For missiles this involves a final movement of up to 6 mu, ending with impact and detonation if not stopped by defensive fire. Fighters are not moved towards their target, rather they may select and fire upon any single eligible enemy ship within 6 mu. Once a fighter or missile has commenced an attack run, it can only be engaged by defense fire from the target ship, or from a supporting ship equipped with ADFC.

It is possible a ship could be destroyed after the missiles or fighters have declared their attack run, but before the actual attack. A missile will continue its run and impact on the wreckage. Fighters have smarter crews, while they do not have time to redirect their attack towards another enemy ship, they can abort their own fire mission and thus save the combat endurance for later. Robot fighters are not so smart, and will pound the wreckage just like missiles, consuming a combat endurance.

Fighters that are not engaging in an attack run have the opportunity to fire upon ordnance and other fighters within 6 mu. The controller of the fighters can elect to split their fire among multiple eligible targets within range. How the fire is to be split must be decided before any dice are rolled. Fighter-on-fighter fire is resolved simultaneously, like ship fire, with players alternating firing fighter squadrons.

Fighter squadrons (or wings) start with 6 fighters. Every successful hit destroys one fighter. Weapons that only inflict one hit, but with multiple points of damage, only destroy a single fighter. Fighters caught in the blast radius of a plasma bomb or antimatter missile suffer a number of losses equal to the damage rolled. So a size-1 plasma bolt would destroy 1d6 fighters, or 1d3 heavy fighters.

Ship Damage

It is important to first distinguish between hits and damage. The hit determines if, and how many times, the gunners have successfully directed their weapons into the target. The damage inflicted by those hits depends on the nature of the weapon used. Some weapons inflict damage that partially bypasses armor. Others do no physical damage to the ship, rather they cause disruption of the electronic systems on board.

Damage is normally applied from left to right, starting with the armor. Once all the armor is gone, damage is applied to the first row of hull boxes. If the last box in a row of hull is destroyed, the ship will need to make Threshold Tests for all its systems (see below). If the ship loses its last hull box, it is destroyed.

Some weapons and damage effects can skip some or most of the armor, and do their damage directly to the hull. This is important for ships with large amounts of armor, especially regenerating armor.

Penetrating Damage. Beam-type weapons, on a roll of a natural 6, can penetrate armor and cause additional internal damage. The damage from that initial roll of 6 is applied to the armor, but any subsequent damage from rerolls is applied

directly to the hull.

Armor Piercing (AP) weapons are designed to efficiently punch through armor and deliver most of their damage to the hull. If an AP weapon causes multiple points of damage from a single hit, then the first point is applied to the armor, and the remainder to the hull.
Example: a large kinetic gun hits a ship for 10 damage. 1 is applied to the armor, the remaining 9 to the hull.

Semi-Armor Piercing (SAP) weapons have some ability to penetrate armor. If a SAP hit inflicts multiple points of damage, then half is applied to the armor (rounding up), and the remainder to the hull.
Example: a missile strikes a ship for 7 points of damage. 4 is applied to the armor, 3 to the hull.

Threshold Tests

When intense beams of energy start to carve up the interior of a warship, some mechanical failure can be expected. When a ship loses a row of hull boxes, it must make a threshold test for every system in the ship- that is every icon that appears on the ship SSD. If a system fails a threshold test, it has been taken temporarily out of action until the crew can make repairs. The difficulty of the threshold test depends on how much damage a ship has taken, and how suddenly that damage is inflicted.

All systems but the main drive are knocked out by a single threshold failure. The drive drops to half power (rounded down) after the first failed threshold, and drops to zero after a second failed test. Note that some systems can be lost progressively, so a ship with Shield-2 that loses one of its shield generators will drop to Shield-1.

The loss of the first row incurs a threshold test of "6", that is on a die roll of 6 a system is knocked out. If the second row of hull boxes is lost, the threshold drops to a 5+, and on the third row it drops to a 4+. Ships of a more delicate construction can have more than 4 rows of hull boxes, leading to threshold tests of as little as 2+. These tend to be civilian ships not designed for the rigors of combat.

If more than one row of hull boxes is lost in a single damage phase, then the difficulty of the threshold test is increased by 1. So if a ship lost the first two hull rows in a massive volley, the threshold test would increase from 5+ to 4+.

A ship may make multiple threshold tests throughout the turn. Damage from mines is resolved before ships fire, and so on. Increased threshold tests from multiple rows lost only is incurred if all that damage was done in the same phase.

When a ship loses its last hull box all systems are assumed to have failed a final threshold test- meaning any antimatter weapons carried explode.

When a Biotech ship loses a row it also automatically loses the generator group associated with that mass of hull. Generators cannot be disabled by failed threshold, EMP or Needle fire. Normal threshold tests are taken for all other systems on a Biotech ship.

Damage Control

While damage is an inevitable part of combat, the trained crews of warships stand ready to make repairs and keep a ship fighting. These repairs can be performed on any system that has failed a threshold test, even systems that failed that turn. The drive, the only system with two levels of damage, can be repaired one step at a time.

The number of repairs that can be done depends on how many crew are still alive. A ship has 1 crew for every 20 mass, or fraction thereof. They are lost as hull boxes are destroyed (see the ship design sections for details of crew allotment).

If a single crew unit attempts to repair a system, that system is repaired on a roll of "6". Additional crew can be added to improve the chance of repair. Two crew will repair a system on 5+, three on 4+. Three is the most crew that can work to repair a system. You cannot roll multiple times to repair a single system in a turn.

Many different systems can be repaired in a single turn, if there are enough crew present.

Biotech ships use a different repair mechanic. They must allocate power equal to the mass of the system being repaired into the repair pool. During the damage control phase they then roll, repairing the system on a 4+. If the system is repaired, a single point of biomass is consumed. No biomass is consumed if the repair roll fails. The delay in allocating energy means that unless the ship had sufficient spare (unused) power left in its repair pool, the repair of a system lost to a threshold test is delayed by a turn.

Entering or Leaving the Table via FTL

Starships come equipped with Faster Than Light drives which, upon activation, tear a hole in the normal fabric of space-time. Ships can exploit these holes-in-space to cover interstellar distances quickly.

The FTL drive can be used to enter a battle, or to leave and escape a losing combat. To use FTL to enter the battlefield, one player must by either the scenario design or campaign structure be designated the attacker. Either side can use FTL to try and escape a losing battle.

Leaving via FTL-
To leave a combat a ship must first energize it's FTL system. During the orders phase record "FTL warm-up" as

the ships orders. All other ships on the table will be able to detect this process, due to the exotic energies leaking from the FTL system. Energizing an FTL system is a delicate, energy-intensive process. The ship may neither fire nor maneuver while warming up the system. The only exception is that defensive weapons may be fired against attacking ordnance/fighters.

The turn after the ship may jump. If it jumps it moves a half-move straight ahead, and then disappears. A ship may abort its jump, but if it does so it will have to re-energize its FTL system again before it can jump.

The FTL system causes huge distortions in the fabric of space-time, and as such it is very sensitive to the presence of other large objects nearby. If there is a planet, asteroid, or ship within 6 mu of the jumping ship, it must roll for a potential mishap on the table below. Ordnance, fighters and gunboats lack the mass to interfere with the FTL drive, so their presence within 6 mu does not necessitate a roll on the table. The distortion wave will inflict a BD* hits on any fighters, missiles or gunboats in the 6 mu effect area.

If a ship leaves the table via FTL it may not return to that battle.

If jumping out with an object within 6mu. Roll a d6.
1 FTL fails to engage.
2-4 The ship jumps away safely, but everyone else within 6 mu takes 1d6 damage.
5-6 The jumping ship explodes. Everyone within 6 mu suffers damage equal to the original (undamaged) hull of the jumping ship.

Damage is applied to armor first and cannot be reduced by shields or fields, except for the Black Globe which would block all damage.

Entering via FTL-
A ship may also use its FTL drive to enter a battle. Such circumstances can happen in a designed scenario, or in a campaign game when one player is attacking a system controlled by another player. The attacker decides if his ships will be entering via FTL, what turn they will appear, the planned entry point, and the initial vector of the ship. The entire fleet must elect to either warp-assault the system, or approach in real space. It is impossible to coordinate a mixed-type assault. The entry point for each ship is recorded as coordinates (x,y- the distance along each axis of the table). Entry speed can be between 1 and 10, and the direction may be recorded as a "clock face" based on a pre-agreed "top" edge of the table. Once the attacker has assigned his attack coordinates, the defender deploys their ships anywhere on the table, with a heading of their choice and a speed of 1 to 10. The defenders ships should have headings that will keep them on the table.

If the defender has forts then the attacker has a much better idea where the defender will be. The defender places the forts (but not the mobile assets) on the table before the attacker writes his entry coordinates. But the data on the fort location is not exact. After the attacker has written their FTL emergence orders, move the forts 2d6 mu in a random direction. Forts that are deployed as a group move as a group during the scatter, they are not dispersed. Forts cannot randomly scatter into adverse terrain, the defender can elect to reroll the scatter direction in that case.

The science of FTL travel is tricky, and ship rarely emerges exactly where predicted. Each ship entering the table via FTL rolls a scatter die (a die with arrows on each face) or a d12 (if using "clock-face" directions) to determine the direction of the scatter, and a d6 to determine the distance of scatter in mu. If a "6" s rolled, roll another d6 and multiple the results (so a second "6" would see the ship moved 36 mu in the indicated direction!

If a ship emerges within a planet or moon, it is instantly destroyed. If there is a solid object (planet, asteroid, ship) within 6 mu of the actually entry point of the ship, the emerging ship will be damaged. Roll a d6. On a 1 to 5 the ship takes an amount of damage equal to the die roll, applied to armor first. On a roll of a 6 roll a second d6 and multiple the results to determine the damage caused. The solid objects will also suffer damage. Roll a d6 for every ship or fort within the distortion area. They suffer damage just like the ship does. Fighters, missiles or gunboats caught in the distortion wave suffer a BD* hits.

Note that advanced FTL systems have smaller "distortion waves", this means that ships equipped with them need only roll if a solid object is within the more limited radius (3 mu), and likewise the distortion wave does not extend as far so is less likely to catch and damage other units. Ships with super-advanced FTL drives generate no distortion wave.

Ships appear during phase 5-ships' movement. This is after fighter/ordnance launch, so the attacking ship will not be able to launch until the next turn.

Unless otherwise specified in a scenario, defenders may not pre-launch any ordnance. As these craft have limited endurance, and the defenders don't know exactly when the attackers will appear, they must hold back until the first enemy ship appears. They can maintain a "Combat Space Patrol" with fighters and gunboats. 25% of the fighters or gunboats may be in space on the first turn of the game. If the defender wishes to have only some specific fighter or gunboat types available for CSP, then only 25% of those available units can be in space. These units will have expended some of their endurance. Roll a d3 for each fighter squadron or gunboat, and subtract that much endurance.

A ship can enter the table with the shields up, including vapor shrouds and black globes.

The FTL system can be used to leave a hyperspace sector during combat. They cannot be used to "drop into" a hyperspace sector, as all ships enter the hyperspace bubble

through the edges on turn 1.

Fleeing battles without FTL

Circumstances can arise when a ship may be able to flee a battle in normal space. In campaign games this can be in situations where the battle is taking place in a multi-sector planetary system. If a ship can escape weapons range of its pursuers, and has a thrust rating equal to or greater than the pursuers, it is considered to have escaped.

If a ship is deliberately running from a battle, it can be ruled to have disengaged and ceded the system to the opponent. This sort of running is distinct from "tactical retreats" to escape missiles, rearm fighters, or repair battle damage. A Game Master or neutral third party can be useful in determining when one player is simply avoiding combat. In long chases you may as an optional rule determine that fighters and gunboats consume 1 point of combat endurance every 5 turns or normal flight.

Terrain

The universe is almost entirely empty. A ship wandering randomly though interstellar space could go billions of years without ever striking another solid object.

But intelligent beings don't tend to wander around interstellar space that much. They are interested in stars and planets. The gravity wells of these objects can collect moons, asteroids, meteor showers, clouds of dust and other objects collectively referred to as terrain.

Ships and fighters are built to withstand impacts from tiny micro-meteorites and withstand the cosmic radiation that permeates space (remember, the universe is nuclear powered, and all those stars are pumping out lots of hard radiation). When the density of matter or energy gets too great, ships feel the effect. This can result in degradation of firing solutions, making it harder to hit opponents, or it in damage to ships that run into solid objects at very high speed.

Players can agree on terrain before a scenario, or simply distribute 1d6-3 pieces of random terrain about the play area.

Meteor Showers are filled with tiny meteorites, most pebble-sized. But running into a pebble at speeds of hundreds of kilometers a second can cause great damage even to an armored warship. Most meteor have densities from 1-6, rolled at scenario start. If a ship, fighter or ordnance passes through the meteor shower, it could take damage. Roll a number of BD* equal to the density of the shower. The damage caused by the hits depends on the speed the ship was going. Speeds up to 6 mu/turn result in no damage. At speeds up to 12 mu/turn the meteors do 1 damage per hit. At speeds up to 18 mu/turn the meteors do 2 damage per hit. At speeds up to 24 mu/turn the meteors do 3 damage per hit, and

above speed 24 they do 4 damage per hit. The small size of fighters, missiles and gunboats allows them a -2 DRM when rolling the BD* of hits, so that they are only hit on a 6. Shields, fields, and stealth provide no protection from a high-velocity rock. Pinpoint shields can be used to protect from the impacts.

Meteor showers do not block of affect direct fire weapons. They can be easily represented by a piece of cut felt.

Planets, Moons, and Asteroids are large solid bodies that block sensors, weapons fire, and destroy any object unlucky enough to run into them. If a ships movement brings it into contact with an asteroid, moon or planet, it is in a great deal of danger. The helmsman can attempt a last-second maneuver to try and dodge the solid object that is captain ordered the ship towards. Subtract the ships thrust rating (double its thrust rating for Advanced Grav Drive equipped ships) from its velocity. The controlling player must then roll that number or higher on a d6 to avoid impact and destruction of the vessel.

For example, a cruiser with thrust 4 moving at speed 9 accidentally plots a course that takes it right through a small moon. The helmsman must roll a 9-4 = 5+ to avoid a fatal collision. If the ship had been thrust 4 with AGD, it would have needed to roll a 9-8 = 1+, meaning it would have evaded automatically. If the ship evades, it skirts around the solid object and continues along to finish its plotted course.

Planets and moons can be represented by circular cut-outs or hemispheres 1 to 8 mu in diameter. Asteroids tended to be smaller, usually not more than 1 mu across.

Dust Clouds/Nebula are regions of space that are filled with minute particles of dust. These tiny flecks are too small to damage ships or other solid craft moving through them. They are dense enough, however, to confuse targeting sensors.

For every 6 mu of dust (or fraction thereof) a ship fires through, it suffers a -1 DRM to its attack. Dust does not affect the launching or targeting of missiles or other ordnance.

Ion Storms are clouds of highly charged particles that have been created by a nearby star. Ships passing through these clouds can build up huge static charges on their hulls, resulting in damage to sensitive electronic systems. The charged particles in the Ion Storm also create all sorts of twisted magnetic fields which can distort and dissipate beam weapons fire.

Ion Storms have a density of 1d6, rolled at the start of the battle. Any object (ship, fighter, gunboat, ordnance) passing through the Ion Storm suffers a number of BD* hits equal to the storm's density. These hits function like EMP damage. Ships that spend multiple turns in the EMP cloud sustain EMP hits on each turn.

Against a ship threshold tests are required. If one hit is sustained, the threshold is a on a 6, two hits require a 5+ threshold, and 3 or more hits require a 4+ threshold. The number of hits corresponds to the number of systems that must take threshold tests. Unlike EMP weapons which can preferentially target systems, Ion Storms always hit systems in the following order: Drive (2 hits), FTL, Shields, Fire Control, any other fields, any other vulnerable systems. So a ship that suffered 4 EMP hits from an ion storm would have to take two tests against their drive system, one on their FTL, and if it had shields it would have to test for one of the shield generators, if it had no shields then it would have to test one of its fire control systems. These tests would be on a 4+.

Shields provide protection against Ion Storms.

Ion Storm damage to fighters, gunboats or ordnance destroys one craft per hit. Ion Storms can be very dangerous for such small craft, as they do not get their usual negative DRM protection for being small and maneuverable. Heavy Fighters and Gunboats get a -1 DRM against the Ion Storm damage, all others are hit on a 4+.

Projectile weapons can be fired through Ion Storms without penalty. Any weapon the fires using Beam Dice suffers a -1 DRM if fired through an Ion Storm.

Ship Wreckage (Optional)
When a ship is destroyed in combat its wreckage remains as a slowly expanding cloud of debris. This can pose a navigation hazard for other craft. Replace the destroyed ship with a debris marker 2 mu in diameter. This counts as a meteor shower with a density equal to the size of the ship (mass 1-50 is size 1, mass 51-100 is size 2, etc).

Hyperspace Battles and Terrain

When fleets meet in hyperspace, the battles are very different than those in normal space. Hyperspace is governed by its own set of physical laws, and while the ships have wrapped themselves in a space-time bubble of laws from our own universe so that they can exist in that weird place, they are not completely immune for the oddities of that realm.

Engagements in hyperspace take place in "space-time clusters" where the FTL drive effects of the two fleets intersect. This bubble is round and 48 mu in diameter. Unlike battles in real space, the walls in hyperspace are fixed, and a ship colliding with the hyper wall risks severe damage.

Unlike battles in real-space where the fleets deploy across the table from one another, the random fluctuations of hyperspace dictate the entry points of the ships. Each player must decide before the battle if their ships will enter as a group, as individuals, or some mix. They must also decide on the starting velocity of their ships, between 1 and 10. All ships on both sides must enter on turn 1. Once each player has decided how their ships will enter, they roll a scatter-die for each ship or group of ships. The scatter die is a six sided

die with arrows draw on each facing. Roll the die in the center of the table for each ship or group of ships. The edge to which the arrow points is the entry point of the ship. Groups of ships must be deployed within 3 mu of their entry point, which can get crowded for a large fleet.

Ships enter the table during phase 5, ships' move. One consequence of this is that no ordnance, fighters or gunboats can be launched the first turn. When the ships enter they make a half-move (half their starting velocity) straight ahead. (This is similar to the half-move ships make when exiting real space battles via an FTL jump). Ships can fire spinal mounts on the turn of arrival. Biotech ships do not need to allocate any power to FTL on the turn of arrival. Ships may enter with shields, fields, vapor shrouds or black globes active, though if coming in with black globes the number of turns of activation must be written before entering.

Only ships equipped with a FTL system may enter a hyperspace bubble. Non-FTL capable ships may be towed in on a Tug or Tender.

Entering or leaving the hyperspace "bubble" involves using the FTL drive. This does not generate the "distortion waves" experienced in real space, so ships do not suffer from the ill-effects of nearby ships or other such massive objects.

Ships with super-advanced FTL drives can arrive in the exact same position as an enemy ship with conventional FTL technology, and if both ships selected the same starting speed then they finish their first move "right on top of each other." In such a circumstance the two ships are considered to be passing close alongside one another, and all weapons on both ships are considered to bear on the opponent ship, regardless of arc.

Before ships actually enter the hyperspace bubble the amount of sensor data available is very limited. Ships with advanced and super-advanced FTL drives have an enhanced ability to determine the point of entry relative to enemy ships, they cannot however determine which enemy ship is which until they appear. To represent this the player without enhanced FTL drives rolls to determine where each ship nor group of ships will emerge. All his opponent is told is how many ships will emerge from each point around the hyper-wall, not the size of class or speed of those ships.

Leaving a FTL "bubble" in combat is a tricky maneuver. The ship must use its own FTL drive to pierce the edge of the bubble, whereupon it can depart in FTL space. To pierce the wall requires careful timing, a ship must strike the wall the turn its FTL drive is activated (the turn it makes a half move straight ahead while jumping). Mis-timing the jump could result in the ship striking the hyper wall, potentially with dire consequences.

A ship that strikes the hyperspace wall suffers 1 BD* of gravitic gun damage for every mu of unused movement. So if a ship was moving at speed 10 struck the hyper wall after

moving 4 mu it would suffer 6 BD* hits (for the 6 unused mu of movement), with each hit inflicting 1 damage (because the speed was up to 12 mu/turn).

Planet Shadows are tremendous distortions in the hyperspace fabric caused by the gravity wells of stars and planets in the real universe. Anything moving through such a distortion can be ripped apart by the tidal stresses. Any object (ship, fighter, gunboat, ordnance) passing through a planet shadow suffers 1 BD* of gravitic-gun damage for every 1 mu of shadow passed through. (See weapon system "Gravitic Gun" below for a full description). The damage done is based on the speed the ship is traveling. Fast transit across a large planet shadow can tear even a Battleship to pieces. Shields do protect against this damage.

Planet shadows completely block direct weapons fire.

Grav Shears are regions of gravity distortions that can cause sudden and unexpected changes in course of any craft passing through them. Any time a ship or Plasma Bolt passes across a boundary in or out of a shear roll a d6. On a 1 turn it 60 degrees to the left. On a 2-3 turn it 30 degrees to the left. On a 4-5 turn it 30 30 degrees right, and on a 6 turn it 60 degrees right.

Fighters, missiles and gunboats have the maneuverability to correct for these distortions, and can move through and across Grav Shears without penalty.

Grav Shears completely block direct direct fire weapons.

Ion Storms can also be found in hyperspace. These function in a manner identical to Ion Storms in real space.
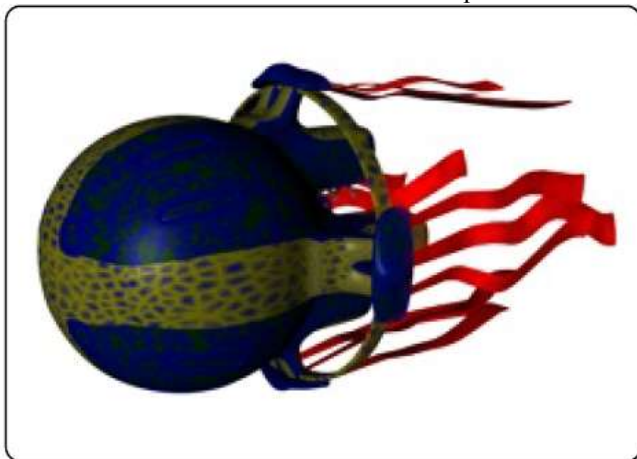
Tugs and Tenders

System Defense Boats (aka battle riders) don't have their own FTL systems, and require the services of a specialized tug or tender to be moved to strategically valuable systems. Forts, which have neither drives nor FTL systems, can also be moved around using these types of vessels.

The tug/tender must have extra mass devoted to FTL equal to 20% of the mass of the ship(s) to be carried along through an FTL jump. So a tug designed to carry a mass-100 Battlecruiser would need an extra 20 mass devoted to FTL.

Strategic movement in the campaign game is based on both having an FTL capability, and the normal-space drive. If the ships carried by the tender have their own drive system, these can be used between FTL-transits. If a fort is being towed, the speed of the tug is reduced based on the aggregate mass of the combined units. Compare the mass of the two joined ships to the mass of the drive on the tug. Determine what speed that mass of drive would generate on a ship of the combined mass.

Ship carried by a tender may be launched (detached) during the ordnance launch phase. Orders should be written to this effect. The launched ship starts with the same vector as the tender (speed and heading), but it may maneuver the turn it is launched. Forts must be deployed at speed zero.

Docking is a more complicated maneuver, very difficult in the heat of combat. The two ships must match course, that is have the same speed and direction and be less than 2 mu apart. If the ships meet this criteria, then at the end of the turn they may dock.

A docked ship cannot fire any of its weapons. Nor may it activate any shields or fields. The tender may fire its weapons, and its shields/fields will protect docked ships. Enemies firing at joined ships may choose to target either the tender or the docked ship(s). Area of effect weapons will damage both.

Remember that docked ships are being carried externally. Internally carriage can be done in modified hangers/boat bays. These bays would need to be 1.5 times the size of the carried ship. A ship carried in a hanger bay cannot be targeted.

Ship Design

Full Thrust allows players to design their own ships, and then test those designs in the furnace of combat. While the large number of available systems provides a near-infinite variety of designs, the core of each design comes down to four factors: size, maneuverability, defense and offense.

Some systems have a fixed mass, while others have a mass that is a percentage of the total ship mass. For percentage based systems round numbers of 0.5 and greater up to the next whole integer, and numbers of 0.49 and less down to the next whole integer, with a minimum of 1 mass.

Each of the technology options listed below has a "technology slot" cost associated with it. This is primarily for

use in campaign games, where empires must build their fleets from a limited list of pre-selected choices, representing the technological "flavor" of that empire. For non-campaign games players can elect to limit the available technology, at their discretion.

Players may also elect to remove entire classes of technology if it does not fit with their re-designed universe. Fighters, Gunboats, Spinal Mounts, ordnance, and others can all be removed without affecting the overall play of the game. Single systems within a class of systems can also be excluded or banned, if the players so desire.

Every starship requires the following systems:
A FTL drive (10% ship mass)
A convention drive of at least thrust 1 (5% of ship mass per thrust)
A hull of at least 10% the total ship mass
A Fire Control to direct the weapons
Weapons, defenses and other equipment at the players discretion

System Defense boats do not have a FTL drive, but contain all the other systems and are built in a manner similar to starships.

Fortresses have neither FTL nor conventional drives. Otherwise they are built in a manner similar to starships. In campaign games forts are priced at at half the value of starships and system defense boats, due to their lack of tactical and strategic mobility. In purely tactical games this may not be appropriate, due to the large amount of firepower that can be mounted on a fort.

Systems that are a percentage component of the hull come in two varieties. One has a minimum mass per system, such as the signature distorter. Each signature distorter must be at least 2 mass. Systems that do not have a minimum mass each can be very small. Multiple units can be fit into a single point of mass. For example, a tiny mass-3 ship with 1 mass of drive would have 33% of the ship devoted to drive, which would round up to 35% or thrust 7. Otherwise very small craft become completely inefficient. The mass of a system must still be at least 1, even if the fractional % would be a number much less than 1 on a small ship.

Ships Systems

Ship Mass Factor- The size of any ship, system defense boat or fort is defined by its mass factor. This is decided at the time of construction. The minimum mass factor is 1. The maximum mass factor for ships is typically 200-250, though larger ships could be allowed depending on the background of the universe. Forts can exceed this 250 limit substantially.

The mass factor of a ship costs 1 per mass. So a 100 mass BC would have an initial cost of 100, before any systems were installed.

Hull and Drives:

1. Hull (0 technology slots)
   All ships must have at least 10% of their mass devoted to hull. The hull is the base structure of the ship. The number of hull boxes a ship has determines how much damage it can withstand before being destroyed. The hull is split into four rows, with excess hull boxes being applied to the top rows. (Example: a ship with 18 hull would have two rows of 5 and two rows of 4.) Each point of hull requires one mass.

   Crew are assigned to some of the hull boxes, when that hull box is lost, that crew factor is killed and is unavailable for damage control. A ship has 1 crew for each 20 mass or fraction thereof. Divide the total number of hull boxes by the number of crew, rounding up. The number shows how many hull boxes there are per crewman. So on a mass 85 ship (5 crew) with 26 hull, crewmen would be placed in the 6th, 12th, 18th, 24th and 26th hull boxes.

   Hull costs 2 per mass.

2. Variable Hull Rows (1 Technology Slot)
   Military hulls are built to be a good balance of cost-effectiveness and ability to withstand battle damage. It is possible to build hulls that are more or less robust. This is represented by changing the number of hull rows. Three, five or six rows can be used in place of four, with a 3-row ship better able to withstand damage before needing to take a threshold test.

   3-row hull boxes costs 3 per mass
   5-row hull boxes costs 1.5 per mass
   6-row hull boxes costs 1 per mass

3. Armor (0 technology slots)
   Ship may armor their outer hull. This armor absorbs damage before it can strike the hull. Armor is placed above the top row of hull, and damage strikes the armor first. Armor piercing and semi-armor piercing weapons bypass some of the armor, and deal damage directly to the hull. A ship can carry any amount of armor, limited only by available mass. Each point of armor consumes one mass.

   Armor costs 2 per mass.

4. Regenerative Armor (2 technology slots)
   A more advanced form of armor is available that has a limited capacity for self repair. This can take the form of a organic carapace that seals over its wounds, or nanotech self-assemblers that quickly repair and reassemble broken components. During phase 11 roll a d6 for each point of regenerative armor that has been damaged. On a 5 or 6 the armor box is repaired. On a 1 the armor has sustained too much damage and it cannot regenerate further this battle. Ships with large amounts of regenerating armor ca be very difficult to kill. Regenerative and non-regenerative armor can be combined on one ship. Regenerative armor requires one mass per point.

Regenerative armor adds 2 to the cost of standard armor. Cost is 4 per mass.

5. Shell Armor (1 technology slot)

Armor can be configured in multiple layers, making it better able to stop penetrating damage. Armoring a ship under multiple shells is difficult and expensive, but it can prove decisive by countering armor-piercing weapons. An armor-piercing weapon that strikes shell armor does one point of damage to each shell, and then deposits the remained of its damage into the hull. Semi-armor piercing weapons do half their damage to the outermost layer of shell armor (rounded up), and the remaining half of their damage to the next shell layer. Shell armor and regenerative armor can be combined, simply add +2 to the cost of the shell armor to make it regenerative shell. Like normal armor, shell armor requires one mass per point of armor.

Shells cost +2 points per mass per layer of shell.

Inner layer- 2 per mass
first shell- 4 per mass
second shell- 6 per mass
third shell- 8 per mass
fourth shell- 10 per mass

6. Stealth Hull (1 technology slot)

Stealth technology reduces the emission signature of the ship, making it more difficult for weapons systems to lock-onto the ship. This is represented by reducing the range-bands of opponents weapons. Level 1 stealth reduces the size of range brackets by one-sixth. Level 2 stealth reduces the size of range brackets by one-third. A class 3 beam normally has a range of 36 mu. Against a stealth-1 target it would have a range of 30 mu, against a stealth-2 target it would have a range of 24 mu. The reduction of effective range also applies to missile lock-on range.

Original range:	*Level 1 Stealth*	*Level 2 Stealth*
12 mu	10 mu	8 mu
9 mu	7.5 mu	6 mu
6 mu	5 mu	4 mu
4 mu	3.33 mu	2.66 mu

Stealth hulls are marked on the SSD. Damage to the hull results in a loss of stealth. A stealth-1 ship has a stealth marker at the end of the second row of hull boxes. Once the second row of hull has been destroyed it negates the ship's stealth. A stealth-2 ship has a marker at the end of the first and third rows of hull boxes. The loss of the first row reduces the ship to stealth-1, the loss of the third row removes all stealth benefits.

Stealth-2 equipped ships must rely more on passive sensors, as powerful active sweeps would reveal the ship's position. To gain the benefits of stealth-2 the ship may only target enemies out to 24 mu.

A stealth-2 ship can write orders to "go active," this brings the fire control systems into full-power active-scan mode, allowing the ship to target its weapons out to the normal FC range of 54 mu. This does reduce much of the protective power of the stealth systems, however, and the ship is only treated as being stealth-1 as long as the FC are in active mode.

Stealth-1 adds a cost of +2 for every point of hull and armor. Stealth 2 adds a cost of +4 for every point of hull and armor. Neither type of stealth hull has any mass requirement. Stealth-2 is the maximum a ship may mount.

7. Streamlining (0 technology slots)

Streamlining is a modification to the outer hull that allows a ship to survive close passage with an atmosphere. Streamlining requires no extra mass, but adds +1 to the cost of every point of hull and armor on the ship. A streamlined ship can land-on or take off-from a planet with atmosphere. The ship can only move at speed 1 until it is clear of the planet, for even when streamlined if the speed is too great the ship will still burn up in the atmosphere. Streamlined ships can also "skim over" planets with atmosphere in an attempt to avoid a collision. Streamlining adds a DRM to the emergency evasion roll equal to the thrust rating of the ship.

Streamlining costs +1 per point of hull and armor.

8. Drive System (0 technology slots)

The ships of the Full Thrust universe use an advanced reactionless drive that gives ship huge rates of acceleration, great maneuverability, and the ability to cover great distances without the need for huge bunkers of fuel. Ship drives are rated by the amount of the thrust they can generate. Each point of thrust requires 5% of the ship's mass. On very small ships a single mass of drive may produce multiple points of thrust. The thrust rating of a ship determines how quickly they can accelerate and decelerate, they also define how many 30-degree turns a ship can make during a single turn. A ship can make 1 turn for every 2 full points of thrust. (Exception- a ship of thrust 1 can still make a single turn.)

When the drive system is damaged due to a needle hit or a failed threshold test, its drive rating drops by half, rounded down. A Thrust 1 ship loses its whole drive in a single hit.

The thrust rating of a ship is also used to calculate its strategic speed in the campaign game setting. Strategic speed is equal to half thrust, rounded up.

Ships can mount a backup drive system, but it cannot be active at the same time as the main drive. Backup drives are inefficient, and only useful in a few circumstances.

Drives cost 2 per mass.

9. Advanced Gravity Drive (3 technology slots)

A vastly improved system over the conventional reactionless drive, the advanced gravity drive (AGD) makes ships much more maneuverable. A ship with an AGD may make a 30-degree turn for every point of thrust rating. AGDs are purchased in a manner similar to conventional drives, with each point of thrust requiring 5% of the ship's mass.

Advanced Grav Drives cost 3 per mass.

10. FTL Drive (0 technology slots)

The Faster Than Light drive is used to pierce the dimensional wall and propel a spaceship across interstellar distances in seconds. The FTL drive has a mass equal to 10% of the ship's mass, minimum 1. FTL drives are required for strategic (interstellar) movement in the campaign game. Ships without FTL drives are known as system defense boats or battle riders.

FTL dries cost 2 per mass.

11. Advanced FTL Drives (1 or 2 technology slots)

There are improvements of the FTL drive available. Ships equipped with these drives have a much greater safety margin when entering and leaving hyperspace, and a much greater degree of control when encountering enemy ships in hyperspace battles.

Both types of advanced FTL drive still require 10% of the ship's mass.

Advanced FTL (1 technology slot)

Ships so-equipped gain the following advantages- Their "interaction radius" when entering and leaving hyperspace drops from 6 mu to 3 mu. They only scatter 1d3 mu when entering the tabletop from FTL-space. A ship jumping away into hyperspace may either Fire or Maneuver the turn it is warming up its drives, but not both. Biotech ships only require ½ the normal power to energize the FTL system. In hyperspace battles the ship's controller may roll the scatter dice twice for entry location, and pick.

Advanced FTL drives cost 3 per mass.

Super-Advanced FTL (2 technology slots)

Ships so-equipped have no interaction radius. They can enter and leave FTL without any ill effect of large objects (ships planets, etc) nearby. They do not scatter when entering the tabletop from FTL. When warming up the drive for an FTL ship the ship may still maneuver and fire normally. Biotech ships only require ¼ the normal power to energize the FTL system. In hyperspace battles they may choose their point of entry.

Super-Advanced FTL costs 4 per mass.

When two advanced-FTL tech enemies encounter each other in a hyperspace battle, their drives partially cancel. So is a super-advanced FTL fleet encountered an advanced FTL fleet, the super-advanced FTL fleet would roll a scatter die twice, and the advanced FTL fleet would roll it once (as if they had regular FTL systems).

12. Drive Backfire System (1 technology slot)

The reactionless drive system creates a 60-degree wide blind spot behind a ship when it is in use. These are known as the "baffles", and a ship cannot target its weapons into this region. Some enterprising engineers came up with a partial solution. By pulsing the drive, they can create eddies of gravitational distortion within the baffles, damaging any units within.

A ship may "backfire" its drive during the shooting phase. This is an area-of-effect weapon, covering an arc to the rear of the ship out to a range of 12 mu. All units, friend and foe, within the area can be hit. The ship generates 1 BD* for every 5 full mass of drives out to 6 mu, and 1 BD* for every 10 mass of drives out to 12 mu. If the drives are at half-strength due to damage, half the number of BD* (rounded down) are generated. If the drive is off-line due to damage, it cannot be backfired. As this is an area-of-effect, DRMs for targets within the area do no apply.

Using the backfire system badly stresses the drive system. The drive cannot be used the next turn, and furthermore the drive system must take an immediate threshold test at the current level (6 if no other damage has been taken).

Biotech ships generate a backfire pulse based on the amount of power put into the drive that turn. So if a mass-100 biotech ship put in enough power to generate thrust 6, then it would be the equivalent of a 30-mass drive system for purposes of backfire BD* calculation.

Equipping a backfire system adds +1 per mass to the cost of the drive system. Backfire systems can be added to both conventional and AGD drives.

Defenses

1. PDS (1 technology slot)

Point Defense Systems (PDS) are small, autonomous weapon mounts optimized for engaging and destroying enemy fighters and missiles. Each installation has its own miniature fire control system allowing it independent targeting. Furthermore, the micro-missiles use by the PDS are able to maneuver into the ships "baffles" and engage fighters and missiles attacking from the rear.

PDS generates a BD* hits against missiles and fighters. PDS suffers a -1 DRM when engaging heavy fighters, and a -2 DRM when engaging plasma bolts.

PDS systems may only be fired once a turn. It is a 6-arc weapon, and can fire at targets in the rear arc even if the ship has maneuvered that turn.

PDS can be used in anti-ship fire mode. It has a

range of 6 mu, and scores a single hit for 1 damage on a roll of 6.

PDS systems are mass 1, and costs 3 per mass.

2. ADFC (0 technology slots)

Area Defense Fire Control (ADFC) is an advanced fire control system designed to allow point-defense weapons (PDS, ADS and weapons that can fire as a PDS- pulsers, gattling batteries, twin particle arrays and meson projectors) to engage fighters and missiles making attacking runs against allied ships within 6 mu. A ship with ADFC may support any number of allied ships withing 6mu, though each PDS/ADS may still only fire once a turn.

ADFC has a mass of 2, and costs 3 per mass.

3. ADS (1 technology slot)

The Area Defense System (ADS) is a modified version of the Point Defense System that is capable of engaging enemy units out to a range of 12 mu. This is very useful when coupled with ADFC, as a central "Aegis Cruiser" can then cover a more widely spread task force. The ADS system fires like a PDS. It can fire once to a range of 12 mu, or twice to a range of 6 mu. Inside 6 mu the two point-defense dice may be targeted at different enemy units.

ADS can also be used to target enemy ships, like PDS it inflicts on hit on a roll of 6.

The ADS system is mass 2, and has 3 arcs of fire. For +1 mass the system can be made to fire into all 6 arcs. Like PDS, the ADS may fire into the ships "baffles," if its arcs extend there.

ADS costs 3 per mass.

4. Scattergun (1 technology slot)

Scatterguns (also known as scatterpacks) are a 1-shot weapon derived from gravitic/kinetic weapon technologies. Small semi-guided projectiles are launched at the target at very high speed. The spray of pellets is very effective at ripping apart attacking fighters and missiles. The scattergun has its own miniature integral fire control system, and does not require data from the ship's own fire control. Furthermore, scatterguns have an in-built ADFC capability, and they can be used to support allied ships within 6 mu. Scatterguns may fire into the "baffles" behind the ship, like PDS.

The range of a scattergun is 6 mu. They inflict 1d6 hits on fighters and missiles (including salvo missiles), 1d3 hits on heavy fighters, and 1 BD* hits on plasma bombs and gunboats.

Scatterguns used in ADFC-mode have a chance of causing some damage to the ship being assisted. On a roll of "1" the allied ship suffers one point of damage, in addition to the effect of the scattergun on the attacking fighter/missile.

Scatterguns can be used in direct-fire mode against enemy ships. They inflict 1 BD* hits, unaffected by screens.

When a scattergun is used, cross it out. It is a 1-shot weapon and may not be used again that battle.

Scatterguns have a mass of 1, and cost 5 per mass.

5. Screens (1 technology slot)

Screens are thick webs of electromagnetic energy that surround the ship and divert incoming beam attacks. Screens have a mass of 5% of the ship's total mass per level. A ship can have 1 or 2 levels of screens. Unless otherwise specified, screens affect all beam attacks. Beam attacks use BD* to deliver damage. Screens also reduce the damage from plasma weapons (both plasma cannon and plasma bolts), reducing the damage per plasma die rolled by the level of shield, and they reduce the damage from nearby antimatter explosions. Shields have no effect on projectile-type weapons.

Unscreened	Level 1 Screens	Level 2 Screens
1-3 = miss	1-3 = miss	1-3 = miss
4 = 1 hit	4 = miss	4 = miss
5 = 1 hit	5 = 1 hit	5 = 1 hit
6 = 2 hits + reroll	6 = 2 hits + reroll	6 = 1 hits + reroll

If a beam penetrates the shield and generates rerolls, those rerolls are not affected by the shields.

Each level of shield is represented on the SSD. Loss of a single shield generator to battle damage would reduce the overall shield level of the ship by 1.

Shields mass 5% of the total ship mass per level. They cost 3 per mass.

6. Vapor Shroud (1 technology slot)

The Vapor Shroud is an alternative shields technology that surrounds the ship with a highly refractory material that effectively disperses and dissipates incoming beam attacks. Vapor Shrouds have the same effect as level 2 shields against all beam and plasma attacks. They provide no protection from projectile weapons. Vapor Shrouds do not have to be on at all times. Their activation state (on/off) is noted when orders are written.

Vapor Shrouds have an unfortunate side effect, they block the fire control systems of the protected ship. This prevents the ship from firing any weapons, even point defense weapons. The shroud does not affect the ability of the ship to maneuver. A Shrouded ship can launch fighters or gunboats, but it cannot recover them. Defense drones will continue to follow a shrouded ship, but as they lose datalink they cannot fire on enemy units.

Vapor Shrouds have a mass of 5% of the total mass

of the ship carrying them. They cost 3 per mass.

7. Holofield (1 technology slot)

Holofields are high-tech devices that use field-generators and powerful ECM systems to create a complex pattern of sensor ghosts around a ship. This confuses enemy fire control systems, making the ship more difficult to hit. Shooting at a ship with direct fire weapons incurs a -1 DRM penalty. Weapons that inflict BD* hits still generate re-rolls on a 6, but the -1 DRM penalty applies to the reroll as well. Needle beams are ineffective against a ship protected by holofields, but needle missiles can still strike designated systems if they overcome the -1 DRM penalty. Holofields also confuse the miniature fire control systems used by missiles, fighters and ordnance. Their attack range is reduced by 1 mu. Area of effect weapons are not affected by holofields.

Holofields cannot be combined with other shield or field technology.

Holofields can be combined with up to 3 levels ECM, this would reduce fighter/missile lock-on range to 2 mu.

Holofields require 10% of a ships mass. They cost 5 per mass.

8. Pinpoint Shields (1 technology slot)

Pinpoint shields are an application of shield technology where in stead of generating a diffuse shield all around a ship, all the shield energy is concentrated into a very small area. Pinpoint shields can be used to stop most types of attack including beam, projectile and ordnance. After your opponent has rolled to hit, Pinpoint shields can be assigned to attempt to block some of those hits. Multiple pinpoints can be assigned to stop a single hit, but each pinpoint shield can only be used once per turn, so it may be wise to save some if another large enemy ship has yet to fire. On a roll of 5+ the pinpoint successfully intercepts and blocks that hit.

Note that pinpoints block a hit, not a point of damage. This is an important distinction. A pinpoint can block a single hit from a beam-1, or hit from a K-6. This makes pinpoints much more effective against large projectile-type weapons and missiles than beam-type weapons.

If used against a beam-weapon that scored a roll of "6" the pinpoint will block one of the hits, and prevent penetration and thus rerolls. So a beam weapon would still score one point of damage on a "6", but the pinpoint would have stopped the second point of damage and the reroll.

Pinpoints provide no defense from area of effect blast weapons like Plasma Bolts and Antimatter Torpedoes, or the area of effect of Spinal Mount weapons.

Pinpoint shields mass 3 each. They have a cost of 3 per mass.

9. Stealth Fields (1 technology slot)

The stealth field is a powerful yet subtle ECM system that seeks to masks the emissions of a ship, making it more difficult to target and attack. In practice, the effects of stealth fields are identical to a stealth hull of the same level (see above). Stealth Fields are systems that require mass, however, and have an icon on the SSD that can be damaged by threshold tests, and can be targeted by needle-beam fire (unlike stealth hulls which are only disabled by loss of complete rows of hull boxes).

Like stealth hull, a ship with level 2 stealth fields cannot target enemy ships beyond a range of 24 mu without negating the effectiveness of the stealth systems. Stealth fields can be turned on and off by writing appropriate orders. Stealth fields and stealth hulls can be combined, but the aggregate stealth level cannot exceed 2.

A stealth-2 ship can write orders to "go active," this brings the fire control systems into full-power active-scan mode, allowing the ship to target its weapons out to the normal FC range of 54 mu. This does reduce much of the protective power of the stealth systems, however, and the ship is only treated as being stealth-1 as long as the FC are in active mode.

Stealth field generators are 5% of ship mass per level. They cost 6 per mass.

10. ECM (2 technology slots)

Electronic Counter Measures (ECM) use powerful broad-band electromagnetic noise generators, along with chaff and multi-spectrum flares, to confuse enemy targeting sensors. ECM suites come in different sizes (levels), the larger the ECM suite, the more effective it is.

ECM has two effects in game. First, it confuses enemy sensors, making it difficult to gain accurate information about your ship. For every level of ECM your ship has subtract 6 mu from the "de-blip" range of enemy sensors. This will also decrease the effective information range of the more advanced sensors by a similar amount. Second, ECM can badly confuse the low-power miniature targeting sensors on missiles, fighters and gunboats. Every level of ECM reduces the lock-on range by 1 mu, meaning missiles and fighters need to be closer to attack.

The aggregate ECM level of a ship (its own plus any area ECM) cannot exceed 3. ECM can be combined with Holofields to produce a net -4 mu range reduction for missiles, fighters and gunboats. ECM has no effect on rockets.

ECM is 1 mass per level, and costs 3 per mass. Each ECM system is displayed individually on the SSD, so it can be lost progressively by damage. ECM can be targeted by EMP attacks.

11. Area ECM (comes with ECM technology)

Area Electronic Counter Measures use even larger

and more powerful electronic "noise" generators than standard ECM, and can cover an area around the ship. Area ECM is usually mounted into specialist electronic warfare ships in support of a fleet.

Area ECM functions like conventional ECM, however it covers the ship mounting the system and all allied ships within 6 mu. The aggregate ECM level of a ship (its own plus any area ECM) cannot exceed 3.

Area ECM has one major side-effect. The jamming systems are so powerful they also blind the carrying ships own sensor system to some degree. When Area ECM is turned on, the carrying ship cannot use its own Fire Control systems. The shorter-range fire control systems in PDS, ADS, scatterpacks and ADFC still function normally.

Area ECM is 2 mass per level, and costs 3 per mass. Each Area ECM system is displayed individually on the SSD, so it can be lost progressively due to damage. Area ECM systems can be targeted by EMP attacks.

12. Black Globe Generator (1 technology slot)
The Black Globe generator is a very exotic and powerful technology, that uses the space distorting ability of the drive system to create a little "pocket dimension" around the ship, protecting it from most damage. The Black Globe generator requires a functional drive system to operate. If the destroyed is damaged, the Black Globe may not be turned on. The Black Globe may function if the drive has only sustained a single hit.

When orders are written for the Black Globe to be activated, the number of turns it will be active must be noted. While the Globe is active the ship is blind, it cannot launch or land, fire its weapons, enter hyperspace, receive communications, or maneuver in any way. The ship proceeds in a straight line at its previous turns' speed as long as the globe is active. If the ship strikes a planet or other large solid object while the Globe is active, the ship is destroyed.

The Globe blocks all damage from projectile and ordnance weapons. The only way to damage to ship within is to pump enough energy into a small space to achieve a "burn through," beam weapons can do this with a penetrating hit. If a natural "6" is rolled by a beam weapon it has penetrated. While that has not done any damage, the rerolls strike the ship normally, and can inflict damage. If the Globe Generator or drive is lost to a threshold test, the ship loses the Black Globe, and may begin maneuvering and firing normally on the next turn (assuming the Black Globe, and not the drive was lost to the threshold). Needle beams cannot target systems on a ship that is within a Black Globe.

The Black Globe may not be combined with any fields or shields. The ship does not gain any bonuses for stealth while the Globe is active. Missiles are "smart" enough to know they cannot harm a Globed ship, and will ignore it. Fighters may fly in escort of a globed ship, though they will be outside the globe. If a ship with defense drones raises a black globe then the drones will continue to follow the ship outside the Globe, but they cannot fire in combat due to the lack of datalink with their controlling ship.

The black globe goes "up" on phase 2a after initiative is rolled. The black globe deactivates on phase 2b. Thus a globe that is to activated on turn 3 for 2 turns will come up in phase 2a of turn 3, and drop on phase 2b of turn 5. Ships can enter a table from hyperspace with the globe active, though they must have written orders for how long the globe is to remain up.

A black globe is 5% the total mass of the ship, its cost is 5 per mass.

Direct Fire Weapons

1. Beams (1 technology slot)
Particle Beams are one of the most common, versatile, and effective weapons available. Beams use 12 mu range brackets, and can generate a number of BD* in the closes bracket equal to the size of the beam. Beams attenuate over range, losing 1 BD* of hits for every 12 mu bracket beyond the first. So a Beam-3 would generate 3 BD* to 12 mu, 2 BD* to 24 mu and 1 BD* to 36 mu.

Beam-1's can also be used in point-defense fire against enemy fighters and missiles. They suffer a -1 DRM when used in this mode, so they do a single hit on a 5+. Beams used in defensive fire do not get rerolls. If used in this mode they cannot fire at opponent ships on the same turn, like all weapons they can only be fired once per turn.

All beams cost 3 per mass. Larger beams are more massive, and start with restricted arcs. Extra arcs can be purchased for these larger beams at the mass cost listed.

Beam 1 Mass 1 6-arcs
Beam 2 Mass 2 3-arcs. +1 for 3 additional arcs
Beam 3 Mass 4 1-arc. +1 mass per additional arc
Beam 4 Mass 8 1-arc, +2 mass per additional arc

2. EMP Projectors (1 technology slot)
These are a type of beam projector which fires small packets of super-energized ions at enemy ships. These can cause overloads in some electronic systems, disabling systems. EMP projectors are the same size and mass as Beam weapons, and generate a similar number of BD* in each range bracket. Their hits do not damage the hull and armor of target ship, rather they make that ship take threshold tests against some systems.

The difficulty of the threshold tests depends on how many EMP hits the target ship has suffered that turn. EMP hits from multiple ships can be combined to produce more dramatic effects. A single EMP hit requires a threshold test on a 6, two hits require two tests on a 5+, and three or more hits require tests on a 4+. The systems that can be affected are: Drives, FTL, Fire Control, Shields, Turrets, ECM, Area

ECM, any Fields (Stealth, Holo), and the black globe generator. The number of systems that can be affected is equal to the total number of EMP hits delivered that turn. The attacker (person who fired the EMP weapon chooses the allocation of EMP hits to valid target systems.

For example a battlecruiser sustains 7 EMP hits in a single turn. The BC commander will need to make 7 threshold tests on a 4+. The BC has three fire control systems. The attacker decided to put two EMP hits on each fire control (requiring each to make two tests on a 4+), and places the last EMP hit on one of the shield generators. The attacker could have chosen a different pattern of systems that need to take tests. Allocating all 7 hits to the drive would have almost certainly taken the drive out (7 chances of a 4+ threshold, with two hits being necessary to completely cripple the drive).

Systems knocked out by EMP attacks can be repaired by damage control like any other threshold damage.

EMP pulses can also effectively burn out the smaller electronic systems on missiles, fighters and gunboats, effectively "killing" them. EMP-1s can be used in point defense like a beam 1, inflicting a BD hits with a -1 DRM.

EMP projectors cost 3 per mass.

EMP 1 Mass 1 6-arcs
EMP 2 Mass 2 3-arcs. +1 for 3 additional arcs
EMP 3 Mass 4 1-arc. +1 mass per additional arc
EMP 4 Mass 8 1-arc, +2 mass per additional arc

3. Plasma Cannon (1 technology slot)
Plasma Cannon are powerful weapons that send dense streams of plasma at their targets. These weapons can inflict hellacious amounts of damage very quickly, reducing even a heavily armored battleship to scrap.

Plasma cannon do not use Beam Dice (BD*). Plasma cannon inflict 1d6-2 (-shields/DRM) hits, with each hit inflicting 1 damage. So on a roll of 3 it inflicts 1 hit, on a 4 it inflicts 2 hits, on a 5 it inflicts 3 hits, and on a 6 it inflicts 4 hits, penetrates, and gets a reroll! Like beam weapons, they generate a number of dice equal to the size class of the plasma cannon up to 12 mu, and lose one dice of damage for each additional 12 mu.

Plasma cannon are double the mass of normal beam weapons. Because of their heavy and somewhat unwiedly mounts, plasma cannon cannot be effectively used in defensive fire mode.

Plasma cannon cost 3 per mass.

Plasma 1 Mass 1 3-arcs
Plasma 1 Mass 2 6-arcs
Plasma 2 Mass 4 3-arcs. +2 for 3 additional arcs
Plasma 3 Mass 8 1-arc. +2 mass per additional arc
Plasma 4 Mass 16 1-arc, +4 mass per additional arc

4. Grasers (1 technology slot)
Grasers are gamma-ray lasers, a very potent laser weapon system. Functionally grasers have two key differences from beams. First, they do 1d3 damage per hit, not the 1 damage per hit of conventional beams. Second, Grasers are semi-armor piercing weapons.

Like beams, grasers hit with BD*, so they can cause penetrating damage and get rerolls on a natural 6. Grasers inflict a number of BD* hits in the closest 12 mu range bracket as the size of the graser. So a graser 3 would inflict 3 BD* to 12 mu, 2 BD* to 24 mu, and 1 BD* to 36 mu, with each hit doing 1d3 damage semi-AP.

Grasers need to be carefully aligned and focused, and thus even the smallest ones cannot be used effectively as defensive-fire weapons.

Grasers cost 4 per mass.

Graser 1 Mass 1 3 arcs
Graser 1 Mass 2 6 arcs
Graser 2 Mass 4 3 arcs, +2 for 3 additional arcs
Graser 3 Mass 8 1 arc, +2 mass per additional arc
Graser 4 Mass 16 1 arc, +4 mass per additional arc

5. Transporter Beams (1 technology slot)
Transporters are an arcane technology that, though careful atomic manipulation and quantum calculation, can create a macroscopic "tunneling" event. The real-world effect is that it allows troops to be sent in an instant onto the deck of an enemy ship, where they can then fight to take control of that ship. Nuclear   bombs cannot be sent via the transporter, as the probability junction cannot transport high-Z materials, so the uranium or plutonium of a bomb would be left behind.

Transporter Beams generate a BD hits (no rerolls) against targets within range. Their number of BD at range is the same as any other beam mount. Every hit generated allows the player to send one unit of Marines (a Damage Control Party) over to the enemy ship. The beam is one-way only, so the Marine boarding parties must win or die, and cannot be brought back to their home ship until the battle is done. If a ship runs out of DCPs, it cannot use its transporters any more. The Transporters can be used to send marines to help in the defense of an allied ship. Roll to hit normally.

Transporter beams are affected by shields like normal beams.

Transporter beams are the same size as normal beam mounts. They cannot be used to target ordnance/fighters/gunboats, and thus cannot be used in defensive fire. T-beams cost 3 per mass.

TB 1   Mass 1 6-arcs
TB 2   Mass 2 3-arcs. +1 for 3 additional arcs
TB 3   Mass 4 1-arc. +1 mass per additional arc
TB 4   Mass 8 1-arc, +2 mass per additional arc

6. Gattling Battery (1 technology slot)

The Gattling Battery is a specialist short-range beam mount capable of delivering a rapid burst of fire. The more advanced aiming and control systems of the Battery can also be used very effectively in point defense fire.

A Gattling Battery used in anti-ship fire generates 6 beam dice (BD*) out to a range of 12 mu. These dice must all be directed at the same target. The Battery may also be used as a Point Defense installation, at which point it fully follows the rules for PDS. The one exception is that the Gattling Battery may have limited fire arcs, and if the ordnance or fighter is attacking from outside its' arc, the GB cannot fire in point defense mode. GB's with arcs to the rear of the ship may fire in PDS mode into the baffles, but they may not fire in anti-ship mode into the baffles.

Gattling Batteries cost 4 per mass.

Gattling Battery Mass 2 1 arc
Gattling Battery Mass 3 3 arcs
Gattling Battery Mass 4 6 arcs

7. Twin Particle Array (1 technology slot)

The Twin Particle Array is a more developed version of the convention of beam weapon. By more careful focusing and control of the particle stream, and more consistent beam can be maintained. The TPA generates 2 beam dice (BD*) to a range of 24 mu. The TPA can also be used in a point defense mode very effectively. In this mode it acts just as a Point Defense installation, with the exception that if the TPA has limited arcs, then the point defense coverage is also limited to those arcs, like the Gattling Battery above.

Twin Particle Arrays cost 4 per mass.

Twin Particle Array   Mass 2 1 arc
Twin Particle Array   Mass 3 3 arcs
Twin Particle Array   Mass 4 6 arcs

8. Meson Projector (comes free with either Twin Particle Array or Gattling Batteries)

Meson Projectors are a further refinement of the particle technologies in the Twin Particle Array, allowing a narrow beams of energetic mesons to be projected to great distances. The Meson Projector generates 1 BD* out to a range of 36 mu. Like the Gattling Battery, the Meson Projector can also be used as a Point Defense installation, limited only by the arc of the projector.

Meson Projectors cost 4 per mass.

Meson Projectors   Mass 2 1 arc
Meson Projectors   Mass 3 3 arcs
Meson Projectors   Mass 4 6 arcs

9. Needle Beams (1 technology slot)

Needle beams are a specialist weapon system that uses a high intensity, super-focused particle beam to punch a small hole deep into an enemy warship to cripple key systems. The accuracy of the targeting depends on good intelligence. The more you know about the enemy ship, the more accurately you can target the intended system. With basic sensors you know what types of weapons the opponent has, but not the particulars of the mounts (size, arc). So for example, with that limited information you could target "a beam mount", and if a hit was scored, a random beam mount would be destroyed. Better information from improved sensors allows for more exact targeting. Without at least the information of basic sensors, the needle beam is relatively ineffective. While it can still do a point of damage to the target, rolls of a 6 do not cripple targeted system. For a ship to use needle beams effectively beyond 24 mu it must have enhanced or advanced sensors, and if a ship is facing a foe protected by stealth or ECM the needle beams will only be useful at very close range.

Needle beams can be used to target any system that appears on the SSD (the only exceptions being stealth hulls and biotech generators). The accuracy required for such targeting means that extra fire control needs to be dedicated to the attack. A Fire Control must be designated for every needle beam target, though multiple needle beams firing at the same target may share a fire control. Other weapons can share the fire control to target the same ship normally.

The focus and intensity of Needle Beams means that they are not affected by shields. The distortions of a holofield (-1 DRM) prevent the needle beam from being guided accurately enough to hit a target system.

Needle beams have range bands of 12 mu, like all other beam weapons. Larger Needle Beam mounts generate extra needle dice at close range. On a roll of 4+ they inflict a single point of damage. On a roll of a natural 6 they inflict a single point of damage, and destroy the targeted system. Systems destroyed by needle beam fired cannot be repaired by damage control parties, as the damage requires repair resources and spare parts that ships do not have on hand.

Needle Beams cost 3 per mass.

NB-1   Mass 2 2 arcs, +1 mass per additional arc, 3 arcs maximum.
NB-2   Mass 4 1 arc, +2 mass per additional arc, 3 arcs maximum
NB-3   Mass 8 1 arc, +4 mass per additional arc, 3 arcs maximum
NB-4   Mass 16 1 arc, +8 mass per additional arc, 3 arcs maximum

10. Pulse Torpedoes (1 technology slot)

Pulse Torpedoes are one of the most common projectile weapons in use. At short range they are very accurate, and a lucky hit can deliver a large amount of damage. Pulse Torpedoes are semi-armor piercing weapons. As a projectile weapon, Pulse Torpedoes ignore shields. If a pulse torpedo hits it inflicts 1d6 point of damage, semi-AP.

The chance of a hit decreases with range.

	Hits on 2+	Hits on 3+	Hits on 4+	Hits on 5+	Hits on 6
LR Pulse Torpedo	to 9 mu	to 18 mu	to 27 mu	to 36 mu	to 45 mu
Pulse Torpedo	to 6 mu	to 12 mu	to 18 mu	to 24 mu	to 30 mu
SR Pulse Torpedo	to 4 mu	to 8 mu	to 12 mu	to 16 mu	to 20 mu

Pulse Torpedoes also come in standard, long range (LR), and Short range (SR) versions. All Pulse Torpedoes cost 3 per mass.

LR Pulse Torpedo   Mass 8   1 arc, +2 mass per additional arc, 3 arcs maximum
Pulse Torpedo   Mass 4   1 arc, +1 mass per additional arc, 3 arcs maximum
SR Pulse Torpedo   Mass 2   1 arc, +1 mass for 2 additional arcs, 3 arc maximum

11. Fusion Array (1 technology slot)
The Fusion Array is a somewhat complex weapon that fires and hits as a modified projectile weapon, yet does damage in BD*. It is possible for a fusion projectile to hit, and yet do no damage. The Fusion Array may be set in one of two modes, either as a Fusion Flare launcher, or as a Fusion Torpedo launcher. The array must be configured before combat begins, and it cannot be changed between modes in combat. Because they hit as projectiles, they ignore shields but cannot penetrate a black globe protected ship. For purposes of targeting fighters and pinpoint shield blocking both the flare and torpedo deliver a single hit, with the possibility of multiple points of damage.

Fusion Flare

Range	Hits on	Damage
to 6 mu	1+	1 BD*
to 12 mu	2+	2 BD*
to 18 mu	3+	3 BD*
to 24 mu	4+	4 BD*
to 30 mu	5+	5 BD*
to 36 mu	6	6 BD*

Fusion Torpedo

Range	Hits on	Damage
to 6 mu	6	6 BD*
to 12 mu	5+	5 BD*
to 18 mu	4+	4 BD*
to 24 mu	3+	3 BD*
to 30 mu	2+	2 BD*
to 36 mu	1+	1 BD*

Fusion arrays cost 3 per mass.

Fusion Array   Mass 3   1 arc, +1 mass per additional arc, 3 arcs maximum.

12. Submunition Pack (1 technology slot)
Submunitions are one-shot weapons designed to deliver heavy damage at close range. The power and intensity of submunitions means that they ignore the effects of shields. Once a submunition has been fired, it is crossed off the ship SSD and cannot be used again. The number of BD* a submunition generates is based on the range. They inflict 3 BD* hits to 6 mu, 2 BD* to 12 mu, and 1 BD* to 18 mu.

Submunitions cost 3 per mass.

Submunition   Mass 1   3 arcs

13. Multiple Kinetic Penetrators (2 technology slots)
The Multiple Kinetic Penetrator derived from research into hyper-kinetic penetrators and kinetic-guns. They are one shot weapons that launch a projectile at very high speed towards the target, inflicting great damage if they hit. As projectiles, MKPs ignore shields, furthermore they are armor piercing weapons.

An MKP has a range of 12 mu, and hits on a roll of 4+. On a roll of a 6 it hits twice. Each hit inflicts 4 points of damage (AP).

MKPs cost 4 per mass.

Multiple Kinetic Penetrator   Mass 1   1 arc

14. K-Guns (1 technology slot)
Kinetic Guns (K-guns) are slug-guns that use gravitic technology to throw solid projectiles at very high speeds, making them accurate at the ranges of typical space combat, and capable on inflicting massive damage. K-guns are projectile weapons, and as such their chance of hitting decreases with range, but they are unaffected by shields. All K-guns are armor piercing (AP) weapons, as the hyper-velocity slugs easily punch through most armor.

Long range and short range versions of the K-gun are available, though these are sometimes referred to as high-velocity and low-velocity versions.

	Hits on 2+	Hits on 3+	Hits on 4+	Hits on 5+	Hits on 6
LRK-gun	to 9 mu	to 18 mu	to 27 mu	to 36 mu	to 45 mu

	Hits on 2+	*Hits on 3+*	*Hits on 4+*	*Hits on 5+*	*Hits on 6*
K-gun	to 6 mu	to 12 mu	to 18 mu	to 24 mu	to 30 mu
SRK-gun	to 4 mu	to 8 mu	to 12 mu	to 16 mu	to 20 mu

The damage inflicted by a K-gun depends on its size/class. The base damage inflicted is equal to the class of the K-gun, so a hit from a K-3 will inflict at least 3 points of damage. All K-guns have a chance of doubling the damage they inflict, as the projectile slams deep into the enemy ship. Roll a d6, if the result is equal to or less than the class of the K-gun, the damage done is doubled. A roll of a 6 is always a failure, so K-6's and larger do not automatically double, but a K-6 that does (on a roll of 1-5) inflicts 12 points of armor piercing damage!

K-1's (normal, long and short ranged) are nimble rapid-fire mounts, well suited to defensive work. Like a Beam-1, a K-1 can be used as a PDS installation, but with a -1 DRM. It cannot fire into the baffles of the ship, however. When engaging missiles and other attacking ordnance the K-1 gunner always waits until the missile has entered the closest range bracket to achieve the best chance of hitting. When engaging fighters or gunboats (which are not flying straight at the ship on an intercept vector) the hit probability of the K-1 is based on the range bracket of the target.

K-guns cost 4 per mass.

K-1   Mass 2   6-arcs
K-2   Mass 3   1 arc, +1 mass for an additional arc, 2 arcs maximum
K-3   Mass 5   1 arc
K-4   Mass 8   1 arc
K-5   Mass 11   1 arc
K-6   Mass 14   1 arc
(Larger K-guns can be built at +3 mass per class)

SRK-1 Mass 1.5   6-arcs
SRK-2 Mass 2   2 arcs
SRK-3 Mass 3   1 arc
SRK-4 Mass 4   1 arc
SRK-5 Mass 6   1 arc
SRK-6 Mass 7   1 arc
(Short Range K-guns are half the mass , rounded up, of a conventional K-gun)
Short range K-1's can be treated in two ways. Either they can be bought in pairs for 3 mass, or they can be excluded from your game.

LRK-1 Mass 4   6-arcs
LRK-2 Mass 6   1 arc, +2 mass for an additional arc, 2 arcs maximum
LRK-3 Mass 10   1 arc
LRK-4 Mass 16   1 arc
LRK-5 Mass 22   1 arc

LRK-6   Mass 28   1 arc
(Long Range K-guns are double the mass of a conventional K-gun)

15. Gravitic Guns (1 technology slot)
The Gravitic Gun is an application of drive technology that creates a propagating wave of gravitational disturbances and eddies. While this does not affect normal space very much, it can have profound effects on ships and other small craft using reactionless drives. Gravitic guns generate beam dice to hit like a normal beam weapon. The damage inflicted by the hits depends on the speed of the target, as a quick moving object in a reactionless drive field can experience sudden tidal surges that can cause severe internal damage (which is why the weapon is sometimes known as a "gravy gun" for the effect it can have on a crew). As a beam-type weapon, the effects of a gravitic-beam can be reduced by shields.

Target Speed:	under 6 mu/turn	under 12 mu/turn	under 18 mu/turn	under 24 mu/turn	over 24 mu/turn
Damage per hit	0	1	2	3	4

Gravitic guns cost 3 per mass.

Grav-1   Mass 1 6-arcs
Grav-2   Mass 2 3-arcs. +1 mass for 3 additional arcs
Grav-3   Mass 4 1-arc. +1 mass per additional arc
Grav-4   Mass 8 1-arc, +2 mass per additional arc

16. Boarding Torpedoes (1 technology slot)
The boarding Torpedo is a specialist projectile weapon designed to deliver boarding parties onto an enemy ship. These boarders could be stasis-protected Space Marines, killer warbots, nanotechnological swarms, or bloodthirsty Reavers, depending on the particular flavor of your game universe.

The Boarding Torpedo is different from other projectiles in one key respect- it is a magazine fed weapon. Every time it fires, hit or miss, it expends one of the torpedoes in the magazine. When all the torpedoes are used up, the weapon can no longer fire. If either the magazine or the launcher is disabled due to threshold/needle damage, it cannot fire until the damage is repaired. Multiple launchers can be fed from a single large magazine, or smaller magazines can be tied to each individual launcher, each has its own tactical advantages and disadvantages in terms of resistance to battle-damage.

Boarding torpedoes use the projectile to-hit numbers. There are no long-range or short-range versions available. If a boarding torpedo hits it does one point of damage to the target, and two "boarder/marines" markers are

placed by the ship. At the end of the turn, during phase 11, the owner of the boarded ship can attempt to fight off the boarders as a damage-control action, or kill them with the ship's own marines. Every successful damage-control operation kills one unit of boarders. For every boarder still alive at the end of phase 11, the ship takes a point of damage to the hull (no armor protection, even for shell armor), as the boarding parties cause mayhem inside the ship. In campaign games you can designate that ships that are destroyed by boarders are instead captured.

Boarding Torpedoes cost 3 per mass.

Boarding Torpedo Launcher	2 Mass	3 arcs
Boarding Torpedoes	1 Mass each	

17. Pulsers (2 technology slots)

Pulsers represent the pinnacle of beam technology. The pulser is an adaptable weapon system that can be configured before a battle to optimize it for long, short or medium range combat. A captain who chooses his pulser settings wisely before a battle will have a decisive advantage. Also, because the pulsers can be reset between battles, a single design of ship is capable of carrying out a variety of battlefield roles.

The pulser, in any mode, can also be used as a point defense installation (PDS). In PDS mode the pulser is limited to the fire arcs of the weapon mount, but if the arcs permit it may fire into the baffles of the ship. In PDS mode the pulser delivers a single dice of point defense fire. A pulser configured for short range cannot use its beam dice for defensive fire.

Set as a short range weapon a pulser generates 6 BD* to 12 mu.
Set as a medium range weapon a pulser generates 2 BD* to 24 mu.
Set as a long range weapon a pulser generates 1 BD* to 36 mu.

Pulsers cost 5 per mass.

Pulser	Mass 2	1 arc
Pulser	Mass 3	3 arcs
Pulser	Mass 4	6 arcs
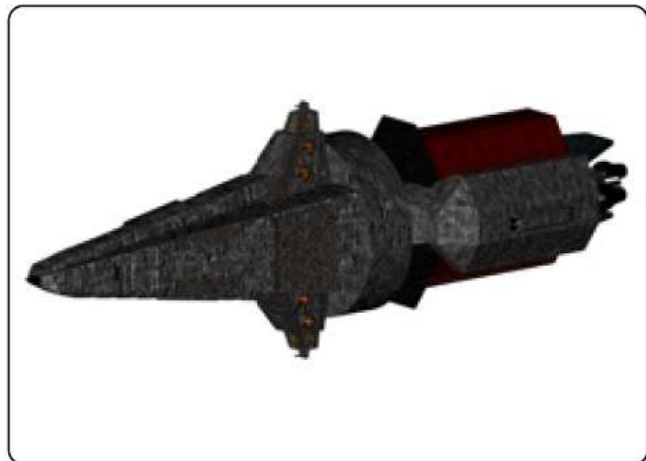
Ordnance Weapons

1. Anti Matter Missile (1 technology slot)

Anti Matter missiles are a capital missile body fitted with an antimatter warhead. Due to the inherent danger of carrying antimatter into a combat environment, AM Missiles may only be mounted in external racks.

AM Missiles have one endurance, and the launching rack has a 3-arc coverage. The unique decay products of the antimatter warhead makes the AM Missile distinguishable from other capital missiles, so enemy point defense may concentrate on them. AM Missiles may also be fused to detonate in open space, without making at attack run. This can be done to try and destroy large waves of incoming missiles, or blow holes in dense minefields. Enemy ships and fighters may still fire at the missile before it detonates.

Making antimatter explode in the vacuum of space is more difficult than most people image. If not done right, a small amount of energy is released, just enough to blow apart the warhead and send chunks of antimatter flying off into the void of space. To help overcome this AM warheads are fitted with sensors which will attempt to detonate the warhead if they detect any damage that may cause the warhead to fail. As a proper blast from a AM missiles has a large blast radius, stopping an AM missile just before impact may not be enough!

To simulate this AM missiles take multiple "hits" to kill. Each hit from point defense fire reduces the warhead strength by 1d6 and the blast radius by 1 mu. Three hits will disrupt the warhead sufficiently to prevent any meaningful explosion. If firing at AM missiles in free flight (missiles that are not making attack runs, and are fused to detonate in free space) the same 3-hit requirement applies.

If an AM Missile impacts at full strength it explodes, doing 3d6 damage to the target ship and any other unit within 1 mu. It does 2d6 damage to any ship or unit within 2 mu, and 1d6 damage to any ship or unit within 3 mu.

Shields reduce the damage of antimatter blasts. Apply a -1 DRM to each die of antimatter damage per level

of shield. So a ship with shield-2 caught in a 3d6 antimatter burst would only take 3d6-6 damage.

If an AM Missile fails a threshold test it explodes on the rack, immediately doing 1d6 damage to the carrying ship, and 1d6 damage to any unit within 1 mu. A missile that explodes on the rack obviously cannot be later repaired by damage control. Shields will not protect a ship from its own exploding missiles.

Anti Matter missiles cost 5 per mass.

Rack-mounted AM Missile   Mass 2   3 arcs

2. Anti Matter Suicide Charge (Comes with AM Missile technology)
Some species and civilizations have developed a rather fatalistic attitude towards combat that can be summarized as "we die- I win!" For these people, there is the Antimatter suicide charge. This is a system mounted deep within the hull of the ship that can be detonated, destroying the ship and damaging any unit within 3 mu.

As the AM suicide charge is buried deep within the hull of the ship, even if the warhead is broken apart by battle damage there is plenty of matter around (the remains of the ship) for the antimatter to annihilate and generate a satisfactory explosion. So the loss of an AM suicide charge will always result in a 3 mu blast radius, 3d6 explosion like a full-strength AM missile.

AM suicide charges are well armored and protected against accidental detonation, and thus get a -1 DRM whenever they take threshold tests. They can be targeted by needle beams normally.

A ship may write "detonate" orders. During phase 10c the ship explodes. A ship with multiple AM suicide charges gets the additive damage of all the charges, but no increase in blast radius. So a ship with 3 charges would do 9d6 damage to 1 mu, 6d6 to 2 mu and 3d6 to 3 mu. If the ship was destroyed prior to phase 10c, it explodes at the end of the phase in which it was destroyed, at the full strength of all the AM charges.

The detonation of an AM suicide charge causes damage directly to the hull of the carrying ship, it is not reduced by armor or shields (the explosion starts within). A large ship might survive the accidental detonation of a single AM charge.

AM suicide charges cost 5 per mass.

AM Suicide Charge   Mass 1

3. Salvo Missile Launcher (1 technology slot)
The salvo missile launcher is a weapon system that takes salvo missiles out of a central magazine and fires them at the enemy. Multiple launchers can be tied to the same magazine, or each can be fed separately. Threshold tests are taken separately for magazines and launchers. The launcher has 3 arcs of fire.

The magazine can hold two types of salvo loads, normal and extended range. Normal salvo missiles are moves in a straight line up to 24 mu the turn of launch. They cannot move through any solid objects, and if fired through terrain that could damage them (meteor swarms), they must roll immediately for losses. After ships move see if there is an enemy ship within 6 mu, if so the salvo attacks. If not, the salvo is removed. If multiple ships are within 6 mu, the salvo attacks the closest target. Salvos are engaged and shot down as normal missiles, except it takes 6 hits to fully destroy a salvo. A salvo that has taken less than 6 hits penetrates the targets' defenses. Each missile remaining in salvo then does 1d6 points of damage (semi-AP) to the target, so in theory a full-strength and unstopped salvo would do 6d6 damage to an enemy ship. Salvo missile hits are semi-armor piercing.

ER Salvos operate in a similar manner, except they can be moved up to 36 mu, not 24.

Salvo launchers and missiles cost 3 per mass.

Salvo Launcher   Mass 3   3-arc
Standard Salvo   Mass 2   (magazine)
ER Salvo   Mass 3   (magazine)

4. Salvo Missile Rack (comes with salvo missile launchers)
Salvo missiles can also be mounted in a one-shot external rack. While slightly less mass-efficient than a well-stocked magazine, it allows a ship to very quickly fire all its carried salvos, or for a small ship to carry a single salvo.

The salvo rack has 3 fire arcs, is a 1-shot weapon, and fires a single missile salvo exactly like a salvo launcher. Standard and ER Salvo racks are available, though the ER racks are slightly more mass intensive.

Salvo missile racks cost 3 per mass.

Standard Salvo Rack   Mass 4   3-arc
ER Salvo Rack   Mass 5   3-arc

5. Capital Missile Launcher (1 technology slot)
Capital Missiles (CMs) are large anti-ship missiles which can carry conventional warheads or a wide variety of specialist payloads. An efficient way to deploy these weapons in battle is a Capital Missile launcher coupled to a magazine loaded with CMs. Each CM Launcher must be connected to a magazine loaded with missiles. The CM Launcher can only load and fire Capital Missiles, it cannot handle the smaller Standard Missiles. Each launcher may have its own magazine, or multiple launchers may feed off of a larger centralized magazine.

The launcher has 3 arcs. A launcher may fire any type of CM, and multiple types of CMs can be loaded into a magazine. If the magazine carries a mixed load, the launcher may select any missile to fire each turn, they are not loaded in

a particular order.

CM launchers cost 3 per mass.

Capital Missile Launcher Mass 2   3 arcs
Capital Missile Magazine Mass 1   (per missile)

6. Capital Missile Rack (comes with capital missile launcher)

The CM rack is a hull-mounted 1-shot weapon that carries a single CM of any type. The cost and mass of the Missile are included in the rack. The CM rack has 3 arcs of fire.

CM racks (with missile) cost 3 per mass.

Capital Missile Rack   Mass 2   3 arcs

7. Capital Missiles- Assault, MT, Long-Lance (comes with capital missile launcher)

The three types of general-purpose capital missile are the Assault, Long-lance and medium varieties. Each makes a different trade between fuel for the engine (combat endurance) and warhead size. Capital missiles have a base move of up to 24 mu, and they can move in any direction due to the high maneuverability of the compact missile drive unit. On the turn of launch they are limited to moving within the are of the fire arcs of their launcher or rack. Every turn the CM expends 1 point of combat endurance, even if it does not move the full 24 mu.

Capital Missiles may expend a point of combat endurance to take a second 12 mu movement during phase 4. If, after ships movement, there is an enemy ship within 6 mu, the capital missile attacks. If multiple ships are within 6 mu, the missile attacks the closest target. A single hit is sufficient to shoot down a capital missile. If they are not shot down they inflict 1-3 hits based on the warhead size , with each hit inflicting a dice of damage. Damage is semi-armor piercing.

Assault CM   1 endurance   3d6 warhead
Medium CM   3 endurance   2d6 warhead
Long-lance CM 5 endurance   1d6 warhead

If at the end of a turn a CM has no enemies within range and is out of combat endurance, it is removed from play.

Capital Missiles cost 3 per mass. They come loaded in either a CM rack, or as part of a CM launcher magazine.

8. Specialist Capital Missiles (1 technology slot)

The Capital Missile has a large enough mass and volume devoted to its warhead that a variety of specialized payloads have been developed. These missiles all have the same mass and cost of conventional capital missiles. They can be loaded into racks or launchers, and a single magazine may hold many types of capital missile. All specialist capital missiles have an endurance of 3. Specialist capital missiles can be loaded into and fired from a capital missile magazine.

In the absence of capital missile launcher technology, specialist capital missiles are loaded into racks, as conventional capital missiles.

-Needle Missiles are designed to knock out critical systems on the target ship. On launch decide and record what system the needle beam will target when it reaches an enemy ship. If the missile hits roll a d6, on a 4+ the missile has struck and destroyed the target system. In addition the warhead of the missile does 1d6 damage to the target, semi AP, whether or not the needle function hit its target. The needle missile is considered to have standard sensors for the purposes of distinguishing enemy systems.

-Electromagnetic Pulse (EMP) missiles replace their entire payload with a electromagnetic detonation warhead. If the EMP missile strikes is target it does 1d6+2 EMP hits to that target. Resolve these EMP hits as for an EMP beam.

-Reconnaissance (recon) missiles replace their entire warhead with a sensor and telemetry setup that feeds the sensor data from the missile back to the friendly fleet. The missiles sensors can resolve as much as standard ship sensors, with a range of 12 mu. Fleets with improved sensors also have better recon missiles. The recon missiles of an empire with enhanced sensors have a basic sensor range of 18 mu, and an enhanced sensors range of 12 mu. The recon missiles of an empire with superior sensors have a basic sensor range of 24 mu, and enhanced sensor range of 12 mu, and a superior sensors range of 6 mu. The sensor technology need only be in the possession of the empire, the ship launching the missiles need not mount improved sensors.

Electronic Countermeasure (ECM) missiles replace their entire warhead with a powerful sensor-jamming emitter, along with decoys, chaff and flares. This ECM makes the missile and all other missiles within 3 mu harder to hit, so that weapon fire (both long-range antiship and point defense) suffer a -1 DRM against those missiles. The ECM missile can be "picked off" from a large group of missiles, as the source of powerful jamming stands out. Missiles making attack runs might also move out of the protective ECM envelope.

Specialist Capital Missiles cost 3 per mass. They come either in a CM rack, or as part of a CM launcher magazine.

9. Homing Missiles (1 technology slot)

The Homing Missile is a capital missile where much of the warhead is sacrificed for much better sensors and other tracking and identification hardware. This allows the missile to better predict where its target ship will be based on its movement vector, and it also allows the Homing Missile to pick a specific target out of a closely packed mass of enemy ships.

To reflect these abilities, the Homing Missile may take its second 12 mu move after ships move.

Homing missiles have an endurance of 3, and a 1d6

semi AP warhead.

Homing Missiles cost 3 per mass. They come either in a CM rack, or as part of a CM launcher magazine.

10. Standard Missiles (1 technology slot)
The Standard Missile (SM) is a smaller and less powerful version of the Capital missile. While their endurance is less, and their warheads are smaller, the lower mass of the Standard Missile allows them to be carried in effective numbers by small ships, and carried in vast numbers by larger ships.

Like Capital Missiles, Standard Missiles can be mounted using either a rack or in a launcher/ and magazine. SM racks have a mass of 1, fire into 3 arcs, and carry a single 1-shot SM. SM launchers are mass 1, fire into 3 arcs, and much be connected to a SM magazine. Standard Missiles loaded into a magazine are 0.5 mass each, so each mass of magazine may hold 2 standard missiles. Launchers may have a mixture of missiles loaded, and freely choose which to fire each turn. Each launcher can have its own magazine, or multiple launchers can feed off of a single magazine, as for CM launchers.

Standard Missile systems (missiles and launchers) cost 3 per mass. There are three missile types available. The long-lance standard missile has an endurance of 3, and carries a 1d3 warhead (semi-AP). The medium standard missile has an endurance of 2, and carries a 2d3 warhead (semi AP). The assault standard missile has an endurance of 1, and carries a 3d3 warhead (semi AP).

Standard Missile Rack   Mass 1   3 arcs
Standard Missile Launch Mass 1   3 arcs
Standard Missile Magazine Mass 1 (2 missiles per mass)

11. Plasma Bolt Launchers (1 technology slot)
The Plasma Bolt Launcher (PBL) loads and fires bombs which explode at range, bathing a huge area of space in superheated plasma. These plasma bombs are very difficult to destroy because they move quickly, have a small signature, and just tend to explode anyways if not destroyed quickly and completely.

Plasma Bolt launchers have two significant restrictions. First, a ship can mount only one 1 launcher per "size" of ship. So a mass 101-150 ship could mount 3 launchers, while a mass 1-50 ship could only mount 1. These launchers may be any size, within the available mass limit, it is the total number of launchers that is limited. The second limitation is that a PBL may only fire every other turn.

The PBL is fired during ordnance launch. A marker showing the detonation point is placed anywhere within arc and line of of site of the launcher, out to a range of 30 mu. PBLs explode with a blast radius of 6 mu (12 mu diameter), and every ship, missile, fighter and gunboat within the blast radius will be damaged. Any ship or other unit within the blast radius may fire at the PBL to try and shoot it down, but this is quite difficult. PDS fire suffers a -2 DRM, so only hits on a 6. Scatterpacks and interceptor pods do 1 BD* of hits. Each hit on the PBL reduces its strength by 1. So a class 1 PBL is destroyed by a single hit, while a huge class 6 will take 6 points of damage to completely destroy.

Every class (1-6) of PBL uses the same damage radius, but the amount of damage inflicted depends on the class of the bolt. Plasma bolts do 1d6 damage per class to every target within the blast radius. So an undamaged class 6 plasma bolt will do 6d6 damage to everything within the blast radius. Roll for each target separately, as the luck of the blast may bathe targets in more or less plasma. Fighters and heavy fighters take 1d6 casualties per dice of plasma damage. Missiles and gunboats are destroyed.

Shields do provide significant protection against the plasma. Each level of shield (2 maximum) provides a -1 DRM to each die of plasma damage. Stealth and holofields provide no defense from plasma bombs.

PBLs cost 3 per mass.

Class 1 PBL	Mass 5	3-arcs
Class 2 PBL	Mass 10	3-arcs
Class 3 PBL	Mass 15	3-arcs
Class 4 PBL	Mass 20	3-arcs
Class 5 PBL	Mass 25	3-arcs
Class 6 PBL	Mass 30	3-arcs

12. Rocket Pods (1 technology slot)
Rocket Pods are short-range direct attack ordnance weapons. They are most effective in high-speed close-in maneuvering battles, a place where other types of ordnance often has trouble tracking and attacking enemy ships. Rocket Pods are one-shot weapons that are crossed off the SSD once fired. They are fired during ordnance launch, but they use a different attack mechanic. Select an enemy ship within range and fire-arc of the rocket pod. The pod fires two rockets at that ship. Roll for each rocket to see if its hits.

Range	*up to 6 mu*	*up to 12 mu*	*up to 18 mu*
Hits on:	2+	3+	4+

If the rockets "hit" then place an appropriate number of rocket counters next to the ship. These will attack at the same time as other missiles, and the rockets can be shot down by point defense weapons as if they were conventional missiles. As the rockets fly straight in, they hit in the arc visible at the moment of launch. This will effect which which defensive weapons are in arc. Placing the rocket counters next to the ship in that arc is a good way to keep track of this.

Rockets can be fired at gunboats. They suffer a -1 DRM to target the gunboat.

Rockets do 1d3 damage (semi AP) each.

Rocket pods cost 3 per mass. Rocket pods carry 2 rockets which both must be targeted at the same enemy ship.

Rocket Pod	Mass 1	3 arcs
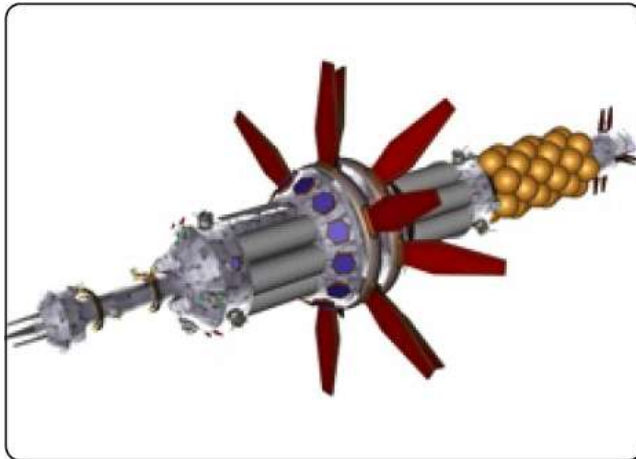
Spinal Mounts

Spinal Mounts are weapons so immense and powerful that the gun forms the central core around which the rest of the ship is assembled. The devastating firepower of spinal mounts comes with some considerable tactical costs and limitations.

--A ship may only mount one spinal mount weapon per size class of ship. So a size 3 battleship (mass 101-150) could mount up to three.
--Spinal mounts must face forward, cannot be turret mounted, and have a fire arc that is half the normal width (30 degrees).
--The turn after a spinal mount if fired a ship cannot maneuver at all, nor can it be charging its FTL drive.
--Spinal mounts may only be fired every other turn, though a ship with multiple spinal mounts could alternate firing the weapons to keep up a continuous barrage.

Spinal mounts all fire a beam of energy that can hit any model caught within. Larger spinal mounts generate beams that are longer and wider. The focus of the beam means that little power is lost with distance, so spinal mounts deliver the same number of damage dice along their entire range. Missiles, fighters, gunboats and even plasma bolts caught within can also be hit. Their chances of being hit are the same as for a ship, there is no negative DRM for shooting anti-ship weapons at small targets. If multiple ships are within the beam area, they all sustain the same number of dice of hits, but roll dice separately for each target. Only a planet or other large body can block a spinal mount, and even then it does bad things to the surface of the planet.

Spinal mounts ignore the range reduction of stealth and DRM of holofields. Shields can provide some protection against the beam and plasma spinal mounts. Spinal mounts can be targeted at an "empty point of space" so to catch more ships in the beam, or sweep away undetected mines. It still requires a Fire Control to target the spinal mount on the point in space.

Spinal Mount	Mass	Range	Beam Width
Small	8	24 mu	1 mu
Medium	16	36 mu	1.5 mu
Large	32	48 mu	2 mu

The damage they inflict depends on the type of spinal mount being used.

1. Point Singularity Projector (2 technology slots)
This exotic and highly dangerous weapon creates and fires a miniature black hole. While it is unlikely that the black hole will directly strike an enemy ship, the steep gravity gradient and tidal forces caused by the singularity can rip ships apart.

The PSP only generates 2 BD (no rerolls) of hits along its flight path. The damage these hits can generate, however, depends on the size and mass of the target. The bigger you are, the worse the damage inflicted. It does 1 damage per hit to small craft, missiles, fighters, gunboats. Against ships the damage per hit is 1d6 per size class of ship. So if two hits were scores against a mass 100 BC (size 2), it would suffer 4d6 damage.

The damage from a PSP is armor piercing, and is not affected by shields.

PSPs cost 5 per mass.

2. Beam (1 technology slot)
The beam spinal mount is a natural evolution and development of beam technology, a gigantic particle cannon capable of delivering crippling blows at long range. Beam Spinal Mounts generate 12 BD* hits within the beam area. Shields have their normal effect on these hits.

Beam Spinal Mounts cost 4 per mass.

3. Plasma (1 technology slot)
Plasma spinal mounts are a very large, super efficient plasma cannon. they generate 6 plasma dice within the beam area. These inflict 1d6-2-shields hits to all targets within the beam area, with rerolls on sixes. Note that there is no -1 for Holofields, which are ignored by area of effect weapons.

Plasma Spinal Mounts cost 4 per mass.

Fighters

1. Hanger Bays (0 Tech Slots)
Hanger bays hold fighters when they are not in flight. They contain all the equipment that is necessary to

rearm and refuel fighters during combat. The hanger bay cannot launch and recover fighters, that is the job of the launch tube. Hanger bay technology is available to all species. Each hanger bay holds a single squadron (wing) of 6 fighters.

Hangers cost 1 per mass, and are six mass each.

2. Launch Tubes (0 Tech Slots)
Launch tubes are connected to hanger bays and are used to launch and recover fighters. Launch tube technology is available to all species. A single Launch Tube may serve multiple hanger bays.

Launch tubes cost 3 per mass, and are 3 mass each.

3. Standard (1 technology slot)
Standard fighters have good capabilities in both anti-ship and point-defense fire modes. Against ships a full strength fighter wing (6 fighters) inflicts 6 BD* hits. Against other fighters or missiles, they inflict 6 BD* hits (equivalent of a beam-1 against ships, and a PDS against fighters/ordnance). This combination makes the standard fighter the most balanced option for engaging a wide variety of different targets.

Standard fighters can be equipped with either beams or cannon. If equipped with beams they inflict BD* hits. If equipped with cannon they inflict BD hits, but ignore the effects of shields.

Standard fighters cost 3 points each, 18 per wing.

4. Heavy modification (1 technology slot)
The heavy modification includes a variety of different possible modifications such as miniature shield generators, armored strengthening of the fighters frame, ECM, and stealth technology. All of these modifications produce the same net result, making the fighters harder to kill. Heavy fighters much more resistant to light point-defense type weapons.

This technology slot offers the "heavy" option which may be applied to other fighter types. Heavy fighters attack and move in the same manner as conventional fighters.

Point defense weapons, including other fighters, suffer a -1 DRM when engaging heavy fighters. Scatterpacks and interceptor pods do 1d3 hits, not 1d6. Heavy anti ship weapons used in defensive fire(Beams, K-1) have only their normal -1 DRM, as while the minor strengthening of the heavy fighter might protect against the light fire of a PDS mount, it does little against a full strength anti-ship weapon.

The heavy modification may be added to other fighter types at a cost of +3 per fighter (+18 per wing).

5. Fast (+mod) (1 technology slot)
The fast modification is a supercharging of the already fast fighter engine system to push the fighters right to the theoretical speed limit of the drive technology. The base move of a fast fighter is increased from 24 mu to 36 mu. Fast fighters may also may a secondary endurance move, but like normal fighters the range of this move is limited to 12 mu.

The fast-fighter technology slot makes available both fast standard fighters, and the "fast" modification which can be added to other fighter types.

Fast standard fighters cost 4 each, 24 per wing.
The fast modification may be added to other fighter types at a cost of +1 per fighter (+6 per wing).

6. Long Range (+ mod) (1 technology slot)
The long range modification gives fighters extra fuel-cells, allowing them to fly farther and stay in battle longer. The fighter has 9 points of combat endurance, not the normal 6. This modification can only be applied once, a fighter cannot have more than 9 endurance.

The extra endurance is consumed as normal for fighters, by engaging in extra 12 mu secondary moves and firing weapons.

The long-range fighter technology makes available both long range standard fighters and the "long range" modification which can be added to other fighter types.

Long range standard fighters cost 4 each, 24 per wing.
The long range modification may be added to other fighter types at a cost of +1 per fighter (+6 per wing).

7. Interceptor (comes with standard fighter technology)
The interceptor is a fighter that has traded off anti-ship firepower in order to maximize its killing ability against other fighter, missiles and other ordnance. It delivers BD* hits with a -2 DRM against ships, and BD* hits with a +1 DRM against fighters, missiles and ordnance.

Like the standard fighter, interceptors can be armed with either cannon or beams. Cannon lose the reroll of the beams, but ignore shields.

Interceptors are the same cost as standard fighters at 3 per fighter, or 18 per wing.

8. Attack Fighter (1 technology slot)
Attack fighters are the opposite of interceptors, they have traded away their anti-fighter/missile abilities in order to maximize their anti ship firepower. Attack fighters generate BD* hits with a +1 DRM against ships, and BD* hits with a -2 DRM against fighters, missiles and ordnance.

Like the standard fighter, attack fighters can be armed with either cannon or beams. Cannon lose the reroll of the beams, but ignore shields.

Attack fighters cost 4 points each, or 24 per wing.

9. Torpedo Fighter (1 technology slot)
    Torpedo fighters trade away most of their conventional beam (or cannon) firepower to mount a powerful 1-shot pulse torpedo launcher.

    Torpedo fighters can attack using their beam armament. They generate BD* hits with a -2 DRM against either ships or fighters. Firing these weak weapons still consumes a point of endurance.

    The Torpedoes may also be launched for 1 point of endurance. These have a range 6 mu, like other fighter weapons. The torpedoes hit on a 4+, and do damage equal to their die roll. So a roll of a "5" would both hit and inflict 5 points of damage. As these are pulse torpedoes, they ignore shields and inflict semi-armor piercing damage.

    The Torpedoes may only be fired once, and they must all be fired on the same turn, and at the same target. The torpedo fighters secondary beam weapons cannot be fired the same turn as the torpedoes are launched.

    Torpedo fighters cost 6 points each, 36 per wing.

10. EMP Fighter (1 technology slot)
    EMP fighter replace the normal beam or cannon armament of a standard fighter with a electromagnetic pulse projector. These EMP pulses can be used to burn out critical ship systems on enemy ships in a manner identical to ship mounted EMP weapons.

    The EMP pulses will also cause catastrophic damage to the smaller and less well shielded electronics on ordnance, fighters, mines and gunboats.

    A full strength EMP fighter squadron delivers 6 BD* of EMP hits to a target ship, or 6 BD* of hits against other fighters or ordnance. I costs one endurance to fire the EMP weapons.

    EMP fighters cost 3 points each, 18 per wing.

11. Graser Fighter (1 technology slot)
    Graser fighters are are a specialized ship-killing version that mounts short ranged graser mounts onto the small fighter frame. While they are quite capable at eviscerating a ship, they have very limited abilities when combating other fighters or ordnance. A full-strength wing delivers 6 BD* hits with the graser against ships, with each hit inflicting 1d3 damage, semi-AP. Against other fighters or ordnance, the fighter are limited to secondary cannon that inflight only BD* hits with a -2 DRM.

    Firing the graser is very energy intensive, and drains 2 points of combat endurance.

    Graser fighters cost 7 points each, 42 per wing.

12. Plasma Fighter (1 technology slot)
    Plasma fighters are extremely dangerous fighters that mount a miniaturized plasma cannon and are optimized for ship killing. The plasma cannon can be fired like other fighter weapons, except against ships they inflict plasma dice of damage, that is they inflict 1d6-2-shields/DRM hits, with rerolls on sixes. A full strength wing of plasma fighters can inflict enough damage to cripple a cruiser in a single volley. Plasma fighters have very limited abilities against other fighters or missiles, as the plasma cannon do not target such nimble targets easily. If used in a point-defense mode, the plasma cannon inflict BD* hits with a -2 DRM.

    Firing the plasma cannon is very energy intensive, and thus consumes 2 points of combat endurance.

    Plasma fighters cost 7 points each, 42 per wing.

13. MKP Fighter (1 technology slot)
    MKP (multiple kinetic penetrator) fighters carry one-shot kinetic attack packages that are very effective against enemy ships. Like the torpedo fighter, the MKPs may only be fired once, must all be fired on the same turn, and all must target the same enemy ship. They have a range of 6 mu, and inflict damage just like a ship-mounted MKP (1 hit on 4+, 2 hits on a 6, each hit inflicting 4 points of AP damage). The MKP fighter carries a small secondary beam (cannon) armament that gives it limited anti ship and anti-fighter capabilities. Against either ships or fighters/ordnance it generates BD* hits with a -2 DRM. These fighters cannon fire their secondary weapons and the MKPs in the same turn.

    MKP fighters cost 6 points each, 36 per wing.

14. Needle Fighter (1 technology slot)
    Needle fighters each carry a miniaturized short range needle beam. The weapon, and the sensors necessary to guide it accurately, consume most of the available weapon space, leaving the needle fighter limited abilities against other fighters or missiles.

    When needle fighters attack an enemy ship they must nominate a class of system they are attacking. Determination of the system being attacked depends on the amount of information available to the fighters. If an allied ship has advanced sensors within range, that information may be relayed to the fighters. Otherwise they may have to nominate a weapon or system class, and then hits are assigned at random. Every fighter in the wing must target the same type of target, though multiple successful hits could destroy multiple eligible targets. Like a needle beam, needle fighters hit on a 4+, inflicting one point of damage. On a roll of a six they inflict 1 damage and they destroy the nominated system.

    Against fighters and ordnance the needle fighters inflict BD* hits with a -2 DRM.

    Firing the needle beam consumes two points of combat endurance.

    Needle fighters cost 6 each, 36 per wing.

15. Missile Fighters (1 technology slot)

Missile fighters are specialized anti-ship attack craft that have been configured to carry the standard missile into combat. By combining the seeker head of the missile with the fighters own sensors, the engineers have managed to extend the normal fire control range of the fighter from 6 mu to 12 mu. The missile fighter must approach within 12 mu of an enemy ship before it can provide enough tracking data to safely launch its missiles. These missiles are launched during the ordnance launch phase. The six (if wing at full strength) missiles do not all have to be launched in the same direction, a spread can be used to increase the chance of a successful intercept. Launching the missiles consumes one combat endurance.

Missile fighters may carry either the medium standard missile (endurance 2, 1d6 semi AP warhead) or assault standard missiles (endurance 1, 1d6+2 semi AP warhead). The entire wing must carry the same missile subtype. The fighters carry one missile each.

Missile fighters do have a limited beam (cannon) armament for anti-ship or anti-fighter fire. These weapons generate a BD* hits with a -2 DRM against either ships or fighters/ordnance. These weapons are limited to a 6 mu range.

Missile fighters cost 4 points each, 24 per wing.

16. Rocket Fighter (1 technology slot)

Rocket fighters are a version of the missile fighter configured to carry one-shot attack rockets. Like the missile fighter they can combine the power of their own sensors with the tracking hardware of the rockets to extend their fire control range to 12 mu. The rockets may be fired at the cost of one combat endurance during the ordnance launch phase, they must all be launched at the same time, and against the same target. Their chance of hitting depends on the range to the target at the moment of launch. If the range is 6 mu or less, they hit on a 2+, if the range is 12 mu or less, they hit on a 3+. Rocket fighters carry one rocket each. Like ship-carried rocket pods, these rockets will hit at the same time as other missiles, and can be shot down by the point defense fire of the targeted ship. They count as approaching from the direction of fire at the moment the fighters launched.

Rocket fighters carry one rocket each. Rockets do 1d3 damage each, semi armor-piercing.

Rocket fighters do have a limited beam (cannon) armament for anti-ship or anti-fighter fire. These weapons generate a BD* hits with a -2 DRM against either ships or fighters/ordnance. These weapons are limited to a 6 mu range.

Rocket fighters cost 4 points each, 24 per wing.

17. Multi-Role Fighters (3 technology slots)

Multi-role fighters (MRF) are an evolutionary improvement over many of the more specialized fighter types. The MRF is based around a central weapon bay to which a wide variety of attack payloads can be fitted. By changing this weapon load the fighter can launch and fight as a standard, interceptor, attack, missile or rocket fighter. When multi-role fighters are being refueled and rearmed in a hanger bay, they may be reconfigured for another mission. This takes place simultaneously with the refueling. Multi-role fighters may also be rearmed in either cannon or beam-attack mode, as both type of weapons pods are available.

Multi role fighters cost 4 each, 24 per wing.

18. Robot Fighters (1 technology slot)

Robot fighters remove the cockpit and pilot of a normal fighter, replacing it with a computer control system. This reduces the cost and complexity of the fighter, but at a cost of some combat abilities.

Robot fighters is a modification that can be applied to any other fighter type. Purchasing the robot fighters technology comes with standard robot fighters. Robot fighters cost 1 less per fighter (6 less per wing) than normal piloted fighters.

Because computer control systems are not as creative and adaptable as a living pilot, they take their secondary (endurance-burning) move at the same time as missiles. This means that robot fighters cannot react to ship movement, they must complete their move before any ships move. Also, robot fighters can make some stupid decisions. If they are flying in escort of a ship that runs into a planet or hyper wall, the robots will blindly follow the ship to destruction, where crewed fighters would have the option of using their reserve move after ships move to escape the collision.

Standard robot fighters cost 2 each, 12 per wing.
The robot fighters modification cost -1 per fighter, -6 per wing.

19. Defense Drones (1 technology slot)

Defense Drones are a type of robot fighter which have sacrificed many of the capabilities of conventional fighters in order to make them smaller and cheaper. Defense drones are not carried in a hanger bay, rather they are carried in a hull-mounted rack, like a missile rack. Defense drones are launched during ordnance launch as normal.

Defense drones have limited sensors and electronics, and carry very small drive units. They can only fly in escort of the launching ship. If their launching ship is destroyed, the defense drones lose their control circuits and are immediately removed from play (so if the controlling ship is lost during phase 9, ships fire, the defense drones may not fire during phase 10). Defense drone have 6 points of combat endurance. Defense drones cannot be refueled during combat.

If the defense drones are cut off from their launching ship because it has raised a Black Globe or Vapour Shroud, the drones follow the ship. Without control feedback from the

ship they cannot fire, and are outside of the defensive field. If the defense drone system is lost on the SSD due to either a failed threshold test or a Needle Beam hit, the drone group that came from that rack is out of action until the system is repaired. The drones will continue to follow the parent ship, but cannot fire.

Otherwise they perform exactly like fighters. They may make attack runs on enemy ships within 6 mu. They can fire against enemy fighters and ordnance within 6 mu. The may be equipped with either cannons or beams. A full strength wing has 6 defense drones.

Defense drones come in both Standard and Interceptor versions, each performing like the fighter of the same name. Defense drones may not be given the Heavy or Long Range modifications. Defense drones may be beam or cannon armed, this is determined when the ship is built.

Defense drones cost 4 per mass.

Defense Drones   Mass 3   1 wing of defense drones

20. Fighter Racks (come with robot fighter technology)
Fighter racks allow robot fighters to be carried on the hull of a ship. This provides the advantage of rapid launch (no limitation of the number of launch tubes), and is a very cheap way for a warship to carry some fighters into combat.

Any type of robot fighter can be rack-mounted.

Robot fighters cannot be refueled or rearmed in the carrying rack. A launch-tube and hanger bay equipped ship, with the proper type of hanger bay for the fighter type being used, is required for combat reloads.

Fighter racks cost 1 per mass.

Fighter Rack   Mass 6   can carry 1 wing of robot fighters.
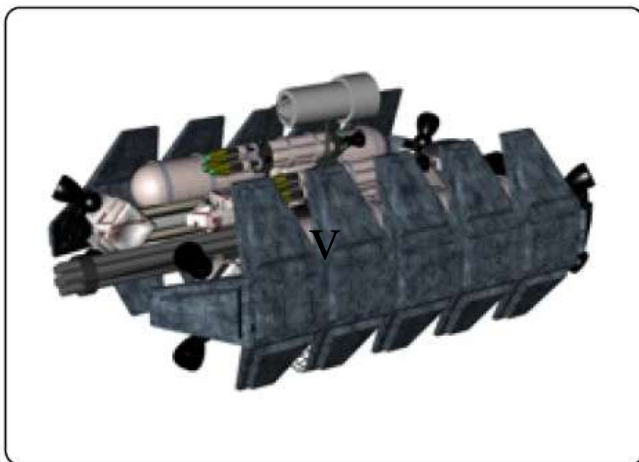
21. Fighter Package Deals
A species that wishes to use a carrier-based fleet with many different fighter options can find that all of its technology slot options (campaign game) are quickly consumed. "Carrier Race" package deals are therefore available.

The 6 slot package "fighter specialists" allows the user to pick 10 slots of fighter technology.

The 10 slot package "carriers supreme" package allows the user to use all fighter technology.

Gunboats

1. Gunboats (1 technology slot)
The gunboat technology option does not come with specific weapons like fighter technology. Rather the gunboat options that are available depends on the other weapon choices the player has made. If beams, pulse torpedo and PDS technology has been purchased, then those three gunboat options are available.

Gunboat racks are mass 3 each, or 18 mass for a squadron of 6 gunboats. The cost of the rack is included in the gunboat cost.

Gunboats cannot be refueled or rearmed in combat using their carrying rack, which limits the utility of some ordnance-carrying models. Gunboat-carrying ships with a boat bay of sufficient size to recover the whole squadron may use that boat bay to retrieve and rearm gunboats during combat. All gunboats require 1 endurance to fire their main weapon. All gunboats have 6 points of endurance.

The cost of the gunboat depends on the type of weapons carried.

2. FTL Gunboats (1 technology slot, requires Gunboats)
With advanced miniaturization, a FTL drive unit can be (just barely) crammed into a gunboat hull. This allows the gunboat to enter and leave FTL like a ship, and make strategic moves on its own. FTL Gunboats cannot be carried in racks. They count as being mass-4 for purposes of captive wormhole transits, and for docking in boat bays.

They have a maximum strategic speed of 3. Endurance is refreshed at the beginning of each strategic turn for all FTL gunboats in supply. It does not consume an endurance point to enter a battle from hyperspace.

FTL gunboats can only mount normal FTL drives. More advanced FTL drives cannot be crammed into the tiny hull.

Unlike normal gunboats which are counted as ordnance/fighters in strategic game, and automatically replaced at the end of the strategic turn, FTL gunboats count as ships. If the gunboat is destroyed in combat, it is permanently destroyed, and a replacement must be built. That

replacement must be built in the capital, or in a provincial shipyard.

Gunboats are represented as normal "size 1 blips" on the strategic and tactical maps. They may explore and hold terrain in strategic games.

Gunboat FTL drives generate very weak "distortion waves" when the gunboat enters or leaves hyperspace, insufficient to damage any nearby units. The gunboats themselves are very vulnerable to distortion, however. If there is a ship, planet, asteroid or other object sufficient to cause distortion where the Gunboat engages its FTL, the gunboat is destroyed.

The maneuverability of gunboats means that they may elect to move in any direction while charging their FTL drive, up to the normal maximum of 18 mu/turn. The next turn they make a half-move in that direction, and disappear into FTL-space.

The FTL Gunboat modification can be applied to any gunboat type, at a cost of +6 points.

3. Beams (comes with beam technology)
Beam gunboats carry 2 class-1 beams. These have a range of 12 mu, and both must be fired at the same target due to limited fire control.

Beam gunboats cost 3 per mass (9 points each).

4. EMP (comes with EMP projector technology)
EMP gunboats carry 2 class-1 EMP projectors. These have a range of 12 mu, and both must be fired at the same target due to limited fire control.

EMP gunboats cost 3 per mass (9 points each)

5. Plasma (comes with plasma cannon technology)
Plasma gunboats carry 1 plasma-1 with a range of 12 mu.

Plasma gunboats cost 3 per mass (9 points each).

6. Graser (comes with graser technology)
Graser gunboats carry 1 graser-1 with a range of 12 mu.

Graser gunboats cost 3 per mass (9 points each).

7. Gattling/Pulser (comes with either gattling battery or pulser technology)
Gattling battery and pulser technology both produce a similar gunboat. It has a weapon that can generate 6 BD* against a single target within 12 mu, or can be fired once as a PDS at a target within 6 mu.

Gattling/Pulser gunboats cost 5 per mass (15 points each)

8. Needle (comes with needle technology)
Needle gunboats carry a single needle beam. This weapon has a range of 12 mu.

Needle gunboats cost 3 per mass (9 points).

9. Pulse Torpedo (comes with pulse torpedo technology)
Pulse Torpedo gunboats carry a single short-range pulse torpedo launcher. The fire control of the gunboat limits the engagement range to 12 mu. The PT will hit on a 2+ out to 4 mu, a 3+ out to 8 mu, and a 4+ out to 12 mu.

Pulse Torpedo gunboats cost 4 per mass (12 points each).

10. Submunition (comes with submunition technology)
Submunition gunboats carry two 1-shot submunitions. These may either be fired singly (one per turn), or both may be fired off simultaneously against the same target. The submunitions each generate 3 BD* to 6 mu, or 2 BD* to 12 mu. Fire control limitations prevent them from being used beyond 12 mu. Once the submunitions are gone, the gunboat has no more weapons. Submunition attacks ignore shields.

Submunition gunboats cost 4 per mass (12 points each).

11. MKP (comes with MKP technology)
MKP gunboats carry two 1-shot MKP packs. These may either be fired singly (one per turn), or both may be fired off simultaneously against the same target. They each hit once on a 4+, and hit twice on a 6. Each hit delivers four points of AP damage.

MKP gunboats cost 5 per mass (15 points each).

12. K-gun (comes with K-gun technology)
The K-gun gunboat carriers one short-range K-2. The range of the weapon is limited to 12 mu by the fire control of the gunboat. The K-gun will hit on a 2+ to 4 mu, a 3+ to 8 mu, and a 4+ to 12 mu. Like a normal K-gun shot the damage from a K-2 doubles on a subsequent roll of 1 or 2, and is armor piercing.

K-gun gunboats cost 4 per mass (12 points each).

13. Gravitic Gun (come with gravitic gun technology)
Gravitic ("gravy") Gun gunboats carry 2 class-1 gravitic guns. These have a range of 12 mu, and both must be fired at the same target due to limited fire control. The damage caused by these weapons depends on the speed of the target. See gravitic guns for full descriptions.

Gravitic Gun gunboats cost 3 per mass (9 points each).

14. Missile (comes with standard missile technology)
Missile gunboats carry 4 standard missiles. They can carry a mix of medium and assault versions. Due to fire

control limitations, these missiles can only be launched when an enemy ship has come within 12 mu. The missiles are launched during the ordnance phase. The ship may launch none, some or all of its missiles for a single point of combat endurance. Like missile fighters, these missiles do not all have to be launched in the same direction.

Missile gunboats cost 4 per mass (12 points each).

15. Rocket (comes with rocket technology)
Rocket gunboats carry 4 rockets. Due to fire control limitations, these rockets can only be launched when an enemy ship has come within 12 mu. The rockets are launched during the ordnance phase, and their chance of hitting depends on the range at the moment of launch. They hit on a 2+ to 6 mu, and a 3+ to 12 mu. The ship may launch none, some or all of its rockets for a single point of combat endurance. All the rockets must be launched at the same target. Rockets can be used to target other gunboats, with the normal -1 DRM firing modifier.

Rocket gunboats cost 4 per mass (12 points each).

16. Boarding Torpedo (comes with boarding torpedo technology)
The Assault gunboat carries a miniaturized boarding torpedo launcher and two boarding torpedoes. Due to fire control limitations, the weapon can only fire out to a range of 12 mu. It can fire one boarding torpedo per turn. It hits on a 2+ to 4 mu, a 3+ to 8 mu, and a 4+ to 12 mu.

Boarding Torpedo (Assault) gunboats cost 4 per mass (12 points each).

17. Point Defense (comes with PDS technology)
The point defense gunboat carriers two PDS systems. The range of these weapons is limited to 6 mu. The small built-in fire controls of the PDS does allow them to be fired at different targets. The point defense gunboat counts as having ADFC, and may fire in support of allied ships in units with 6 mu.

PDS gunboats cost 3 per mass (9 points each).

18. Area Defense (comes with ADS technology)
The area defense gunboat mounts a single area-defense array. This can generate 1 dice of PDS fire out to 12 mu, or 2 dice of PDS fire out to 6 mu. The area defense gunboat counts as having ADFC and may fire in support of friendly units within 6 mu.

Area Defense gunboats cost 3 per mass (9 points each).

19. ECM (comes with ECM or area ECM technology)
ECM gunboats carry no weapons. Rather they carry a small ECM suite that provides protective jamming for all allied gunboats, fighters and missiles within 3 mu. All weapons fire against these units is subjected to a -1 DRM. Multiple ECM gunboats do not result in a cumulative DRM.

The ECM gunboat can be identified and targeted at range, due to the distinctive electronic signature its own jammers give it.

ECM gunboats cost 5 per mass (15 points each).

20. Scatterpack (comes with scatterpack technology)
Scatterpack gunboats carry two 1-shot scatterpacks. These may be fired either individually, or both on the same turn. Because they have their own guidance systems, they can be individually targeted even if fired simultaneously. Scatterpacks count as having in-built ADFC.

Scatterpack gunboats cost 5 per mass (15 points each)

21. Plasma Bomber (comes with plasma bolt launcher technology)
The plasma bomber gunboat carries two 1-shot size 1 plasma bombs. These are dropped during the ordnance launch phase. Note that they are not launched, they are dropped in the current location of the gunboat, which then must move away to escape destruction when they explode. One or both plasma bombs can be dropped in a single turn.

Plasma bombers cost 5 per mass (15 points each)

Mines

Every species has access to mines, they have no technology slot cost. The types of mines they can build depends on the anti-ship weapons they have developed and deployed. So an Empire with Pulse Torpedo technology can build PT mines.

Mines do not have a mass value, as they are only built and deployed strategically.

Conventional Tech Mines:

Mine Type	Cost	Effect
Beams	3	1BD* hits
K-guns	4	hit on 3+, damage as a K-1
Pulse Torpedo	8	hit on 3+, 1d6 damage Semi-AP
EMP	3	1 BD* hits, EMP damage
Plasma Cannon	6	1d6*-2-(shields/DRM) hits
Graser	6	1BD* hits, 1d3 damage/hit, semi-AP
Gattling Batteries	8	3 BD* hits
Needle Beams	6	1 Needle Die

Mine Type	Cost	Effect
Submunition	6	3 BD* hits, not affected by shields- ONE SHOT
MKP	8	Hit on 4+, 2 hits on 6. 4 AP damage/ hit- ONE SHOT
Pulsar	8	3 BD* hits
Plasma Bolt	8	Explodes as size 1 Plasma Bolt- ONE SHOT
Salvo Missile	6	Launches a 3-missile salvo- ONE SHOT
Standard Missile	6	Launches 2 Standard Assault missiles- ONE SHOT
Capital Missile	6	Launches a single Assault Missile- ONE SHOT
AM Missile	10	Launches a single Antimatter Missile- ONE SHOT
Rocket Pack	3	Fires 4 rockets that each hit on a 3+ ONE SHOT
Boarding Pods	6	Hits on 3+ ONE SHOT
PDS or ADS	3	Fires as a PDS, has ADFC
Scattergun	5	Fires one scatterpack- ONE SHOT
ECM	3	All friendly mines within 3 mu get a -1 DRM from enemy fire, activates when enemy within 6 mu.

Biotech Mines

Mine Type	Cost	Effect
Stinger Node	3	1BD* hits
Energy Pod	8	Explodes as size 1 plasma bolt- ONE SHOT
Projectile Pod	6	Launch a single Assault Missile- ONE SHOT
Interceptor Pod	5	Attacks fighters/missiles. 1d6 hits.- ONE SHOT
Lance Pod	6	Hits on 3+, 1d6 damage AP- ONE SHOT
Leech Pod	6	Hits on 3+- ONE SHOT
Spicule Node	3	One BD* at a fighter or other ordnance

Other

1. Fire Control (0 technology slots)
    Fire Control systems direct the weapons, providing the precise targeting information needed to hit small targets tens of thousands of kilometers away. Each Fire Control can target a single enemy. This enemy can be a ship, mine, missile, fighter wing, or gunboat. Any number of weapons may be directed by that fire control. The only exception is needle beams. A separate fire control is needed for each system targeted by needle fire, though a single FC could direct multiple needle beams to fire at a single system.

    Fire controls have a maximum range of 54 mu. No enemy unit may be fired upon outside this range. The only way for a ship to attack beyond this range is by means of fighters or gunboats. Because fire control radars use active emissions to track and scan targets, the number of active FC systems can be determined by enemy sensors. Fire Controls can be turned on and off by written orders.

    Fire controls cost 4 per mass.

    Fire Control   Mass 1

2. Advanced Fire Control (1 technology slot)
    Advanced fire control systems pack more range and tracking capability into the space of a normal fire control setup. Advanced FC systems can track two separate targets each, acting just like two normal Fire Controls. Advanced FC can also track and scan enemy ships out to a range of 72 mu. While no direct fire weapon has this sort of range, it does allow an advanced FC equipped ship to launch long-lance missiles at extreme range.

    Advanced Fire controls cost 5 per mass.

    Advanced Fire Control   Mass 1

3. Advanced Sensors (1 technology slot) Enhanced and Superior
    More powerful sensor packages are available to some species. These improvements allow enemy ships to be revealed at a greater range, and provide much more information than basic sensors.

Enhanced Sensors
    These have a range of 36 mu. At 24 to 36 mu they provide the same information as basic sensors. Inside of 24 mu they provide the following additional information:
    -The exact number, size and arc of enemy weapon mounts.
    -The exact type of all missiles and fighters
    -The drive power of a ship (total thrust and presence of AGD)

    Enhanced Sensors cost 3 per mass

    Enhanced Sensors   Mass 2

Superior Sensors
    These sensors have a range of 48 mu. At 36 to 48 mu they provide the information available to basic sensors. From 24 to 36 mu they provide the information available to

enhanced sensors. Inside of 24 mu they provide the following additional information:

-You may see the opponents SSD at any time. You know the exact status of the ship, including how much ammunition remains in magazines, how many marines are embarked, and what the captain had for breakfast.

-You can detect Biotech power allocation. This is revealed after all orders are written, but before movement and fire.

A player with Superior Sensors technology can build both Superior and Enhanced sensors.

Superior Sensors cost 3 per mass.

Superior Sensors   Mass 4

4. Minesweeper (1 technology slot)
The minesweeper system is a specialized fire control system optimized to detect and track mines. When coupled with point defense type weapons (PDS, ADS, B-1, K-1, EMP-1, Grav-1 scatterpacks, interceptor pods) it can allow a ship to fire on and destroy mines before they can detonate and damage the ship. For mines that attack with ordnance weapons, a minesweeper can potentially fire defensively twice, once before the mine triggers, and a second time (if defensive weapons remain) against the attacking ordnance if the mine was not destroyed by the initial fire.

Mine sweepers can also use their anti-ship weapons to target mines within 12 mu without suffering the normal -2 DRM. This fire occurs during phase 9, ships fire, so will not help to protect against any mines within 6 mu, which would have already detonated. Note that the ship must still use one fire control to target each mine with anti-ship weapons.

Minesweeper systems cost 3 per mass.

Minesweeper   Mass 2

5. Interdictor Fields (1 technology slot)
The FTL interdictor field creates an area of unstable space-time that badly effects FTL drives. These field effects can be easily detected by ships sensors, so they will know when they are within the area of effect of a FTL interdictor field.

Any ship that tries to jump off of the table in real space while within the area of the interdictor must roll a d6 and consult the chart below.

1-2 The FTL engages and the ship jumps away safely.
3-4 The FTL fails to engage. The ship takes 1d6 damage, and must take a threshold test on the FTL drive
5-6 The ship explodes. All ships and units within 6 mu take 1d6 damage per size of ship.

Any ship that tries to jump onto the table from hyperspace is also restricted by interdictor fields. These can be detected in hyperspace, so that ships can avoid jumping into them. If a ship does jump into one, either by design or due to scatter, roll a d6 and consult the following table. Advanced FTL drives provide no protection against the interdictor field.

1 Ship arrives safely.
2-3 The arriving ship takes 2d6 damage
4-6 The arriving ship is spread across space-time, and ceases to exist.

FTL interdictors do not function in hyperspace.

FTL interdictor fields cost 3 per mass.

Interdictor Level 1	Mass 2	12 mu radius
Interdictor Level 2	Mass 4	24 mu radius
Interdictor Level 3	Mass 6	36 mu radius

6. Signature Distorter (1 technology slot)
Signature distorters are a combination of ECM technology and a clever engineering approach during ship design. By masking or accentuating key emissions a ship can be made to look larger or smaller on long range sensors. These are built into the ship, and cannot be turned on and off, nor can they be altered once the ship is completed.

Each level of signature distorter can increase or decrease the size of the ships "blip" on long range sensors by 1. Each level of signature distorter is requires 3% of the ship's mass, at a cost of 3 per mass.

For example, a mass 30 destroyer is a size 1 blip on long range sensors. A level 2 signature distorter is mass 4 and 12 point, and it will make the destroyer appear as a size 3 blip on long range sensors. Seeing what looks like a Battleship or Battle Carrier in the distance, and enemy fleet may elect to withdraw.

Signature Distorters are limited to 2 levels. They have a minimum mass of 2 per level.

Signature Distorter   3% of ship mass per level, minimum 2 mass.

7. FTL Expander (1 technology slot)
The FTL expander is a device that works with the normal FTL drive to allow a large ship to fit through space-time junctions which would normally not allow such a large ship. Hyperspace tunnels (as described in the Campaign rules) have an intrinsic size limit in terms of the largest ship that can pass safely through them. A size-3 hyperspace corridor will allow ship of up to 150 mass to pass through. Every level of FTL expander allows the ship to pass through a passage one size smaller than its own size. So a Battleship with a level 2 FTL expander could pass through size 1 passages, which would normally only admit ships of mass 50 or less.

FTL expanders cost 3 per mass.

FTL Expanders   3% of ship mass per level

8. Boat Bay/Hanger Bay (0 technology slots)

Boat bays are distinct from the hanger bays that carry and resupply fighters. The boat bay is an internal bay that can carry other small ships. These small craft are launched at the same time as other ordnance, and can be recovered like fighters (it is assumed small tractors and other docking gear are present). The boat bay can be used to rearm gunboats in combat. The ship must carry gunboats of the appropriate type as are to be reloaded. Roll a d6 as for fighter reloads to determine how long it takes to rearm the gunboat.

The boat bay must be 1.5 times the size of the boat carried. (rounded up). The boat is designed and constructed using the normal ship construction rules. The minimal size for a boat is mass 2, 1 hull and 1 drive. The maximum size is only based on the size of the available boat-bay.

Boat bays cost 1 per mass. The ship within must be purchased separately.

9. Cargo Holds (0 technology slots)

While large cargo ships form the economic backbone of most star empires, they have little relevance to most warships in a tactical situation. Cargo bays can be used to hold vital supplies for a ship, allowing it a much greater ability to repair and resupply in the field.

Each cargo hold provides the supplies necessary to keep the ship "in supply" for one campaign turn (see campaign rules). Cargo holds are 3% of the ship's mass each, and appear on the SSD. If a ship loses a cargo bay to a needle hit, the cargo within is considered destroyed. If a ship has multiple cargo bays, roll threshold checks for each bay as for a normal system. If a full cargo bay is lost to a threshold test, the cargo within is considered destroyed and cannot be used to keep the ship in supply.

Cargo holds cost 1 per mass.

Cargo Hold   3% of ship mass each

10. Shipyard Facilities (0 technology slots)

Shipyard facilities provide the ability to build and modify ships in the frontiers of an empire. In the campaign system, the only shipyards are present at start are in the home system, so all newly built ships must start there. Shipyards also allow an empire that has lost its capital to continue ship construction and provide vital supplies from the frontier.

Shipyards can only built into fortresses, not into ships or system defense boats. Shipyards are a single system of any mass. The size of the shipyard determines the maximum size and the total mass of ships that can be built in a single strategic turn. A shipyard can build a ship that is double the mass of the shipyard. So a 50-mass shipyard can built ships up to 100 mass. Shipyards can build a total mass of ships equal to double their mass. So the 50-mass shipyard

mentioned could built one 100-mass BC, or two 50-mass CLs, or three 33-mass DDs.

Shipyards cost 2 per mass. They can be of any size.

11. Captive Wormhole (4 technology slots)

The captive wormhole harnesses the power of strange and exotic physics to create a direct link between two distant points. Captive wormholes can only be built into fortresses, they cannot be placed in ships or system defense boats. Furthermore, a captive wormhole can never be taken through a FTL transit, even if it is being towed or being carried internally by a large ship.

Wormholes are bought as a system of any size. A captive wormhole is linked to every other captive wormhole in your empire, and ships may move through the wormhole to travel great distances nearly instantaneously. Lines of supply can be drawn through wormholes.

The largest ship that can move through a wormhole is determined by the smaller of the two in any wormhole pair. The carrying capacity of a wormhole is equal to double the mass of wormhole. So a mass 100 wormhole could transit up to 200 mass of ships per impulse. Bases may be pushed through the wormhole on impulse 1.

Multiple small wormholes can all be linked to a single large wormhole, so long as the size limit of any single wormhole in the system is not violated.

Warp expanders do not interact with captive wormholes, and cannot be used to cram a larger ship down a small wormhole.

Captive wormholes cost 2 per mass.

12. Turrets (1 technology slot)

Turrets are mechanical assemblies into which entire weapon mounts are fitted. By rotating the turret, the weapon may be brought to bear into a variety of arcs. While turrets allow some limited arc weapons a wider field of coverage, they have a number of operation restrictions. Like multi-arc weapons, turret arcs do not have to be contiguous.

A turret is a system that appears on the SSD with the weapons within. If the turret is damaged due to a threshold test or a needle hit, it remains stuck in its current facing until repaired.

Turrets can bear into a number of arcs (the exact number depending on the construction of the turret). During the orders phase the facing of each turret must be recorded.

The weapons in a turret can fire into the single 60-degree arc that the turret is facing. Weapons with more than 1 arc that are mounted in a turret lose their additional arcs, and are limited to the single turret arc.

All the weapons mounted in a single turret must be

fired at the same target.

A ship is limited to one turret per size class of ship.

Turrets cost 3 per mass. Turrets are purchased based on the size of the weapons installed, and the number of arcs the turret can bear into. When determining turret size, round all fractions up.

6 arc turret	1 mass of turret holds 2 mass of weapons
5 arc turret	1 mass of turret holds 3 mass of weapons
4 arc turret	1 mass of turret holds 4 mass of weapons
3 arc turret	1 mass of turret holds 5 mass of weapons
2 arc turret	1 mass of turret holds 6 mass of weapons

For example, fitting a K-4 (mass 8) into a 4 arc turret would 2 mass of turret. Fitting it into a 5 arc turret would require 3 mass of turret.

Turrets cost 3 per mass.

13. Damage Control Parties (0 technology slots)
Ships can be fitted to carry additional crew. Most commonly these are used as extra damage control parties, increasing the number of available crew units to try and repair systems lost to threshold tests. The DCPs can also act as Marines, fighting off enemy boarding parties or boarding enemy ships if the technology is present to beam them over to the enemy (Transporters).

DCPs cost 5 points each, and are 0 mass. A ship can carry any number of DCPs.

DCPs appear on the SSD, and can be lost to threshold damage. Damaged (killed) DCPs cannot be repaired during a battle as killed and injured personnel take longer to repair than damaged machinery.

DCPs may not be targeted by Needle Beams.
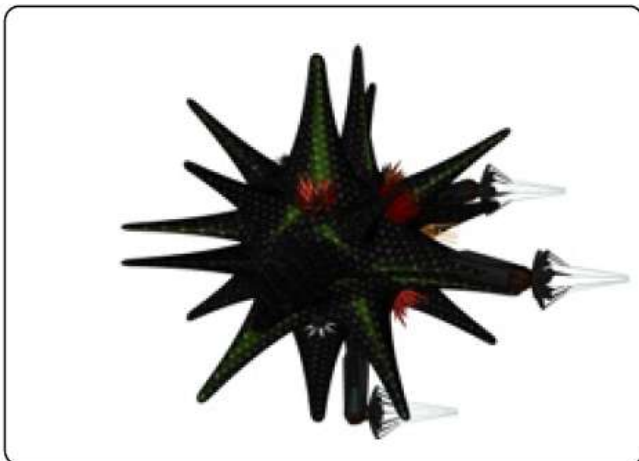
Biotech Systems

Biotechnological construction is based not around artificial ships with crews living within, but rather ships as living organisms, capable of making their own decisions and fighting on their own. Biotech ships have many similarities to conventional-tech ships (they all follow the same laws of physics), but the Biotech ships also have a number of unique devices which can radically affect their performance in combat..

The combat power of Biotech ships come from their flexibility. While the cannot match a specialized conventional-tech ship mass-for-mass in any particular weapons system, they can use a mix of stinger nodes, pod launchers and drone wombs to fight against an opponent's weaknesses, not their strengths. Biotech ships can generate huge bursts of speed, large numbers of beam dice, or a waves of ordnance- just not all at the same time!

Biotech ships must be equipped with Power Generators. These provide the power that is needed to provide propulsions, grow attack ordnance, and energize the weapons and shields. During the orders phase each turn the controller of a Biotech ship must allocate all of the available power into one of four different power pools.

The power is used when the system is activated. The repair pool is probably the most complicated in the regard, as it can be used at multiple points during the turn. Pod projectiles are grown/used during phase 9 (ship's fire), while drones and marines are grown during phase 11. The generation of drones, marines and the repair of damage takes place after marine combat. Associated biomass is consumed at the same time as the power is used.

The Attack pool is used to power the stinger, EMP, plasma and graser nodes.
The Defense pool is used to energize the spicules (PDS) and shields
The Repair pool is used to repair damaged systems, and to grow pod launcher ordnance or fighter wings.
The Movement pool is used to energize the drive systems, or to power up the FTL system.

Generating Thrust:
The power required to generate movement points from the drive nodes uses the following formula:
Power points required = 2% * thrust rating desired * mass of ship.

So for a mass 80 cruiser to generate 6 thrust would be 6 * (.02) * 80 = 9.6, which rounds up to 10 power points.

If the drive node becomes damaged, the power required to generate a point of thrust doubles. If a drive node suffers two damages (needle hits or failed thresholds) it ceases functioning until repaired.

Damage Control:
Biotech ships must regrow damaged regions. This can take longer than the damage control operations of a conventional tech ship. To repair a damaged system (note that systems lost by needle beams cannot be repaired in this

manner) the biotech ship must allocate a number of power points to its repair pool equal to the mass of the system being repaired. Unless the ship had sufficient spare power in the repair pool the turn the system was damaged, repairs cannot be initiated the same turn as the system was damaged. During the damage control phase roll for the system being repaired. On a roll of 4+ the system is repaired. If the repair is successful, one point of biomass is consumed. Biomass is not consumed on a unsuccessful repair roll.

Generating fighters and ordnance:
        The Pod Launcher and Drone Womb allow Biotech ships to generate fighters and ordnance during a battle. Power must be allocated into the repair pool, and an appropriate amount of biomass is consumed. Biomass is taken from the hull of the ship, starting at the bottom row of hull and moving right to left. Loss of a row of hull from biomass consumption does not cause the loss of those generators, nor does it incur threshold tests. If hull damage, which is being allocated from top to bottom and left to right, ever meets the consumed biomass, the ship is destroyed as it has no more empty hull boxes.

        Ships with drone wombs can regain biomass by recovering and "consuming" fighter wings.

1. Power Generators (0 technology slots)
Power generators are the lifeblood of a Biotech warship, without the energy they provide the ship can not move or fire. The power generators are not single large power plants, rather they are distributed networks of energy producing cells. This helps make them more resistant to damage. They cannot be targeted by needle beams, nor may they be knocked out by EMP fire. Only destruction of the hull reduces the power available.

        The power generators are divided up, with one quarter being marked at the end of each hull row. In the inverse to extra hull boxes, leftover power generators are noted on the bottom hull rows, making the more resistant to damage. The loss of a complete row of hull boxes knocks out the associated generators. They cannot be repaired by damage control.

        Each generator has a mass of 1, and produces one point of power every turn. Power may not be saved from turn to turn.

        Power Generators cost 3 per mass.

2. Carapace (0 technology slots)
        Biotech ships may elect to protect their hulls and the valuable biomass within with a layer of organo-ceramic carapace. The carapace functions just like conventional armor. Carapace does not require power to function. It has a mass of one per point, and costs 2 per mass.

3. Cortex Node (0 technology slots)
        The cortex node acts as a Fire Control system for biotech ships. It does not require any power to operate. The use the same rules as Fire Control systems.

        Cortex Nodes have a mass of 1, and cost 3 points each.

4. Stinger Node (1 technology slot)
        Stinger Nodes are the primary beam weapon of Biotech ships. Power can be shunted through the stinger node to generate beam dice against an opponent. The number of power required to generate a beam die depends on the range. Like any weapon, stingers require fire control for direction, and each stinger node can only fire at one enemy.

        Stinger nodes are restricted in the amount of power they can safely channel. A light stinger node can handle 4 power per turn, while a standard stinger node can handle 8.

        Stinger nodes cannot be used in point defense type fire.

        The number of beam dice the Stinger node can generate depends on the range. At long range it takes more power to generate 1 BD*.

Range	Power Required per BD*
to 12 mu	1
to 24 mu	2
to 36 mu	4
to 48 mu	8

        Stinger nodes are 3-arc weapons, and cost 3 per mass.

Lt Stinger Node Mass 1 3-arc   4 power maximum
Stinger Node   Mass 2 3-arc   8 power maximum

5. EMP Node (1 technology slot)
        EMP nodes are like the stinger node, but instead of beams, they fire EMP pulses to disable enemy systems. The generate EMP dice just like the stinger node above.

        Like Stinger nodes, EMP nodes are limited in the total power they can channel. EMP nodes are 3-arc weapons, and cost 3 per mass. They cannot be used in defensive fire mode, only in anti-ship mode.

        EMP nodes need the same amount of power to generate a BD* as a Stinger node.

EMP Node   Mass 2 3-arc   8 power maximum

6. Plasma Node (1 technology slot)
        Plasma nodes allow biotech ships to generate plasma dice. The node is larger and more power-intensive than a Stinger node, but like all Biotech energy weapons it can, given sufficient power, attack enemies up to 48 mu away.

Like conventional tech plasma cannon, these weapons inflict 1d6-2-shields/DRM hits per die.

Range	Power Required per Plasma Die
to 12 mu	2
to 24 mu	4
to 36 mu	8
to 48 mu	16

Plasma nodes are 3-arc weapons, and cost 3 per mass.

Plasma Node   Mass 4 3-arc   16 power maximum

7. Graser Node (1 technology slot)

The Graser node allows biotech ships to fire gamma-ray laser beams at enemies. Like conventional tech grasers, these deliver BD* hits, with 1d3 damage (semi-AP) per hit.

Graser nodes have the same power requirements per BD* generated as Plasma nodes.

Graser nodes are 3-arc weapons, and cost 4 per mass.

Graser Node   Mass 4 3-arc   16 power maximum

8. Transporter Node (1 technology slot)

The Transporter node functions in a manner similar to the transporter beam of conventional technology. It uses power to generate BD (no rerolls) hits against opponents. Each hit allows it to transport boarders (marines) onto enemy ships. These boarders are created using the ships own Biomass.

For each hit the Transporter node generates the ship owner may transport one boarder onto the enemy ship. These boarders must have been created by the ship prior to transport. The power required to generate a transporter BD is the same as for a Stinger node. By sending marines to an allied ship transporter can be used to move biomass between biotech ships.

Transporter nodes are 3-arc weapons, and cost 3 per mass.

Transporter node   Mass 2   3-arc
8 power maximum

9. Spicules (1 technology slot)

Spicules are small launchers that fire tiny self-guided defensive organisms at incoming ordnance and fighters. In combat they perform in manner identical to PDS systems, and as such may fire a maximum of once per turn. They each require 1 power in the defense pool to energize.

Spicules cost 3 per mass.

Spicule Mass 1 6-arc   1 power

10. Pod Launchers (1 technology slot)

The Pod Launcher is a versatile weapon system that uses Biomass to create a wide variety of specialty projectiles that can be used to damage enemy ships, or to protect allied ships.

All Pod Launchers share the following rules. The Pod Launcher must have power allocated to the repair pool in order to fire, this is because all Pod Launcher weapons must consume Biomass to fire. The amount of power required depends on the type of pod fired. The type of weapon does no have to be selected until the moment of launch, so long as sufficient power and biomass is available, any type of pod can be fired. Some pods launch during the ordnance launch phase, others during ships fire. Compare the pod to the relevant type of conventional weapon to determine when it should fire.

Pod Launchers are 1-arc weapons. Missiles launched must move within this limited arc on the turn of launch. Interceptor pods have a 6-arc area of engagement, and can even target missiles, fighters or gunboats within the baffles behind the ship.

Projectiles fired from the pod hit using the standard to-hit numbers for projectile weapons (2+ to 6 mu, 3+ to 12 mu, etc.) with a maximum range of 30 mu. There are no long or short range versions of the pod launcher.

Pod launchers may only launch a single pod per turn. The type of pod to be launched does not have to be chosen until the moment of launch, and any available type may be launched so long as sufficient biomass and power is available.

Purchase of the Pod Launcher technology gives access to Lance, Leech and Interceptor pods, additional pod technologies can purchased.

The Pod launcher has a mass of 3 and costs 3 per mass. It is limited to 1 fire arc.

Lance Pod-   Power cost 3   Biomass cost 1
Fires a projectile which inflicts 1d6 AP damage if it hits. Chance of hit depends on range, as for normal projectile weapons. It is limited to the single arc of fire of the projectile launcher.

Leech Pod-   Power cost 3   Biomass cost 1
Fires a projectile which does one point of damage and deposits two borders onto an enemy ship. Chance of hit depends on range, as for normal projectile weapons. It is limited to the single arc of fire of the projectile launcher.

Interceptor Pod- Power cost 3   Biomass cost 1
Produces a defensive pod that can be fired at any enemy fighter, missile, ordnance or gunboat within 12 mu. It

has a full 360-degree attack area, and can fire into the baffles of the launching ship. It counts as having ADFC, and can fire in support of allied ships. Its effect on impact is the same as a scatterpack, except that it cannot be used in anti-ship fire.

FTL Scrambler Pod- Power cost 3 Biomass cost 1
(1 technology slot)

This weapon can only be effectively used against ships that are powering up their FTL drives. If the scrambler hits on the turn a ship is energizing its FTL drive , it delivers a huge overload of energy into the FTL capacitors. The affected ship has only two options, it can attempt to jump but it must roll on the mishap table with a +2 DRM, or the ship can abort its jump, but it still must roll on the jump mishap table.

Advanced FTL drives provide no protection from the FTL scrambler pod.

Burst Pod-   Power cost 5   Biomass cost 1
(1 technology slot)

The Burst Pod functions exactly like a class-1 Plasma Bolt Launcher (PBL), with two exceptions. First, it only has a range of 24 mu, not the 30 mu of a PBL. Second, it may fire every turn, so long as power and biomass are available. The Burst Pod may be placed anywhere within the single arc of the launcher.

Needle Pod-   Power cost 3   Biomass cost 1
(1 technology slot)

The needle pod is fired and hits like a conventional projectile weapon. On impact, however, it generates 3 needle dice (hit on 4+, system knocked out on a 6) against a single system on the enemy ship.

Missile Pod-   Power cost 3   Biomass cost 1
(1 technology slot)

The missile pod function exactly like a capital missile. Assault, Medium and Long-Lance missiles may be generated. A single missile may be launched per turn out of each pod launcher, so long as sufficient power and biomass are available. The missiles may only launch into the limited 1-arc field of fire of the pod launcher, but after that move exactly like conventional capital missiles.

11. Drone Wombs (1 technology slot)

The Drone Womb is a structure that can grow, launch and recover wings of Biotech fighters. Upon launch these fighters operate in a manner exactly like conventional tech fighters. Purchase of the Drone Womb technology gives access to standard fighters and interceptors. Other fighter technologies are available.

Because it takes time to grow fighter wings, they are not available for immediate launch. A wing of fighters grown on turn 1 could be launched on turn 2. Like conventional launch tubes, a Biotech carrier can launch a number of wingers equal to its number of Drone Wombs or recover half that many each turn. Drone wombs can only hold one wing of fighters at a time, and cannot be used to grow, store, or reabsorb multiple wings simultaneously.

When a wing of Biotech fighters is recovered, it is reabsorbed by the carrier. Each surviving fighter restores one point of expended Biomass from the carrier. Note that re-absorbtion cannot repair hull damage from enemy weapons fire, it can only restore expended Biomass. This process occurs on the turn the fighters are recovered, and requires no power.

The fighter modifications of Heavy, Fast, and High Endurance are not available.

Fighter Type	Biomass Cost	Power Cost
Standard	6	6
Interceptor	6	6
EMP	6	6
Attack	6	8
Lance	6	12
Leech	6	12
Graser	6	15

Attack Fighters (1 technology slot)

Function exactly as conventional tech Attack Fighters.

EMP Fighters (1 technology slot)

Function exactly as conventional tech EMP Fighters.

Graser Fighters (1 technology slot)

Function exactly as conventional tech Graser Fighters.

Lance Fighters (1 technology slot)

These function in manner very similar to Torpedo fighters. They have a one-shot weapon with a range of 6 mu that hits on a 4+ and each hit delivers 1d6 AP damage. They may only fire their Lance Pod once.

Leech Fighters (1 technology slot)

These function in a manner very similar to Torpedo fighters. They have a one-shot weapon with a range of 6 mu that hits on a 4+ and each hit delivers a leech to the enemy ship. They may only fire their Leech Pods once.

Drone Wombs have a mass of 3, and cost 7 per mass.

12. Drive (0 technology slots)

The drive system on a Biotech ship occupies 10% if the total hull mass. The output of the drive depends on how much power is shunted into it each turn.

Biotech ships may also mount Advanced Grav Drives. This option requires 4 technology slots, as for conventional technology ships. AGDs also mass 10% of the total ship mass, and their output is dependent on the power

put into them by the generators. The AGD allows the ship to make a turn for every point of thrust generated during a tactical turn.

Drive	10% ship mass	Cost 2 per mass
AGD	10% ship mass	Cost 3 per mass

13. FTL Drive (0 technology slots)

Biotech ships may mount FTL drives for strategic mobility. These occupy 10% of the total hull mass, as for conventional FTL drives. Like the conventional FTL drive, they require a turn of powering-up before they can be activated. The power required is equal to the mass of the FTL drive. Biotech ships are limited like conventional technology ships in the actions they can perform while powering up the drive, that is they may only use defensive weapons and systems. Power can only be allocated to the defense, repair and movement pools. Power for the FTL drives comes from the movement pool.

Biotech ships may purchase advanced FTL drives. They confer the same advantages as for conventional ships (the ability to better move and fire while preparing for FTL), while having the additional advantage of requiring less power to activate than normal FTL drives.

Advanced FTL requires 1 technology slot, while super-advanced FTL drives require 2 technology slots.

FTL	10% of ship mass	Cost 2 per mass
Advanced FTL	10% of ship mass	Cost 3 per mass
Super-Adv FTL	10% of ship mass	Cost 4 per mass

14. Shield Nodes (1 technology slot)

Shield Nodes are used to generate defensive shields that can protect against enemy beam fire. They require power from the defense pool to activate. A ship can carry up to 2 shield nodes. Each shield node has a mass of 5% of the total ship mass, and requires power equal to its mass to activate.

Shield Node	5% of ship mass per node	Cost 3 per mass

15. Other Technology Options

Biotech ships can purchase and use some other conventional technologies. Their points cost per mass, size and technology slot are identical to their conventional tech analogs. Where applicable, power requirements are listed.

- Variable Hull Rows
- Regenerative Armor
- Shell Armor
- Stealth Hull
- Streamlining
- Holofield   Power = mass of system (defense pool)
- Stealth Field   Power = mass of system (defense pool)
- ECM   Power = mass of system (defense pool)
- Area ECM   Power = mass of system (defense pool)
- Black Globe   Power = mass of system + mass of FTL (movement pool)
- Advanced Fire Control
- Advanced Sensors   Power = mass of system (attack pool)
- Minesweeper   Power = mass of system (attack pool)
- Interdictor Field   Power = mass of system (attack pool)
- Signature Distorter
- FTL Expanders   Power = mass of system (movement pool)
- Boat Bay
- Cargo Hold
- Shipyard
- Captive Wormhole

Campaign Rules

The campaign rules presented here have been designed to give a strategic aspect to Full Thrust games so not every game is a simple fight to the death encounter, and to allow players to test their strategic planning skills against one another. Some of the ship systems listed about (signature distorters, FTL expanders, cargo holds, shipyards, etc.) are only really relevant in a campaign setting. The campaign rules have been simplified to increase speed of play. Complicated campaign systems that take careful account of supply, maintenance, research, and other such factors can too easily bog-down into a very tedious game of "accountants in space." That is not the game we want to play.

The basic idea behind the campaign is that each player has just entered this unexplored sector of space and established a provincial capital of their home empire. They have a starting fleet, with which they can explore and capture neighboring star systems. This provides income to build more ships. Eventually they will encounter other interstellar empires, and they can then make war with them.

Campaign Version 1:

Map

The campaign map has two different basic types of terrain, planetary sectors and hyperspace sectors. Ships move from sector to sector, exploring and fighting.

Planetary sectors contain worlds and resources that can be used by the controlling empire to build more ships and other units. Bases and minefields may be built/placed in planetary sectors. Hyperspace sectors are unstable regions, so bases and mines may not be deployed there.

Hyperspace sectors have a size limit that dictates the largest ship that can safely enter the sector. These limits are

usually 50, 100, 150 or 200 mass. Warp expanders allow larger ships to enter these sectors. Any number of ships may occupy a hyperspace sector.

[EXAMPLE IMAGE OF MAP]

Maps may either be pre-generated, or generated as players explore. Each map style has advantages and disadvantages. A pre-generated map can be balanced so each player has the same number of worlds within 3 or 4 moves of their capital, so that they all have a roughly even economy.

A randomly rolled map that is generated during exploration has the advantages of allowing each campaign to be unique, and adds a exciting element of uncertainty to empire creation.

On a pre-generated map it is best to keep the empire home systems at least 6 moves away from every other empire home system. If they are too close to one another it becomes to easy for one player to take out another in a rush on the first or second turn.

A map that develops as players explores can be very exciting, as nobody knows exactly what they will find, or when they will encounter another player race. Use a sheet of hex paper, sized to suit the number of players in the campaign. Each players starting system should be at least 6 hexes away from their nearest neighbor. The further apart you place the home sectors, the larger the empires will become, and the longer the game will take. 6 to 8 intervening hexes between capitals is a good mix for a moderate-length campaign (10-15 turns).

When using a random map every player starts with a value-200 system with three size-200 outbound hyperspace corridors. These outbound corridors are straight for their first segment, and are evenly spread around the hex.

The region being explored was once held by an vast star empire that has long since collapsed. The remnants of this empire can be found in a few robot warships, still trying to defend the planets. Scouts may have to engage and destroy these defenders before they can explore planetary systems.

Whenever a ship moves into an unexplored hex, roll 1d6 and consult the discovery table.

1   Straight hyperspace corridor (1)
2-3   Branching hyperspace corridor (2)
4-6   Planetary System (3)

(1) A straight hyperspace corridor extends in the same
    direction, straight across the hex. All hyperspace corridors
    are the same size for their entire length. The only
    exception is when a corridor of a different size "blunders
    into the side" of an already explored corridor. Running
    into a planet or other h-space corridor terminates the
    hyperspace corridor.
(2) A branching hyperspace corridor splits so that there are

two exit paths. Roll two d6 to generate the facing those exit paths take. Reroll any doubles.

(3) Exploring a planetary sector takes time. An exploring ship must end its movement in a planetary sector in order to explore it. You cannot move on through a planetary sector until it has been explored. Exploration may reveal defenders which must be engaged to take control of the system.

Upon exploration roll 2d6 to determine the nature of the system.
    2-3: Special (Table E)
    4-5: Terrain (Table A,B,C,D)
    6-8: Normal (Table A,B,C)
    9-10: Technology (Table A,B,C,F)
    11-12: Occupied (Table B,C,G)

Roll to determine the economic value of the system (table A), the number of outbound warp points (table B), and the size of those warp points (Table C). (On turn 1 there is a +1 DRM to the rolls on tables B and C to prevent empires from being caught in a cul-de-sac.)

Table A- System Economic Value:
1   50 points/turn
2   75 points/turn
3-5   100 points/turn
6   150 points/turn

Table B- Number of outbound hyperspace corridors:
1   0 (dead-end system)
2-3   1
4-5   2
6   3
        Roll a d6 to determine the hexside each outbound point is in. Reroll doubles.
        They are straight for their first hex.
        Existing connections are counted towards the total. Existing real-space connections in a multi-planetary system are also counted towards the total.

Table C- Size of outbound hyperspace corridors:
1   50
2   100
3-4   150
5-6   200
        Roll for each outbound hyperspace corridor separately.
        A 50-size corridor extends 1d3+1 hexes out, and then ends in a planetary system. The length of the corridor will not be known until it is explored. 50-size corridors skip over and under intervening hyperspace corridors and planets without connecting. The destination point and length are not known until the corridor is explored by entering, then exiting into the destination planetary system. The destination is always a planetary system in an empty hex. The corridor can twist and turn, for each hex of distance roll a 1d3 to determine if it goes straight, right or left. Moving through a 50-size corridor only requires one point of strategic movement, no matter what it's length.

Table D- System-wide terrain
1   Dust Cloud- A thick nebula impedes weapon fire. A ships suffer a -1 DRM per full 12 mu of range.
2   Asteroid Field- the table is filled with asteroids and meteor showers
3   Giant Planet- there is a super-sized gas giant surrounded by rings and moons
4   Derelict Minefield- a mixture of old but functional beam mines litter the battlefield. There are mines in a 6 mu by 6 my grid throughout the playing area. They are set to attack all targets.
5   Plasma Stream- The whole system is filled with swirling hot gas. All units (ships, ordnance, etc) take 1d3 (-shields) plasma damage during phase 11 every turn. Ships and forts can be placed there in the strategic game, they are assumed to be in a protective hanger or shell, which must be shed for combat.
6   Solar Storm- Dozens of ion storms fill the area, disrupting ship systems.

Table E- Special Planetary System
1-2   Starless Nexus- The system has no star or planets, and thus has an economic value of 0. It is, however, an intersection of multiple warp lines. There are outbound warp points in every open hex side. Roll for the size of these warp points normally.
3-4   Multi-planetary system- This is a cluster of interlinked planetary systems. There are 1d3+1 additional planetary sectors in addition to the one first discovered. Create these new planets in a chain from initial system, rolling a d6 to see which facing the next planet adjoins. Roll for the economic value and number of outbound connections of these systems normally (Tables A,B,C). Planetary sectors must be explored one at a time, and cannot be moved through until that exploration is complete.
5-6   Wormhole- this double system contains a giant wormhole. Ships, FTL-capable or not, may pass through this wormhole as a strategic move, and emerge in any other wormhole system in the universe. All discovered wormhole systems interlink. If only one wormhole has been discovered, and the owner send ships through that wormhole, they discover another wormhole system in a random hex somewhere on the map. This system can be explored for economic value normally. Subsequent discoveries of wormholes simply add to the network. Wormhole systems have economic value as a normal system, but they only have one warp point, so they are always dead-ends (unless an external warp line ends up connecting into them).

Table F- Technology systems
1-3   Technology Merchants- This system has an outpost of the The Technology Merchants. Technology merchants cannot be attacked, and will sell technology to the possessor of the system at a cost of 250 points per tech slot. Roll on tables A, B and C normally.
4-6   Artifact Shipyard- Millions of years ago the galaxy was wracked by a great war. Some of the weapons remain. In this system is an automated shipyard, if the owning player feeds in resources it will pop our warships. The shipyard can

only produce one type of warship. The technology contained within is so advanced and esoteric that deciphering of the technology is impossible (metric system). The system is defended by a task force of 300-750 point in value. The defenders are conventional technology ships, from which technological innovations can be gleaned normally. Draw a random pre-generated shipyard card. This will contain the defenders, and the product that the shipyard produces.   Roll on tables A, B and C normally to determine the system value.

Table G- Occupied systems
Exploring this system uncovers a species that has developed space travel, but had not yet mastered the secrets of FTL travel. Your arrival provides the final clues they need to make FTL drives. Now you have an aggressive, imperialistic neighbor with up to 1000 points worth of starting fleet. The low-tech (2 tech slots) species should be run by another player who is not otherwise in direct conflict with the discoverer, or by a Game Master. This system has an economic value of 200/turn. This information should be on a pre-generated NPC fleet card that is drawn at random when the system is discovered. Roll normally on tables B and C to determine the number of outbound connections.

Natural Wormholes

These structures can be discovered on the randomly generated map, or placed in a pre-designed map. The wormhole presents a number of unique tactical and strategic implications.

Ships without FTL can pass through the wormhole safely. This includes fortresses which can be "pushed through" on the first strategic movement impulse. These is no mass limit with natural wormholes, any number of ships, of any size, can pass through the wormhole.

Passing through a wormhole completes a units' move. All ship emerge from the destination wormhole at the end of the turn, just in time for combat.

Wormhole systems are always dead-ends, and do not roll for any outbound passages. Wormhole systems are controlled as normal, they require an armed unit to count for supply lines. Forces in the hex with the wormhole are adjacent to the wormhole, and contest all transits.

The tactical setup and rules for fighting a wormhole transit are as follows. The wormhole should be represented by a disk 6 to 7 mu in diameter. The wormhole event horizon completely blocks line of sight, and ordnance weapons cannot be fired through it. The defenders array themselves around the wormhole, with the only limitation being that no ship, fort or mine may be placed within 6 mu of the edge, nor may any unit be further than 72 mu away.

The first attackers arrive on turn 1. The attackers can elect to have all their forces enter on turn 1, or can pre-arrange via written orders what turn each unit will arrive on.

The attacker also decides if ships will be arriving singly, in groups, or some combination. The gravitational eddies within the wormhole makes it impossible to determine the exact exit vector of any object. Roll a scatter die for each ship or group of ships. The arrow indicates the direction of emergence. Ships can start with a velocity of 1 to 10, and orders can be written for their first turn, allowing ships to maneuver immediately upon emergence.

Forts, if pushed through on strategic impulse 1, appear on turn 1 on the edge of the wormhole at speed 0.

Advanced and super-advanced FTL have no effect on the control of the exit vector. The wormhole counts as a "massive object" for purposes of FTL activation by ships of either side, with the normal 6 mu effect radius.

A ship that re-enters the wormhole disappears, and cannot rejoin the battle. It is in the process of making a strategic move to another wormhole elsewhere in the universe. Activation of an FTL drive is not needed to enter the wormhole.

Strategic Movement

The strategic speed of a ship is determined by it tactical thrust rating. For every two points of thrust (rounded up) the ship has one point of strategic movement. So a thrust-4 ship would have a strategic speed of 2, while a thrust-5 ship would have a strategic speed of 3. Advanced Grav Drives have no effect on strategic speed. Organic technology ships use one third of their maximum drive rating to generate strategic speed, this is to represent the fact that they cannot put all power into engines indefinitely, some power from the generators is needed to keep the rest of the ship-organism alive.

To enter or leave a hyperspace sector a ship must also have an operational FTL drive. In places where planetary sectors are linked (multiple system cluster) non-FTL ships can make strategic moves.

Ships that enter a hyperspace sector with enemy units are engaged in combat, and cannot move out of the square. This is known as "pinning." Ships pin one based on their total size at a 1 to 1 ratio, so a force of four size 1 ships, will pin four "size worth" of enemy ships in combat. That could be a single size 4 Dreadnaught, a pair of size 2 Battlecruisers, or any other combination. If size total of your ships is greater than your enemy, your excess ships may move out of sector on subsequent impulses normally. If you have more ships than your opponent you can elect to keep some of them out of the combat. This can be done to protect crippled non-combatant ships. It can also be useful to allow some of your ships to keep moving out of the sector even as a battle rages. Signature distorters can raise or lower the pinning ability of a ship. The is no pinning in real space, though a force with more ships can elect to leave some of the units out of the combat, again to protect damaged or vulnerable ships.

Note there s a risk in this tactic, if that side loses the winning side may immediately attack those ships. Start a new tactical battle with the victorious fleet in its current battle-state.

Endurance using craft cannot make strategic moves (missiles, gunboats, fighters). They also cannot move through a wormhole on their own. The exception to this is FTL gunboats.

Starting Resources

Each player gets a small fleet at start. This can be added to as the game progresses.

Version 1- Each player gets a fixed number of tech-slots worth of technology choices, plus a fixed amount of fleet. A 1500 point fleet is a good starting size. This will expand rapidly as systems as discovered and conquered. The number of tech slots depends on how high-tech you want the empires to be. A low-tech empire would have 4-8 tech slots, a medium tech empire would have 9-14, and a high-tech empire would have 15+.

Version 2- Each player gets to decide how much technology their empire has developed, but more technology results in a smaller starting fleet. For example, an empire would be given 4500 points worth of ships, but it must purchase every tech slots for 250 points. Thus if it bought 12 tech slots (a medium technology empire) it would have 1500 points remaining to purchase its starting fleet. Very high technology empires would have very small fleets at start, and would be very reliant on finding undefended or lightly defended systems quickly so to build an economic base and expand the fleet.

Bases purchased at start can only be deployed in your home system (obviously). Bases cost half the normal cost of a ship, rounded up.

Income

Income is derived from the planetary systems each player controls. Hyperspace sectors generate no income. A system must be in supply for its income to count towards the empire total. That is, the system must be able to draw a line of supply through planetary and hyperspace sectors (or through a wormhole) back to the capital. If a sector between the capital and the system is held by enemy forces, those resources are cut off that turn and cannot be used.

Systems with their own shipyard, or that can draw a line of supply to a shipyard, can produce units in that shipyard using their income even if cut off from the rest of the empire.

Building

An empire uses its income to build more military

units. These are ships (both FTL and non-FTL capable), forts, and mines. The industry to build these units is located in the capital (central) system of the empire.

All of the ships bit are considered to be military units, purely civilian ships and resources are not represented on the strategic scale for simplicity sake. Therefore all ships, system defense boats are forts built must contain some type of offensive weapon system. That is, they must have some means for causing damage to the enemy. This could be a direct fire weapon, a transporter with embarked marines, ordnance, fighters or gunboats. Systems that do not cause damage (recon missiles, ECM gunboats) do not count as offensive weapons in this regard.

New military units become available at the end of the turn they are built, and may move or engage in combat on the next turn.

Ships (units with drives and FTL units) come into play in the capital system, and may move away. System defense boats (ships with a drive but no FTL), forts and mines can come into play in any system of the empire that is in supply. This represents the ability of the merchant ships to move resources around the empire quickly. In large games this may mean that forts and mines "instantly" transport huge distances across a sprawling empire, but this is much easier than trying to account for the position of dozens or hundreds of merchant ships.

Forts are considered to be modular, and can be assembled on-site. They are thus not restricted to any limitations of hyperspace corridor size. This is not so for system defense boats, they must be able to fit through all hyperspace corridors to reach their destination.

Because the drive and FTL systems add so much to the cost and complexity of ships, all forts may be purchased at half price (rounded up).

A empire with shipyards outside the capital may build ships at those shipyards. The capacity of a shipyard per turn is double the mass of the shipyard system. So a 50 mass shipyard could produce up to 100 mass of ships per turn. If the situation arises where an empire has only its provincial shipyards after losing the capital, then limits must be placed on fort and mine building. A shipyard can produce four times its mass in forts, and an unlimited number of mines.

Building gigantic space battleships does involve some planning and paperwork. To represent this each empire writes its planned building orders at the beginning of each strategic turn in the form of a building queue. That is, all the units to be build in priority preference are listed. If sufficient income is available these units will be produced at the end of the turn. If there is not enough income (due to either a loss of systems to enemy action during the turn or a failure to capture an enemy system) to build all the planned units then some will not be completed. The ships and other units on the bottom of the queue will not be completed. These ships and

units then become the priority (first) items on the building queue for the next turn.

If playing with a Game Master (GM), each player should submit their list of planned builds to the GM at the start of each turn.

A partially built ship can be carried over and completed the next turn. Players can also elect to save some of their resources for later construction needs in an economic "saving account" by not fully allocating their build queue. If your capital is captured these resources are taken by the capturing player.

If a provincial shipyard is moved (towed) between systems during a turn, it cannot be used for construction of any units that turn.

Supply Lines

Logistics is the key to running an empire. Ammunition, replacement personnel, spare parts, and other equipment must all be transported from the core of the empire to the frontiers where the fleets are fighting. Likewise the resources from the outer systems must make their way inwards to be refined and manufactured into more weapons of war.

Supply lines are drawn through planetary and hyperspace sectors from the capital (or a frontier shipyard) through friendly controlled systems to the ships. For a system to be under your control it must have an armed ship or fort within. The smallest system that could be considered a weapon is a PDS. Carried fighters and gunboats also count as weapons. So long as no intervening system or hyperspace sector is held by enemy units, the supply line is intact.

If a supply line is broken by the enemy there are a number of consequences.
- Resources from systems cannot be collected or used
- Ships cannot be rearmed
- Ships cannot be repaired
- Ships may become "supply crippled" due to a lack of fuel
- Biotech ships cannot replenish expended Biomass

Supply lines can be drawn through wormholes, both natural and artificial.

Allied empires may draw supply lines through each others territories.

If a sector is cut off from supply, but has a shipyard, it can build units in that shipyard using resources of systems in supply of that shipyard. Unlike a capitol system provincial shipyards cannot save excess income, so anything not used is lost.

Repairs and Resupply

At the end of each strategic turn determine which ships are in supply, and which are out of supply. Shipyards can keep ships cut off from the capital in supply, but the shipyard must be large enough to service the ships in question. Thus, a mass 50 shipyard could keep ships of up to mass 100 in supply. Ships large than that would have parts and components that the small shipyard could not manage to reproduce. (So a series of mass-1 shipyards in every system of your empire will not make you immune to supply failure.)

A ship that is in supply automatically restocks any expended ordnance, and replaces any fighters and gunboats that were lost. Furthermore lightly damage ships are immediately repaired. Lightly damaged is a ship that has suffered less than 50% hull damage. If a ship loses its second row of hull boxes it is no longer lightly damaged, and now counts as crippled.

Crippled ships take longer to repair. If the ship had intact engines at the end of the battle, it can still move. Otherwise it is limited to a strategic speed of 1 as civilian tugs try to bring the shattered hulk back from the front lines so mobile repair ships can get to work on it. If the ship engages in combat, either because the controlling player decides to do so, or because an attacking player has more ships than the defender and can thus force the defender to use all his ships in combat, it cannot be repaired that turn. None of the damage has been repaired, and no ordnance has been reloaded. The ship fights in the same condition it was in at the end of the last battle.

A crippled ship takes one full turn to repair. So a ship crippled on turn 2 would be out of action (could not engage in combat) during turn 3, and would become available for normal movement and combat against on turn 4.

If a ship is out of supply no damage can be repaired, and no expended ordnance is replaced. Furthermore there is a chance the ship will run out of fuel or some other critical component, and be rendered near-helpless. Roll a d6 for each ship that is out of supply. On a roll equal to or less than the number of turns out of supply, the ship becomes supply crippled. So on the first turn this is only on a roll of 1, on the third turn a roll of 1-3, and on the sixth turn the ship is automatically supply crippled.

A supply crippled ship cannot make strategic moves, and if engaged in combat by the enemy is automatically destroyed. Supply crippled ships cannot hold systems. Ships equipped with transporters or boarding torpedoes can capture supply crippled ships. The owner of a supply-crippled ship can prevent their capture if they have another armed military unit in the system. Before the battle commences they announce they are scuttling the ships, destroying them.

Intelligence

Every empire has a network of long range sensors in their capital system that allows them to detect the presence of ships and bases at very long rage. Each player must mark the location of all their ships and bases with counters denoting the size (size 1 is mass 1 to 50, etc) of the unit. Mines do not appear on the strategic map. Ships that become supply crippled have their status detected by long range sensors, and thus must be marked accordingly on the strategic map.

Technology

Empires may get the opportunity to acquire new technology as the game goes on. The most common means to new technology is to purchase it from a technology merchant, or to capture it from another player empire. Purchased technology should cost 250 points per tech slot. Players may not directly trade technology.

Capturing Ships

If a ship is captured by boarding action, survives until the end of the combat, and is on the winning side, then that hull is available for study by the capturing empire.

If that type of ship has never been captured before, it will have to be disassembled and studied. This is done at the end of the turn the ship is captured. After this period of study the empire can exactly replicate that ship design, including all the technology within. Note- this does not mean that the empire has gained full access to any new technologies, only that they can exactly copy the versions of that technology in that particular hull.

So if a new type of enemy cruiser was captured at the end of turn 7 it would be immediately studied and on turn 8 that empire could start cranking out copies of that ship type.

If an empire captures a ship of a type they have already studied, that ship can be repaired, rearmed and brought back into service normally.

Every time you capture a ship with alien technology (new technology slots) your engineers and scientists learn a bit more about that technology. At the end of the turn on which the ship was captured roll a d6 for each new type of technology on that ship. Note- do not roll for each mount, you only get 1d6 if the technology is present. Keep a running total of you roll totals for each different technology.

You can only roll once for the captured technology on each class of ship. Capturing two identical cruisers only allows one roll per technology type. Different versions, mounts and fittings of the technology allow for better reverse-engineering and deciphering.

It takes a roll total of 5 per tech slot cost to master a new technology. So it would take 5 points to master beam technology (1 slot), and 20 points to master advanced grav

drives (4 slots).

Newly mastered technology is available for construction the next turn.

Capturing a shipyard is especially valuable. Roll 2d6 for every tech area in that empire, as the shipyard is filled with plans, parts and specialist tools.

Capturing Planetary Systems

If you capture an enemy controlled system you gain a d6 knowledge points in one random technology possessed by that empire..

Capturing Homeworlds

If you ever take an enemy homeworld (player or non-player), you immediately gain access to all their technologies.

Winning Battles

If you win a battle in real space and remain in control of the system at the end of the turn, there is a chance you may salvage some technology from the wreckage of the destroyed enemy ships. Roll a d6 for each enemy ship destroyed, adding one per size of ship. So if an enemy mass 150 battleship was destroyed, you would roll once and add 3. On a roll of 7+ there is technology to be gleaned. You gain a d6 knowledge points in one random unknown technology, if present. If you roll an 8 you gain a d6 in two technologies. If you roll a 9 you get a d6 in three different enemy technologies. Wrecked super-ships can be a wonderful source of technology.

Incompatible Technology Types

Each empire uses either conventional of biotechnology based ships. When these empires go to war with one another, they will capture ships and systems using this completely alien technology. Roll for acquisition of technology as normal, counting technology items that have a slot-cost of one or more. Every time something is learned about such an alien technology, that player also gains 1d6 point in knowledge about the underlying technology (conventional or biotech). It requires the equivalent of 10 technology slots (50 tech points) to master the alien technology. If that occurs then that player may start building ships using the different technology base. They may not however mix and match conventional and biotech systems on the same ship.

Reaver Raids

There are terrible things lurking in the dark of space. Remnant weapons of long-forgotten wars, mad species that seek only to kill, and nameless horrors that lurk in the dark.

These are a danger to all space traveling species.

From turn 3 onwards the raids begin. There are 1d3+1 raids every turn. Roll to determine a random hex where the raiders enter. If no planet is under the raid point strike a random planetary system in an surrounding hex. If no planets are in range, that raider will attempt to attack a ship. If there are no ships either, the raid is canceled. If two or more planets are equidistant, dice to see where the raid hits. If the raid lands directly on a planet there are 500 points worth of attackers. If the raid goes into an adjacent hex their fleet size drops to 250 points.

If the raiders are victorious they kill everything in the system, cut off supply through the system for the turn, then disappear back into the black.

Campaign Version 2:

This version differs most significantly in that it does not use a map of systems liked by warp corridors. In this case the map is a open hex grid. Each hex is either a planetary system, or a hyperspace sector. The map should be pre-generated, providing each player with a multi-system empire with 14 planets. (1 value 200, 3 value 150, 4 value 100, and 6 value 75). The value 200 planet is the home system, and the other worlds should be arrayed within 6 hexes of the home system. Empires should be placed so there is a narrow "neutral zone" 2 to 4 hexes wide between each empire. Some unclaimed star systems can be placed within the neutral zone.

On a large map a few wormholes scatter among the neutral zones can add to the excitement.

Each player is in an alliance with 2 other players, picked at random. It is likely that your allies are not your neighbors, which is one reason you may get along with them better! Each player gets 4 tech slots of equipment for their empire. Before the game begin the alliances trade technology with their partners. Each player may take up to 2 technologies from each of their allies, or a single technology of cost 2 or more.

Each player starts with a fleet worth 3500 points. Forts are half-cost, but starships and system defense boats are normal cost. Long-range strategic sensors and intelligence operate as campaign version 1, as does pinning in hyperspace (the number of ships pinned is equal to the size of the force).

Pre-game deployment works as follows: each player rolls 2d6 for initiative. The player with the lowest number then places 10-size worth of ships or forts within their empire. Work up the initiative until everyone has placed some units. Then the player with the highest number places 5 size worth of ships and forts, and you work down the initiative numbers. Alternate working up and down the initiative number placing 5 size worth of ships and forts until all the units have been deployed.

Ships with FTL have a strategic movement equal to the tactical speed. Biotech ships have a strategic speed equal to 1/3 of the maximum tactical speed, rounded up.

Supply lines can be traced through any hex you control, or any empty hex not adjacent to an enemy unit (enemy units have a 1-hex "zone of control"). For s ship to be in supply it must be able to trace a supply line of six hexes or less back to a friendly system. You can draw a line of supply to or through an allied system.

Because this campaign is designed to represent a quick and dirty war, there is no technology acquisition from captured enemy ships or worlds. Captured ships can be refit for use, or disassembled and later reproduced, as in campaign version 1 above.

A campaign length of 5 turns keeps everything quick and brutal. At the end of turn 5 calculate the victor points for each player, and for each team as an aggregate empire.

Strategic Turn Order

1. roll initiative – each player rolls 2d6. Lowest roll moves first.
2. plan construction
3. roll for number, location and sizes of Reaver Raids
4. players move by impulses
5. combat
6. determine lines of supply
7. count income for all systems in supply
8. roll for ships out of supply
9. newly built units appear

Victory Points (optional rule)

The precise end-point of the game is not known at start. Starting on turn 10 roll a d6 at the end of the turn. On a roll of "6" the game ends. Each turn after turn 10, apply a +1 DRM to the die roll (so the game will certainly end by turn 15).

Determine the winner by calculating victory points. VPs are scored for the following:
1 VP per enemy Capital held.
1 VP for most advanced (most Technology slots)
1 VP for most enemy tonnage sunk during game (by mass, not point value)
1 VP for largest economy
1 VP for largest aggregate income (economy over the whole game)
1 VP for largest fleet (ships with FTL and drives)
1 VP for most defenses (forts and system defense boats)

Quick Reference Sheet

TURN ORDER

1) Write orders
2) Roll for initiative
a) switchable systems turn on
b) switchable systems turn off
3) Fighter/ ordnance primary move. Fighters within 3 mu may screen/escort
4) Missile secondary move. Robot Fighter secondary move.
5) Move ships and screening fighters
6) Fighter/Gunboat secondary move. Homing Missile secondary move. Fighters at their carrier may be recovered.
7) Determine Sensor Data
a) Determine and resolve mine attacks (sweeper fire, detonation, damage effects)
8) Fighter and missiles declare attack runs against enemy *ships*

9) Ships fire: players alternate firing one ship at a time, including that ship's anti-fighter/ordnance fire. Apply damage after fire.
10) Fighter and ordnance attacks:
a) Fighter-vs-fighter/ordnance attacks: Those fighter groups that did NOT declare attack runs in phase 8 may fire at enemy fighter groups and ordnance markers. Gunboats Fire.
b) Fighter-vs-ship attacks: Those fighter groups, which DID declare attack runs in phase 8 now execute those attack runs
c) Plasma Bolts, AMT's detonate
d) Surviving missiles attack
11) Turn end (ship repairs, remove markers, marine combat, etc.)

BEAM RANGES

Beam-Type	Beam 1	Beam 2	Beam 3	Beam 4
Normal Target	12 mu	24 mu	36 mu	48 mu
vs Stealth 1	10 mu	20 mu	30 mu	40 mu
vs Stealth 2	8 mu	16 mu	24 mu	36 mu

BEAM HIT PROBABILITY

Beam Dice	1 to 3	4	5	6
BD	miss	1 hit	1 hit	2 hits
BD*	miss	1 hit	1 hit	2 hits + reroll
vs Shield 1	miss	miss	1 hit	2 hits (*+ reroll)
vs Shield 2	miss	miss	1 hit	1 hit (*+ reroll)

BEAM & PROJECTILE MODIFIERS

vs fighters & ordnance in free flight	-2 DRM
vs mines	-2 DRM
vs holofields	-1 DRM
vs gunboats	-1 DRM
through dust clouds	-1 DRM per full 12 mu

PROJECTILE WEAPONS: RANGE & HIT#

LR Projectile	hit on 2+	hit on 3+	hit on 4+	hit on 5+	hit on 6
Normal	9 mu	18 mu	27 mu	36 mu	45 mu
Stealth 1	7.5 mu	15 mu	22.5 mu	30 mu	37.5 mu
Stealth 2	6 mu	12 mu	18 mu	24 mu	30 mu

Projectile	hit on 2+	hit on 3+	hit on 4+	hit on 5+	hit on 6
Normal	6 mu	12 mu	18 mu	24 mu	30 mu
Stealth 1	5 mu	10 mu	15 mu	20 mu	25 mu
Stealth 2	4 mu	8 mu	12 mu	16 mu	20 mu

SR Projectile	hit on 2+	hit on 3+	hit on 4+	hit on 5+	hit on 6
Normal	4 mu	8 mu	12 mu	16 mu	20 mu
Stealth 1	3.33 mu	6.6 mu	10 mu	13.3 mu	16.6 mu
Stealth 2	2.66 mu	5.3 mu	8 mu	10.6 mu	13.3 mu

Weapons Fire against Fighters and ordnance

	Fighters, Missiles, Mines	*Heavy Fighters*	*Plasma Bombs*	*Ships*
Point-Defense Dice	BD*	BD* -1 DRM	BD* -2 DRM	BD -2 DRM
B-1,EMP-1,Grav-1	BD -1 DRM	BD -1 DRM	N/A	BD*
K-1 (all types)	-1 DRM	-1 DRM	N/A	by range
Scattergun, Int Pod	1d6 hits	1d3 hits	BD*	BD*
Fighters	BD*	BD* -1 DRM	BD* -2 DRM	BD*
Interceptors	BD* +1 DRM	BD*	BD* -1 DRM	BD* -2 DRM
Attack Fighters	BD* -2 DRM	N/A	N/A	BD* +1 DRM