

# Fate and Destiny Starforce at War

Version 0.04 Beta

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## Introduction

This is a multiple level space miniatures game. While the core system is a starship fleet battle game the scope ranges in scale from a campaign system of resources, and production and star travel to ship to ship and tank to tank battle game. Also included are rules for individual man versus alien warfare at an almost role playing level.

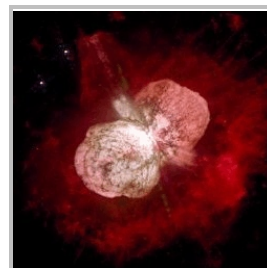
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## History

Even though Eta Carinae is more than 8,000 light-years away in the Sagittarius arm of our galaxy, features 10 billion miles across (about the diameter of our solar system) can be distinguished. It is one of the most massive stars in our galaxy and is estimated to be

100 times more massive than our Sun. Eta Carinae suffered a series of eruptions culminating in an immense outburst in 1843, when it outshone all stars in sky but Sirius. Though the star released as much visible light as a supernova explosion, it survived the outburst. Somehow, the explosion produced two lobes and a large, thin equatorial disk, all moving outward at about 1.5 million miles per hour.



## Story

Eta Carinae's outburst some 1053 years ago (game date is 2906) produced shock waves of hot gases that spread out incinerating nearby worlds as the cloud engulfed them. In addition the solar eruptions produced deadly gamma rays. The intensity was so great planets within seven light years suffered total loss of life. One of these worlds was the home of the very advanced Triminax. To survive this devastation, the Triminax, who up to then may not have been aggressive, gathered together their civilization and escaped. These insect like creatures packed into immense arks or hive ships traveled in a wide swath across the galaxy hoping that some of their kind would find suitable habitat. They eventually encountered other civilizations. Hostilities arose with the results always to the Triminax favor. Civilizations that were not devoured and could travel in space fled for their lives and invaded the territory of their neighbors. So began a hegira in the direction of the Federation, a cascade of displaced alien civilizations. Like Eta Carinae's shock waves of gas, alien race pressed on alien race in shock waves of migrations. Soon the outer waves of roiling aliens neared the frontiers of the Federation. The scene is set for the great conflict for the Orion arm of the Milky way galaxy.

## 1.0 Start

**1.1. Equipment.** To play the game you need miniatures to represent ships or at least counters that represent them. Also needed is a metric tape measure. A number of dice are also needed. Both six sided (D6) and ten sided (D10) are needed. Grappling rules likely require the use of a calculator so they are optional.

### 1.1.1. Game components.

1. Rule set.
2. Ship and Equipment lists
3. Ship Data Log
4. Ship Turn Worksheet
5. Various aids and angle gauges.

## 1.2 Turn

Each space battle tactical turn is equivalent to 75 seconds. Battles in space or on planet surfaces are fought in this time scale. The campaign turns are equivalent to 30 earth days. Players build and purchase war materiel in this time frame. Both types of turns are played in a simultaneous manner.

### 1.3. Time and Distance Scale.

The tactical space battle scale is 1:10,000,000. Distances are given in 10 kilometer units. 1000 means 10,000 kilometers. 100 means 1000 kilometers.

A space battle turn is 75 seconds in length.

All distances are stated in these rules are meant to be millimeters so if the rules say a distance is 200 it means 200mm.

In the campaign scale one hex equals one light year.

The surface ground combat tactical scale is 1:2000 scale while the turn length is 37.5 seconds.

The skirmish scale is 1:100 scale.

### 1.4 Unit Scale

Each ship figure represents one space ship. Each troop base represents a squad of 10-12 individuals. Each ground vehicle represents one such element.

Skirmish scale is a representation of single individuals.

### 1.5. The Game Area.

3-D space is collapsed to 2-D table top for battles. It is just too difficult to play a battle in 3-D space with miniatures. Typically a 4' x 6' area is needed for a small battle and maybe a 6' x 8' is needed for a larger battle. Movement off the table area can be plotted on graph paper.

**2.0 Dice and Probability** - Chance plays a big part in the game as it does in the universe. In the game dice rolls are used to determine if something that has a chance of happening does succeed or not. Generally, the minimum number needed to succeed is derived from tables or charts. Rolling any number higher would also succeed. Ordinarily only a single **D10** or **D6** (depending on the chart) are required to be rolled. However, when a great number of small chance success rolls are needed it is faster and more convenient to roll two **D10** together and call them percent dice (**D100**). One D10 would be the tens dice and the other is the ones dice. (Note in the case of '00' this would be 100 not zero, but a '09' means 9.)

**2.1.** The **D10** is used to generate to-hit chances.

When determining success chances the numbers -4 to 15 (a '0' on a single die is considered to be 10) can be generated. The numbers 1 to 10 can be read directly from the dice roll. Numbers over 10 are called **OVERS**. Numbers less than one are called **UNDERS**.



**2.1.1. Overs** - If a '0' (10) is rolled this can be 'backed up' with a second dice roll. If this second roll is a '6' then the number **11** has been made. If the backup roll is '7' then a 12 is made. An '8' is a 13. A '9' is a 14. If this second roll is another '0' this equals a roll of 15, the highest roll possible.

**2.1.2. Unders** - If a '1' is rolled this can be 'backed up' with a second dice roll. If this second roll is a '5' then the number zero has been made. If the backup roll is '4' then a -1 is made. A '3' then a -2 is made. A '2' is a -3. If the second roll is another '1' this equals a roll of -4, the lowest roll possible.

**2.2.** When rolling a **D6** the numbers from 1 to 9 can be made. The numbers 1 to 6 can be read directly from the dice determined by the number of pips on the die. If a number greater than 6 must be made then a '6' must first be rolled on the die. A second die then is rolled. If this second die is a '4' then a 7 has been made. A '5' is a 8. And a second '6' equals a score of 9.

**2.3.** Sometimes the rules indicate two possibilities having a 50:50 equal chance of either being the case. This is sometimes noted by two numbers separated by a slash as in (4/5). Roll either a D6 or a D10 with the lower half of the die numbers being the first case and the high half indicating the choice is the second case.

**2.4.** When a great number of low odds chances must be made use one of the Aggregate Chance tables. These are

a table of numbers showing the average percent chance of a number of successes cross-referenced by the number of attempts. This is where the D100 comes in. The numbers being calculated by a polynomial formula.

**2.5.** The game uses the principle of determining a threshold success score by adding many variable factors to get a total threshold score. A success would be to roll a die to make or better that score. Usually adjustments (up or down) are not made to the die roll number.

### **3.0 Method of Play**

Play is based on simultaneous play. First simultaneous fire then semi-simultaneous movement.

#### **3.1. The Space Tactical Turn**

**Phase 1.** Communication. Ships on the table can all communicate with one another. Communication range off the table is quite good too. Ships within 30,000 of each other may communicate with each other directly. Ships at 30,001-75,000 must write their messages down and place them aside where they can be read by their recipient the following turn. Each additional 75,000 distance requires a one turn delay in the message.

**Phase 2.** Write Orders. Players must write orders of each capital ship or flight of tactical ships each turn. For each capital ship write any change of speed or any turns to the nearest 10°. Indicate if the ship will be grappling or boarding. For tactical combat craft (Tac-craft) write orders for a flight group of from one to 10 craft..

**Phase 3.** Offensive fire. Ships with working fire-controls may fire their beam weapons. Damage to ships are resolved. Destroyed ships replaced with debris fields.

**Phase 4.** Missiles. Ships with missiles or torpedoes may launch them. Missiles and torpedoes launched in previous turns are required to move in this phase as well.

**Phase 5.** Defensive fire. Beam weapons not fired in the offensive fire phase may fire them now. They can be fired at ships at their current position or at missiles along their path of the movement.

**Phase 6.** Missile Attack. Missiles and torpedoes that have moved within effective lethal distance of their target may attack that target. Missiles or torpedoes may attack at any point along their path within lethal effective distance.

**Phase 7.** Grappling. Tractor beams lock-on or grappling is done in this phase.

**Phase 8.** Boarding. Attempt to board enemy ships takes place at this time.

**Phase 9.** Melee. Battles between troops on boarded ships takes place in this phase.

**Phase 10.** Movement. All ship pre-plotted ship movement takes place. Ship move in the order according to their speed and thrust.

**Phase 11.** Regeneration. Ships with operating Matter anti-matter reactors may regenerate one shield factor per operating reserve section.

#### **3.2. The Setup**

Fleet battles are usually the scenario type. A given situation is outlined. Often the types and kinds of capital ships are dictated by the scenario creator. Besides this a given number of build points are given each side to purchase additional equipment such as tac-craft, troops, tractor beams, grappling units or to upgrade missiles.

If the battle is to be a surprise meeting encounter each player is to enter from different sides of the game area. If the battle is to be over possession of a planet, moon or large asteroid a small disc of 10-50 millimeters is used for the body. For example the Earth would be about 42mm, the size of US silver dollar (the old kind) in this scale. Ship orbit range would be from 20 to 500 millimeters away. The exact location relative the planet and the edge of the table that an enemy may enter can be determined by a die roll.

The orbital speed for game purposes is zero. From the stand point of 75 seconds turns orbiting vessels would be standing still.

Ship movement off the table is plotted on graph paper. Before they arrive ship movement is done in secret. If ships move off the table their movements are still plotted but must be shown the opposing players.

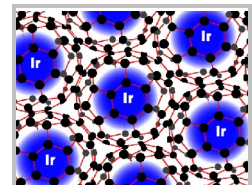
In order to penalize leaving the table after having been on roll a percentage die (D100) each turn for each ship that is off table. There is a 4% chance per turn something off board calls it away which it has to deal with and it is removed from play for the current battle.

## 4.0. Star ships

Star ships consist of a superstructure framework and armor plate incasing multiple component systems while the smaller tactical combat craft are primarily of one or two units. Warships employ an all-or-nothing design scheme. Vital fighting and living space is protected by the best armor of the ship. This is listed under armor in the tables. Non-vital sections of the ship housing dry stores, raw materials, frozen water and some reclamation systems are lightly protected.

### Description of star ship sections and components.

**4.1. Armor plate.** Ships and vehicles are protected by armor plate rated in factors from 1 to 10. Capital ship armor plate generally is rated from 6 to 10 while troops, tanks, robots and ground vehicle armor generally is rated from 1 to 7. Heavy armor plate takes advantage of what is known as field armor. Thus named because the plate material is a super-strong nano carbon - Iridium (or Osmium) ion matrix held in place by magnetic force fields running within it.



Iridium ions are captured in nano carbon fullerene matrix.

**4.2. Hull.** This is the superstructure of the ship. This holds the ship and all its sections together. Once the factors of this component are reduced to zero the ship breaks apart. Field armor is mounted on the hull superstructure and is heavily buttressed by it. The field armor generators transfer much of the shock of a hit from the armor plate to the hull in order to disperse its effect.

**4.3. Shields.** Besides being protected by field armor ships can be protected by field shields. This consists of a plasma of charged ions held in place by powerful magnetic fields.

Similar to Jupiter's bow shock wave though thousands of times stronger and smaller.

While shields act to protect the ship from various weapons they are a strong source of radio waves and consequently cannot be used with stealth technology.

**4.4. Beam weapons.** These produce laser, x-ray or gamma ray beams. They are highly accurate and powerful weapon though useful within a relatively short range.

**4.5. Matter anti-matter reactors (MAR).** Using antiprotons as a fuel in a pure mass to energy proton plus antiproton reaction these supply power in most star ships for most operations. Some are even used in large super heavy tanks and surface vehicles. MAR produce energy at a constant and manageable rate but are not used directly by weapons. Byproducts of this reaction produces ions

which are then employed in the shields.

**4.6. Power Reserve sections (PR).** Cryogenic capacitors used for storing large amounts of energy until when a sudden burst is needed. They work like huge batteries storing power for weapons and shields. While discharging takes micro seconds it generally takes about 75 seconds to recharge them from the anti-matter reactor.

**4.7. Engines (Eng).** Antiproton are combined with ordinary matter to produce huge amounts of energy. This is used to ablate other material and give it a very high velocity. This is directed with the use of magnetic nozzles to produce **thrust** to propel and maneuver the ship. Engines also help indirectly in recharging the protective shields.

**4.8. Fire Control (FC).** This section detects and locks onto target enemy craft. One fire control section is needed to fire a beam weapons battery or to launch a missile salvo.

**4.9. Guidance Section (G).** This is used to maneuver the starship. High speed turns cannot be made without a guidance section nor are planetary landing nor docking permitted.

**4.10. Life Support (LS).** Like the name implies this system manages all life supporting systems like air, food, heat, radiation protection. This is fairly dispersed through most large ships so only local sections are likely to be damaged if a ship is hit.

**4.11. Radiators (RA).** These units are used to draw off the tremendous waste heat of the reactors, engines and beam weapons. There are numerous designs: fins, grills, spikes, cables or fuzzy threads. But all extend out from the ship and are for the most part not armored.

**4.12. Bays.** Bays are open areas of a ship used to hold cargo or smaller craft. There are two types of bays, cargo bays and Tac-bays. Tac-bays hold Tac-craft, small space ships. Cargo bays hold all other types of equipment, troops, tanks, raw material or any thing else that needs storing. Elements that can fit into a bay are given a size in the appropriate bay factors. They can be housed in a bay such that their total bay size factors are equal to or less than the ships bay factors.

**4.12.1.** Some Tac-craft or ground vehicles have bays of their own. Troops or equipment residing inside the bays of these vehicles do not count against other bay factors of the ship holding the intermediate vehicle.

**4.13 Missiles (M).** Missiles are a slower reacting weapon system than the light speed beam weapons, but they are much longer ranged. They can be launched as when the enemy is located. They do have limited fuel so their ability to follow an enemy target is limited. These are represented by counters for each salvo of up to ten

missiles. Missiles are usually type rated per their warhead. A ten megaton missile would be a M10 missile.

**4.14. Anti-Missile systems (AMS)** Electronic disruption systems and short ranged weapons such as small lasers, rail guns, particle projectors, and even short ranged defensive anti-missiles are employed to defend and protect ships from attack by missiles. These are employed at point bank ranges as a last resort feature. The AMS section with its own short range detection and fire control systems and all its short ranged defenses is counted as a single section.

**4.15. Black hole bottle (BHB)** - The most rare but most powerful system ever devised. A small primordial black hole (micro black hole) is captured within a gravity-magnetic bottle. Prodigious amounts of energy quantum mechanically tunnel out of the event horizon. So much so that the BHB ship cannot possibly use it all. It is forced back through the event horizon and only enough for power use is harvested. The BHB is used to create antiprotons and other anti-particles to replenish the supply used for fuel in all ships in the battle fleet.

However the most important use for the BHB is not as a power plant or fuel factory. The most important feature is that the micro black hole can be spun to create a Kerr ring singularity. The ring can made wide enough to form a wormhole in the fabric of space-time. Ships can travel into the ring and through this tunnel into another place in space. The actual distance is a combination of many factors but at this time is believed to have a maximum of about 3 light years.

Micro black holes for the BHB are extremely rare. Presently only 24 micro black holes have been acquired by the Federation. Twenty three are currently in use in BHB equipped ships, the twenty-fourth is part of a jump gate like structure somewhere in solar orbit. BHB ships generally do not go into combat, they are too valuable. They remain far from any conflict behind a screen of ships. Without the BHB ship the fleet would be stranded and could not leave the system they warp into. Usually an entire battle fleet will have but one or two BHB ships.

**4.16.** All the above described sections can be part of a star ship design. The Ship Data Tables list the currently fielded star ships and the number and kind of the various sections. Damage to star ships can result in the loss of one or more sections. These are often randomly assigned by die roll.

**4.17. Starship Log** For each ship players should fill out a ship item on Starship Log sheet. These should be printed out as needed and filled out for each ship. This aid in keeping track of section losses and other status of

Name:	<b>Vanguard</b>				Class:	<b>BC</b>				Thrust:	<b>35</b>								
Beam	<b>L10 4x2</b>				Missiles	<b>0</b>				Mass:	<b>275</b>								
Shields	<b>80</b>				Crew	<b>16</b>				MAR:	<b>1</b>								
Engines	<b>Hulls 20</b>				FC	<b>5</b>		LS	<b>5</b>		GS	<b>4</b>		PR	<b>6</b>		C Bays	<b>T Bays</b>	
1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			
12																			

A typical log status filled out for a battlecruiser. Cross out all the unused boxes.

1	<b>6 Marines</b>
2	
3	<b>2 Scout</b>
4	<b>1 Interceptor</b>
5	
6	
7	
8	
9	
10	
11	
12	

The right side of the log status can contain additional information on the ship including the cargo contents of the bays. Here we see that the battlecruiser has 6 marine squads on board as well as 3 tac-craft.

the ship. In the picture operating sections and available factors are shown as open boxes. Shield factors go up and down so fast that it is best to put them on the Ship Operations sheet. This is an used to write orders and keep track of rapidly changing factors.

**4.18.** Once a ship loses all sections it is considered destroyed or hard killed. Ships that have lost some systems and are no longer battle worth are considered soft killed.

## 5.0 Fleet Combat

### 5.1 Orders.

Before beginning a scenario players must write (in secret from their opponent) the starting speeds of all ships involved. Combat battle speed ranges from 50 to 500. Scouting speeds range from 500-1000. Ships traveling at speeds greater than 1000 are not capable of scanning or detecting ship size objects. Also attaining those speeds greater than 1000 takes too much time and fuel to be of any practical use.

**5.1.2.** In the second phase of each turn players must write the actions their ships will take that turn. If a ship is going to increase or decrease speed the new speed must be written down.

**5.1.3.** If the ship is going to maneuver by turning the turn angle within 10° must be written down.

**5.1.4.** If a player fails to make any changes in a ships movement it will move the same speed and direction as it did last turn.

**5.1.5.** Write orders for flights of tac-craft. If tac-craft must be launched and stay in groups of at least 3 craft if they have that many and have not suffered losses.

### 5.2. Ship Movement.

Ship movement is simultaneous and should take place as such. Both players move their ships according to their written orders. However, if ships get within 500 of one then they must go in order.

**5.2.0.1.** When players go in order then those with the least amount of thrust move before those with the most. If capital ships have the same thrust factor then a tie is broken by moving the one with the greater speed first. If there is a tie in moving tac-craft then the flight with the least number of tac-craft goes first. The flight with the most would go last.

A ship's speed or velocity is the distance it will move in a turn provided no change of speed takes place.

**5.2.1.** Ships moving at speeds under 750 can change both their speed and change direction in the same turn.

**5.2.2.** Ships moving at speeds 750 or greater must slow to under 750 in order to make course changes.

**5.2.3.** A ship may change the distance it moves up to the current thrust value of the ship. This increases the speed at the end of the turn by twice the thrust added. The ship will not receive the full movement for this speed until the following turn.

As an example if you are stopped in your car and then want to accelerate to 60 mph. It takes time to get to 60 mph, you don't get there all at once. Assume it takes one turn. For that first turn your average speed is 30 mph ((60mph-0mph)/2). Only at the end did you reach 60 mph. If this example was in the game we would call 30 as the thrust or distance gained in one turn. The car moved 30

times 1 turn distance. From then on the car would move 60 times 1 turn distance each turn.

In the orders phase the thrust amount must be written down. The speed value the ship will be at the following turn should be written in down in the ship work sheet.

(Motion equations: The distance ('d') something moves changes as to acceleration as  $d = \frac{1}{2}at^2$  where 'a' is the acceleration and 't' is time. The velocity ('v') changes as  $v = at$ .)

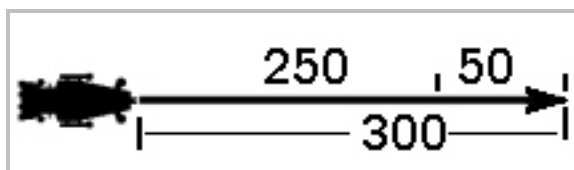
In this game thrust actually is  $\frac{1}{2}a$ .

**Example:** If a ship traveling with a speed of 250 a turn has a Thrust of 40. It is ordered to increase speed by the maximum 40 of thrust. This causes the ship to move 290 in the turn. The player must write down that the ship's speed will be 330 at the end of the turn.

**5.2.4.** A ships thrust is halved for speed over 1000 up to 2000. Any increase over 1000 is pro-rated with that under 2000.

**Example:** A ship with a speed of 975 and a thrust of 75 may increase its speed in one turn using maximum thrust power to 1025 ( $975 + 25 + 50/2$ ). The actual speed the ship will be traveling at the start of the following turn is  $975 + 50 + 50$  or 1075.

**5.2.5.** A ship's thrust may only increase or decrease its speed by one quarter if its speed is between 2000 and 3000.



When a ship with speed of 250 adds 50 factors of thrust in a turn it results in the ship moving 300 in that turn. But it results in giving the ship a speed of 350 at the end of that turn. And this is the speed it takes into the following turn.

**5.2.6.** Because of the relativistic increase in mass with velocity the **thrust** of any vehicle will be halved for every additional 1000 in speed it travels over 3000.

**Note** - at these high speeds ships will easily leave the table and thus out of the battle for a number of turns.

**5.2.7.** Ships may pass freely over, through or by one another without any chance of collision. This is because the scale is so large (1:300,000,000) and the game area actually represents 3-dimensional space that is packed to 2-dimensions for playability.

**5.2.8. Turning** If a "turn" order is given to a ship the ship may pivot up to a specific angle depending on the



ship's current **thrust** and speed. The pivot is done before the ship actually is moved. Consult the Turning Table to find the maximum angle that can be made per the speed and thrust of the ship. If engines have been destroyed pro-rate the thrust factor of the ship by the fraction of engine sections remaining.

**5.2.8.1.** Space craft of any type that can pivot  $20^\circ$  or more may split their turn into two pivots. The first pivot must be before the ship moves. The second pivot must be near the mid-point of movement. The split does not have to be equal but one pivot cannot be more than two times the other.

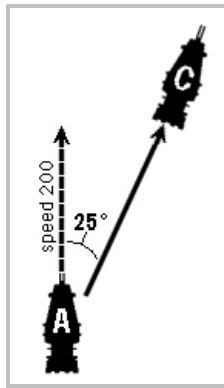
**Example:** A starship with a speed of 200 and thrust of 100 is ordered to do the maximum pivot of  $25^\circ$ . During its movement it makes a pivot of  $15^\circ$  then moves 100 ahead. Next it pivots an additional  $10^\circ$  (in the same direction) and then moves the final 100 distance of its move.

**5.2.8.2.** Moves with turns of  $30^\circ$  or more must be split into two pivots.

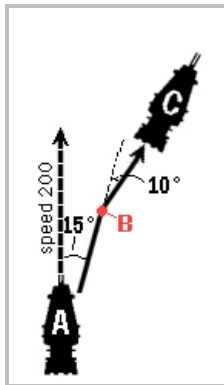
#### 5.2.8.3. Crazy Ivan.

A ship may order a turn of any fraction of the number of degrees it is able to turn. If dividing the turn in two pivots the pivots may be in opposite directions.

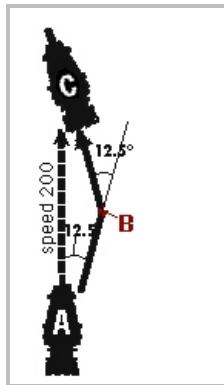
**Example:** A starship with a speed of 200 and thrust of 100 is ordered to pivot  $0^\circ$ . Since the maximum pivot it can make is  $25^\circ$  it may pivot  $12.5^\circ$  before moving. Then move 100 where it pivots in the opposite direction  $12.5^\circ$ . It then moves another 100 where it ends its



Ship at position A with speed 200 has orders to turn  $25^\circ$  to starboard.. At position A it pivots  $25^\circ$  and moves straight 200 to position C.



Ship at position A has been ordered to turn  $25^\circ$  to starboard.. This can be made in two pivots. The first one of  $15^\circ$  at position A and after moving 100 another a  $10^\circ$  pivot is made at position B. The ship finishes its movement by moving 100 to end at C.



For the Ivan a ship at position A with speed 200 has orders to turn  $0^\circ$  ahead.. At position A it pivots  $12.5^\circ$  and moves straight 100 to position B where it pivots  $12.5^\circ$  in the opposite direction. It moves another 100 to position C.

movement. The ship is on a different heading but has successfully completed the move.

**5.2.8.4.** Ships may combine a speed change and a course change. The amount it can pivot would be based on the distance it can travel in the turn. (Speed plus thrust.) Thus if a ship with a speed of 200 and a thrust of 100 was to use maximum thrust it would be able to move 300 in the turn. It would have to use 300 to determine the maximum angle it could pivot. (Which in this case is  $20^\circ$ .)

**5.2.8.5.** A ship may decrease speed in a turn instead of increasing it. If a ship with a speed of 200 and a thrust of 100 was to decrease its speed it could use it all to move 100 in the turn. The ship would be able to make a pivot of  $45^\circ$  in the turn based on its 100 movement. As per the rules it would have to break this up into two pivots.

**5.2.9. Planetary Landing.** Ships may enter the upper atmosphere of planets provided they slow to 1 per turn outside the atmosphere of the planet. Ships cannot move through an atmosphere at greater than 1 per turn. In most case ships are limited to moving through an atmosphere at 0.1 per turn. When ships enter an atmosphere the shields are neutralized and go to zero. The shields cannot be built up until the ship leaves the atmosphere.

Depending on the height of the atmosphere the ship must then take 1-6 turns to pass through the atmosphere and land.

**5.2.10.** Some ships are capable of landing and taking off from a planet. These are generally low mass ships of less than 40,000 metric tons (40 mass factors). To land on a planet with an atmosphere a ship must reduce its speed to 0 above the point on the planet it intends to land. The ship must start from within 25 of the planet disc edge. It then takes 6 turns to land on an earth sized planet. To take off a planet it takes 10 turns to reach space (from an earth sized planet). Where the ship can increase its speed beyond 0.

**Note -** With the use of the more efficient centrifugal tether elevators to move cargo into space most ships dock at a elevator dock and transfer cargo there.

#### 5.2.11. Launching Tac-craft

Tactical craft when not on patrol or on a mission are kept in a ready state in Tac-bays. The size of each Tac-craft is given in Tac-bay factors. The size is the number of Tac-bay factors the craft takes to be stored in a ready state. It takes one turn to prepare the craft for launch. It takes another turn to launch them.

**5.2.11.1.** No tac-craft can be launched from cargo bays.

**5.2.11.2.** On the other hand ground elements are stored in



cargo bays. No ground elements may be launched from tac-bays.

### **5.3. Location and Detection of Enemy Ships.**

**5.3.0.1.** Location is the ability to know the position and speed of an object well enough to fire a beam weapon or launch a missile salvo at it. Location is the same as locking on to a target.

**5.3.0.2.** Detection is the ability to know there is an object within the maximum location range. Once an object is detected it still must be located in order to be attacked. But detection is enough to allow the detector to take action to defend itself and react to a potential threat.

**5.3.1.** Refer to the **Detect and Location** table for specific location distances for different circumstances.

**5.3.2.** It is impossible to lock onto objects moving over 0.05c or 3750 per turn.

**5.3.3.** Ships with using stealth technology or cloaking devices are located at 50% of normal location distances.

**5.3.4.** Surface installations on a planet with earth like atmosphere can be located at 1000. On a body without an atmosphere like a moon or asteroid or in orbit is 3000.

**5.3.5.** Large ground units on planets with earth like atmosphere can be located from 100 away. Ground vehicles on planetary bodies without atmosphere up to 500 away.

**5.3.5.** Elements in underground bunkers a planet or under a very thick atmosphere is only up to 10 away. Though sometimes conditions prevent any detection at all.

### **5.4. Firing weapons**

A beam weapon may only fire once per turn. In order to fire a beam weapon a the battery must have an operating fire control section controlling that battery. Usually a battery will consist of one to three beam weapons. All weapons of a battery must be targeted on a single object. A fire control section may control one or all batteries of a ship. And as many targets as fire controls may be fired as long as there are weapons to be fired and no battery splits fire.

**5.4.1.** The target object must be located in order to be fired on. Target objects moving over 1000 per turn and not directly at the firing ship cannot be fired on with beam weapons. Beam weapons can fire in any direction from a ship. As both the weapons and engines are on articulated gimbals they do not have dead zones of fire.

Note - There really are dead zones for periods of time but they ordinarily only last a few seconds until the ship can be yawed or pitched to bear weapons.

**5.4.1.1.** The targets of a beam weapon can be anything in

line of sight and within hitting range. The target of a beam weapon could be another ship, a Tac-ship, a missile or even a planet. Ships can only hide behind other ships if the first ship is at least 10 times the mass of the hiding ship and actually touching. Other than that ships cannot screen others.

**5.4.1.2.** All ships can be screened by planets and most by moons and asteroids.

**5.4.2.** Beam weapons are fired before other weapons. Roll all to-hit dice of the beam weapons for a firing ship at once, no matter if the weapons are targeted at one or many ships or targets. Roll all to-hit dice from a ship before determining any damage.

Beam weapons are of a number of general types the two most common used with the fleet being:

**5.4.2.1.** L6 Lasers. A medium x-ray laser mounted on Tac-craft. The to-hit number is rolled on a D6. The energy of this weapon does 6 factors of damage to the target.

**5.4.2.2.** L10 lasers. A heavy gamma-ray laser mounted on capital ships often in multiple mounts. The to-hit number is rolled on a D10 and which does 10 factors of damage to the target.

**5.4.2.3.** Other known beam weapons are listed on the Beam Weapons table.

**5.4.3.** For every beam weapon firing roll the corresponding type of to-hit dice. The number needed is the range in units of 100 from the firer to target..

**Example:** A twin battery of L10 lasers are firing at an enemy cruiser at 250 away. Two D10s are rolled. A '2' and a '8' are rolled. The '2' is a miss as a '3' or better is needed and a '2' only hits up to 200. The '8' does hit and does 10 points of damage.

**5.5.4.** If the ship has shield factors the damage factors are subtracted from the number of shield giving the remainder of shields.

**5.5.5.** If the ship has no remaining shield factors the remaining damage factors must be applied to the ships hull or sections. To do so it must first penetrate the armor plate. Roll one D10 for each damage factor. Compare the resulting number to the armor of the ship. If the number equals or exceeds the armor value one internal damage hit (IDH) is taken on a hull or ship section. Roll on the Ship Internal Damage table to see where the damage goes.

**5.6.** Once all of one type of section is eliminated the ship no longer can use that function.

**5.6.1.** Certain systems rely on other systems to function

thus causing a cascade of loss of capability.

**5.6.2.** A ship may recharge its shields by one factor per operating Reserve section in phase 10 of the turn. If there are no operating reserve sections the shields can no longer be recharged.

**5.6.3.** The Reserve sections must have an operating MAR in order to work. If the MAR section is destroyed the reserve section cannot operate to recharge the shields.

**5.6.4.** The engines need antiproton fuel to perform. If the anti-proton fuel storage is destroyed the engines may only run on what the MAR can produce in one turn. This allows a maximum of 25% of the thrust value. If the MAR is also destroyed the engines will not operate at all. If the MAR is destroyed but the antiproton storage is not the ship the engines will function at full thrust for 20 turns.

**5.6.5.** The beam weapons need an operating fire control to direct them. If one is not available the weapons cannot hit their target. .

**5.6.6.** The ship needs a guidance section in order to change speed, to land, dock or travel through a black hole worm-hole. If one is not functioning it can not do any of these things.

## 5.7. Firing Missiles

While slower acting missiles have a greater range than beam weapons. Missiles move and attack during the missile phase of a turn. In order to be fired a missile salvo needs a functioning fire control section to launch it an lock onto a target. The fire control section can not control any other weapon at the time.

**5.7.1.** M10 missiles have an engine thrust power of 150 when turning and changing speed. The maximum missile speed is 1000. Higher than that the missiles guidance is unable to effectively maneuver to hit moving targets.



We see an attack in progress. At the start of the Missile phase a salvo of 6 missiles launched from ship A in some previous turn is targeted on ship B.



Missiles which intend to attack and can reach their target move up to the target ship and stop once they reach their lethal distance from ship B. This even though they might have enough speed to fly past.

**5.7.2.** When fired missiles move 50 plus the speed of the ship it was fired from for the first turn of movement in the direction of movement at the time of firing.

Thereafter the missile may increase its speed based on its thrust.

**5.7.3.** Missiles may not change both speed and direction in the turn that it attempts to attack an enemy ship. Though missiles may change both direction and speed if it is not trying to attack an enemy ship. Use the Turn Table to move and pivot a missile in the same manner as ship movement.

**5.7.4.** Missiles may only be fired in the direction of movement of its launch craft. If the launch craft is moving at under 50 the missile may be fired in any or all directions.

**5.7.5.** Missiles are launched in salvos of from 4-10 missiles. Only one salvo per operating FC section. They also must move in salvos. Place a single ½" x ½" counter which will represent the missile salvo. Record how many missiles are in the salvo and its speed.

**5.7.6.** Missiles have a maximum fuel supply for 10 turns of movement. After this is expended the missiles are in free flight and self-destruct.

**5.7.7.** Missiles do not attack in the Missile movement phase of a turn. Instead if they can reach their target through movement they are left there until after the Anti-Missile phase of a turn. Missiles must come within lethal distance of their target in order to attack. For M10 missiles this is 20. For M20 missiles this is 30.



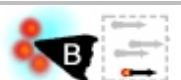
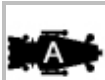
At the end of the Defensive Fire phase mark the record of the missile salvo to show only 4 missiles remaining.



In the Defensive Fire phase ship B uses 2 of its main lasers to fire at and hit two of attacking missiles. They can be fired on anywhere along their path of movement in that turn. This is ship B's choice.

**5.7.8.** During the Defensive Fire phase enemy ships may attempt to use lasers and other protective measures to eliminate missiles. Missiles thus eliminated cannot attack in the following Missile Attack phase. Record the loss of missiles on the missile salvo record sheet.

**5.7.9.** During the Missile Attack phase each missile is given a chance to hit its target. Roll one D10 per attacking missile. A missile needs a '2' or better to hit a unprotected capital ship and a '3' or better a Tac-craft. But most capital ships have some sort of anti-missile system (AMS) which is rated +1 to +5. Add the AMS factor to the basic number. The total now becomes the



During the Missile Attack phase the 4 remaining missile roll to hit. Add the defensive AMS factor to the basic '2' in order to get the number needed for a hit. In this case three of the M10 missiles hit ship B giving it 30 points of attack. The fourth missile missed and thus is rendered inert and removed from play along with the missile salvo marker.

number needed to be rolled to hit. Missiles failing to hit are rendered inert by the AMS system and removed from play. Ships often have multiple AMS sections. Only the effective of one is taken into account. The others serve as backup should one be taken out from a hit.

**5.7.10.** Missiles attack in salvos so once a salvo makes an attack it is removed from play.

**5.7.11.** Missiles that do hit a target will cause damage to the target per its 'M' number. An M10 missile will cause

10 factors of damage and M20 missile will cause 20 factors. Damage is done to shields and internal sections in the same manner as beam damage.

#### **5.7.12. Forward Remote Missile Controller.**

Certain ships have the ability to control other ships missiles if they have a Integrated -Missile - Command system (IMC).

If there is a communication link made between the FRMC ship and the missile firing ship the missiles can be fired free with out a target. (The orders for this must be written in the turns order phase.) When the missiles come withing 1500 of the FRMC ship it must roll a '3' or better on a D10 to gain control the missile salvo. The next turn the FRMC may direct the missile salvo to any target its own fire control can lock on to.

#### **5.7.13. Anti-FRMC.**

So equipped EMC ships may be employed to try to take command of remote launched missiles. If a remote launched missile comes within 1500 of one of these ships the ship can roll a D10 per salvo. If a '9' or better is rolled this ship takes command of the enemy missiles and not the FRMC ship.

### **5.8. Planet to Space warfare**

Troops, vehicles and installations on the surface or deep inside a planet with an atmosphere are immune to beam weapon fire beyond ranges of 50 from the planet. Within this range beam weapons only need a '2' of better to hit.

**5.8.1.** Missiles fired from a distance greater than 50 at a planetary target need a '5' or better to penetrate the atmosphere and hit a target.

**5.8.2.** Missiles from a planet to an orbiting or space borne target may only move 20 the first turn. It moves

an additional 75 the following turn. After that it can accelerate by its normal thrust.

**5.9. Tac-Craft** If the armor of a Tac-craft is penetrated several things can happen. Roll two D10, one red and one green. If the red die is a 6 or better the Tac-craft has lost its weapons. It can no longer fight. If the green die equals 6 or better then the engines are destroyed. The craft can no longer change its speed or course. If in space it travels with the same speed and course that it had at the start of the turn. If flying in an atmosphere or in orbit around a planet it will eventually crashes and may be destroyed.

If at the same time both the red and green have rolled greater than 6 the craft is completely destroyed and replaced by a small debris splotch.

*The following rules on grappling and boarding are optional.*

#### **5.10. Tractor Beams and Grappling.**

Special beam weapons project a 'tractor' beam. This is used to attract and pull together two ships at range from one another. There are several levels of strength of tractor beams, the most common being the T1 and T2. This device uses quantum entanglement to catch, slow down or stop a target object.

**5.10.1.** Tractor beams are not standard equipment. They must be purchased with build points. A T1 tractor beams takes 0.5 cargo bay factors. T2 tractor beams take 1 cargo bay factor. Tractor beams must have a reserve section all their own in order to operate. As a result the reserve section cannot regenerate shields the same turn it powers the tractor beam.

**5.10.2.** One fire control section is need to target the tractor beam.

**5.10.3.** The maximum range is 100. The maximum speed either ship can be is 500.

**5.10.4.** A '3' or better on a D10 is needed to hit with the beam. No damage is caused by hitting with the beam.

**5.10.5.** The tractor beam is fired during the Offensive Fire phase of a turn.

**5.10.6.** Grappling is done by using cable made from nano carbon fullerene matrix. It is shot from special cable launching projectors, spooled out after grapnel missiles. These are very short ranged in the scale of our game.

**5.10.7.** The ship models must actually touch in order for grappling to be attempted and to take place. (If playing with oversized or undersized models then the centers should be about 25-50mm from each other.)

**5.10.8.** Grappling from ships that are not tractor connected need a '4' or better on a D10 to hook.

**5.10.9.** Grappling from ships that are connected via a tractor beam lock is automatic.

**5.10.10.** Grappling takes place during the missile fire phase of a turn. Grappling equipment can be installed on ships and rated as G1 or G2 depending on strength. Grappling equipment is not standard. It must be purchased as extra equipment. The G1 unit takes 0.5 cargo bay spaces. A G2 takes one cargo bay factor..

**5.10.11.** If the tractor beam hits or grapple is hooked the ships can be pulled and held together provided the shear stress from separation is not too great. To find this requires what may be a difficult process.

**Note - calculations are required. You will probably need a calculator to multiply and add some large numbers.**

For the two ships involved in tractor/grappling multiply the mass factor of each ship times its speed (speed at the start of the turn). This is the momentum. Subtract the lesser of these two numbers from the larger. This number is the **momentum difference**.

Next find the angle difference in courses the ships are traveling. This will vary from 0° to 180°. Using the **Torque Table** find the torque factor each ship is applying relative to each other. Find the torque for both ships involved.

**5.10.12.** Add together the torque factor of both ships into a sum. Next add this sum to the momentum difference. This is the final **Shear factor**. Each grappling/ tractor system works up to a maximum shear factor. If the shear factor just calculate is under or equal the maximum shear factor the grapple or tractor will hold and will be successful.

**5.10.12.1** If the tractor/grapple is successful the ships will be held together. If the tractor beam is successful the ships will still be separated but will move as one. Each turn after the first the tractor beam will reduce the separation distance by 25 until the models touch. When that happens they can grapple.

**5.10.13.** Once joined by a tractor beam or grappling the two ships move as one. This happens immediately the same turn as the tractor or grappling.

[I haven't designed any rules for resultant velocity currently so this is left out.]

### **5.11. Boarding Enemy ships.**

Boarding parties consist of troops carried in a ship's cargo bays. Boarding attempts take place after all beam and missile fire. To board, the ship being boarded can have no shields. To board the ship doing the boarding must have troops of marine or better quality in its cargo bays. Troops defending on ships being boarded may be of any quality.

**5.11.1.** Boarding parties must be organized into two task forces, a shock force and a backup force. The first task is the more difficult. It is carried out by the shock force. They must travel in carts along grappling cables or through free space with the use of small assault sleds and force their way into the enemy ship. Roll one D10 per squad in the shock force for shock results on the Boarding Table.

**5.11.2.** If the first force is successful and even one squad of the shock force survives then the backup force can attempt to board. The backup force also rolls one D10 on Boarding Table for each squad in its force.

**5.11.3.** All squads in either the shock force or backup force not passing the boarding test are destroyed and eliminated from play.

**5.12. Melee.** The defender is the owner of the ship. The attacker is the boarding side. The defender must assign a number of defending squads equal to the number of ship hull factor. If there are not that many defending troops and crew squads then all available troops and crew squads must be used.

The attacker must assign a number of attacking squads up to the number of ship hull factors. If there are more hull factors than attacking squads then all attacking squads must be assigned to attack.

**5.12.1.** The attacker and defender must roll one D10 per squad assigned to melee. Each squad attacks with a die roll equal to its melee factor. If the squad has 6 melee factors its needs a '6' to hit an enemy squad. Both sides roll for all melee squads and tally of the hits to the other side.

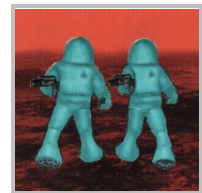
**5.12.2.** After the hits have been tallied up the players can assign which of their own units will take the hits. Hits must be distributed equally with at least one hit going to each squad if there are enough to go around.

If there are extra hits these are saved for a second round of hit allocation.

In the first round roll a D10 for each squad hit. If the D10 is equal or less than the melee value the squad is eliminated.

**5.12.3.** If after the first round of hit allocation there are still unallocated hits these are distributed to any survivors of the first round. More rounds may be necessary to be played if there still are unallocated hits.

**5.12.4.** If there are surviving attacking squads and defending squads on the same ship after the melee they continue their battle in the melee phase of the next turn.



The heaviest melee troops are the Guards.

**5.12.5.** In a following turn instead of boarding or continuing to melee an attacker may decide to retreat. He must leave one squad behind as a rear guard, but the rest may retreat to their ship if it is within reach. Then the melee is over.

**5.12.6. Troop organization.** {Advanced Rule}

Troops consist of squads of marines, rangers and guards. They are organized into platoons of 3-6 squads depending on sovereignty. These platoons may contain one or more support robot support squad. Each platoon may contain one command squads, but no more than one. Command squads may be equal or greater quality than to other squads in the platoon. There can be no more than one Centurion squad per platoon for Federation troops.

**5.12.7. There is no surrender.** Melee will continue until one side or the other is eliminated or the attacker retreats. In human to human conflicts there may be a possibility of surrender if one side consists of only crew (or less level) squads and the other has at least one squad of Marine (level 4) troops. Roll one D10 per squad before processing the melee. On a '6' or less the crew squad will give up instead of fight.

In all human vs. alien or alien vs. alien melee there are no prisoners taken nor surrender offered.

**5.13. Troop Transportation.** Troops on board starships must have cargo bay factors allocated for them and their kit. For long voyages it usually is necessary to allocate one cargo bay factor per troop squad. In emergencies like evacuations it is possible to cram up four times this number into a bay factor. This usually is dependent on the type of troop as Guards and Rangers require more space for their bulky power armor.

**5.13.1.** There are two types of cargo bays. Because of need to protect living beings from radiation and damage from cosmic rays these cargo bays are lined with armor or protective insulation shielding as well as heating and some personal facilities. As these are large areas the amount of material used to shield them contributes a large part to the mass of the ship.

The other type of cargo bay (denoted in the tables with an '\*' asterisk) is for inert bulk cargo. These may or may not have heat or even air. They may not even be reachable for inspection by the crew as they often are large containers fixed to the ship hull. These are not for the transportation of sentient cargo.

**5.14. Orders and Keeping Track of Things.**

Supplied with the rules are several sheets to help track ship information. 4.15 covers the Starship Log of ship data. Also useful is the Ship Work Sheet. This is where orders are noted and the turn to turn ship speed and pivots are recorded. Useful as well for tallying the current shield factors.

Ship Name		Thunder		BC		Reserves 6		Missiles:	
Turn	Start Speed	Thrust 35	End Speed	Turn Angles	Shields	Grapple	Boarding		
1	150	0	150	20	80				
2	150	15	180	15	70 76				
3	180	10	200	0	56 62				
4	200	-35	130	20	32 38				
5	130	-35	60	25	0 6	G		4M 6M	

In this example the battlecruiser Thunder is engaging in combat. In turn one only a pivot of 20° is made. In turn 2 thrust of 15 is used resulting in a speed increase of 30 to 180. Also 10 pts. of damage has occurred to the shields, but 6 have been restored at the end of the turn thanks to the reserves.

In turn 3 10 thrust is used to end the turn with speed at 200. Also 30 shield factors have been lost to hits but 6 come back through regeneration.

Turn 4 full thrust is used in reverse to slow the ship. The speed ends at 130. In the meantime the ship has taken 20 hits to the shield.

Turn 4 the ship will again reduce speed by maximum thrust. The ship is also ordered to grapple if possible. The ship takes enough hits to reduce the shields to zero. (Shields never go less than 0.) Some internal damage also takes place but this is recorded on the Ship Log table. In the grappling phase 4M (Marine squads are readied to be the shock force, while another 6 standby as the backup force. At the final phase of the turn 6 reserve sections recharge the shield by 6 factors.

## 6.0. Tactical Ground Combat.

Ground elements use the ground and time scales. Ground attacks are not usually massed assaults, but are mop up operations or infiltrations.

Infantry ground troops are very dispersed. The troop squad be dispersed over an area of ground 100 in diameter. Still the center of this area can be marked with a troop stand. The ranges are such that targets are easily located. Also at battlefield ranges the weapons will normally be able to hit another target to some degree. The power of the weapon will determine if it is an effective hit or not. When that threshold is reached then it must be determined if it can burn through the protection of the target.

**6.1.** Each troop element with weapons listed as 'X' lasers (X3 to X7) will be able to fire one time per turn. Roll one D10 for each squad firing at a target. If the number is equal to or less than the firing troop's class (1-6) it has scored an 'effective' hit.

**Example:** A Guard squad would need a 6 or less to 'effect' an enemy element.

For each vehicle or heavy beam weapon the effective hit number is usually 10. An L1 will need a 10 or less on a D10 at all ranges that it has a line of sight on a target. An L2 weapon receives two D10 rolls to hit and to damage. (Note - there is a possibility when rolling to-effect that an over can be rolled. In that case a '11' may be the result and this is a no effect roll.)

**6.1.1.** For each effective hit roll one D10 per penetration. If the number exceeds the armor protection of the element then the element has been penetrated. If the number equals the armor protection is partially penetrated.

**6.1.2. Penetration** For each penetration on a vehicle or robot. Roll two D10s. A red one for weapons system and a green one for mobility systems. If the number rolled is 6 or greater that system is knocked out. If both are knocked out by the same hit the vehicle effectively is burnt out. Mark with a pin, chit or colored bead the damage to the vehicle. A red chit for weapon loss, a green for mobility and a black for burnt out.

**6.1.3.** For each penetration of a troop element the troop is eliminated from play. However, if in a campaign game the troop may only be wounded. If in a campaign game roll a D10 for each penetration on a troop's armor. If the number is 6 or greater the troop is killed. If under then it is wounded and can be evacuated and regenerated at some later campaign turn.

**6.1.4.** If a vehicle carrying other elements (living or robotic) is penetrated then another D10 roll must be made against the armor of those elements. If they are penetrated roll as in 6.1.3. to damage or kill the element.

**6.1.5. Partial Penetration** For vehicles that are partially penetrated roll two D10s (red and green). If the red is a 9 or better the vehicle's weapon systems are destroyed. If the green is 9 or better then the vehicle's mobility system is destroyed. For troop element armor that are partially penetrated roll one D10. If the D10 is a 9 or better the element is eliminated. Otherwise for both troops and vehicles partial penetration of armor results in the element being temporarily stunned.

**6.1.6.** Elements stunned are marked with a blue marker, chit or bead. They make no moves in the movement portion of the turn. Nor are they allowed to use their weapons or communicate in the next turn. Following the next turn's melee phase the stun marker is removed and the element can return to normal provided it suffers no further damage or stun hits.

**6.1.7.** Troop or robotic intrinsic support weapons. A squad may contain one or two special support weapons. These can be used in addition to the squad troopers individual weapons. These are not required to fire on the same target as the squad fires at. These weapons are required to make an 'effective' hit roll before they test for penetration.

**6.1.7.1.** The Light Plasma weapon is a direct line-of-sight area weapon and can hit an area 25 wide and 100 long along the line of fire. For Light Plasma weapons the effective number is 2 or less. Reduce the effective factor by 1 for each 200 in range the target is away from the firer. All targets in this area can take hits.

**6.1.7.2.** For heavy KE weapons the effective number is 4 or less. Reduce the effective factor by 1 for each 200 in range the target is away from the firer. If the roll indicates the weapon is effective then proceed as per 6.1.2 or 6.1.3 for damage results.

Note - While it doesn't seem like the support weapons are very powerful they represent just one or two of these weapons. The X-lasers effectiveness seems greater because they represent 6-10 weapons all firing together.

**6.1.7.3.** Grenade launchers are an area weapon. Any point within line-of-sight can be fired on. In addition the firer may select hidden targets if there are friendly elements in communications that can trace a line-of-sight to the target. The firer selects a point to hit and everything within 100 of that point can be affected. Roll one D10 for each vehicle, robot or troop within 100 of the point. Subtract 5 from the die results. If this number is greater than the armor of the targets armor the target has been penetrated. If penetrated proceed to damage as 6.1.2 or 6.1.3.

**6.1.8. Side arms.** (S1 or S2 weapons) These light weapons are not particularly useful for ranged fire. Roll one D10 per troop firing side arm weapons. Each 100 in range the target is reduces the effectiveness of the weapon by 1. The die roll must be less than this reduced score to be effective.

**Example:** A crew element from a downed craft attempts to shoot an enemy marine troop approaching it. The enemy marine is at 140 away. The S2 weapons of the crew have a normal effectiveness of '2'. But as the marine is over 100 the crew weapons effective factor is 1. A 1 or less on a D10 to score will be needed to be effective.

**6.2. Ground Facilities** One of the few reasons to send ground forces down to a planet to fight enemy ground forces is to capture valuable assets rather than destroy them from space. There are a number of different ground facilities that are important enough to secure with ground forces.

**6.2.1. Factories** consist of 4 modules. The actual size may vary but all factories being generic they so each module should be about 100 x 100. They can be joined in various configuration or separated by up to 200. If a factory's armor is penetrated one of its modules is destroyed. When all four are destroyed the factory is completely razed. A factory produces a net 100 build points (BP) a campaign turn. Loss of a module reduces output 25 BPs.

**6.2.2.** Factories actually produce 110 build points (BP) a campaign turn, but 10 BP factors are used in the resource extraction and fabrication process. Planetary environmental damage from energy and missile damage can hamper factory output by increasing the cost to gather resources.

**6.2.3. Resources.** These are a generic factor of the useful mineral value of a planet. Resources cannot be used up nor destroyed in the course of the game. Their usefulness and access can however be affected by heavy weapons hits on their deposits. Mass thermonuclear attacks can increase the cost a factory must allocate to extract and retrieve the resources. The costs could range from the standard 10 BPs per turn to 20, 30 up to 70 BPs.

**6.3.** If a missile silo's armor is destroyed the missile inside also is destroyed. There is not another roll to determine if the missile's armor, if any is penetrated.

**6.4.** If a troop units armor is penetrated it is eliminated from play.

**6.5. Laser gun ranges.** Lasers are usually either mounted on tanks, walkers or installations. The range of these is to the horizon unless it is blocked by terrain. They are so accurate there is no roll to-hit. The only roll

is to see if the hit has had enough energy to do have a chance to penetrate.

**6.6. Missiles** - Missiles tend to always hit their targets too unless intercepted by AMS or lasers on weapons. Lasers on weapons do need to hit missiles. For ranges over 10 kilometers the number to hit is 5 (D10). For ranges under 10 kilometers it is a 2.

**6.6.1. Missile damage.** There are two types of weapons used. They are tactical and operational weapons. Tactical missiles have warheads of one or less kilotons in strength. Operational warheads are greater than one kiloton. The operational warheads are all thermonuclear using fission and fusion materials. Anti-matter material is not normally used in this manner as anti-proton material is fairly expensive and the systems needed to hold it safely is also expensive as well as being both heavy and bulky. (Notice that single fighters and interceptors with antiproton fueled engines weight around 1000 tons.)

Thermonuclear warheads do considerable damage to troops and tanks. Each blast will give a number of damage factors on each tank, building, vehicle, troop or civilian. The number of damage factors is reduced the further from the impact point. For each damage factor roll a D10 to determine if the unit is penetrated. And for each penetration roll for damage as in previous weapon damage.

**6.7. Nano weapons.** At this time the rules limit nano-bots to intelligence gathering nano-bots only. These are delivered in several ways to a planet before any attack in order to gather intelligence. There are various types of nano-bots.

**6.7.1. Dust nano-bots.** Mostly scattered from the air these are carried along with the wind. They are the size of dust particles and randomly look for traces of the enemy. These are rather slow acting though hard to detect and counter.

**6.7.2. Area nano-bots.** These are pre-programmed to head for a specific area to search or watch for enemy units. They stay at that position and if enemy elements are present relay targeting information.

**6.7.3. Mission nano-bot.** These are pre-programmed to look for specific enemy forces. They search in a skirmish line of sorts for the enemy. When found the nano-bot will attach itself to the enemy or his machines and transfer its location and activity real-time back to an orbiting micro relay probe.

**6.7.4. Digger bots.** These are slightly larger and more robust nano-bots. Their mission is to dig into the ground and search for enemy underground facilities. One end of



some contain a tooth with a diamond coating. All can be joined head to tail with others. They must join together in the millions to form a chain or thread and auger their way down into the planet's surface.

**6.7.5. Tiger-bots.** These are anti-nano-bot nano-bots. A little bit bigger than the normal nano-bots they hunt other nano-bots or lay in ambush for them to approach. Their grippers, chemicals agents and computer viruses are used destroy or reprogram enemy nano-bots. Whole nano-battles often take place unseen by normal sized sentient forces.

**6.7.5. Micro-relay probes.** These are usually stealthy relay stations inserted in low orbit to pick up low power messages from the nano-bots. No bigger than a grain of sand, and indistinguishable from meteoroid grains they are the primary way to collect and transfer data from nano-bots. Many are used in steps of 100 to 100,000 kilometers to relay back to listening scouts. Scouts usually stay at the outer reaches of a solar system to avoid detection.

## **6.8. Centrifugal Tethers.**

Ships capable of grappling can tether to a planet from space within 300 kilometers (1). Provided there is something solid for them to anchor on. The starship must be stopped over the anchor location.

**6.8.1.** A ship may tether at any place on a planet provided it has functioning engines to maintain its altitude and location. A ship using its grappling gear as a tether may transfer 10 metric tons per turn per tether.

**6.8.2.** Heavy cargo tethers can be set up in equatorial orbit with a dock a low costs. These typically orbit at about 600 kilometers above the surface and can transfer cargo at a rate of 20-25 metric tons a turn.

## **6.9. Rules of Engagement.**

One of the key components of a ground combat scenario should be the rules of engagement. If these aren't in place there is no reason not to slag the entire planet with nuclear or anti-matter weapons. But since the reason to send ground units to the planet is to secure or capture assets. If they are destroyed there is no need to even be on the planet.

### **6.9.1. Capture Installations.**

Capturing factories or resources are important reasons to send ground troops to an area. If the installation is destroyed the point of risking valuable ground troops is lost.

**6.9.2. Protect Civilians.** Many scenarios involve protecting civilians from indigenous enemies or outside invaders. In this case protecting the civilians also involve protecting their environment. So tactical nuclear

weapons should not be used.

## **7.0 Advanced Rules.**

### **7.0.1 Fleet Operations.**

Up to now Tac-craft were merely launched and not recovered. But for fleet actions they must be recovered to re-arm them and refit them. As their antiproton fuel supply is fairly limited they only have about 40 turns of full thrust.

**7.1.** In order to recover a Tac-craft it must have its mobility intact. If not a rescue or repair ship must be sent to tow it back to the mother ship.

**7.2.** To reunite with its mother ship the Tac-craft must end its turn within 25 of the mother ship. The speed difference may not be more than 100. Space in Tac-bay factors must be available for the Tac-craft to fit into.

**7.3.** If these things apply then the Tac-craft may dock and be taken in by the mother ship.

**7.4.** If the Tac-craft is undamaged it takes only one turn to dock. Three turns to re-arm and refit. Then the launch procedure is as before, one turn to ready and one to launch.

If the Tac-craft has lost its weapons or mobility there is an added 10 turn cost in replacing each of those component modules. Cost of replacements will be assessed during the campaign turn.

**7.5.** There are no missile reloads. Reloads must be purchased. They can be stored 10 to a cargo bay. To be reloaded from a cargo bay to a launcher requires 6 turns. Extra missiles can be stored in bays on the mother ship for convenient access on cargo ships for less expensive storage. However these are only transferred during non-combat times.

### **7.6. False Detection.**

Ships use a variety of location and detection methods, one being gravitational detection. While false echos and stealth systems can mislead as to what kind or race a ship belongs to, the mass can't be faked nor hid. If something is 500,000 tons there really is 500,000 tons of something there.

### **7.7. Advanced Movement.**

So far movement has been calculated on the ability to turn or pivot up to 90°. Ships or missiles may want to turn greater than that. To do so they may break their movement into quarters and may make a pivot before moving each quarter.

[content to be added]

## **8.0. Advanced Weapons.**

These weapons must be added to any warship as a weapons pod. They are integrated in with the other weapons. Normally they will take away one cargo bay factor from the ship. If this is not desired an additional charge equal to the armor factor of the ship is added to the cost of installation.

### **8.1. Plasma Cannon.**

This fires a charge of hot plasma at the target ship. The range is only 100 though. The plasma is relatively slow moving so needs a '3' or better to hit.

A plasma needs 6 units of reserve power to recharge. However long it takes for to be supplied is how long it takes to fire the weapon again.

The plasma has the effect of disrupting any shields a ship might have. The ions of the shield leak out and the shields suffer 100 hit points.

The plasma does not penetrate armor well. If the plasma does hit a ship's shields to zero roll only one time to attempt to penetrate the armor. If a penetration does however occur give the ship IDH (internal damage hits).

## **9.0 Campaign.**

[content to be added]

## **10. Skirmish and RPG**

[content to be added]

## 11.0. Background.

The **Federation** is the most powerful planetary government in the known region of space. It now is comprised of 22 full member planets and a larger number of settlements, bases and colonies. The Federation consists of two regions. The central region is called the old region or Old Federation. It is made up of the 7 original human colonies and Earth. Outside this spheroid region of space is a ring of non-Federation planets. Beyond that is a halo of the largest number of Federation members thinning out to the frontier of minor settlements and bases.

The Federation military force, known as Star Force, is the most powerful military in the known region of space. It is used as a model of for other smaller forces.

There are several non-Federation planetary sovereignties of human origin in the immediate regions surrounding the Old Federation. These are formed from settlements sent out from Earth within the last several hundred years. Most of these worlds have so far declined to be members of the Federation. Some have organized into large sovereign states who fight each other in small wars on a regular basis. Though the Federation has treaties with many it tries not to take sides in their squabbles.

The most powerful sovereigns are the Yan Imperium and the Anvesson Commonwealth with the Kerkfrum League close behind. Though combined they only number about a dozen planets.

At the far reaches the frontier touches several sovereigns of non-human origin.

**The Yuhnui** - A group star wanders who settled down when they encountered humans. They have an affinity for all things human and have adopted many human customs and languages. Probably the most friendly race encountered.

**Samaneron** - 26 years have past since the Federation and the Samaneron were locked in a bitter war. The Samaneron were defeated and have since been occupied by Federation forces. They are now at peace but occupation continues and has been a source of unrest in the region.

**Xenoraptors** - Group of reptilian looking creatures. Rather aggressive but so far only one hostile encounter has been documented.

**Cyn' Ru** - They appear to be new arrivals in this arm of the galaxy. It is alleged that forces from this race have laid waste to a few frontier settlements and have harassed unarmed trading vessels. Little else is known of them. Currently diplomatic missions have tried to contact these sovereigns to find out more about them and what if anything lays beyond.

## 11.1. Black holes

The common theory is black holes swallow energy and matter and nothing can ever escape. But those black holes are large. The event horizon would be several kilometers in diameter. The size of those black holes would have the mass at least that of our sun. The reason energy can escape from a micro black hole is because it has such a small event horizon. Energy can quantum mechanically tunnel the small distance (less than the size of a proton) out of the gravitation potential well. This escaping energy is called Hawking radiation.

A micro black hole of a million tons would be immensely hot. Over ten million times hotter than the center of the sun. It would also produce pairs of protons and antiprotons. This radiation would cause the black hole to lose mass and become even smaller. Eventually it would evaporate completely. A black hole of this size could persist for 2,000 years. A black hole of only 100,000 tons has a life span of a few days.

If contained within a BHB and energy was used slowly and the excess returned to the singularity it could last for years, even decades.

*A primordial black hole the size of a proton, would have a temperature of 120 billion degrees Kelvin, which corresponds to some 10 million electron volts. A primordial black hole would release energy at the rate of 6,000 megawatts, equivalent to the output of six large nuclear power plants.<sup>1</sup>*

But if released from the BHB the micro black hole will rapidly evaporate. And then...

*The process of evaporation escalates as the mass of the hole decreases. The escalation is so rapid for a tiny black hole that during the last few seconds of evaporation the black hole explodes. The total amount of energy released during the final second of evaporation is equivalent to a billion one megaton hydrogen bombs.<sup>2</sup>*

More recent sources on Wikipedia puts the energy released in the final second at  $2.05 \times 10^{22}$  joules or  $5 \times 10^6$  megatons of TNT (5 billion megatons).<sup>3</sup>

1. Scientific American, The Search for Black Holes, Kip. S. Thorne, Dec. 1974.

2. Page 286, Cosmic Frontiers of General Relativity, Kaufman 1977.

3. Wikipedia, Hawking radiation, 2006.

### 11.2. Technical Worm Hole Tunnel Problems.

The process of being able to create a worm hole or jump tunnel had been known for some time prior to its use for practical purposes. That is because while a star ship could enter one end fairly easy the other end of the worm hole tunnel spewed it out at an almost random location. Probably caused by fluctuations in the Cosmic Microwave Background or rotational wobble of the Kerr ring singularity, a worm hole tunnel anchored by a black hole at only one end acted like a loose garden hose. It sent each successive ship entering it out to a different location in space. Fortunately they were not more than a few weeks travel from each one another. But for practical purposes a battle fleet scattered about would be easy prey if it came out near an enemy force.

Another problem is that while ships could be built to conform to the rather small diameter of the ring the BHB ship and the ring singularity were left behind. Early tests were done so that the worm hole tunnel length was only several million kilometers and ships could be retrieved. Still this problem took 131 years to be completely solved. In the mean time a number of one way expeditions for settlement were made in the hope that the problem would be readily resolved and the settlers reunited with the Colonial Republic (which was the name of the Federation at the time.) The long delay and isolation from the common culture lead to the many fractions of humans that currently inhabit the fringes of the Old Federation and adjoining solar systems.

One solution to the scattering problem was to send a second BHB ship through the worm hole in order to make a worm hole there for the fleet to come back through. This had limited success as now the second BHB ship was stuck in that region of space. It was found that two BHB ships operating in tune with each other opened a worm hole from both ends at once much faster and more precise than just one alone. Both ends now connected perfectly at known locations. At last there was no random exiting of the tunnel. And two way traffic could be now take place.

As many as 17 BHB ships were employed as stationary jump worm holes in this manner. Obviously in this system of jump worm holes each planetary member of the Federation needed its own BHB ship. As time passed the number of planets that could be made members of the Federation exceeded the number of jump worm holes. Thus the need for the BHB ships to travel from system to system along with the fleets was again of utmost importance.

Finally some 39 years ago the method of getting a BHB ship and singularity to tunnel through its own worm-hole was found. Now a single BHB ship could go with a fleet

and return home again.

The solution goes back nearly three centuries (2612 CBE) to the works of V.K. Pup. His treatise on induced virtual reality lead to the development of Non-causalational Physics. Somewhat similar to what happens in the micro world of quantum mechanical encumbrance of particles, he proved the same could happen to entire systems of particles. Though the only place thought that this could happen was in the strange space near a worm hole.

It is now believed that the BHB ship does not physically travel through its own singularity's worm hole. Instead it ceases to exist at a determined point in space and time. This has the disconcerting consequence which leads to fact that the ship and its crew's existence has ended. They have met their fate. Yet a perfect copy is teased from the sea of virtual energypotential at the other end of the worm hole. This is exactly the same as the ship and crew that just ended existence so far away (except the black hole now is spinning in the opposite direction). Out of nothingness and maybe by the laws of this or some other universe they exist again. Or maybe it was their destiny.

### 11.3. Strategy and Tactics in the 30<sup>th</sup> Century.

The key problem is the small number of BHB ships limits the flexibility of Federation strategic operations. One BHB ship is an absolute necessity for each fleet while two is a far more effective use of them.

The problem with a loose ended worm-hole tunnel ejecting ships at different random locations has not gone away. The tactic around it is to send the second BHB ship as one of the first ships through the worm hole. This ship will engage its BHB's ring singularity to form a worm hole which joins with the current worm-hole tunnel and anchors the loose end. Then all the remaining ships can travel to the same location.

Worm hole tunneling is not that reliable. There is a tonnage limit for maintaining an open worm hole. Tremendous amounts of energy is required to spin the black hole in order to get it to curve time-space and form a usable ring singularity. This energy comes from the black hole itself. And takes days or weeks of constant acceleration to get the spin just right. Matter moving through the ring has a deleterious effect on the spin (it slows down). The more mass entering a ring singularity the more the spin slows down. So only one or two large ships or a few small ships may pass through the worm hole each hour.

## 12.0. Designer's Notes.

I published a set of miniatures rules for space battles back in 1978 after being inspired by Star Wars. The original set had ideas from Star Trek and Star Wars and the book *Star Ship Troopers*. At about the same time I had a class on Black holes at UCLA. The rule booklet was a commercial set and named *The Space War Campaign Game*.

In and around the early 1990s I produced an online multi-player BBS computer game called *Star Force Commander*. Many of the races in that were inspired by *Babylon 5* as well as the previous sources. And since I continued to study cosmology I incorporated the popular theories of those years. Around 2000 I became a fan of the *Andromeda* series and met some of the writers and the science advisor and communicated through the internet. Recently while rummaging through my library of old rules I came across what may be the only surviving issue of the original rules. Since I have been offering my World War II land combat and naval rules and my modern land combat rules on the internet for free I thought that I should re-release these too. How much work could it be? I amalgamated all those rules and ideas into this rule set. Well here they are.

I use a lot of science to explain some of marvelous future stuff. But most is just speculation. (One little clue all the made up stuff is in this Roman type of type.)

What is not included is anti-gravity propulsion, faster than light particles or physics, exotic or magical materials, psionic abilities or even teleportation. They may be discovered some time in the future or maybe not. I also for the most part keep Dark Matter and Dark Energy out of the core rules as their interaction with current physical matter is not understood. I just have no way of knowing how they would work with all other laws of physics. And what laws of physics they would modify or break. Most everything in this future operates on transfer of energy. Either in forms of radiation, light and heat or kinetic energy. I feel if I keep the system clean of all those unknowns then if something really startling is discovered that would be useful to the game I don't have to back out or fit it in with those other things.

End.

Modifications.

5/16/06 Changed space battle scale.

4/8/06 - re-costed missiles and reloads.

4/6/06 - Changed damage to tac-craft and ground vehicles.