Spaceship Design Rules for the Phase World Setting (Simplified version)
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What are these rules?
This is a rule set to be used for the spaceships of the Three Galaxies. It works best with average tech level ships, ranging from small shuttles to gigantic carriers. However, with a little effort one can design (or more like translate his designs into game statistics) bigger ships on different technological levels, be they primitive ships without CG propulsion or an advanced super-capital from the Core.

How to use these rules?
When using this rule set to design your spaceships, go through steps 0 to 10. The main numbers you have to keep track and the most important universal options are the following:
- Mass: first decide what mass (in metric tons) will your ship have (this gives an approximate size too), subtract everything from that limit - hull, armor, engines, cargo etc.
- Length and size: To determine the ship's dimensions, the designer use the internal module numbers as basic number during the calculation. If the ships is not a mini sized craft, then the first step is to multiply the module number by 1.1 (to represent the extra 10% module space used for corridors, lifts etc). This is the total internal volume of the ship and from this number, anyone able to calculate the sizes of the designed craft using reverse volume calculation to get the length, width and height of the ship.
- Module slots: From your spaceship's size, in step 1 you will have the maximum number of module slots - ie the space occupied by engines, reactors, cargo and so on. The larger the ship, the more internal room (ie module slots) she has. A “module slot” represents 250 cubic feet (about 7 cubic meters).
- Price (prototype cost): In Three Galactic Credits. Market cost for mass produced ship is about 50% to 60% less than the prototype cost, while the market cost for ships that produced in limited numbers is about 25% to 35% less than the prototype's price.
- Abbreviations in the text: MR - module requirement, W - weight, P - price.

Step 0: Universal Rules

Materials:
Ships hull and the various armor options may be constructed from various materials. The listed weight/mass, M.D.C. and price values found in the Hull and the Armor section is for average, industry standard materials. Stronger and lighter materials are available, but every 10% of mass reduction (down to the minimum of 10% of the base mass) or every 20% of M.D.C. increase (up to +400% of the basic value) means 50% of price increase.
The use of weaker and heavier materials may lower the M.D.C. or add additional weight and lower the price. Every +20% mass of hull or -10% M.D.C., lowers the costs by 10%, down to the minimum of 25% of the price (if the total amount of price reduction – including both the weaker and heavier options – exceeds the 200% value, the final price of the hull/armor lowered to 10%).

Newer/older systems:
STL drives (except the fuel tanks), FTL drives, communications, sensors, electronic warfare equipment, support systems, guns, shields, reactors and batteries are available in the market in newer and older configuration too. The newer variant of a ship system is smaller and lighter (lower mass and module requirement to one half), consumes less energy (reactors provide 25% more, so increase their support performance by 25%), but costs more (triple the price of the system) than its standard equivalent. Experimental systems exists too, with even smaller and lighter design (their mass and size is only 25% of the standard system's size and mass), consumes even less energy (in case of reactors, increase their support performance by 50%), but costs a small fortune (costs ten times more than the standard system).

Older variants can be found and widely used across the Three Galaxies, however, these systems are larger, heavier and consumes more energy than the standard version. Double the MR and W, consume more energy (in case of reactors, the older types provide 25% less energy), but lower the price to one quarter. Obsolete and early versions are almost completely disappeared, however, from time to time the spacers found or use such relics. These very old (usually several hundred years old) systems are enormous and bulky (triple the mass and size of the system), consume much more energy (in case of reactors, they provide 50% less power), but very cheap (one-tenth the price).

Internal size:
The accommodation, the command systems and life support are designed to grant comfortable living and working conditions with enough life support for species of up to 7 - 8 feet tall or smaller. Larger creatures and races need larger living and working areas. Increase the mentioned systems and areas module requirements by 15%, the weight by 5% and increase the price by 5% when building ships for races whose average height are 8-10 feet. Finally lower the maximum number of module slots by 5% (this extra amount of space means larger/wider corridors).
Designing ship for huge people (average height of 11-13 feet), increase the module requirements by 40%, the weight by 10%, the price by 10% and lower the maximum number of module slots of the basic ship by 10%. For even larger people (14-18 feet average height) double the module requirement of the system, increase its weight by 25%, the price by 25% and reduce the maximum number of module slots of the basic ship by 20%.

**Step 1: Hull size and basic characteristics of the ship**

**Mini sized ships** - All ships up to 50 tons total mass considered as mini sized vessels. Most of the ships in this category are fighters or bombers, but the smallest gunships and shuttles can be found in the lines of the mini vessels.

- The mass of the ship's hull - 8% of its total mass.
- Price of the frame - 10,000 credits per ton (based on total mass of the ship).
- Internal modules - Maximum number is limited to 2.5 modules per ton.
- The basic M.D.C. of the hull - Multiply the total mass by 10 and add 150 to the value for ships up to 20 tons total mass. For ships that weights more than 20 tons, multiply their total mass by 8 and add 200 to this value.

**Small sized ships** - Every spaceship, whose total mass exceeds 50 tons, but remains under 15,000 tons is considered a small ships. This category covers most of the interstellar ships, from heavy shuttles to the light and medium transports or from corvettes to heavy frigates.

- Mass of the hull - 9% of the total mass.
- Price - 5,000 credits per ton (total mass).
- Internal modules - Maximum is 2 per ton (total mass). The actual internal space is 10% larger than this, but the extra space used for corridors, crawl spaces, lifts, tunnels etc, and cannot be used by the designers).
- Basic M.D.C. - Divide the total mass by 5 and add 650 to the final value.

**Medium sized ships** - This category is the depository of the real stellar ships. The cruisers, patrol ships, most monitors, the real trade ships and cargo haulers, bulk transports, light carriers and light capital ships can be found here. Any ship whose total mass exceeds 15,000 tons, but remains under 500,000 tons is considered a medium sized craft.

- Mass of the hull - 9% of the total mass.
- Price - 2,500 credits per ton (total mass).
- Internal modules - Maximum is 2 per ton (total mass). The actual internal space is 10% larger than this, but the extra space used for corridors, crawl spaces, lifts, tunnels etc, and cannot be used by the designers).
- Basic M.D.C. - Divide the total mass by 25 and add 4,000 to the final value.

**Large sized ships** - The largest interstellar crafts, battleships, colony ships, fleet carriers and stations can be found in this category. Any ship whose total mass exceeds 500,000 tons considered a large sized ship. Currently no major players of the Three Galaxies are able to build spaceship over 100 million tons total mass.

- Mass of the hull - 10% of the total mass.
- Price - 1,250 credits per ton (total mass).
- Internal modules - Maximum is 1.5 per ton (total mass). The actual internal space is 10% larger than this, but the extra space used for corridors, crawl spaces, lifts, tunnels etc, and cannot be used by the designers).
- Basic M.D.C. - Divide the total mass by 250 and add 25,000 to the final value.

**Non-streamlined:**
This is a spherical, cylindrical, cubical, or humanoid/bestial/animal hull, or a complex collection of spheres, saucers, cylinders, booms, and pods. It is designed for space operations, not atmospheric operations; has poor aerodynamics, may enter atmosphere but most non-streamlined ships remain in space and avoid entering atmosphere.

**Streamlined/aerodynamic:**
A streamlined hull’s shape may be a wedge, lifting body, cone, disk, teardrop, bullet, or needle-like shape. It is optimized for high atmospheric speed. Modules -5%; price +15%.

**Atmospheric abilities:**
Vessels without this feature cannot normally enter a planets atmosphere and fly in atmospheric conditions and may submerge into shallow waters (up to 500 feet). In emergency all ships are able to enter atmosphere but vessels without this feature will be damaged sometimes beyond repair. In the atmosphere use the non-streamlined speed values even on streamlined crafts. Takes 0.5% of total module slots, add 2% to the mass of hull and +5% to the price.

**Enhanced atmospheric abilities:**
A vessel with this feature may land on water surface and able to submerge into it without taking any damage (up to 2 miles) or having problems. The reinforced hull, the extra systems built into the hull rises the price by 15%, adds 10% to the mass of hull, and takes 2.5% of the module slots. The depth tolerance can be enhanced further. For every additional
1 mile depth tolerance increase the cost and the mass of hull by additional 1%, and increase the module requirement by additional 0.1%. Streamlined crafts taken this option use the streamlined speed values in atmosphere while non-streamlined vessels may go 50% faster in the atmosphere if this option taken.

**Stealth design:**
Raises detection difficulty. Compatible with all above options. Takes 5% of the module slots, 5,000 Credits for every ton of the ship (based on total mass), detection difficulty -20% (Read Sensors skill).

**Step 2: Armor options**

**No armor**
Just the framework of the hull. There are a few pressurized compartments, maybe they are connected by corridors, but not always. Modules are visible, even prone to enemy fire. The Argon and Goliath class vessels from Dimension Book Six: Three Galaxies is a fine example for this armor option.

**Sealed hull:**
No additional armor, just a basic, minimal plating all over the ship. The sealing provides the ship radiation shielding. The sealed hull increase the ship's protection (M.D.C.) by 10%, the weight of this layer is 2.5% of the total mass and cost 10% of the unmodified (ie the basic price multiplied by the total mass) hull price.

**Light Armor:**
Thin layer of basic armor plates over the sealed hull. Its protection (additional M.D.C.) is 50% of the ship's hull M.D.C. value. The weight of the armor is 5% of the total mass and its price is 75% of the ship's unmodified hull price.

**Medium Armor:**
The medium armor increase the ship's survivability considerably, but weights and costs more than the light armor plates. Increase the ship protection by 100%, weights 10% of the total mass and cost 125% of the ship's unmodified hull price.

**Heavy Armor:**
The best protection available for any ship. Thick, strong and heavy. Increase the ship M.D.C. by 200%, its weight is 20% of the total mass and cost 200% of the ship's unmodified hull price.

**Self-sealing hull:**
No additional armor, but a self-sealing coating on the inside of the armor. Weights 1% of the total mass of the ship, costs 10% of the unmodified hull price. It is able to seal holes up to 10% of the total hull+armor M.D.C. - however, this is not M.D.C. recovery, just preventing decompression. It can also keep out hostile atmospheres if the outer pressure does not exceed the internal pressure by 0.1 Mpa. Compatible with sealed and armored hull, as well as stealth coating.

**Stealth coating (can be applied to any armor, but always as the out-most layer):**
This consists radar and other radiation absorbing materials, measures to shadow thruster banks (on reaction drives) and similar items. Standard and Military versions are passive systems without energy consumption, while the Advanced system and the Cloaking system require energy to be fully effective (without energy both systems have the same modifiers as the standard stealth coating, but when the stealth system is energized, the shields must be switch off). +5% M.D.C. (based on unmodified basic Hull M.D.C. value) and +5% Mass of Hull, reduces signature. When a stealth ship looses 25% of its maximum M.D.C., the detection difficulty modifiers are lowered to one half. Loosing 50% or more of its M.D.C., means the detection difficulty is lowered to one quarter of its starting value, while loosing more than 75% of the hull M.D.C. makes the stealth coating virtually useless (grants only 1/10th of its basic detection difficulty value).

<table>
<thead>
<tr>
<th>Stealth Coating (example)</th>
<th>Detection Difficulty</th>
<th>Price (Credits)*</th>
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<tbody>
<tr>
<td>Standard (Runner Ship)</td>
<td>-40% to Read Sensors skill when the ship is standing still, and -20% to Read Sensors skill when the ship is moving.</td>
<td>5,000</td>
</tr>
<tr>
<td>Military (Proctor, Hunter)</td>
<td>-60% to Read Sensors skill when the ship is standing still, and -30% to Read Sensors skill when the ship is moving.</td>
<td>10,000</td>
</tr>
<tr>
<td>Advanced (Oni shadow ship)</td>
<td>-80% to Read Sensors skill when the ship is standing still, and -40% to Read Sensors skill when the ship is moving.</td>
<td>25,000</td>
</tr>
<tr>
<td>Cloaking</td>
<td>Dimension Book 13: Fleets of the Three Galaxies, page 28, Cloaking</td>
<td>50,000</td>
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*Per every ton of the ship's total mass.

**Step 3: Propulsion**

3.A. STL (Slower Than Light) Non Reaction Drives:
Contra Gravity Drive:
80% of all space drives are contra gravity drives which can be used both in space and atmosphere. Contra Gravity drives provide artificial gravity and gravity compensation. Accelerates and Decelerates at the rate of 1 Mach per melee (ie a ship with a top speed of 10 Mach need 10 melee turns/150 seconds to reach its maximum speed from standing still position).
The module requirement is 1% of total mass per Mach, weights 0.5 tons per module, costs 5,000 credits per Mach per total mass.

3.B. STL - Reaction Drives:
All drives are vectored thrust with built in maneuvering drives. They need reaction mass stored in fuel tanks to operate with the exception of the electric jets.

Ion Drives (space only):
A high-impulse, low-thrust engine that ionizes a reaction mass and accelerates it as a beam of ions to produce thrust. Cheap, fuel and energy efficient drive system with low acceleration. Accelerates and decelerates at a lower rate than the Contra Gravity drive with 0.25 Mach per melee (1 Mach per minute). Not designed for quick maneuvers or stunts. -10% to pilot skills. Ion drives are not atmosphere capable, so craft with them must have a secondary drive system to enter atmosphere or shuttle craft to ferry passengers and cargo to surface.
The module requirement is 1.5% of total mass per Mach, weights 0.25 ton per module, costs 1,000 credits per Mach per total mass.

Fusion Drives:
Generates a fusion reaction to heat hydrogen into plasma and expel it, adding extra cold mass for extra thrust. Powerful drives with high speed and exceptional acceleration. Accelerates and decelerates at a rate of 2 Mach per melee. Some planets restrict the use of fusion drives in atmosphere due to environmental reasons. This might be a restriction on maximum ship size and/or maximum atmospheric speed - or a total ban, as in the case of most Wolfen planets.
The module requirement is 2% of total mass per Mach, weights 0.3 tons per module, costs 2,000 credits per Mach per total mass.

Electric jets (for mini and small crafts, atmosphere only)
These are electric engine driven turbines similar to the ones on RIFTS Earth power armor. This drive works only in atmosphere or underwater and is unable to work in outer space. Accelerates at a rate of 1 Mach per 15 seconds.
The module requirement is 2% of total mass per Mach, weights 0.3 tons per module, costs 2,000 credits per Mach per total mass.

Fuel/Reaction Mass tanks:
This is a full tank of reaction mass for a reaction drive or a fusion reactor. Each filled tank holds 1 ton of fuel. A spacecraft with one or more reaction drive engines or fusion reactor requires fuel tank with appropriate reaction mass to supply those machinery. Module requirement is 1 module slot per 1 ton of fuel, empty weight is 0.05 tons per module, costs 3,000 credits (filled with fuel). Refueling cost is 500 credits for every ton of fuel.

Ramscoop:
An electromagnetic scoop intended to capture and refine interstellar Hydrogen molecules for fuel and reaction mass. To reload 50 lbs (22.5 kg) of reaction mass for fusion and ion drive the ramscoop system needs 15 minutes in atmosphere or 60 minutes near planets with atmosphere/in gas/star clouds or 6 hours in interstellar space.
Module requirement is 4 module slots, weights 5 tons, consume 1 energy unit per hour when using, cost 2,500,000 credits.

Combined Drives:
There are several reasons for combining different drive systems, like economy, increased peak performance and so on. The rules are the following: Top speed is the sum of the combined drives - keep in mind, that some systems cannot be used in vacuum or in atmosphere. Acceleration is however the best from the different systems.

Maneuvering Modifications:
Acceleration/Deceleration: Every additional 1 Mach per melee acceleration costs 1% of engine price and raises fuel consumption by 2% during acceleration.
Handling: This upgrade gives bonuses to piloting skill - every percentage increase increases engine price by 1%, up to the maximum of +50%. This gives a +1 to dog-fighting rolls for every 10% increase, too.
Maneuvering: Raising a ship's maneuverability to that of Fighter combat: basic costs +30% of engine price. Raising it to the equivalent of Fighter Combat: Elite costs +50% of engine price. For every further +1 to dodge, it takes a further +5% of engine price - so a Scorpion fighter with Fighter Combat: elite and a further +6 to dodge (which is the practical
maximum) in space, the engine price is +80%.

**Important notice:** For raising handling and maneuvering, the prices are for “mini” ships. Small ships must pay twice as much, medium ships five (5) times as much and large ships 20 times as much - it is not really economical to have a dreadnought which can fly circles around a fighter.

**Atmospheric speed limits of the STL drive systems:**
The atmospheric speed of the various drives depends on the vessel aerodynamics and its space speed. The atmospheric speed is 10% of the space speed in Mach for non-streamlined vessels, while the streamlined spacecrafts may reach up to 50% of their space speed in Mach in atmosphere. The maximum speed of the electric jets caps at Mach 2 for non streamlined crafts, but streamlined crafts may go as fast as Mach 10.

Contra-gravity drives can be used in underwater conditions, but their maximum speed is limited to 25 Mph (40kph) per every 1 Mach speed in atmosphere (ie a spaceship with Mach 2 maximum atmospheric speed, which use contra-gravity drives, have 50 Mph maximum speed in underwater environment).

**Fuel Consumption of the STL reaction Drives by ship size categories:**

<table>
<thead>
<tr>
<th></th>
<th>Mini</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ion</td>
<td>0.001</td>
<td>0.005</td>
<td>0.025</td>
<td>0.3</td>
</tr>
<tr>
<td>Fusion</td>
<td>0.0025</td>
<td>0.0125</td>
<td>0.075</td>
<td>1</td>
</tr>
</tbody>
</table>

**3.C. FTL Propulsion:**

**FTL Drives and their price:**
The most common types of technology based FTL systems in the Three Galaxies are the phase drives (or P-Drives) and the contra-gravity (CG) drives.

To calculate the base price of the drive system, multiply its speed (in light-years per hour) by itself (ie speed x speed) this value is the price tag in million credits. This is the price of a FTL system that designed for mini sized crafts. The small sized ships use larger variants that costs 2 times more. The medium sized variants (made for medium spaceships) cost 5 times more, while the largest ships takes the most expensive variants that cost 10 times more.

The P-Drives always cost 50% more than the contra-gravity ones with the same performance.

**Phase transceivers:**
Price and capabilities are listed in Dimension Book 12: Dimensional Outbreak, page 34-35.

**Size and mass:**
Contra-gravity – MR is 0.0025 modules per every ton of total mass, W is 0.5 tons per every module slot.

Phase Drive – Halve the MR and W values described above, which means that a P-drive is always smaller and lighter than a similar performance contra-gravity drive system.

Phase Transceiver – MR is 0.1 module slot and W is 0.05 tons regardless of the size or mass of the ship.

**FTL Travel:**
Before the FTL speed initiate, the ship crew must do preparatory calculations (stellar navigation skill check), scanning the area and the nearby FTL movement, switch off the shield system (shields are not operate at FTL speed and prevent the jump until it switched off), switch off the STL drives (it is not needed during FTL travel). All these preparations takes 1 melee round (15 seconds) regardless of the distance and speed of the FTL travel. After all these preparations, the ship begin its FTL travel.

After each jump, the FTL drives need time to cool down and run self-diagnostics. This time depends on the operation time. If the travel time is shorter than 1 minute the FTL drive need only 1 melee turn (15 seconds) cool down before starting a new jump (starting a new preparation before jump). Longer journeys (any FTL travel that lasts longer than 1 minute) increase the cool down period by 1 second per every minute of FTL travel over the previously listed 15 second. For example when a ship use its FTL system for two hours, the drive need a cool down period of 135 seconds (15 second basic time and another 120 seconds for the 120 minutes operation time).

**FTL micro jumps (short jumps within a planetary system):**
Any FTL drive may go slower than its listed maximum speed (usually used for travel between two planets in the same planetary system). During a micro jump the normal STL drives are operate but the ship cannot go faster than 5 Mach (the ship must slow down to 5 Mach or less before initiate the micro jump).
Shortest micro jump is a quarter light-second (46,875 miles or 75,000 km) trip, but the ship will drift away from the desired location by 1D6x1,000 miles in a random direction (no collision to a planet or a star, the FTL system switch off in close proximity of a stellar body or any strong gravitational well) unless the pilot makes a successful pilot starship and stellar navigation rolls with -20% penalty (both rolls must be successful to prevent the drift). Lower the penalty described above by 1% for each additional one quarter light-second over the first (ie. a 1 light-second jump means -17% penalty, while a 5 light-second or longer jump suffer only -1% penalty on the skill checks).

Some planetary systems (about 25% of the populated systems) may restrict the FTL micro jumps (this usually means speed restrictions, sometimes prohibit the micro jumps within a certain distance, the actual number varied) for safety or traffic control reasons.

Step 4: Command and control:
4.A. Controls:
Standard Cockpit (reinforced pilot's compartment):
Cockpits of this size used on smallest vessels, like fighters or bombers. It come with HUD, compact fire suppression system, a flight data recorder, IFF, navigation system, radiation shielding, air conditioning , distress beacon and limited life support (air supply for 48 hours, air conditioning). Usually the cockpit is a single person command and control module, but two or even four person variants exist, too. In emergency, the cockpit can be detached and launched as a lifeboat (125 M.D.C., built in air supply for 48 hours, a survival pack, short ranged distress beacon with 200,000 miles range, a rechargeable micro battery).
The module requirement of the standard cockpit is 0.75 module slots for one person and an additional 0.5 for every additional people, weights 0.5 tons per person and cost 1,500,000 credits per person.

Standard Bridge:
Standard bridge is the typical command module for most ships (military ships sometimes have two or more bridges). It is come with multiple crew stations, HUD, compact fire suppression system, internal communication devices, flight data recorders, IFF, navigation system, emergency sealing mechanism (to retain internal atmosphere, radiation shielding, air conditioning when the bridge hull is penetrated), distress beacon, computer consoles and may or may not contains a reinforced airlock. Module requirement is 5 module slots per person, weights 1 tons per person and cost 1,500,000 credits per person.

C.I.C. (Combat Information Center):
The Operations Room (or CIC) is the tactical center of a warship, providing processed information for command and control of the near battle space or 'area of operations'. Regardless of the vessel or command locus, each CIC organizes and processes information into a form more convenient and usable by the commander in authority. Each CIC funnels communications and data received over multiple channels from several types of data, which is then organized, evaluated, weighted and arranged to provide ordered timely information flow to the battle command stuff under the control of the C.I.C. officer and his deputies.
Full sized C.I.C.'s (used on cruisers or larger capital class ships, eight personnel capacity) module requirement is 25 module slots, weights 5 tons and cost 7,500,000 credits.
Small sized CIC's (used on frigates and destroyers, up to four personnel capacity) module requirement is 12 module slots, weights 2.5 tons and cost 2,500,000 credits.

Security Station:
Security ready room for 6 to 10 people with monitoring stations, security terminals, force field controller (may erect and maintain up to 4 force fields anywhere inside the ship, each with 300 M.D.C., for up to 250 square feet area), defensive weapon controllers, folding tables, chairs and a small armory (store enough body armor and light weapons for 20 people). The armory have a single reinforced door, state of the art security and locking mechanisms. The armor and weapons usually used by the security forces. The heavier armament used by the landing force stored in reinforced cargo bays or inside the vehicles used by the soldiers.
Module requirement is 20 module slots, weights 2.5 tons and cost 2,500,000 credits.

4. B. Communication and FTL communication:
Basic communication system – Wide-band and directional radio communication system transmits both voice and video. Advanced (higher class systems), more complex and sophisticated systems utilize contra-gravity field technology or other scientific (tachyon transmission) or mystic methods (telepathy or magic) to increase the real time communication range.
The basic range (no delay within this range, the target receive the message within 1 second) is 200,000 miles (320,000 km). Beyond basic range, the message need more time to reach its target (1 second per every 200,000 miles). No FTL
communication system. MR and W is 0.5 and P is 0.1 million credits.

**Civilian standard** – Basic range is 300,000 miles (480,000 km). Limited long range FTL communication system, based on contra gravity field technology with 5 light-years range and 5 light-years per hour speed. MR and W is 0.5, P is 2.5 million credits.

**Standard military** – Basic range is 400,000 miles (640,000 km). Long range FTL communication system is a contra-gravity field communicator with 250 light-years range and 50 light-years per hour speed. MR and W is 2, P is 10 million credits.

**Enhanced** – Basic range is 700,000 miles (1,120,000 km). This system is hardened against communication jamming attacks lowering the negative effects by 10%. Long range FTL communication system is a contra-gravity field communicator with 2,000 light-years range and 100 light-years per hour speed. MR and W is 4, P is 45 million credits.

**Advanced** – Basic range is 1,000,000 miles (1,600,000 km). This system is hardened against communication jamming attacks lowering the negative effects by 30%. Long range FTL communication system is a tachyon transmitter array with 10,000 light-years range and 250 light-years per hour speed. MR and W is 8 and P is 100 million credits.

All the above described systems are designed for small sized or larger ships. Mini sized ships use different systems, that are much smaller and lighter (only 25% of the basic MR and W), cost three times more (+200% price), and their performance is limited (halve all bonuses).

4. C. Sensory systems:

Sensory systems build around radar, ladar (laser detection and ranging), radiation, thermographic, motion, electromagnetic and gravity-wave detectors which can detect objects and anomalies within their range. It has to be noted, that sensory range stands for real-time tactical information. However, all spaceships are capable to map a star system within a few days - it takes a minute for scanning in a one million mile radius area (volume to be exact), and a further minute extend this radius with each further million miles. A ship arriving near our Sun would detect Mercury, Venus, and Earth within about 100 minutes of scanning. However, this is not real-time information - accurate enough to find planets, asteroids and coasting spaceships, however for maneuvering (for example accelerating) and/or cloaked ships one can only confirm their presence (with some luck or a lot of experience in scanning), but not exact position. For further information one has to go there or send out probes or a fighter patrol.

Every standard spaceship sensor capable to perform limited range electronic warfare attack against a single target once per minute. This is a weaker and limited form of the jamming set's attack. Gunners and pilots on the target loses one attack/action, range of the attack is 10 miles (half in an atmosphere or through an atmosphere) and as mentioned before, can be used against one target at a time and no more than once per minute.

**Basic** – Short range real time sensory range is 200,000 miles (320,000 km). Maximum number of tracked objects is limited to 100. Detect FTL contra-gravity and FTL phase drive crafts movement within 1 light-year range. MR and W is 0.75, P is 1 million credit.

**Civilian standard** – Short range real time sensory range is 300,000 miles (480,000 km). Maximum number of tracked objects is limited to 300. +5% to read sensory system rolls. Detect FTL contra-gravity and FTL phase drive crafts movement within 2 light-years range. MR and W is 1.5, P is 5 million credits.

**Standard military** – Short range real time sensory range is 400,000 miles (640,000 km). Maximum number of tracked objects is limited to 500. +10% to read sensory system rolls (increase this bonus to +15% within half range), resistant against sensor scramblers (lower attacker's sensory/electronic countermeasure skill value by 5%). Detect FTL contra-gravity and FTL phase drive crafts movement within 5 light-years range. MR and W is 3, P is 20 million credits.

**Enhanced** – Short range real time sensory range is 700,000 miles (1,120,000 km). Maximum number of tracked objects is limited to 2,000. +20% to read sensory system rolls (increase this bonus to +30% within half range), resistant against sensor scramblers (lower attacker's sensory/electronic countermeasure skill value by 15%). Detect FTL contra-gravity and FTL phase drive crafts movement within 10 light-years range. MR and W is 5, P is 50 million credits.

**Advanced** – Short range real time sensory range is 1,000,000 miles (1,600,000 km). Maximum number of tracked objects is limited to 5,000. +40% to read sensory system rolls (increase this bonus to +50% within half range), resistant against sensor scramblers (lower attacker's sensory/electronic countermeasure skill value by 40%). Detect FTL contra-gravity and FTL phase drive crafts movement within 20 light-years range. MR and W is 10, P is 100 million credits.
All the above described systems are designed for small sized or larger ships. Mini sized ships use different systems, that are much smaller and lighter (only 25% of the basic MR and W), cost three times more (+200% price), and their performance is limited (halve all bonuses).

4.D. Electronic Warfare

Offensive systems:
These systems combine jamming systems (to overload enemy controlling and sensory systems) and communication jammers (to scramble enemy communication) into one package. To perform an electronic warfare attack, the attacker must make a successful Electronic Countermeasure skill roll. A successful roll suppresses enemy sensors for 3D4 rounds (45 to 180 seconds). While suppressed, the enemy gunners attack precision and attack rate lowered, the pilots response time increased and their ship controlling skills are weakened temporary due to electronic system disturbances. Communication jammers (after a successful attack) scrambles or even knocks out enemy communication (for the target or within range, depend on the jammer class) who cannot send and receive messages, be it video or audio. Scramble duration is 3D4 melee rounds (45 to 180 seconds).

Basic – Jammers can be used against up to 3 targets at a time (roll scrambler attack separately for each target). Gunners and pilots on the target vessel loses one attack/action, communication become scrambled (-15% to any communication skill based rolls for the enemy/foreign ships, video communication and even the audio messages are hard to understand). Range of the attack is 20 miles (half in an atmosphere or through an atmosphere). MR and W is 0.75, P is 2.5 million credits.

Para-military standard – Jammers can be used against up to 10 targets at a time (roll scrambler attack separately for each target). Gunners loses one action and lower their to Strike modifier by 1 (ie. -1 to Strike), while pilots loses 1 action/attack and lower their pilot skill rolls by 5%. Enemy communication become scrambled (-25% to any communication skill based rolls for the enemy/foreign ships, video communication and even the audio messages are hard to understand) within 50 miles diameter (half range in an atmosphere). Range of the jamming attack is 50 miles (half in an atmosphere or through an atmosphere). MR and W is 2, P is 10 million credits.

Standard military – Jammers can be used against up to 20 targets at a time (roll scrambler attack separately for each target). Gunners loses one action and lower their to Strike modifier by 2 (ie. -2 to Strike), while pilots loses 1 action/attack, lower their pilot skill rolls by 15% and lower their Dodge rolls by 1 (ie -1 to Dodge). Enemy/foreign communication become scrambled (-40% to any communication skill based rolls for the enemy/foreign ships, no video communication and the audio messages are hard to understand) within 100 miles diameter (affect every enemy/foreign targets within range). Range of the jamming attack is 100 miles (half in an atmosphere or through an atmosphere). The system grants its operator a +10% bonus to his/her Electronic Countermeasures roll. MR and W is 6, P is 20 million credits.

Enhanced – Jammers can be used against up to 40 targets at a time (roll scrambler attack separately for each target). Gunners loses two actions and lower their to Strike modifier by 3 (ie. -3 to Strike), while pilots loses two actions/attacks, lower their pilot skill rolls by 20% and lower their Dodge rolls by 2 (ie -2 to Dodge). Enemy/foreign communication become scrambled (-60% to any communication skill based rolls for the enemy/foreign ships, no video communication and the audio messages are hard to understand) within 200 miles diameter (affect every enemy/foreign targets within range). Range of the jamming attack is 200 miles (half in an atmosphere or through an atmosphere). The system grants its operator a +20% bonus to his/her Electronic Countermeasures roll. MR and W is 15, P is 40 million credits.

Advanced – Jammers can be used against up to 75 targets at a time (roll scrambler attack separately for each target). Gunners loses two actions and lower their to Strike modifier by 4 (ie. -4 to Strike), while pilots loses two actions/attacks, lower their pilot skill rolls by 40% and lower their Dodge rolls by 4 (ie -4 to Dodge). Enemy/foreign communication become scrambled (-80% to any communication skill based rolls for the enemy/foreign ships, no video communication and the audio messages are hard to understand) within 500 miles diameter (affect every enemy/foreign targets within range). Range of the jamming attack is 500 miles (half in an atmosphere or through an atmosphere). The system grants its operator a +30% bonus to his/her Electronic Countermeasures roll. MR and W is 25, P is 75 million credits.

All the above described systems are designed for small sized or larger ships. Mini sized ships use different systems, that are much smaller and lighter (only 50% of the basic MR and W), cost twice as much (+100% price), and their performance is limited (halve the number of targets and penalties).
**Defensive systems:**
Combinations of ECM (electronic countermeasures), ECCM (electronic counter-countermeasures) and hardened systems.
The ECM makes the attacker's job harder by the combination of sensor jamming devices, radio-pulse flares and old-fashioned chaff dispensers. When active, the ECM system impose penalty to anyone trying to target the protected vessel using the Weapon Systems skill, and cause missiles to lose any targeting bonus (only affect smart missiles, no effect against dumb fire variants and rockets). The attacker (gunners and smart missiles) suffer penalty to his/her/its to Strike modifier.

ECCM is a special system designed to counter the negative effects of the opponent's ECM system. If the attacker and its prey carries the same quality systems, then reduce the effects by 1 step (advanced lowered to enhanced, enhanced system to military, military system reduced to para-military, para-military goes down to basic, while the effects of the basic system is negated). If the attacker use better quality defense system, then lowers the effects of the weaker system by 2 steps (enhanced reduced to para-military, military reduced to basic, para-military and basic is negated). If the attacker carries lower quality system than its target, then reduce the better system's Weapon System penalty by 10%, lower the missile's strike penalty and the gunner's strike penalty by 1.

Hardened systems are a combination of passive defensive measures (shielding) and active firewalls or other defensive solutions which can prevent a successful electronic attack against the protected ship by lowering the attacker's Electronic Countermeasure skill or reduces the penalties of the attacks.

**Basic** – ECM and hardened systems only. 15% penalty to the attacker's Weapon Systems skill rolls, lower smart missile's Strike bonus by 1 and lower the Strike modifier of the enemy gunner by 1. Works against up to 8 missiles and up to four attackers (mini ships or turrets/guns) at the same time. MR and W is 0.5, P is 1 million credits.

**Para-military standard** – All systems (ECM, ECCM, hardened systems). 20% penalty to the attacker's Weapon Systems skill rolls, lower smart missile's Strike bonus by 2 and lower the Strike modifier of the enemy gunner by 2. Works against up to 48 missiles and up to 24 attackers (mini ships or turrets/guns) at the same time. Lower the Electronic Countermeasure skill roll of the enemy (if he/she performs electronic attack) by 5%. MR and W is 3, P is 5 million credits.

**Military standard** – All systems. 30% penalty to the attacker's Weapon Systems skill rolls, lower smart missile's Strike bonus by 3 and lower the Strike modifier of the enemy gunner by 2. Works against up to 200 (be it mini sized ships or turrets/guns or missiles). Lower the Electronic Countermeasure skill roll of the enemy (if he/she performs electronic attack) by 15%. MR and W is 7.5, P is 15 million credits.

**Enhanced** – All systems. 40% penalty to the attacker's Weapon Systems skill rolls, negate the smart missile's Strike bonus and lower the Strike modifier of the enemy gunner by 3. Works against any number of attackers. Lower the Electronic Countermeasure skill roll of the enemy (if he/she performs electronic attack) by 20%. MR and W is 15, P is 40 million credits.

**Advanced** – All systems. 60% penalty to the attacker's Weapon Systems skill rolls, negate the smart missile's Strike bonus and lower the Strike modifier of the enemy gunner by 5. Works against any number of attackers. Lower the Electronic Countermeasure skill roll of the enemy (if he/she performs electronic attack) by 20%. MR and W is 25, P is 75 million credits.

All the above described systems are designed for small sized or larger ships. Mini sized ships use different systems, that are much smaller and lighter (only 50% of the basic MR and W), cost twice as much (+100% price), and their performance is limited (halve the number of targets and penalties).

**Step 5: Habitation**
5.A. Support systems:
**Life support systems:**
Life support system contains lights, air conditioner and air filtering, radiation shielding, recycling system, waste processing system, oxygen supply, fresh water, food for one month per person.
The MR of the life support system is 0.25 module slots per people per month, W is 0.2 tons per people per month and P is 2,500 credits per people per month.

**Artificial Gravity System with Gravity Compensation:**
Spacecrafts without Contra Gravity drives need artificial gravity generators and gravity compensation systems to create
a gravity field that can be varied from 0 to 3G. Gravity compensation negates up to 99.5% of felt acceleration. Artificial gravity and compensation may be set for each hull section, and, in habitats or work spaces, for each room (from within the room). Needed on ships not using Contra Gravity drive system.

MR is 0.025 module slots per total mass, W is 0.01 tons per module and P is 1,500 credits per total mass.

5. B. Accommodations:

Bunk room:
Bunk rooms are cramped sleeping chambers. Each bunk room have 4 bunk beds (for 12 people), several storing compartments and a collapsible table with four collapsible chairs. The beds all have built in communications and entertaining consoles and separate lights. Usually built together with a small sized fresher block.
MR is 12 module slots, W is 1.5 tons and P is 10,000 credits.
The built in fresher block (toilets, showers, washers and dryers, water supply) double the MR and increase the W to 4 tons and the total P of the bunk room with fresher block is 25,000 credits.

Cabin:
Self-contained living area with a small bedroom with two separate beds or a single double bed, a double fresher and a living room which need never be left during space travel. This accommodation designed to provide comfortable circumstances during the travel for to two people. Additional systems built into this accommodations are the following: an auto-chef with a small food storage (holds enough food materials to prepare 30 meals total), larger water dispenser storage (100 gallons) with purification devices, miscellaneous furniture (may retract/collapse or fold into the floor, ceiling or wall when not in use), several entertaining consoles and a single computer console.
MR of a single cabin is 10 module slots, W is 2 tons and P is 15,000 credits.
MR of a small cabin (with a single bed or a bunk bed for two people, a single fresher, a single computer console and minimal furniture, no auto-chef) is 6 module slots, W is 1 ton and P is 7,500 credits.

Stateroom:
Self-contained, multi-room living area designed for two people (may hold and sustain four people easily). This accommodation have a separate bedroom (one large or two standard beds), an auto-chef (holds enough food to prepare serve 100 meals total), miniature dining room (comfortable for 4 people), extended drinkable water supply with water dispenser (100 gallons), a larger double fresher (comfortable and have double water capacity), separate life support system (one month supply of air for up to 4 people, plus the usual air conditioning, heating and radiation protection), have a mini bar, various furniture and containers. MR is 20 module slots, W is 4 tons and cost 75,000 credits.

Cell or Cage:
Spartan accommodations for up to four prisoners (with built in sinks and toilets). Includes a barred door, electronic lock, a security post and surveillance camera. MR is 10 module slots, W is 1.5 tons and cost 50,000 credits.

5. C. Other facilities:

Lab:
A scientific laboratory usable by up to two people simultaneously. Fulfills equipment requirements for a scientific skill, e.g., Chemistry, Biology, Physics, Metallurgy, Geology or any other Science skill, with a +10% skill bonus. MR is 15 module slots, W is 2 tons, P is 5,000,000 credits.

Sick bay:
Contains a stabilized diagnostic bed, trauma maintenance, and surgery, for diagnosis and treatment of one patient at a time (First Aid for 1-4 patients). Any size sickbay can use automeds for an extra 25,000 credits per bed, allowing computer software to treat patients. Sick bays have basic life support system for 4 people. The military sick bay is the same as above, with one or two airlocks, room for 10 ambulatory or two litter patients. A full fire-suppression system is included. Sickbays MR is 15, W is 2 tons and P is 2,500,000 credits.
Military Sickbay MR is 25 module slots, W is 4 tons and P is 5,000,000 credits.
For every additional 5 inpatients increase the MR by 10 module slots, W by 0.5 tons and P by 100,000 credits.

Fresher block/laundry:
The fresher block is an oversized variant of the small fresher, designed for 20 people. Contains toilets, showers and sinks. All fresher blocks have large water tanks and water purification devices. Laundry contains 20 washers and driers, large water tanks and purification devices. Freshers have a single toilet plus a single sink (and 50 gallons of water). Double fresher includes a shower, a toilet, a sink and larger water supply (150 gallons) and a low capacity purification device.
MR of a single fresher block or laundry is 25 module slots, W is 7.5 tons and P is 50,000 credits.
Each freshers MR is 1 module slot, W is 0.25 tons and P is 2,500 credits.
Double freshers MR is 3 module slots, W is 1 ton and P is 5,000 credits.

Recreation room/Lounge/Briefing room:
A large room with wide variety of entertaining and recreating devices or other computer consoles/holo emitters. Could be an exercise/gym room, a mini holo-theater, game room with various game consoles, library, briefing room or a canteen/bar. Designed to hold/entertain up to 15 people at a time.
MR is 25 module slots, W is 2 tons, EC is 0.1 energy unit and P is 250,000 credits.

Shipboard Park:
Rare recreational facility found on the largest and luxurious vessels. A beautiful small natural area with various plants (bush, flowers, grass and even small trees), close to natural looking lights, miniature ponds and streams. Each park provide air supply for one person indefinitely (or at least as long as the system get enough energy).
MR is 25 module slots, W is 7.5 tons and P is 50,000 credits.

Hydroponic Garden/Food Vats:
Used aboard of long range vessels as an additional food source, waster processor and as an additional air supply. Each unit provides food, water and oxygen for 10 humans sized, omnivorous passengers/crew members. The food is algae, fungi and krill-like small animals, thought can be processed to variable meals.
MR is 25 module slots, W is 50 tons and P is 150,000 credits.

Kitchen and mess hall:
A compact food preparation and cooking area, with an attached mess hall (for up to 40 people at a time). The kitchen able to prepare and serve 40 meals at a time. Smaller vessels usually don't have enough room for a kitchen and a mess hall. These smaller ships often takes a small galley which is the smaller version of the kitchen (prepare and serve 15 meals at a time) with an attached small dining room (for 15 people at a time). The smallest vessels usually takes only an auto-chef (automatic food preparatory system designed for the smallest ships), which are able to prepare and serve up to 5 meals a time.
MR of the kitchen with mess hall is 25 module slots, W is 2.5 tons and P is 100,000 credits.
The galley with dining room takes 10 module slots, W is 1 ton, P is 50,000 credits.
Auto-chef’s MR is 0.25 module slots, W is 0.1 tons and P is 10,000 credits.

Workshop:
General workshop for repairing and manufacturing parts. In the Three Galaxies, equipment is typically made of larger versions of the nanotech multi-tool, plus an arc furnace to cast M.D.C. parts. With a crew of two in can manufacture parts and plates from scratch about 200 M.D.C. worth or repair the same amount per 8 hour shifts.
Purchasing multiple workshops as a larger industrial facility can be used to process natural resources, be they harvested from comets, metallic asteroids or scooped from the upper atmosphere of gas giants (the latter version requires a ram-scoop, even multiple ram-scoops). Processed quantity varies by material, from a few tons per hour of gases filtrated from atmospheres to a few dozen pounds of highly processed M.D.C. materials per 8 hour shift. Depending on the raw materials and the final product, it is up to the GM to assign values.
MR is 15 module slots, W is 5 tons and P is 2,500,000 credits.

Passenger Seats:
This is an alternative to an accommodation for a short voyage (no longer than 12 hours) or small spacecraft. It includes 12 hours of oxygen supply per passenger seat and a minimal air conditioning. Military version (foldable seat) of this system used on drop/assault shuttles for short range travels (no longer than one hour), far from comfortable but at least its cheap. Each passenger seat need 0.4 module slots, weight 0.05 tons and cost 1,000 credits. Each military seat need 0.2 module slot, weight 0.01 ton and cost 250 credits.

Hibernation Pods, Sleeper Pods:
Various hibernation methods developed by the inhabitants of the Three Galaxies. These pods usually used during the initial periods of interstellar travels, but their usefulness and multipurpose usability guaranteed them a place on the modern space ships as life saving/emergency pods.
A pod housing one person. The “sleeper” inside it is unconscious, but ages at 1/100th speed and does not require sustenance. Comes with its own power source, for safety reasons. Cryopod works on its internal power source for 5 years, the Phase Tech pod works for 25 years, while the Magic pod works for 10 years. Hibernation pod's (regardless its type) MR is depend on its passenger (0.35 module slots for a human sized sleeper, 0.6 module slots for a kreeghor or wolfen, 1 module slot for a seljuk), W is 1 ton per module slot. Each cryopod cost 250,000 credits, every phase tech hibernation pod cost 1,000,000 credits and each magic hibernation pod cost 500,000 credits.
Step 6: Shields:

<table>
<thead>
<tr>
<th>Type</th>
<th>Module Requirement</th>
<th>Weight (tons)</th>
<th>Total M.D.C.</th>
<th>Price (Credits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Force Field</td>
<td>0.5*</td>
<td>0.25*</td>
<td>100</td>
<td>200,000</td>
</tr>
<tr>
<td>Variable Shield</td>
<td>1*</td>
<td>0.5*</td>
<td>100</td>
<td>750,000</td>
</tr>
</tbody>
</table>

*Multiply the module and weight values by 0.5 for mini crafts, by 1 for small ships, by 3 for medium ships and by 5 for large ships.

Recharge limit of the Basic Force Field is 25% per melee total and 30% per melee total for the Variable Shield System.

Step 7: Weapon Systems:
The designer may use the weapon prices and weight that are listed in Dimension Book Two: Phase World, Dimension Book Three: Phase World Sourcebook and Dimension Book Six: Three Galaxies or may create its own weapons using the rules below.

7.A. Guns:

**Module requirement for energy guns** – 0.025 for Point Defense guns, 0.125 for Light guns, 6 for Medium guns, while the size of the Heavy guns (maximum range limited to 125 miles in space and their average damage limited to 10,000 M.D.) are 75 module slots. Truly Heavy guns (better range and heavier damage) are very rare and their module requirement is always at least 250 module slots, but sometimes even more. Increase the size by 20% if the gun has its own power source.

**Weight of the gun** – 1 ton per every module slots taken by the gun.

**Basic price of the gun** – Take the gun's average damage value, multiply it by the square of its range (ie. range x range) in space and finally multiply this number by 1,000 for point defense guns, by 200 for light guns, by 80 for medium guns and by 25 for heavy guns. Weapons produced in large series can be as cheap as 25% of this for governments and major corporations, however for civilians market prices can be as high as 400% or outright illegal. Built in power source increase the price by 25%.

**Gun Categories (as used in the Phase World setting) and Basic Rate Of Fire:**

**Point Defense guns** - Point blank ranged, low damage guns. Their maximum damage cannot go beyond 2D4x10+10 M.D. per gun and their range is capped at 5 miles (8 km) in space. Any gun that do more damage or shoot farther is considered as a light gun. These guns usually have high rate of fire (may fire up to 18 times per melee round).

**Light guns** - Short ranged guns with moderate damage. Used by fighter/bomber crafts as main guns or used on larger ships as an anti-fighter weapon system. Maximum damage is capped at 5D6x10 M.D. per gun and they cannot shoot farther than 20 miles (32 km). Light guns have high rate of fire (may fires up to 12 times per melee round).

**Medium guns** - Medium ranged guns with medium to heavy damage. Used on sub-capital vessels as primary weapon systems or on capital class ships as secondary weapon systems. Any gun whose range is no more than 50 miles (80 km) and its maximum damage doesn't go beyond 3D6x100 M.D. is considered as a medium gun. These guns have average rate of fire (up to 6 attacks per melee).

**Heavy guns** - Long ranged, heavy damage dealing weapons. Any guns that shoots farther than 50 miles and/or their damage higher than 3D6x100 M.D. are heavy guns. These guns usually have low rate of fire (2 attacks per melee).

The Rate of Fire may be increased above its base values. Every additional attack per melee increase the gun price by 10%. The maximum number of attacks per melee (rate of fire) cannot increase further than twice its original value. Decreasing the basic rate of fire lowers the maximum attacks per melee. For every lost attack per melee, lower the gun price by 10%.

**Energy gun types (optional rules):**

**HI laser** - This is the base weapon type, no alteration is needed. All HI lasers have +2 to Strike bonus and do critical hits on a natural roll of 18-20.

**Horn cannon** - Kreeghor variant of the HI laser cannon. Use the same modifiers described above, but increase the MR and W of the gun by 10%, reduce the rate of fire to one half (don't reduce the energy requirement just because the rate of fire lowered), lower its price to 40% and its atmospheric range calculated the same way as the non laser weapons.

**Particle Beam** - For a 10% increase in price, they can have a “scatter” option - switching to scatter mode halves the weapon range, lower the damage (do only 10% of their basic damage to man sized and smaller targets and only 25% of their basic damage to larger targets), but damaging everything in a 10 feet (point defense class guns)/25 feet(light class guns)/50 feet(medium class guns)/100 feet(heavy guns) wide area.

**Plasma guns** - For a 25% increase in price, they can do splash damage - normal damage at the point of impact and do one quarter damage to everything within 3 feet (point defense class guns)/10 feet(light class guns)/25 feet(medium class guns)/50 feet(heavy guns) radius.
Kinetic gun types:

Contra gravity guns or rail guns - While these guns consumes much less energy per shot and their price is 80% lower than a similar performance energy gun's power consumption or price, they also takes more space, are heavier (increase both their MR and W by 50%) and use ammunition. Ammunition needed/used for one attack is calculated as follows: maximum damage in M.D. multiplied by range in space in miles then divide this number by 1,000 to get ammunition weight in pounds. he above result is for the total projectile mass for one attack.

For example a contra gravity gun, doing 4D6x10 M.D. with a range of 16 miles in space use up 3.84 pounds of ammo - rounded to 4 – per attack. It is up to the GM whether the weapon in question fires bursts of a few or a few dozen rounds per attack or a single dart, even a flechette shot like the Boom Gun.

Auto-cannons - Cheap, short ranged guns that can be manufactured by even the less advanced races. These guns do not use energy to deliver their devastating effect. These guns comes in three different size. Smallest ones, sometimes called mini guns, are considered as point defense guns whose MR is 0.125 module slot, W is 0.125 tons, costs a mere 50,000 credits, its range is 2.5 miles in space and have 50 M.D.C.

The medium sized cannons use higher caliber rounds (similar to a 25mm or 30 mm auto-cannon round), shoot farther and deliver more damage. These larger guns needs 0.25 module slots, weights 1 ton, costs 100,000 credits, its range is 5 miles and have 100 M.D.C.

Largest variants are the true auto-cannons. These are the largest, heaviest and do the most damage. Takes 0.75 module slots, weights 2 tons, costs 175,000 credits and its range is 10 miles in space. Heavy auto-cannons counts as light weapon systems with 200 M.D.C.

Auto-cannons usually fires in bursts. To calculate burst damage use the following rules: triple the basic damage for short burst of 10 rounds, quintuple the basic damage for medium burst of 20 rounds or do ten times the basic damage for long burst of 40 rounds. All counts as a single melee attack/action. Increase burst damage by 50% within point blank range (1 mile in space or 2,500 feet in an atmosphere) thanks to the weapon's unique design, its projectile's speed and short range accuracy.

Plasma cartridge machine guns - These guns, which fires plasma cartridge ammunition instead of the basic armor piercing rounds, comes in two sizes. Smaller ones use the smallest auto-cannon size, weight as well as its basic range and able to fire medium or standard cartridges. Large machine gun variant use the same MR/W/P/M.D.C. and range values as the medium auto-cannon, but fires heavy or super heavy cartridges. Just like the auto-cannons, the plasma cartridge machine guns fires bursts (same damage rules as the auto-cannons). All plasma cartridge guns counts as light weapons, regardless their size and ammunition.

Atmospheric ranges:

For non-laser guns (and the Kreeghor horn lasers), their effective range is 75% of the gun's space range. Lasers works better in outer space and have worse performance in atmospheric conditions. Laser's effective range in atmosphere is only 40% of their space range.

Ammunition:

Contra gravity gun and rail gun ammo costs 5,000 Credits per ton for standard calibers. This amount of ammo needs 0.15 module slots. Depleted uranium, tungsten or other heavy rounds are available, but usually as military grade ammunition, which cost 15,000 credits per ton and up for civilians, but increase gun damage by 25%.

Auto-cannon rounds comes in various sizes and calibers. Each of the small caliber round do 2D6 M.D., costs 2 credits each. 10,000 rounds takes 0.05 module slot and 1.5 tons.

Medium caliber rounds do 3D6 M.D., cost 3 credits each. 10,000 rounds takes 0.1 module slots and 2.25 tons.

The heavy caliber variants do 5D6 M.D., cost 5 credits each. 10,000 rounds takes 0.2 module slots and 3 tons.

Depleted uranium, tungsten or other heavy rounds are available, but usually as a military grade ammunition, which doubles the cost of the ammunition, increase its mass by 50%, but adds +1D6 M.D. to the basic damage.

Plasma cartridge rounds comes in two sizes. The medium (do 5D6 M.D., cost 15 credits each) and the standard (do 1D4x10 M.D., costs 25 credits each) rounds use the same size and weight as the Naruni micro missiles.

Heavy cartridges (do 1D6x10 M.D., costs 40 credits each) and super heavy (do 2D4x10 M.D., costs 100 credits each) rounds use the mini missile size and weight values.

7.B. Missiles

These missiles are more or less the galactic standard with Contra Gravity propulsion and advanced guidance systems - as such, they are considerably smaller, faster and lighter than the rocket driven missiles used on Rifts Earth, as well as
being cheaper due to the vast manufacturing in the Three Galaxies. Their atmospheric performance (speed, range) are the same as the Rifts Earth ones.

Short, medium and long range missiles are also available as bombs - they have 50% of length, half the range and 75% of speed of the full-sized missiles. Bombs can be set as floating mines in space, and in this mode, their speed can be enhanced (with halving their range again) as above.

Multi-warhead missiles contain four bombs of one category smaller and are usually loaded with fragmentation warheads, set to detonate simultaneously in a preset pattern. In this case, damage and blast radius are doubled - as per the table above. Keep in mind, that before separation, the missile is a single target, which is easier to intercept.

The maximum range (where the automatic self-destruct mechanism detonate the missile to prevent accidents or misfortune) of the missiles is 10 times more in space than their atmospheric range (except the mini and micro missiles which maximum range is limited to 5 times more than their atmospheric range), while their speed is 10 times more in space than their atmospheric speed.

Light and Heavy Cruise missiles use multiple speed values. Their cruising speed is only 8 times more than their atmospheric speed (2.5 Mach for light and 4 Mach for heavy missiles in atmosphere), but their maximum speed is 15 times more than their atmospheric speed. These missiles use this maximum speed value only in the last 50 miles (80 km), seconds before impact.

The average price of the missiles are listed in their description. Armor piercing missiles use the average price value. High explosive and fragmentation missiles cost 30% less, the plasma missiles cost 25% more, multi-warhead missiles 50% more expensive, while the heavy armor piercing missiles cost 75% more. K-Hex missile variants increase the missile price by an additional 75%, but also increase damage by 25% and blast radius by 50%.

**Micro Missiles** (size: 4 inches by 1 inch diameter/ 10 centimeters by 2.5 centimeters, weight: 4 oz / 0.1 kilograms), 1 M.D.C. Standard missile cost 1,600 credits, smart missile variant cost 6,000 credits each.

**Mini Missiles** (size: 6 inches by 2 inches diameter/ 15 centimeters by 5 centimeters, weight: 1 pound / 0.45 kilograms), 2 M.D.C. Average missile price is 1,000 credits. No multi-warhead or heavy armor piercing missile variants.

**Short Range Missiles** (size: 1.5 feet by 4 inches diameter/ 45 centimeters by 10 centimeters, weight: 5 pounds / 2.25 kilograms), 5 M.D.C. Average missile price is 2,000 credits. No multi-warhead or heavy armor piercing missile variants.

**Medium Range Missiles** (size: 3 feet by 6 inches diameter/ 90 centimeters by 15 centimeters, weight: 40 pounds / 18 kilograms), 10 M.D.C. Average missile price is 5,000 credits.

**Long Range Missiles** (size: 6 feet by 8 inches diameter/ 1.8 meter by 20 centimeters, weight: 150 pounds / 67.5 kilograms), 20 M.D.C. Average missile price is 15,000 credits.

**Light Cruise Missiles** (size: 5 yards by 2 feet diameter/ 4.5 meters by 60 centimeters, weight: 0.5 ton), 30 M.D.C. The price of a light cruise missiles is 150,000 credits (nuclear, 2D6x100 M.D., 75 feet blast radius) or 250,000 credits (anti-matter, 4D6x100 M.D., 50 feet blast radius). Atmospheric range is 2,500 miles (4,000 km).

**Heavy Cruise Missiles** (size: 7 yards by 3 feet diameter/ 6.3 meters by 90 centimeters, weight: 5 tons), 50 M.D.C. The heavy cruise missiles cost 250,000 credits (nuclear, 3D6x100 M.D., 150 feet blast radius) or 500,000 credits (anti-matter, 6D6x100 M.D., 100 feet blast radius). Atmospheric range is 10,000 miles (16,000 km).

**Missiles Storage and launchers**

Missiles are stored in crates as cargo. Combat ready missiles are either in launch tubes or in magazines. Magazines are mechanized storage and loading systems, much like in the case of conventional ammo.

<table>
<thead>
<tr>
<th>Missile Type</th>
<th>Storage/Cargo</th>
<th>Magazine</th>
<th>Launcher*</th>
<th>Launcher**</th>
<th>Price(Credits)***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro</td>
<td>50,000 per module</td>
<td>45,000 per module</td>
<td>1 / 512</td>
<td>NA</td>
<td>150,000</td>
</tr>
<tr>
<td>Mini</td>
<td>10,000 per module</td>
<td>8,500 per module</td>
<td>1 / 256</td>
<td>1 / 512</td>
<td>75,000</td>
</tr>
<tr>
<td>Short Range</td>
<td>1,500 per module</td>
<td>1,250 per module</td>
<td>1 / 128</td>
<td>1 / 256</td>
<td>150,000</td>
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<tr>
<td>Medium Range</td>
<td>320 per module</td>
<td>270 per module</td>
<td>1 / 32</td>
<td>1 / 48</td>
<td>250,000</td>
</tr>
<tr>
<td>Weapon Type</td>
<td>Module Requirement</td>
<td>Price</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>--------------------</td>
<td>-----------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long Range</td>
<td>80 per module</td>
<td>500,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light Cruise Missile</td>
<td>4 per module</td>
<td>1,000,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heavy Cruise Missile</td>
<td>0.75 per module</td>
<td>2,500,000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*This is the module requirement of a reload-able, multi-shot launcher – i.e. a medium range missile launcher which is able to launch 32 missile volleys takes 1 module, while a heavy cruise missile launcher which is able to launch 10 missile volleys takes 20 module slots.

**Single shot launchers have to be reloaded using EVA or in a hangar/docking bay. Under combat conditions it is impossible.

***Per launcher module slots (use the described price if the launcher is smaller than 1 module slot)

7.C. Weapon Placements (for guns and missiles):

**Fixed placement**

The weapon system cannot rotate and must fire one specific direction, protected by ship armor plates (use the additional M.D.C. modifiers from the Step 2: Armor section's Armored Hull table). This type of placement is the cheapest one and not takes any additional space inside the ship.

**Hull Mounted**

Casemate, barbette and similar weapon mountings. The weapons have a limited arc of fire (90° up-down/left-right), protected by ship armor plates. Takes 10% more modules than the fixed placement ones, +10% weight and +20% price.

**Turret**

Turret mounted weapons housed into a turret and placed partially outside of the ship (turrets are not protected by ship armor plates). Have full arc of fire (360°), heavier and more costly than the other placement types. Standard turrets come in six standard sizes, which determine their maximum internal volume (can be filled by guns or missiles). The first number for MR is the size of the turret itself, the second number is their internal volume which can be filled by guns/ammunition or even missiles. Turret weight is the empty weight without any weapon or ammunition.

- Class 1 turrets MR is 0.5 / 0.35 module slots, their W is 0.1 tons and P is 25,000 credits over the weapons/ammo price.
- Class 2 turrets MR is 2 / 1.6 module slot, W is 0.4 tons and P is 75,000 credits.
- Class 3 turrets MR is 15 / 12 module slots, W is 3 tons and P is 200,000 credits.
- Class 4 turrets MR is 40 / 36 module slots, W is 8 tons and P is 500,000 credits.
- Class 5 turrets MR is 100 / 90 module slots, W is 20 tons and P is 1 million credits.
- Class 6 turrets MR is 300 / 270 module slots, W is 60 tons and P is 2.5 million credits.

Pop-up/retractable turrets need much more space, weights more and takes higher price. Increase the turret's total MR, W and P by 50%, but do not increase the internal MR.

Custom built turrets can be created for any weapon systems. These turrets take 25% more space (MR) than the weapon they hold, weights 50% more than the mass of the carried weapon and its loaded ammo and costs 20,000 credits per every modules taken by the turret itself.

7.D. Combat computers:

**Combat/targeting computers and automated turrets:**

Any weapon system may take a combat/targeting computer. This system contains holographic display, advanced targeting software and other analyzer programs which may grants Strike bonuses. Basic system without any additional bonuses to Strike cost a mere 10,000 credits and able to negate any and all modifications come from the speed of the target (i.e. no negative modifiers to Strike due to the speed of the target).

Advanced systems costs 100,000 Credits per each point of Strike modifier (i.e. a targeting computer which gives +2 to Strike to a missile launcher or a gun costs 200,000 Credits) and have the speed modifier negating system. Must be purchased and installed for every weapon separately.

Installing basic automatic fire control (which use combat/targeting computers) to a turret is fairly simple and costs 300,000 Credits, has 3 Attack per Melee (ApM), +2 to Initiative and +2 to Strike (which includes the Weapon Systems and Read Sensory Equipment skills at 70%). Every further ApM, +1 per strike costs 100,000 credits (up to 6 ApM and +5 to strike) and every +1 to Initiative (up to +6) costs 200,000 credits. Must be purchased and installed for every weapon emplacement separately.

**Step 8: Energy:**

**Fission reactors** – While these are the cheapest power plants on the market, they are also the largest, heaviest and weakest, but work constantly and do not need refueling until their lifespan ends. They can power up the following systems beyond the accommodation, life support and other facilities/devices placed on board:
Mini ship's reactor: 4 light or 6 point defense guns or 1 weaker medium gun, 1,200 M.D.C. shield power, FTL speed is limited to 1 light-year per hour.
Small ship's reactor: 12 light or point defense guns, 2 medium guns or 1 weaker heavy gun, 4,000 M.D.C. shield power, FTL speed 3 light-years per hour.
Medium ship's reactor: 24 light/point defense guns, 6 medium guns or 1 heavy and 2 medium guns, 20,000 M.D.C. shield power, FTL speed 4 light-years per hour.
Large ship's reactor: 32 light/point defense guns, 10 medium guns or 2 heavy and 4 medium guns, 36,000 M.D.C. shield power, FTL speed 5 light-years per hour.

**Fusion reactors** – Cleaner, better and smaller reactor that is most commonly used across the Three Galaxies. Unlike the fission reactors, these power plants need refueling every 12 months (refueling cost is 1% of the reactor's price) on a space station or space port, unless the ship is equipped with ram scoop system, which can gather and refine fuel for them. Their maximum gun and shield support capacity is 50% higher than the fission reactor's performance, their higher maximum output increase the above described FTL speed limits by 1.

**Anti-matter reactors** – The strongest standard tech power plant in the Three Galaxies and the most expensive too. Like the fusion reactors, these super power plants need refueling once per every year (refueling cost is 5% of the reactor's price). Their maximum gun and shield support capacity is three times the fission reactor's performance, their higher maximum power output increase the above described FTL speed limit by.

Regardless their type, every additional reactor beyond the first will increase the maximum weapon's number by 25% (minimum 1), shield power by 50%, maximum FTL speed by 1.

<table>
<thead>
<tr>
<th>Type</th>
<th>MR*</th>
<th>Weight (Tons)</th>
<th>Basic lifespan (years)**</th>
<th>Price (Million Credits)***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fission</td>
<td>3%</td>
<td>1.5 per module</td>
<td>0</td>
<td>0.2/2/30/300</td>
</tr>
<tr>
<td>Fusion</td>
<td>1.75%</td>
<td>0.75 per module</td>
<td>0</td>
<td>1/10/150/1,250</td>
</tr>
<tr>
<td>Anti-Matter</td>
<td>1%</td>
<td>0.5 per module</td>
<td>0</td>
<td>5/45/1,600/5,500</td>
</tr>
</tbody>
</table>

* Based on the ship's internal slots (ie. a fission reactor that placed into a ship with 1,000 internal slots takes up 50 modules, while a fusion reactor needs only 25 module slots when placed into the same ship).
**The basic operation time (before a major maintenance must be performed on a space dock/shipyard) or sometimes called lifespan of a reactor is 10 years. For every additional lifespan period (10 years), increase the required module number, the weight and price by 10% (ie a fission reactor with 30 years operating time costs 20% more than the basic 10 years version, needs 20% more modules and weights more by 20%). When the operation time/lifespan elapsed, the reactor need a total overhaul, full maintenance. Shorter lifespan reactors use the same MR and W as the basic one, but costs less (-5% per every year of shorter operation time; ie a fission reactor with 5 years operation time costs 25% less).
***Standard Mini/Small/Medium/Large ship's reactor price.

**Batteries, energy storing devices:**
Rechargeable energy storing devices, used by many crafts as an emergency or backup system or to temporarily enhance the performance of some systems. 1 rechargeable battery stores 0.01% (0.1% for small ships) of a medium or large sized ship reactor's maximum output. For every 1% reserve energy directed to drives to boost their performance will increase the maximum speed by 2.5% for up to 4D6x10 minutes. Another use of the reserve energy is to run the ship on maximum speed for 6 hours per every 1% of reserve energy (usually used if the reactor shuts down/damaged). Overcharging guns will increase both the range and damage by 2% for every 1% of extra energy, but the safety measures built into every cannon will shut down the weapon after one minute of uninterrupted fire (cool down time is 1 melee – 1 minute in case of heavy or very heavy guns – for every overcharged shot). Shields can be overcharged too. For every 1% reserve energy pumped into the shield system will increase the total shield recharge rate per melee by 2.5%.

Each battery system placed onto a mini sized shuttle craft or fighter/bomber grants the ship 1 hour operation time (powers most on-board systems excluding energy weapons and rail guns/contra gravity guns, shields or FTL drives). Each additional battery stores enough energy to shoot a gun up to 100 times in combat (500 times with point defense rail gun or 100 times with light rail guns/contra gravity guns/point defense energy guns, but only 12 attacks with light energy gun or 1 shot per medium gun), or to maintain and recharge shield system (up to 1,000 M.D.C. maximum shield strength per battery) for up to 1 hour or 5 times of full recharge (whichever comes first) or provide enough energy for an FTL drive to move the ship up to 2 light-years. MR is 0.025 ton, W is 0.025 module slot and P is 10,000 Credits

**Step 9: Cargo bays, vehicle bays and other systems:**
**Conventional personal airlock:**
All spaceships (except space capable fighter crafts and bombers) have several airlocks built onto the ship’ hull. Small
ships (and mini shuttles) built to have at least one (frigate sized ships always have at least 3) but rarely takes more than 10. Medium sized vessels have at least 10 personal airlocks and this number may goes up to 50. Large spacecrafts always have at least 25 personal airlocks (never takes more than 100). Additional airlocks can be installed on any craft. 2 EVA suits can be stored in as well as some equipment. MR is 2 module slots, W is 1 ton and P is 10,000 credits.

**Vehicle/hangar/cargo bay doors:**
Not true airlocks, but huge pressure doors (with or without a force field to keep the pressure in) to access cargo bays. Takes 0.05 modules per 50 square feet, weights 0.1 tons per 50 square feet and has a price tag of 7,500 credits (per 50 square feet) - and comes with its own battery for 4 hours of use. Without force field the price tag is lower (2,000 credits per 50 square feet).

**Cargo hold:**
Sealed, internal area designed for cargo transferring and storing. May hold supplies, spare parts, machinery, cargo crates or may be devoted to farms may omit food supplies. Each cargo hold module „slot“ represents about 250 cubic feet (about 7 cubic meters).

**Life Pods:**
The typical survival system is a life pod, a miniature craft capable at least of brief maneuvering to get away from a dangerous situation. A lifeboat may be able to land and will be stocked with survival gear and other resources useful for crewmen who must live in the wilderness for long periods of time (this means survival packs and kits with shelters, hunting kits, climbing kits, rechargeable energy sources, first aid kits and other basic medical, purifier devices). All life pods runs on batteries, have a slow drive system (4 Mach in space, 0.5 Mach in an atmosphere) with limited range (5 days of uninterrupted travel) and have a limited life support system (contains enough food, water and air for one week for each rescued personnel), plus a distress beacon.

Their size, mass and price tag is depends on their holding capacity. MR and W is 1 per people, its price is 350,000 credits per people. M.D.C. of the life pod/lifeboat is 100 + 10 per people (holding capacity).

**Hangar bay for fighters:**
Crafts other than one or two seat fighters and small shuttles are usually stored in their own service/loading bay as it would be impractical to store them stacked.

**Storage**
Most fighters held in the storage area. Some designs carry a few fighters in modified storage called as launch tubes - it takes 1 million credits and +10% module slots to “convert” a "storage space" into a one-craft launch bay. Fighters stored that way can be launched almost immediately, recovery, however, is 1D4 minutes unless the ship has landing bay to gather the craft. Spacecrafts stored in standard storage need 1D4 melee (15-60 seconds) to reach the flight deck/ready hangar before launch.

| Storage module requirement, mass and price of the bay is depends on the size of the craft. |

<table>
<thead>
<tr>
<th>Size category based on total volume filled by the ship (and examples)</th>
<th>MR</th>
<th>W (tons)</th>
<th>EC</th>
<th>P (million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini Fighters (Kittani Transformable robot fighter, Jesstra, Bone Scout)</td>
<td>50</td>
<td>1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Small Fighters (Scorpion, Broadsword, Fire Eater, Dragon Fang, Star Hawk, Necron Posh)</td>
<td>100</td>
<td>1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Medium Fighters (Black Eagle, Shadow Bolt, Katana, Ovoid, NE Rapier Stealth Fighter, Demon Fighter/Bone Fighter)</td>
<td>150</td>
<td>1.5</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Large Fighters / Small Bombers / Mini Shuttles (Nova Star)</td>
<td>250</td>
<td>2</td>
<td>0.1</td>
<td>0.25</td>
</tr>
<tr>
<td>Medium Bombers / Small Shuttles (Star Ghost, Runner Ship, Gas Collector)</td>
<td>500</td>
<td>2.5</td>
<td>0.1</td>
<td>0.25</td>
</tr>
<tr>
<td>Large Bombers / Mini Patrol Crafts (Proctor, Naruni Audit Ship)</td>
<td>750</td>
<td>5</td>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Small Patrol Crafts / Light Starships (Starfish yacht, Oni Shadow Ship)</td>
<td>2,500</td>
<td>7.5</td>
<td>0.25</td>
<td>0.75</td>
</tr>
<tr>
<td>Medium Shuttles (CAF Shuttle, Haelra Shuttle)</td>
<td>4,500</td>
<td>10</td>
<td>0.25</td>
<td>1</td>
</tr>
<tr>
<td>Large Shuttles (Rain of Death Assault Shuttle, Arcane Shuttle Mark XV.)</td>
<td>6,500</td>
<td>20</td>
<td>0.3</td>
<td>2</td>
</tr>
</tbody>
</table>

**Service Station**
- Special storage area where the trained crew perform maintenance, rearm and repairs. Module requirement is the same as the storage with an additional 10% modules, while its mass is twice of the storage’s mass. Consumes 1 Energy Unit and costs 7,500,000 credits.
Ready Hangar/Landing/Launch bay - The ready hangar is functions as the flight deck of real life carriers. All crafts stationed on the flight deck are ready to launch immediately (no preparation time). Its module requirement is ten times as much as the storage value of the largest craft carried on board, while the weight is 10% of the largest craft's own mass. Price of the hangar/landing bay is 1,000 credits per module slot. Only carriers have more than two landing bays, smaller ships usually equipped wint a single one (light/escort carriers and cruisers may have up to two).

Vehicle bays:
Specialized hangars for land based or atmospheric vehicles. The vehicles stored in this method may be launched or released within seconds (1D4 melee action). Need 0.1 Energy Unit per vehicle or 0.1 Energy Unit per 10 power armors. For every vehicle squadron (4 to 12 vehicles/robots) or power armor platoon (40 power armors) the ship have to take a workshop (assault shuttles and landing crafts usually not equipped with workshops).

Module requirement is calculated from the dimensions of the stored vehicle ((length x width x height)/250), multiplied by 1.5 and rounding up to the nearest whole number. Weights 1% of the stored vehicle's weight. Use 0.1 Energy Unit per 100 storage modules and cost 1,000 credits per module slot.

Vehicles can be stored in normal cargo area instead of the above mentioned vehicle bay. In this case, the stored vehicle takes 20% more module slots, but this storage method costs only 100 Credits per module slots taken and weights only 0.5% of the stored vehicle's mass (for the holding/storing equipment to hold the vehicle in its place. This storage method slows down the launching/load out speed to 25 modules per melee round and usually used only on the military shuttles and drop ships, while the real vehicle bays mostly found on the board of the FTL capable ships.

Step 10: Final touches:
10.A. Maintenance:
M.D.C. structures need very little maintenance as they are very durable. Still, after each year of use or drifting in space (or decade of storage) there is a cumulative 1% chance that something will break down - repairs cost about 0.1% of the ship total price. For longer periods, simply assume that for every 20 years it takes 0.5% of the ship original price. This is for maintenance (or overhauling after a longer storage period) in a major spaceport.

Many ships carries workshops - so GM's can calculate not with credits, but with M.D.C. for simplicity's sake, assume that the above repairs need the equal percentage of the ship main body, it takes a nanotech workshop and two operators for several hours to manufacture the parts and maybe 2 hours to make the actual repair work). Another major cost is (in addition to ammunition) the refueling of reactors - which includes the exchange of radiation shielding. It is about 30% of the reactor price.

A final cost is fuel for reaction drives (for ships not equipped with ram-scoops), which is about 500 credits per ton. Refreshing the air supply (including the replacement filters) costs 100 credits per people per month. Basic food materials and water (cleaning the recyclers, refresh water supply) costs 1,000 Credits per people per month.

10.B. Damage Control:
Damage control tasks (emergency repairs, rescue, structural repairs, or emergency procedures) performed by damage control teams. No more than one team can work on the same system, perform emergency repairs, or try to avert the same catastrophe in a given turn. In smallest spacecrafts the damage control team may be as small as a single character. On larger spacecrafts, a damage control party of several peoples (usually 2 technicians or mechanics and 2-4 other crew members) is used. Skill rolls will be made by the team leader.

Combat Repairs
It is possible to quickly repair disabled systems by swapping in parts, switching to backup systems, and replacing blown electronics. The required repair skill is depends on the system. If combat repairs succeed, the system is jury-rigged and no longer disabled - it will be functional again at the start of the spacecraft's next turn. Success means it's fixed, failure means it's not fixed yet, but you can try again on later turns. Critical failure (the roll is missed by 25 or more) means the system can't be fixed without major repairs - there's no chance of doing so until after the combat is over. A jury-rigged system is fixed, but need more attention for the purpose of maintenance until fully repaired. Repairs will hold for at least a few hours, but at the start of any future combat or other stressful situation in which a jury-rigged system is used, there is a 50% chance that the system is not working properly. Roll only when the system is first used, and only once for the entire combat. Failure means the system is disabled.

Structural Repairs
See Workshops description for more information. Cannot be performed during combat.
Rescue
Survivors of a destroyed system that remain in the spacecraft will be trapped in the wreckage and may need medical attention. A damage control team may attempt to get them out. The team leader rolls against the Firefighting skill when searching one person or with a -5% modifier per each additional person after the first need to be rescued. Critical success (successful roll with the negative modifiers) means rescues everyone. Failure means rescued only half of the victims (rounded down) and suffers 1 casualty who need medical treatment. On a critical failure (the roll is missed by 25 or more) no victims saved and the rescue team suffered 1D4 casualties.

Emergency Procedures
It’s possible to try and prevent the ship from blowing up due to a destroyed volatile system, damaged reactor or an exploding ammo storage. The damage control party must be near to the critical system. Roll vs. the repair skill required for that system (it’s the GM’s decision) normally when the team is in the damaged system or roll with a -25% modifier if near but not in the same system. Success means the disaster is averted (but perhaps materials, cargo or even sections were ejected or sections were closed and decompressed). Failure means it isn’t...

10.C. Hit Locations:
For simplicity's sake GM's are strongly advised to round values (for example 1,312 to 1,310 or 967 to 970).
Main Body - Total Hull M.D.C. (add together the hull M.D.C. value and the armor M.D.C. value)
Cockpit - 100 M.D.C. + 10% of the Main Body M.D.C.
Small Bridge - 100 M.D.C + 15% of the Main Body M.D.C.
Bridge - 20% of the Main Body M.D.C. value
Engines - Based on the total module slot percentage taken for the engines. The engines have the same percentage of the Main Body M.D.C. value. Ie if an engine uses 25% of the ship's total module slots, it has 25% of the ship's Main Body M.D.C.
Hangar - 20% of the Main Body M.D.C. value
Cargo/hangar bay doors - 5% of the Armor M.D.C.
Cargo/hangar bay doors with force field - 10% of the Armor M.D.C.
Outer Hull Surface per 100 square feet area - 5% of the Armor M.D.C.
Interior bulkheads per 100 square feet area - 1% of the Hull M.D.C.
Interior doors - 100 M.D.C., reinforced doors have 300 M.D.C.
Exterior hatches - same as the outer surface area
Communication system on small/medium/large ships - 5% of the Main Body.
FTL Communication System on small/medium/large ships - 7.5% of the Main Body.
Sensors on small/medium/large ships - 5% of the Main Body.
Landing Gears, docking ring - 2.5% of the Main Body
Weapons -
Point defense guns: 40 M.D.C. for energy guns or 50 M.D.C. for contra-gravity/rail guns.
Light guns: 70 M.D.C. for energy guns or 100 M.D.C. for contra-gravity/rail guns.
Medium guns: 400 M.D.C. for energy guns or 600 M.D.C. for contra-gravity/rail guns.
Heavy guns: 1,000 M.D.C. for energy guns or 1,500 M.D.C. for contra-gravity/rail guns.
Missile Launchers: 100 M.D.C. + 10 per launcher module slots for heavy cruise missile launchers; 100 M.D.C. + 40 per launcher module slots for light cruise missile launchers; 100 per module slot for smaller launchers (minimum 25).
Turrets: Housed weapon's M.D.C. value multiplied by 1.5

Step 11.: Example
In this section, we present the rules in action. Our example ship will be the CAF's Warshield class cruiser. This ship is a medium sized vessel with good cargo capacity, vehicle and hangar bay and many other options. Lets see the creation of this venerable craft in our rule set, step by step (its final stats are differ from the original).

Step 1.: To recreate the design of the Warshield class CAF cruiser by these rules, the designer takes a 100,000 tons basic hull (this is the listed total weight of the loaded ship) with 50,000 module slots (if we calculate from the length/width/height numbers and its blocky design, we would get roughly the same values). The designers use 100% stronger, but 200% heavier materials for the hull (giving the ship a strong and heavy frame) and they design the ship to be comfortable for every member races (ie they calculate with huge sized people).

The hull's final stats are the following: mass of hull is 27,000 tons (9% of the 100,000 metric tons total mass and triple this number for using 200% heavier materials), maximum module slots 45,000 (the original value reduced by 10% to have larger corridors and more crawl space for the huge crew members), the hull M.D.C. will be 16,000 (100% stronger...
materials, so multiply the basic 8,000 by 2) and the price of the hull is 625,000,000 Credits (the stronger materials increase the base cost by 250%, while the heavier materials lowers it by 100%, the basic price is increased by 150%, so the 250 million base price become 625 million).

The Warshield cruisers are not streamlined (not take the streamlined option), not designed to high atmospheric speed, but take the atmospheric abilities option to enter and fly in atmosphere. The atmospheric option uses 225 module slots (0.5% of the 45,000 modules, rounded up), weights 540 tons (2% of the 27,000 tons hull) and costs 31,250,000 Credits (5% of the ship hull price which is 625 million credits).

**Step 2:**
The Warshield class cruiser is equipped with Heavy Armor that constructed from heavy materials (this lowers the price to one half but doubles the weight of the armor), Self-sealing hull and Military Stealth Coating (constructed from heavy materials which lower the price but double the weight).

These options weights 43,700 tons (40,000 for the heavy armor which made from heavier materials that double its basic weight of 20,000 tons; 1,000 for the self-sealing hull and 2,700 for the stealth coating which is 5% of the 27,000 ton mass of hull that double because the heavy materials), costs 900 million Credits (375 million for the heavy armor that normally cost 500 million, but the heavy materials used for the armor lower the 200% price by 50% to 150% of the unmodified basic price of the hull; 25 million for the self-sealing hull and 500 million for the military stealth coating) and gives the ship an additional 32,400 M.D.C. (32,000 from the heavy armor and 400 from the stealth coating). The total M.D.C. value of the ship are 48,400.

**Step 3:**
The cruiser uses an older contra-gravity drive system that gives the ship 8.5 Mach maximum speed in space. The older design costs less but its weight and module requirement is doubled. This system takes 17,000 module slots, weights 8,500 tons and costs 1,062,500,000 Credits.

Our cruiser have an old, but fast FTL contra gravity drive system that gives this ship 5 light-years per hour maximum speed. This old design needs 500 module slots (old design modifier applied). Being large and heavy, the drive system weighs 250 tons (modern variants with the same performance weighs only 125 tons on a same sized ship). Consumes 3,125 Energy Units (standard system with the same performance needs only 2,500 Energy Units) on maximum speed and costs 31,250,000 Credits (125 million that divided by 4 to 25% of its original price, thanks to the heavier and larger design).

**Step 4:**
Warshields comes with two bridges (10 crew stations on each bridge), a full sized CIC which are designed to be comfortable even for Seljuk crew (increased module requirement, weight and cost) and two security stations. The two large bridges (one is the main bridge the other one placed inside the ship - part of the engineering section - and used when the main bridge is destroyed), the C.I.C. and the two security stations need 189 module slots (40% more because of huge sized crew), weights 25 tons (10% more than basic design, rounded up) and costs 33,010,000 Credits (10% more than the basic design).

These cruisers has older military communication system, which needs 4 module slots, weights 4 tons and costs 2.5 million credits (a modern variant costs 10 million credits).

The Warshields carries an old, but reliable military sensory system package that takes more space and weights more than the modern variants (double weight and module requirements, one quarter price). Its MR and W is 6 and costs 5 million credits (the newer, modern variants costs 20 million credits).

Like the other systems, the electronic warfare systems are an older variant of the standard military grade offensive and defensive systems. The MR and W of the whole package is 27 and its P is 8.75 million credits (older design modifiers included).

**Step 5:**
The cruiser's life support system has enough supplies for a crew of 400 to last three years. Calculating with huge sized crew (40% more modules taken away, 10% more weight and cost) this needs 5,040 module slots, weights 3,168 tons and costs 39,600,000 Credits.

Each standard Warshield cruiser usually have 100 staterooms, 300 cabins, and have 25 cells (for prisoners caught during a patrol). All these accommodations occupy 7,350 module slots, weights 1,142 tons (rounded up) and costs 14,580,000 Credits.
Credits. Huge sized modifiers applied.

All cruisers comes equipped with huge sized facilities. Have four briefing rooms, two labs, two military sick bays (each with additional 20 beds), two laundries, forty (40) freshers, twenty five (25) recreation rooms, five (5) kitchens with mess halls, two galleys with dining rooms (for officers) and ten workshops. All these facilities needs 1,746 module slots, weights 180 tons (rounded up) and costs 52,360,000 Credits.

Step 6:
The unmodified Warshield class cruisers have a strong variable shield system. The shield system takes 900 module slots, weights 450 tons and costs 225,000,000 Credits.

Step 7:
The Warshield class cruisers comes equipped with two hull mounted, heavy HI Laser cannons, four medium contra gravity rail guns in turrets, four hull mounted medium HI Laser cannons, eight point defense contra gravity cannon turrets, eight light particle beam turrets, two heavy cruise missile turrets, four long range missile launchers and eight mini missile launcher turrets. The hull mounted heavy laser cannons needs 82.5 module slots, weights 82.5 tons and costs 750 million credits each. Each medium contra gravity rail gun is housed in a Class 3 turret. Each gun turret takes up 15 module slots, weights 17 tons and costs 1,474,000 credits (including 5 tons ammunition, the turret and the auto turret options). The hull mounted secondary laser cannons takes 6.6 module slots, weights 6.6 tons and costs 10,32192 million credits each. The low rate of fire decreased the price by 40%. Each light particle beam cannon (do 3D6x10 M.D., 6 miles range) is placed into a class 1 turret which needs 0.5 module slots, weights 0.225 tons and cost 806,000 credits.

The point defense contra-gravity cannons are housed in class 1 turrets. Each turret takes 0.5 module slots, weights 2.1375 tons and cost 75,000 credits each (including two tons ammunition).

Each heavy cruise missile launcher is placed into a class 5 turret (able to fire 32 missile salvo). This takes takes 676 module slots (576 modules used by the stored missiles per turret, while the launcher takes only 64 module slots, but it is placed into a 100 module slots sized turret), weights 1,680 tons and costs 321 million credits (including an additional 288 cruise missiles per launcher).

A single long range missile launcher (32 shot salvo, 320 missile in storage for each) require 6.71 module slots, weights 25.76 tons and cost 9,800,000 credits (including 352 missiles total for 25,000 credits each). Each mini missile launcher is placed into a class 1 turret. The turret mounted weapon needs 0.5 module slots, weights 0.64965 tons and costs 1,252,000 credits (including 1,152 missiles for each turret).

The armament's total module requirement (with ammunition and missiles) is 1,643 module slots, its total weight is 3,747 tons (MR and W is rounded up) and its total cost is 2,245,44768 million credits.

Step 8:
The Warshield class cruiser is equipped with an anti-matter reactor that have a long operation time (50 years), and have 2,000 standard batteries (20% reserve energy) as an emergency backup system. The reactor and the batteries uses 500 module slots, weights 275 tons, while these systems costs 1,420 million credits.

Step 9:
The life pods (for 340 crew member) require 476 module slots, weights 374 tons and costs 130.9 million credits. The bay doors (a 300 square feet one to access the cargo hold and a 5,000 square feet sized for the hangar) need 5.3 module slots, weights 10.6 tons and costs 720,000 credits.
The hangar bay for the fighters with 12 storage place, 4 service stations and a single ready hangar (each storage module takes 150 module slots, each service station needs 165 module slots and the single ready hangar takes 1,500 module slots) uses 3,960 module slots, weights 210 tons (including the weight of the fighters) and costs 33,300,000 credits (fighters price not included).

The vehicle bay used by the two battlerams and the 10 power armors need 1,040 module slots (505 for each battleram and 30 by the ten silverhawks), weights 409.5 tons (including the vehicle's weight) and costs 1,040,000 credits (vehicles price not included).
The remaining 4,416 module slots used for the cargo hold (may hold up to 9,982 tons of cargo; 1,104,000 cubic feet/31,000 cubic meters).

Step 10. Example ship summary:
The internal systems use 45,000 module slots from the available 45,000. Its loaded mass with fully loaded cargo bay (may hold 9,982 tons in 4,251 modules) is 100,000 tons. The construction cost of the prototype is 6,859,872,680 credits.