

SPACECRAFT DESIGN

Spacecraft are constructed and sold at shipyards throughout the galaxy. Any class A starport has a shipyard which can build any kind of ship, including a starship with Jump drives; any class B starport can build small craft and ships which do not have Jump drives. The military procures spaceships through these yards, corporations buy their commercial craft from these shipyards, and private individuals can purchase ships that they have designed through them as well. The major restriction on the purchase of ships is money. Ships designed using the system presented here are constructed using off-the-shelf parts that are common throughout the Imperium. Rules for spacecraft using a restricted technology base or cutting-edge technology will be presented in future supplements.

DESIGN CHECKLIST

1. Choose a Hull.
 - a. Choose Hull configuration.
 - b. Optionally, install armour.
- 2a. Decide what the cruising acceleration for the ship should be, and cross-reference it with the ship's tonnage on the Performance by Hull Volume table to determine the Manoeuvre Drive required.
- 2b. Optionally, decide what the maximum Jump range for the ship should be, and cross-reference it with the ship's tonnage on the Performance by Hull Volume to determine the Jump Drive required.
3. Choose a Power Plant, ensuring that it can provide enough power for the Jump and Manoeuvre Drives.
4. Work out fuel requirements and allocate space to fuel.
5. Install a bridge.
6. Install a computer.
 - a. Install computer software. If a Jump drive is installed, then the ship needs Jump Control software.
7. Install sensors.
8. Install staterooms and low berths.
9. Optionally, install other components like vehicles, fuel processors or drones.
10. Optionally, install turrets, bays or screens.
 - a. Install one ton of fire control equipment per turret or bay.
11. Optionally, install weapons.
 - a. Missile launchers and sandcasters require ammunition.
12. Any remaining space can be allocated to cargo.

Design Considerations

Spacecraft are constructed on the foundation of a hull, into which are fitted the jump and manoeuvre drives and power plant, the fuel tanks, staterooms for the crew, computers, controls and sensors. Optionally, other components such as armaments, defensive systems, and other fittings can be added to adapt the ship to its intended function. The total tonnage of the installed fittings cannot exceed the tonnage of the hull.

Definitions

A **spacecraft** is any interplanetary or interstellar vehicle – anything that can travel through space under its own power. A **ship** is any vessel of 100 tons or more. A **starship** is a ship which has Jump drives and can travel on interstellar voyages from star system to star system. A **system ship** is a ship without Jump drives, confined to a single star system. **Small craft** are any vessel under 100 tons; all small craft are incapable of Jump and are constructed using their own rules which will be presented in a future supplement. In the meantime, the statistics for common small craft can be found on page 132.

Size is measured in '**displacement tons**' or d-tons: a hundred-ton ship displaces a volume equal to one hundred tons of liquid hydrogen (one d-ton equals roughly 14 cubic metres).



Standard Designs vs New Designs

Some ship designs have been used by the Imperium for centuries, and have become standards across the stars. Plans for such spacecraft are freely available and components can be purchased in bulk by shipyards reducing the cost of the ship's construction by 10%. This reduced cost does not include ammunition for weapons or fuel, which must be bought – at full price – separately of the ship. If a buyer needs a new type of ship, then he must employ a ship architect to design it. The architect's fees are usually 1% of the final cost of the ship.

Construction Times

Construction times vary wildly, depending on the size and complexity of the spacecraft and the capabilities of the shipyard. On average, assume that it takes one day per million credits to build a spacecraft at a small commercial shipyard.

Alternative Drives

Traditionally, the only form of faster-than-light movement in *Traveller* has been the classic Jump drive, which always takes one week to travel a number of parsecs equal to its Jump rating and consumes a vast amount of fuel. If the Referee wishes to model other science fiction settings with their own forms of stardrive, the classic Jump drive rules may not be entirely appropriate. The alternative drives below use all the same rules as the Jump drive (mass, fuel, power consumption, range) unless otherwise stated.

Some of these drives consume much less fuel or allow much faster travel than the Jump drive, so introducing these drives will vastly impact the carrying capacity of a starship, the profitability of trade, the speed of communication and so forth.

Warp Drive: The ship warps space around it, allowing it to move faster-than-light while staying in our universe. A warp drive does not have a maximum range – instead, the ship's drive rating indicates the number of parsecs crossed per week of travel. Warp travel consumes fuel at twice the normal rate for the ship's power plant rather than needing a single massive expenditure in the manner of a Jump drive.

Teleport Drive: The ship instantaneously jumps from one point to another. This works just like the standard Jump drive without the week-long wait in hyperspace. Instead, no time whatsoever elapses during the transition from one place to another. A teleport consumes no extra fuel but jumping is a strain on the ship's systems and multiple successive jumps can damage the drive.

Hyperspace Drive: The portal drive functions by opening up a gateway into hyperspace, through which the ship can pass. When in hyperspace, the ship uses its conventional engines to travel, then opens up a second gateway back to the normal universe, effectively taking a short cut through a higher dimension. A hyperspace drive is limited by the size of the spacecraft that can pass through the portal – see the Hyperspace Portal table. A hyperspace drive consumes no extra fuel, but takes up twice as much space as a jump drive. While in hyperspace, the spacecraft moves at a rate of one parsec per day per manoeuvre drive rating.

HYPERSPACE PORTAL SIZE

Rating	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z
Size	200	400	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600	3800	4000	4200	4400	4600	4800	5000

Alternative Power Plants

Traveller posits the development of highly efficient fusion power plants, but other settings may use different sources of power. Unless otherwise noted, these power plants use all the same rules as the standard fusion power plants.

Fission: A fission plant requires radioactive elements as fuel. Fission drives only produce half as much power as a fusion drive of the same type – when calculating required power plant rating, work out the required rating for a fusion drive and then find the rating for a drive that produces twice as much power. For example, a 400 ton ship with manoeuvre and jump ratings of B requires a fusion plant with rating B. Cross-referencing B and 400 tons on the Performance by Hull Volume table gives '1'. A fission plant for that ship would have to be rating D or higher, as that is the minimum rating to get performance level '2'.

Fission drive fuel costs 1,000,000 Cr. per ton. Power plants use the following table to determine how many tons of fuel they consume with a year of operation:

FISSION PLANT FUEL

Power Plant	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z
Tons of fuel per year	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48

Antimatter: Antimatter drives work by annihilating small amounts of hydrogen and anti-hydrogen. No tonnage needs to be allocated to fuel, but the drive must be refuelled once per month, at a cost of 5,000 Cr. per ton of drive.

Escape Pod

Abandoning a doomed ship is literally a leap into the darkness. If the ship was disabled close to an inhabitable planet, then the pod may be able to make it to safety. Otherwise, the survivors will have to drift, hoping that a passing rescuer detects their distress beacon.

The escape pod...

- ... is empty, a mute testament to the dangers of space travel. Its logs contain information about the ship it came from.
- ... has crashed on an uninhabited and wild world. Any survivors will need rescuing.
- ... contains a solitary survivor from the doomed ship – but she was the target of the original attack!
- ... contains children, now orphaned.
- ... was launched from a military vessel. The surviving officer will demand the characters aid him in completing his mission.
- ... has landed on a primitive world, and altered their culture forever.



BAY WEAPONS

Weapon	TL	Range	Damage	Cost (MCr.)
Missile Bank	6	Special	Launches a flight of twelve missiles	12
Particle Beam	8	Long	6d6 + crew hit	20
Fusion Gun	12	Medium	5d6	8
Meson Gun	11	Long	5d6 + crew hit	50

Missile banks fire flights of twelve missiles at a time. The missiles otherwise behave exactly as if they were fired from a smaller launcher.

Particle beams are larger versions of the turret-mounted weapon.

Fusion guns fire a directed beam of fusing hydrogen at targets.

Meson guns project a stream of mesons at a target. Mesons have an extremely short half-life, and are calculated to decay while within the enemy ship. Meson weapons are therefore unaffected by armour, as the blast only becomes harmful after it has already passed through the hull. Meson guns also inflict an automatic radiation hit on the crew of any target struck.

Screens

Screens are defensive systems that protect against specific attacks.

Screen	TL	Effect	Tons	Cost (MCr.)
Nuclear Damper	12	Reduces fusion gun and nuclear missile damage by 2d6, removes automatic crew hit from nuclear missile attacks	50	50
Meson Screen	12	Protects against meson weapon damage, reducing damage by 2d6	50	60

Nuclear dampers project a series of nodes and anti-nodes where the strong nuclear force is enhanced or degraded, rendering nuclear warheads ineffective. A nuclear damper reduces the damage from fusion weapons and nuclear missiles by 2d6 when affected.

Meson screens block attacks from meson weapons by preventing meson decay.

MODULAR CUTTER

The fifty-ton cutter is capable of good speed within a short-range operational capacity and has a crew of two. Its main feature is the 30 ton 'module bay' that allows the cutter to be quickly and easily reconfigured for different missions. Changing the module in a modular cutter is an Easy (+4 DM), Intelligence-based Engineer (any) or Mechanic check, with no non-proficiency penalty. It normally takes 1–6 minutes but is often drawn out to 1–6 hours to ensure success.

The modular cutter can mount up to two lasers but any more puts undue strain on the power plant and causes it to shut down.

Hull	50 tons Streamlined	Hull 1 Structure 1
Armour	None	
No Jump Drive		
Manoeuvre Drive A		Thrust 4
Power Plant A		
Computer	Model 1	Rating 5
Electronics	Standard Sensors	-4 DM
Weapons	None	
Fuel	1 ton	One week of operation
Cargo	2.5 tons + 30 ton module	
2 Crew Stations		
Software	Manoeuvre/o Library/o	
Purchase Cost: Cr. 28,000,000 (not including module)		

Three modules are commonly available for the cutter:

- The ATV module includes either a wheeled or a tracked ATV and the means to deposit it on a planetary surface and pick it up again later. The module can serve as an ATV storage location. It costs MCr. 1.8.
- The fuel module incorporates a fuel scoop and 30 tons of fuel tank. It is usually used to ferry fuel from point to point and costs MCr. 1.
- The open module is a customisable frame with 30 tons of excess space. The only difference between an open module and a module-less cutter is that without an installed module the cutter's module bay is open to space. An open module provides a sealed environment for a mere 100,000 Credits and can be customised before installation (at additional cost) with staterooms, low berths, fuel tanks, weapons and ammunition, or anything else travellers could want.