Equipment and Design

The Traveller's Handbook

QUIKLINK INTERACTIVE

TRAVELLER® 20

Science-Fiction Adventure in the Far Future

TRAVELLER T20

RPG REALMS

TRAVELLER20 – The Traveller's Handbook
Equipment and Designs

BASED ON THE AWARD-WINNING TRAVELLER GAME SYSTEM AND UNIVERSE BY MARC W. MILLER
Derived from the 2nd Printing of The Traveller's Handbook

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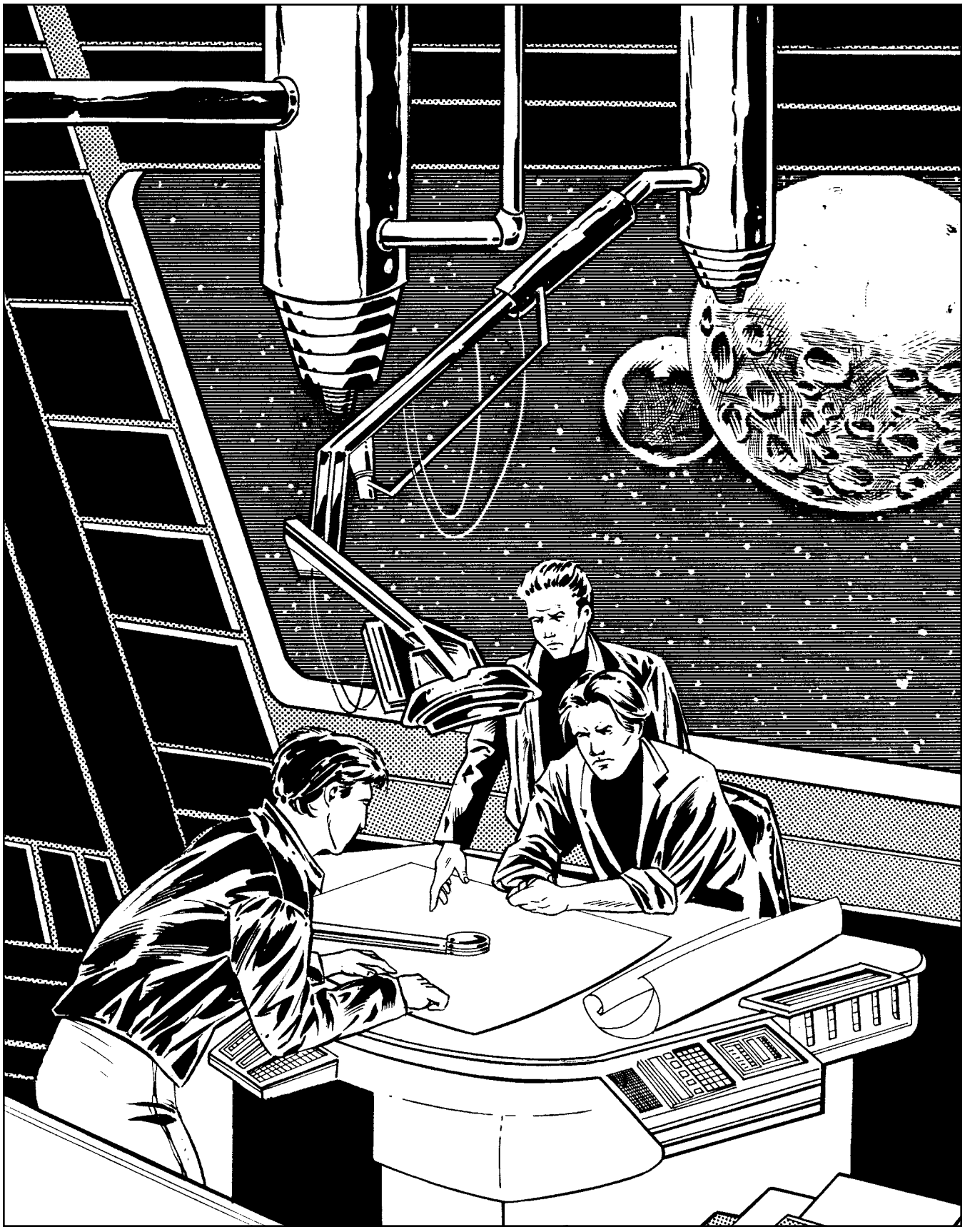
And to the gamers who contributed to our Traveller Experience over the past years and decades; the Traveller community who keeps the game alive; and the original designers whose work we have built upon.

Dedicated to the Memory Of
Rhonda Sue Gordon
Robert "Bob" Jones, Jr.
Mildred Charlyne McMullin

T20's Home on the Web
http://www.TravellerRPG.com

Traveller's Home on the Web
http://www.FarFuture.net

d20's Home on the Web
http://www.Wizards.com/D20/main.asp?x=welcome,3



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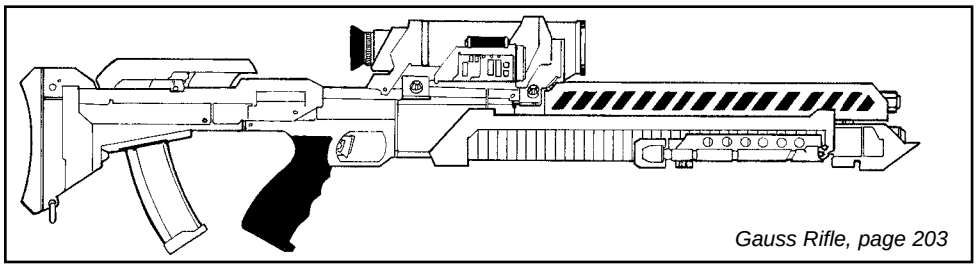
TECHNOLOGY AND EQUIPMENT

Technology in Traveller is rated according to a series of "tech levels" that give a general idea of the level of sophistication available to the local population. The following tables summarize the most advanced technology available to a culture of any given tech level.

	WEAPONRY			ELECTRONICS	
	Personal	*Armor*	*Heavy*	*Computers*	*Communications*
0	club, cudgel spear				runners
1	dagger, pike	jack	catapult	abacus	heliograph
2	halberd, matchlock broadsword		cannon		
3	foil, cutlass, flintlock blade, bayonet				
4	revolver shotgun		artillery	adding machine	telephones
5	carbine, rifle pistol, submachinegun	steel plate	sandcasters	Model/1	radio
6	auto rifle light machine gun	cloth	missiles missile launchers	Model/1 bis	television
7	body pistol assault rifle	mesh flak jacket	pulse/beam laser grenade launcher	Model/2 hand calculator	
8	laser carbine snub pistol	vacc suit	auto-cannon	Model/2 bis artillery computer	
9	laser rifle accelerator rifle	ablat		Model/3 battle computer	
10	advanced combat rifle	reflec cbt environment suit	VRF gauss gun	Model/4	
11		combat armor		Model/5 hand computer	
12	PGMP-12 gauss rifle laser pistol	hostile envir. suit	light assault gun	Model/6	
13	PGMP-13	battle dress		Model/7	
14	PGMP-14 FGMP-14				
15	FGMP-15				
16			disintegrators	artificial intelligence	
17					
18					
19					
20					

	TRANSPORTATION				POWER
	Water	*Land*	*Air*	*Space*	*Energy*
0	canoes rafts	carts			muscle
1	galleys	wagons			
2					wind
3	sailing ships		hot air balloons		water wheel
4	steamships	trains	dirigibles		coal
5	ground cars		fixed wing aircraft		oil
6	submersibles	ATV AFV	rotary wing aircraft		Fission
7	————-hovercraft————-			non-starships	Solar
8		air/rafts			Fusion
9				Jump-1	
10	————————————-grav vehicles————————————- grav tanks				
11				Jump-2	
12			grav belts	Jump-3	
13				Jump-4	
14				Jump-5	
15				Jump-6	
16	————————————-matter transport————————————				
17					anti-matter
18					
19					
20					



Gauss Rifle, page 203

The tech level rating assigned to a world is intended to indicate the highest level of technology in common use. It does not matter whether this technology is locally produced or imported on a regular basis, so long as the world can support it with maintenance or new imports.

The rated level of technology is likely to be encountered close to the Starport or capital, and in major industrial or commercial centres. Further out from the main regions, tech level is likely to be lower. This is particularly true of mid-tech worlds (TL 5-9) where large segments of the population live in rural areas with much more limited technology than their urban cousins. Low-tech (0-4) and High-tech (9+) worlds tend to be more uniform in technology distribution.

The tech level chart is not a hard and fast rule. Examples of higher-tech equipment may exist, for example in the homes or businesses of the ruling elite, or in the hands of special military units. The tech level rating ignores items like this, since they form a small proportion of the available tech base.

For example, a TL 6 world that relies heavily on steam-powered rail transport may choose to import an advanced fusion-powered locomotive for the “Royal Train”, and arm the security staff aboard it with laser rifles. The world is still rated as TL6, since the technology available to an ordinary citizen is of this level and the Royal Train represents an expensive imported (and non-sustainable using local resources) luxury.

The following section attempts to give an overview of each Tech Level. Note that there will always be variations. There are other ways to do things, and sometimes a high-tech device can be copied crudely at lower tech levels; more advanced versions of a lower-tech item may be in use. People are always full of surprises, especially on unusual worlds where alternate technologies have been explored. Stone-age laser weaponry should be rather rare, though...

Note also that social development can be (and usually is) entirely independent of technology. While some forms of government need technological assistance, the majority can exist anywhere. Advanced republics are possible at the stone age level of technology, while brutal anarchies or dictatorships are possible no matter how advanced the material technology of the world may be. It is particularly important to realize that comparisons between TL and Terran technology do not mean that society will be in any way similar to the equivalent period of Earth’s history. TL 7 does not mean flares, white suits and medallions in the disco...

TECH LEVEL 0 (STONE AGE)

Dwelling in natural caves or crude shelters, TL 0 citizens generally have no writing and preserve knowledge through oral tradition. They are capable of domesticating animals for travel and work purposes and of constructing crude boats such as dugout canoes. Muscle is the only energy source available. Hunting and simple agriculture feed the people, who arm themselves with spears and clubs for the hunt and for war. Medicine is a matter of mystical tradition, and may include brutal or wildly incorrect “treatments” alongside excellent herbal remedies. Common injuries (such as broken limbs) can be treated reasonably effectively.

TECH LEVEL 1 (BRONZE AGE, IRON AGE TO EARLY MIDDLE AGES)

Dwellings range from wooden huts to houses of stone or fired brick, and may be grouped into large settlements or even cities. Castles and other fortifications are possible. These settlements are supported by irrigated agriculture and may utilize water power. Communication is by messenger, and perhaps technological means such as signal fires, smoke and heliographs. Early wheeled vehicles (carts and chariots) are used in work, trade and war, while coastal voyages by galleys and early sailcraft are possible. Warfare is conducted with swords, bows and metal body armor, with sieges supported by catapults and similar engines. Advances in mathematics (devices such as the abacus and functions like trigonometry) make such weapons effective. Medicine is somewhat advanced, and many diseases can be diagnosed, though treatments are rather crude and often ineffective.

TECH LEVEL 2 (CIRCA 1400 TO 1700)

Increasingly large cities are connected by good roads and canals to facilitate trade and communication. Quite advanced (animal-powered) wheeled vehicles with early suspension use these roads, while at sea large sailing vessels make long voyages aided by advances in mathematics (including algebra) that lead to crude but effective

navigation methods. In the cities, printing presses make the written word available to a larger segment of the population, while wind power increases productivity. Warfare is conducted with advanced versions of TL 1 weapons, plus primitive firearms and cannon. Medicine advances to an understanding of internal anatomy.

TECH LEVEL 3 (CIRCA 1700 TO 1860)

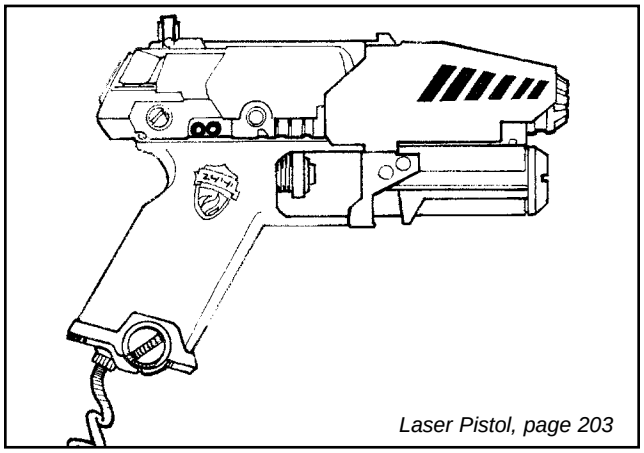
The road network is more or less universal, and travel is increasingly common. Stagecoaches and similar vehicles can make regular runs on land, while at sea advanced sailing ships can reliably navigate the entire globe. Cities now include cement structures while early experiments with electricity allow the creation of a limited electric telegraph system. Other experimentation leads to advanced mathematics (calculus) and a variety of inventions including hot air balloons. Firearms now dominate warfare, with muskets and flintlock rifles being the main smallarms in use. Mobile cannon make battlefield artillery support highly effective, and crude but effective surgery is available to patch up the many victims.

TECH LEVEL 4 (CIRCA 1860 TO 1900)

Steam powered railways and ships help open up remote areas, and quite large cities can be built in rugged or inhospitable areas. Air transport in the form of dirigibles is also possible, though of limited use. Steam engines are used in industry and in warfare, where ironclad warships and mechanical machineguns, combined with repeating cartridge firearms give the beginnings of a “modern” warfare capability. Other advances include vaccination, antiseptics and a variety of devices including primitive audio recordings, mechanical calculating machines and telephones.

TECH LEVEL 5 (CIRCA 1900 TO 1940)

Petrochemical exploitation allows the creation of useful self-propelled ground vehicles and early aircraft, while rail and sea travel are commonplace. Advanced structures such as skyscrapers become possible, as do sealed, environmentally-controlled buildings. Warfare is conducted with crude armored vehicles, good quality artillery and bulky automatic weapons. Early submersibles and armored battleships are the main sea combatants. Crude rockets are capable of putting a satellite into orbit, while radar and radio communications are available, if unreliable. Other inventions include electric calculating machines and the use of X-rays in medicine.



Laser Pistol, page 203

TECH LEVEL 6 (CIRCA 1940-1970)

Cities can be built almost anywhere, including in deep jungle, mountain or arctic terrain. Advanced submersible craft begin exploration of the oceans, while manned rockets perform the same task in space. Satellites are common. Nuclear fission allows cheap power and the creation of nuclear warheads. Coupled with advanced radar, early computers (a massive mainframe equivalent to the Model/1) and missile technology, space defense is now marginally possible, as is total global destruction. Warfare is conducted with early jet aircraft, advanced tanks and helicopters. Fully-automatic smallarms are commonplace. Medicine now understands viruses. Other advances include television and early prosthetic limbs.

TECH LEVEL 7 (CIRCA 1970-1990)

Large cities can now be built in any terrain, including underground, and are linked by satellite communications and early desktop computers. Travel is possible in a variety of vehicles from advanced high-speed trains and hovercraft to ultralight aircraft and supersonic airliners. Unmanned long-range space probes can be launched and solar power is becoming a viable large-scale energy source. Weaponry is increasingly advanced, with experimental beam lasers and advanced missiles complementing composite armor for ground vehicles. Personal protection in the form of ballistic cloth gives a measure of defense against small arms. Organ transplants become more or less reliable, and Medical Slow drug is available.

TECH LEVEL 8 (CIRCA 1990-2100)

Orbital shuttles and space stations mark a new capability in travel, in that the civilization can now launch manned missions to other worlds in the system and even building small outposts there. On-planet, deep submergence vehicles and hypersonic aircraft further advance existing capabilities, while early artificial gills make lengthy underwater operations a possibility. Weather control is also feasible on

a limited scale. Weaponry includes early particle accelerators and laser smallarms, though neither is very effective. Massive computers are capable of advanced functions while optical communication (fiber-optics) and data storage increase computing power still further. Geothermal power is reliably useful, and medicine is capable of creating artificial organs by a variety of means.

TECH LEVEL 9 (CIRCA 2100)

The Jump Drive becomes available, though only Jump-1 is possible. Early interstellar ships can be constructed. Superconductors and early gravitic technology open up new possibilities, including ultra-high-speed rail links and orbital cities. Primitive and bulky fusion plants provide cheap power for vehicles and installations. Huge self-contained cities (arcologies) are possible in any terrain, while reliable space vessels make in-system travel commonplace. Early grav tanks equipped with mass driver guns and lightweight composite armour make their appearance, while orbital combat vessels and grav-assisted fighter aircraft contribute to planetary defense. Smallarms include reliable laser weapons, which creates a need for ablative personal anti-laser armor. Computers are capable of full voice control. Communication is mainly by flat-screen video link. Medicine is capable of limited limb regeneration and cryogenic suspension.

TECH LEVEL A/10 (EARLY INTERSTELLAR)

Interstellar travel becomes more common as supporting capabilities are developed. Fusion plants become smaller and cheaper, and the gravitic maneuver drive for spacecraft and starships becomes available. Fusion power is now the main source of energy for the civilization. Huge cities can be built anywhere, including deep sea and under the ice caps. Grav transport replaces specialized land, air and sea vehicles. The military smallarm of choice is the Advanced Combat Rifle, while reflec armour offers protection against lasers. Plasma weapons are mounted on vehicles, which are protected by crystaliron armour and repulsors. Advanced computers are capable of full holographic displays, while limited viral vaccination and growth quickening are available in the medical field.

TECH LEVEL B/11 (EARLY INTERSTELLAR)

Jump drives become more advanced (J-2) and fusion plants smaller, making for more efficient starships. Local yards are capable of competing for major commercial shipbuilding contracts, since J-2 is the normal maximum for commercial ships. Computers now use a synaptic model, creating a leap forward in capability. Personal datalinks are the norm. Gravitics technology makes static floating structures a possibility, though these are not yet common. Unpowered combat armour protects personnel in combat, while early meson guns are mounted in space vessels and defense installations. Medicine is capable of replacing severed nerves and creating artificial eyes.

TECH LEVEL C/12 (AVERAGE INTERSTELLAR)

The Jump-3 drive and personal grav units represent advancements in transport technology, though by this point advancement is mainly a matter of moderate increases in efficiency or capability rather than great leaps forward. Synaptic computers make semi-intelligent robots and vehicles possible, though expensive. Other advances include personal translators capable of communicating in many very different languages. Major terraforming and climate control projects can be undertaken, and medicine can develop broad-spectrum antitoxins as well as enhanced prosthetics. Man-portable plasma weapons appear on the battlefield, along with early gauss rifles. Vehicles and spacecraft are armed with fusion guns and protected by nuclear dampers plus superdense armour.

TECH LEVEL D/13 (AVERAGE INTERSTELLAR)

Jump-4 capability is achieved, along with massive free-floating (static) grav-supported cities. Holographic technology allows hand-held holocameras and holocrystal data storage, while injuries can be treated by cloning replacement body parts. Reanimation several hours after death becomes possible in a limited number of cases. Increasingly advanced plasma guns arm troops protected by powered Battle Dress, while X-ray lasers are fitted to many combat vehicles.

TECH LEVEL E/14 (HIGH INTERSTELLAR)

The Jump-5 drive becomes available, along with early meson communicators. Fully mobile grav-supported cities can be built. Medicine can transplant brains with a good chance of success, and can implant electronic devices into the brain or erase memories. Handheld fusion guns arm infantry, while vehicles and spacecraft are protected by bonded superdense armour.

TECH LEVEL F/15 (HIGH INTERSTELLAR)

The Jump-6 barrier is reached, and although research continues, higher jump numbers may well be impossible. Full pseudoreality is available, along with reliable meson communications, allowing interactive communications

MONEY

The standard monetary unit used in T20 is the Credit. A Credit, abbreviated Cr, is worth roughly $3 (US as of 2001) in real-life monetary terms. Prices in Credits are always written Cr followed by the actual amount, for example Cr1000. For large amounts, there is also the Kilocredit (KCr) worth 1000 credits, the Megacredit (MCr) worth one million Credits, and the Gigacredit (GCr) worth one billion Credits.

Most worlds within the Imperium of the Official Traveller Universe use the Credit as their local currency, with no exchange problems. However, the Referee might decide that a particular world has held on to its own currency. Characters will then have to transfer their funds into local money - at a fee of course. The Credit provides a standard reference, even if characters encounter a myriad of currencies on their travels.

The time lags involved in communication between star systems require that individual travellers use cash, bearer bonds or special credit accounts secured by a major financial backer. Most people who travel transfer some funds to a holding account carried on their personal comm (supposedly uncounterfeitable) and top up this fund when their bank records catch up with them. Others carry bonds as collateral and deposit them at the Starport on each new world, drawing local currency against this fund as needed.

Larger concerns (e.g. businesses) have several ways of overcoming the travel lag. The simplest (but not the most efficient since it ties up a lot of money) is to set up accounts wherever they intend to trade, and transfer funds as needed to maintain a credit balance at these accounts. One solution is to use a third party to handle funds. Financial businesses, rich merchants and some noble houses often act for others in this way, and charge a fee for their services. Some businesses rely on their reputation for good credit and simply trade on the fact that clients know their invoices will be honored. This does create the possibility for scams, but for the most part the system works.

over vast distances. Complex terraforming projects can be undertaken. Pseudobiological technology is used to create lifelike prosthetic limbs and robots. The Black Globe Generator becomes available to defend starships against attack, though it is not reliable. Anagathics (longevity drugs) become available.

TECH LEVEL G/16 (VERY HIGH INTERSTELLAR)

Beyond TL 15, artificial intelligence becomes indistinguishable from the organic sort. Brains can be reliably transplanted and memories partially transferred. Hand-held meson communicators and holovideo units are available to the general public. Early tractors (reverse repulsors) are available for starships, while neural weapons become viable as smallarms.

TECH LEVEL H+/17+ (EXTREMELY HIGH TECHNOLOGY)

At TL 17+, incredible things are theorized. Starships may be armed with disintegrators and antimatter missiles, and powered by antimatter plants. Teleportation, total terraforming of worlds and suns, and intelligent antibodies are all possibilities. As technology advances, refined versions of existing technologies become available alongside wholly new capabilities.

WEAPONS

Personal weapons available to characters follows on the next page, detailing their cost, weight and other factors needed for play.

Cost: Price in Credits (Cr) or 1000s of Credits (KCr).

TL: The minimum tech level required to manufacture such an item.

Weight: Weight in grams (g) or kilograms (kg).

RoF: Rate of Fire. The number of rounds that may be fired during a standard attack action in the format: Single Shot / Burst Fire / Automatic Fire

Range: The range increment for this weapon.

DMG (Crit): The damage a weapon inflicts. The number in parenthesis is the Critical Threat Range for the weapon. A multiplier (i.e.: x2, x3, etc.) in parenthesis is the damage multiplier if a critical hit occurs.

Size: The size of a weapon. Used in comparison to the size of the person using it to determine if the weapon must be use one-handed, two-handed, or is too large for a character to use.

Type: The type of attack the weapon uses.

Recoil: Lists if the weapon has recoil when fired.

Rounds: The number of rounds the weapon may fire before it must be reloaded or recharged.

Ammo Weight: The weight of a full magazine or power pack for a weapon.

AVAILABLE WEAPONS

	Cost	TL	Weight	RoF	Range	DMG (Crit)	Size	Type	Recoil	Ammo Rnd	Ammo Wt	Ammo Cost
MELEE WEAPONS												
Dagger	Cr10	0	250g	-	1.5/3 meters	1d4 (19)	Tiny	Piercing				
Blade	Crr50	3	350g	-	1.5 meters	1d6 (19)	Small	Piercing				
Foil	Cr100	3	500g	-	1.5 meters	1d4 (18)	Medium	Piercing				
Sword	Cr150	1	1kg	-	1.5 meters	1d8 (x2)	Medium	Piercing/Slashing				
Cutlass	Cr100	3	1250g	-	1.5 meters	1d8 (18)	Medium	Slashing				
Broadsword	Cr300	2	2500g	-	1.5 meters	2d6 (19)	Large	Slashing				
Bayonet	Cr10	3	250g	-	1.5 meters	1d8 (x2)	Large	Piercing				
Spear	Cr10	0	2kg	-	3/6 meters	1d8 (x2)	Large	Piercing				
Halberd	Cr75	2	2500g	-	3 meters	1d10 (19)	Large	Piercing/Slashing				
Pike	Cr40	1	3kg	-	3 meters	1d12 (x2)	Large	Piercing				
Cudgel	Cr10	0	1kg	-	1.5/3 meters	1d6 (x2)	Medium	Bludgeoning				
BOWS												
Sling	Cr1	0	-	1	15 meters	1d4 (x2)	Small	Bludgeoning	-	100g	-	
Short Bow	Cr50	1	500g	1	18 meters	1d6 (x2)	Medium	Piercing	-	-	100g	Cr2
Long Bow	Cr75	2	1kg	1	30 meters	1d8 (x2)	Large	Piercing	-	-	100g	Cr2
Military xBow	Cr250	2	6kg	1	36 meters	1d10 (19)	Medium	Piercing	-	-	100g	Cr2
Sporting xBow	Cr150	3	3kg	1	24 meters	1d8 (19)	Medium	Piercing	-	-	100g	Cr2
Repeat xBow	Cr200	3	4kg	1	24 meters	1d8 (19)	Medium	Piercing	-	10	100g	Cr2
HANDGUNS												
Revolver	Cr150	4	900g	1	30 meters	1d10 (x2)	Small	Piercing	Yes	6	100g	Cr5
Auto Pistol	Cr200	5	750g	1	45 meters	1d10 (x2)	Small	Piercing	Yes	15	250g	Cr10
Body Pistol	Cr500	7	250g	1	24 meters	1d8 (x2)	Small	Piercing	Yes	6	50g	Cr20
Snub Pistol*	Cr150	8	250g	1	18 meters	1d10 (X2)	Small	Piercing	No	6/15	30g/75g	Cr10/Cr25
SHOTGUNS												
Shotgun**	Cr150	5	3750g	1	3 meters	3d6/2d6/1d6 (x2)	Medium	Piercing	Yes	10	750g	Cr10
RIFLES												
Rifle	Cr200	5	4kg	1	72 meters	1d12 (x2)	Medium	Piercing	Yes	10	500g	Cr20
Carbine	Cr200	5	3kg	1	45 meters	1d10 (x2)	Small	Piercing	Yes	20	125g	Cr10
Auto Rifle	Cr1000	6	5kg	1/4	60 meters	1d12 (x2)	Medium	Piercing	Yes	20	500g	Cr20
Assault Rifle	Cr300	7	3kg	1/4	45 meters	1d12 (x2)	Medium	Piercing	Yes	30	330g	Cr20
Accelerator Rifle	Cr900	9	2500g	1/3	60 meters	1d12 (x2)	Medium	Piercing	No	15	500g	Cr25
ACR****	Cr1000	10	3500g	1/4	72 meters	1d12+2 (x2)	Medium	Piercing	Yes	20	500g	Cr15
Gauss Rifle	Cr1500	12	3500g	1/4/10	96 meters	2d12 (x2)	Medium	Piercing	No	40	400g	Cr30
MACHINE GUNS												
SMG	Cr500	5	2500g	0/4	45 meters	1d10 (x2)	Small	Piercing	Yes	30	500g	Cr20
LMG	Cr1200	6	5500g	0/10/20	60 meters	1d12 (x2)	Large	Piercing	Yes	100	2500g	Cr120
LASER WEAPONS												
Laser Pistol	Cr1000	12	1200g	1	36 meters	2d10 (x2)	Small	Laser	No	25	500g	Cr100
Laser Carbine	Cr2500	8	5kg	1	45 meters	3d8 (x2)	Small	Laser	No	50	3kg	Cr200
Laser Rifle	Cr3500	9	6kg	1	60 meters	3d10 (x2)	Medium	Laser	No	100	4kg	Cr300
SUPPORT WEAPONS												
LAG***	Cr600	8	4kg	1	96 meters	2d10 (x2)	Large	Piercing	Yes	5	500g	Cr20
Grenade Launcher	Cr200	7	3kg	1	100 meters	*	Medium	*	Yes	1	1kg	*
RAM Launcher	Cr400	8	5kg	1	200 meters	*	Large	*	Yes	3	1.4kg	*
Disposable Launcher	Cr200	7	1.5kg	1	100 meters	*	Medium	*	Yes	1	n/a	n/a
HIGH ENERGY WEAPONS												
PGMP-12	KCr10	12	6kg	1	24 meters	6d12 (18)	Large	Energy	Yes	40	3lg	KCr2.5
PGMP-13*****	KCr65	13	900g	1	36 meters	7d12 (18)	Large	Energy	Yes	40	7kg	KCr50
PGMP-14	KCr300	14	9kg/50g	1	36 meters	8d12 (18)	Large	Energy	Yes	40	1.6kg/90g	KCr250
FGMP-14*****	KCr100	14	1kg	1	45 meters	7d20 (18)	Large	Energy	Yes	40	9kg	KCr65
FGMP-15	KCr400	15	1kg/50g	1	45 meters	9d20 (18)	Large	Energy	Yes	40	2kg/110g	KCr300

Critical

x2	Weapon does double damage on a critical hit.
18	Threat range is increased to 18-20 instead of just 20. Does double damage on a critical hit.
19	Threat range is increased to 19-20 instead of just 20. Does double damage on a critical hit.

* Fires Tranquilizer (standard), High Explosive, or Armor Piercing rounds.
** Fires Slug (standard) or Buckshot rounds.
*** Fires Standard, High Explosive, or Flechette rounds.
**** Fires Standard or High Explosive rounds.
***** Requires the shooter to be wearing Battle Dress.

Ammo Cost: The cost of a full magazine of standard ammunition or power pack for a weapon

Weapon Structural Integrity: All weapons have a SI rating of 1.

TL0 WEAPONS

Cudgel: A basic stick used as a weapon. Easily obtained from standing trees or through the use of an unloaded long gun such as a rifle or carbine (laser weapons are too delicate to be used as cudgels). Length: 1000 to 2000mm.

Dagger: A small knife weapon with a flat, two-edged blade approximately 200mm in length. Daggers are usually carried in a belt sheath, or less frequently concealed in a boot sheath or strapped to the forearm. Daggers are usually as much a tool as a last-resort weapon of defense, and worn constantly. Each weighs 250 grams; that weight, however, does not count against the weight load of the character as the weapon is worn constantly and comfortably.

Spear: A long (3000mm) polearm with a pointed tip, usually of metal. Often made by the person who carries the weapon, the spear is quite inexpensive.

TL1 WEAPONS

Pike: A long (3000 to 4000mm) polearm with some form of flat blade tip.

Sword: The standard long-edged weapon, featuring a flat, two-edged blade. It may or may not have a basket hilt or hand protector. A scabbard to carry the sword may be attached to the belt, or to straps (or a sash) over the shoulder. Blade length may vary from 700 to 950mm.

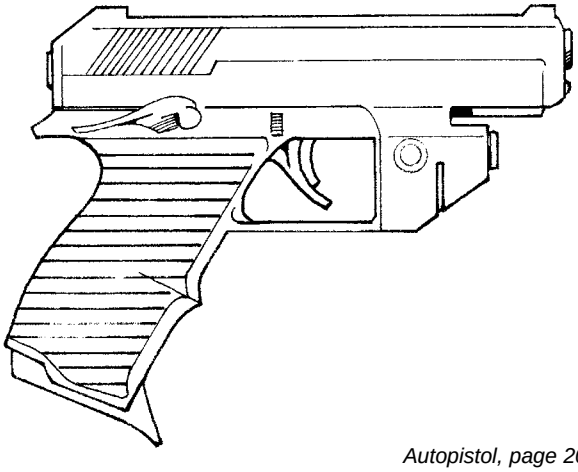
TL2 WEAPONS

Broadsword: The largest of the sword weapons, also called the two-handed sword because it requires both hands to swing. The blade is extremely heavy, two-edged, and about 1000 to 1200mm in length. The hilt is relatively simple, generally a cross-piece only, with little basketwork or protection. When carried, the broadsword is worn in a metal scabbard attached to the belt; less frequently, the scabbard is worn on the back, and the broadsword is drawn over the shoulder.

Halberd: A quite elaborate polearm featuring a pointed, bladed tip. This weapon may be considered to be a combination of a battle ax and a spear.

TL3 WEAPONS

Bayonet: A knife-like weapon similar to a dagger or blade. When not attached to a rifle, a bayonet is treated as a dagger (or blade), carried in a belt scabbard, and requires dagger (or blade) skill for use to advantage. When attached to the muzzle of a rifle (only, not carbine or auto rifle), it transforms the gun into a polearm, and increases the length of the weapon by 200mm.



Autopistol, page 201

Blade: A hybrid knife weapon with a heavy, flat two-edged blade nearly 300mm in length, and (often, but not always) a semi-basket handguard. Because of the bulk of the handguard, it is generally carried in a belt scabbard. Blades are as much survival tools as weapons, and are often found in emergency kits, lifeboats etc.

Cutlass: A heavy, flat-bladed, single-edged weapon featuring a full basket hilt to protect the hand. The cutlass is the standard shipboard blade weapon and sometimes kept in lockers on the bulkhead near important locations; when worn, a belt scabbard is used. Blade length varies from 600 to 900mm.

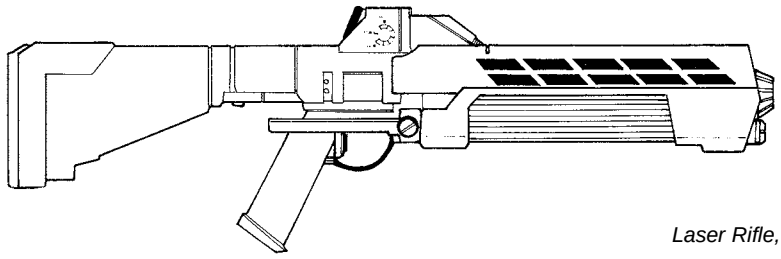
Foil: Also known as the rapier, this weapon is a light, sword-like weapon with a pointed, edged blade 800mm in length, and a basket or cup hilt to protect the hand. Foils are worn in scabbards attached to the belt.

TL4 WEAPONS

Revolver: An early handgun, the revolver fires 9mm bullets with characteristics similar to those used by the automatic pistol, but not interchangeable with them. No magazine is used: six cartridges are inserted into the revolver individually. Reloading takes two combat rounds, or one combat round if the individual foregoes the benefit of evasion.

TL5 WEAPONS

Autopistol: Also referred to as a Semi-Automatic Pistol, Automatic Pistol or just a Pistol, the Autopistol is a basic repeating handgun. One cartridge is fired for each pull of the trigger. Autopistol ammunition is interchangeable with submachinegun ammunition (although magazines are not). Preloaded magazines may be inserted into an empty pistol, requiring one combat round.



Laser Rifle, page 203

Carbine: A short type of rifle firing a small caliber round. A magazine containing ten rounds is inserted into the underside of the carbine ahead of the trigger guard or behind the handgrip (this configuration is referred to as "Bullpup", and in some localities carbines may be referred to as Bullpups), and one round is fired with each pull of the trigger. Replacement of an empty magazine takes one combat round. Carbine ammunition is not interchangeable with any other type of ammunition.

In essence, a carbine is a short rifle, firing a cartridge of smaller, lighter caliber. A sling usually allows the carbine to be carried on the shoulder, out of the way.

Rifle: The standard military arm, firing a 7mm, 10 gram bullet at a velocity of approximately 900 meters per second. Longer and heavier than a carbine, it is also more effective. Standard equipment includes provisions for attaching a bayonet and telescopic sights, and a shoulder sling.

A twenty-round magazine is attached to the front of the trigger guard, and one round is fired with each pull of the trigger. Replacement of the empty magazine takes one combat round. Rifle ammunition may also be used in automatic rifles; rifle and auto rifle magazines are interchangeable, and weigh the same.

Shotgun: The basic weapon for maximum shock effect without regard to accuracy. The shotgun has an 18mm diameter barrel and fires shells containing either six 7mm bullets, or one hundred and thirty 3mm pellets. In each case, the projectiles weigh a total of 30 grams. Velocity for the projectiles is about 350 meters per second. A cylindrical magazine containing 10 shells is inserted under the barrel and parallel to it; cartridges are then fed automatically into the shotgun for firing. Reloading consists of replacing the cylindrical magazine and takes two combat rounds. One shot is fired for each pull of the trigger.

Magazines measure approximately 350mm long by 20mm in diameter and are quite clumsy to carry.

Shotguns are equipped with a sling for carrying.

Submachinegun: A small automatic weapon designed to fire pistol ammunition. Magazines holding 30 cartridges are inserted into the weapon forward of the trigger guard or in the pistol grip, depending on the design. The gun fires a burst of four rounds per pull of the trigger. Replacement of an empty magazine requires one combat round.

Submachinegun ammunition (but not magazines) is interchangeable with autopistol ammunition.

Most submachineguns are equipped with slings for ease of carrying. Some are small enough to be carried in a shoulder or hip holster.

TL6 WEAPONS

Automatic Rifle: A highly refined and tuned version of the rifle, capable of full automatic fire as well as semi-automatic shots. Normally, the automatic rifle fires bursts of four bullets for each pull of the trigger. It may be switched to semi-automatic fire at the end of a combat round, after all firing, in which case it is treated as a rifle until switched back so burst mode. Ammunition and magazines are identical to those used for the rifle.

Light Machine Gun (LMG): A heavier belt-fed version of the automatic rifle. Reloading takes 3 rounds if the weapon is manned by a single individual, one round if a loader is present. The LMG fires up to a 20-round burst each combat round.

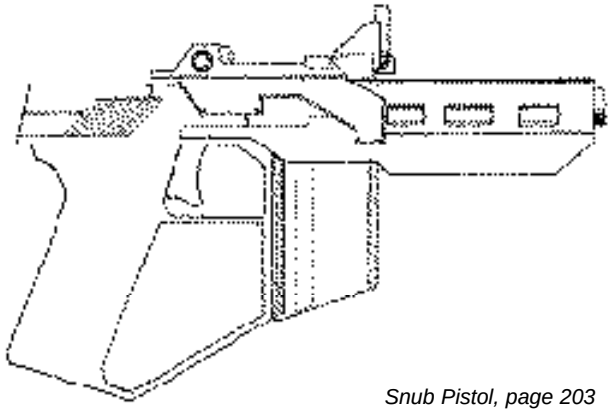
TL7 WEAPONS

Assault Rifle: A lighter and less expensive version of the automatic rifle.

Body Pistol: A small, non-metallic semiautomatic pistol designed to evade detection by most weapon detectors. One cartridge is fired for each pull of the trigger. Preloaded magazines may be inserted into the pistol when it is empty, taking one combat round to do so. Body pistol ammunition is not interchangeable with the ammunition for any other types of guns.

Disposable Launcher: A light-weight, self-contained, disposable, non-reusable version of the Grenade Launcher. Disposable Launchers are designed to fire HEAP grenades only.

Grenade Launcher: Allows users to lob grenades at ranges far exceeding normal throwing distance. Unlike artillery, grenade launchers rely on the destructive power of the warhead alone, as there is little kinetic energy behind their attack. Grenade launchers may be fired once per round as a standard attack action, and require a move action to reload. A grenade launcher may fire any type of grenade, up to a maximum distance of 1000 meters. A grenade launcher may be attached to an assault rifle for the cost of the assault rifle and the grenade launcher plus an additional Cr50.



Snub Pistol, page 203

TL8 WEAPONS

Laser Carbine: A lightweight version of the laser rifle, firing high energy bolts using current from a backpack battery/power pack. The laser carbine fires a 2mm beam of energy, aimed by integrated optic sights. The power pack is capable of producing 50 shots before it requires recharging. Recharging requires at least eight hours connected to a high-energy source. The laser carbine is connected to the power pack by a heavy-duty cable.

Light Assault Gun (LAG): Essentially a heavy (20mm caliber) rifle fed by a 5-round magazine. Requires the firer to have Str 14+ (unless in Battle Dress) or suffer -2 to hit due to the weight and recoil.

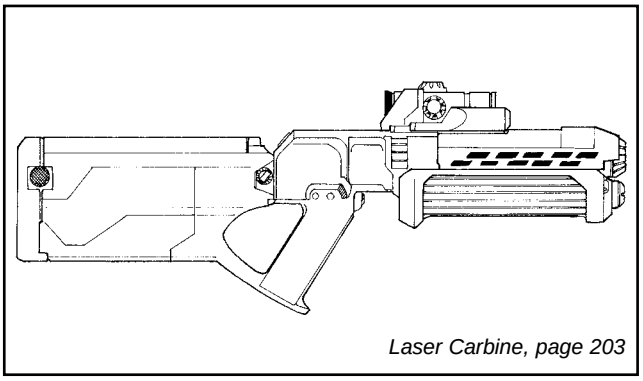
RAM Launcher: Designed to fire RAM grenades, allowing for targets as far away as 1000 meters. See RAM Grenades (pg. 206). The RAM grenade launcher holds a 3 round clip that may be fire at a rate of one round per pull of the trigger. Reloading the RAM grenade launcher is considered a move action.

Snub Pistol: A low velocity revolver designed for use shipboard and in zero-g environments.

TL9 WEAPONS

Accelerator Rifle: Designed specifically for zero-g combat, the accelerator rifle fires a specially designed round which upon leaving the barrel is accelerated by a secondary propelling charge. Normally the rifle fires bursts of three rounds per pull of the trigger, but may be adjusted to fire single rounds.

Laser Rifle: The standard high energy weapon, firing energy bolts in the same manner as the laser carbine. Heavier, the laser rifle is also capable of longer sustained action, and is somewhat sturdier. The power pack can provide 100 shots before recharging. As in the laser carbine, the laser rifle is connected to the power pack by a heavy-duty cable. Power packs are not interchangeable between the two weapons, however.



Laser Carbine, page 203

TL10 WEAPONS

Advanced Combat Rifle (ACR): A progressive development of the assault rifle. The ACR is also designed to fire RAM grenades (pg. 206). A single RAM grenade may be fired per round as a standard attack action, with reloading considered a move action.

TL12 WEAPONS

Gauss Rifle: The ultimate development of the slug thrower, the gauss rifle generates an electromagnetic field along the length of the barrel which accelerates a bullet to high velocities. The round itself consists of a dense armor piercing core surrounded by a softer metal covering, ending in a hollow point, giving the round excellent stopping power and good armor penetration. Gauss rifles are also designed to fire RAM grenades (pg. 206). A single RAM grenade may be fired per round as a standard attack action, with reloading considered a move action.

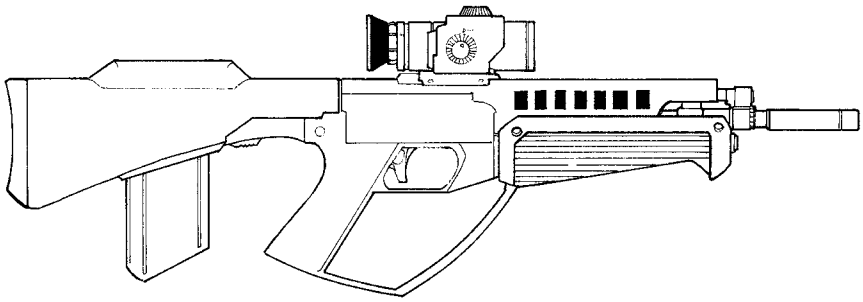
Laser Pistol: A pistol equivalent of the laser carbine, though still dependent on an external power pack.

Plasma Gun, Man Portable (PGMP-12): The weapon consists of a power pack carried on the firer's back, the weapon itself, and a flexible power link. The powerpack powers a laser ignition system in the weapon itself, which heats hydrogen fuel to a plasma state. The plasma is contained in the ignition chamber briefly and then released through a magnetically focused field along the weapon's barrel. The initial plasma jet is 2cm in diameter but begins to dissipate rapidly. Each powerpack has sufficient energy to discharge 40 plasma bolts before recharging is required. Each pull of the trigger discharges one plasma bolt. Because of the recoil of this weapon, it may only be fired once every two rounds. Damage is reduced to one-half at 5-7 range bands, and one-quarter at 8 range bands or more.

TL13 WEAPONS

PGMP-13: Designed to be used exclusively with Battle Dress armor. The strength enhancement units of the armor serve as a recoil carriage, allowing the weapon to be fired

each round. Damage is reduced to one-half at 5-7 range bands, and one-quarter at 8 range bands or more.



ACR, page 203

TL14 WEAPONS

Fusion Gun, Man Portable (FGMP-14): Similar in design and function to the PGMP, differing only in that it contains the plasma slightly longer until a fusion reaction begins to take place. The weapon is therefore somewhat more powerful than a plasma gun, and may only be used by individuals wearing Battle Dress. May still only be fired once every two rounds. Damage is reduced to one-half at 5-7 range bands, and one-quarter at 8 range bands or more.

PGMP-14: The ultimate development of the plasma gun, the PGMP-14 incorporates a gravitic field generator that provides near total recoil compensation. This enables personnel not in powered armor to both carry and fire the weapon every round. The weight listed before the slash is the weight of the weapon with the gravity field generator off, the weight listed after the slash is with the gravity field generator on. Damage is reduced to one-half at 5-7 range bands, and one-quarter at 8 range bands or more.

TL15 WEAPONS

FGMP-15: Incorporates a gravitic field generator similar to that used on the PGMP-14, allowing use by firer's wearing non-powered armor every round. The weight listed before the slash is the weight of the weapon with the gravity field generator off, the weight listed after the slash is with the gravity field generator on. Damage is reduced to one-half at 5-7 range bands, and one-quarter at 8 range bands or more.

NON-STANDARD AMMUNITION

In addition to the standard ammunition available for weapons, some weapons may use the following non-standard ammunition:

Flechette Rounds: These rounds break apart in flight releasing numerous small, sharp shards of metal, increasing the chance of hitting the target, (+2) but inflicting considerably less damage (replace each damage die, of any type, with 1d4). Flechette rounds are useless against armored opponents. Cost is x2 per round.

High-Explosive (HE) Rounds: These rounds are designed to explode once they penetrate a target, inflicting +1 die of damage. Cost is x10 per round.

Armor Piercing (AP) Rounds: As the name implies, these rounds are specifically designed to penetrate ballistic cloth and other types of armor. Reduce the target's AR bonus for any natural or manufactured armor by -1 per penetration bonus of the round. See Armor Piercing Rounds (pg. 154) for costs.

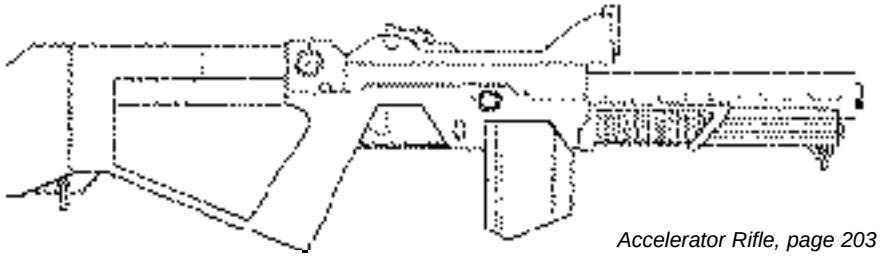
Tranquilizer Rounds: The target must make a Fortitude save vs. DC15 or fall unconscious. Save is made at +1 DC per round hitting the target.

Buckshot: Buckshot has a very short range and is highly lethal. At up to 3 meters, buckshot will hit any single target for 3d6 damage. At up to 6 meters, it will hit any single target for 2d6 damage. Beyond 6 meters, buckshot inflicts 1d6 damage on anyone in a 2 meter wide path out to its maximum range. However, buckshot ammunition penetrates very poorly and suffers a penalty against armor of +2 AR (and an additional +1 AR per range band after the first in addition to normal range penalties).

ACCESSORIES

The following special accessories are generally available for the various weapons.

Telescopic Sights (800 grams; Cr200; TL 6): High-quality telescopic sights for attachment to weapons, for



Accelerator Rifle, page 203

increasing their accuracy, especially at longer ranges. A weapon equipped with such sights effectively doubles its normal range increment.

Telescopic sights are delicate, however, and may be jarred out of alignment by any violent action (such as being left untended in a moving truck, a close explosion, or being dropped) on a basic check (DC12). When the sights go out of adjustment, the basic throw to hit should not be revealed to the firer, and he or she will always miss.

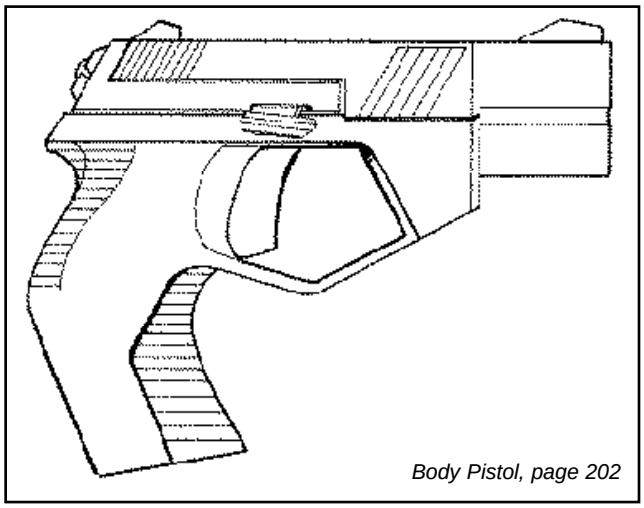
Electronic Sights (1500 grams; Cr2000; TL 9): Electronic sights with image enhancement and light intensifications capabilities are available to provide the capability to see and hit in the dark. Treat any low-light conditions as normal lighting for weapons equipped with such sights. These sights are treated like telescopic sights for damage and reliability, and function similarly, but do not increase the weapon's range increment.

Electronic Telescopic Sights (1800 grams, Cr 3000, TL 9) Electronic sights combining the capabilities of both electronic and telescopic sights. They are still rather fragile.

Silencer (600 grams; Cr200; TL 6): Devices are available which will muffle or eliminate the sound of guns firing, but so far they have proven practical only when applied to body pistols, revolvers, and automatic pistols. A silencer attaches to the muzzle of the pistol, increasing its total length, and making it impossible to holster until the silencer is removed. Silencers are not interchangeable; one must be purchased for each specific model of pistol used.

Shoulder Stocks (1000 grams; Cr75; TL 5): It is possible to produce a shoulder stock which may be attached temporarily to a pistol or revolver, resulting in a crude carbine arrangement and some greater accuracy at longer ranges. Ignore the first range penalty incurred when firing a pistol or revolver equipped with such a stock. The overall length of the pistol is increased by the length of the stock, and the pistol cannot be holstered. Attaching the stock (or detaching it) requires five combat rounds.

Folding Stocks (500 grams; Cr100; TL 6): Carbines, rifles, and shotguns can be equipped with folding stocks which make it possible to reduce the overall length of the weapon by 300mm.



Body Pistol, page 202

GRENADES AND EXPLOSIVES

When a grenade or other explosive is set off, its effects are spread out over a given radius from where it landed. Anything within the blast radius is automatically hit. Those affected may attempt a Reflex saving throw to take only half damage (this does not apply to vehicles or ships).

Plastic Explosive: Because of its nature, plastic explosive may be molded and shaped allowing the user to direct and control to a fair degree the force of the blast. It cannot be used as a grenade. See Demolitions (pg. 155) for more information.

TDX: A gravitationally polarized explosive. Unlike conventional explosives, TDX expends its energy only along the horizontal plane of the blast. For example, a TDX explosive set 1 meter off the ground would inflict its damage on anything within its blast radius that is also at a height of 1 meter. Objects above or below this level would not be effected. Because of this effect, TDX is quite useful at tasks such as felling trees, cutting the supports of

GRENADES AND EXPLOSIVES

	Damage	*Blast Radius*	*Range Increment*	*Weight*	*Cost*
Plastic Explosive	1d20	1.5 meters	-	250g	Cr5
TDX	4d6	6 meters	6 meters	1kg	Cr150
Flechette/Fragmentation	6d6	6 meters	3 meters	1kg	Cr12 (Cr200 per case of 20)
HEAP	4d6	3 meters	3 meters	1kg	Cr15 (Cr240 per case of 20)
Smoke	*	6 meters	3 meters	1kg	Cr10 (Cr160 per case of 20)
Tranquilizer	*	6 meters	3 meters	1kg	Cr25 (Cr400 per case of 20)
Aerosol	*	6 meters	3 meters	1kg	Cr12 (Cr200 per case of 20)

ARCHAIC ARMOR

	Armor Rating	Max Dex Bonus	Armor Check Penalty	Cost	Weight	TL	Speed 9m	Speed 6m
Light Armor								
Padded	1 (0)	+8	0	Cr5	4.5kg	1	9	6
Leather	2 (1)	+6	0	Cr10	7.5kg	1	9	6
Studded Leather	3 (1)	+5	-1	Cr25	9kg	1	9	6
Chain Shirt	4 (2)	+4	-2	Cr100	11kg	2	9	6
Medium Armor								
Hide	3 (1)	+4	-3	Cr15	11kg	0	6	3
Scale mail	4 (2)	+3	-4	Cr50	13.5kg	1	6	3
Chainmail	5 (2)	+2	-5	Cr150	18kg	2	6	3
Breastplate	5 (2)	+3	-4	Cr200	13.5kg	1	6	3
Heavy Armor								
Splintmail	6 (3)	0	-7	Cr200	20.5kg	2	6	3
Banded mail	6 (3)	+1	-6	Cr250	16kg	2	6	3
Half-plate	7 (3)	+0	-7	Cr600	22.5kg	2	6	3
Full plate	8 (4)	+1	-6	Cr1500	22.5kg	2	6	3

a bridge or trestle, etc. Anyone caught in the blast radius may make a reflex save (DC15) to take no damage.

Flechette/Fragmentation: This is the standard anti-personal grenade, inflicting 6d6 damage against any targets within a 6-meter blast radius. Anyone caught in the blast radius may make a Reflex save (DC 15) to take half damage.

HEAP: High Explosive Armor Piercing grenades. They have a smaller blast radius, but give you more bang for your buck and are designed to penetrate heavy armor. Reduce the target's AR for natural or manufactured armor by 5. Anyone caught in the blast radius may make a Reflex save (DC 15) to take half damage.

Smoke: This grenade releases a thick cloud of smoke that rapidly engulfs a 6-meter radius, reducing visibility down to 1/2 meters. This effectively gives everyone in the cloud a 90% Concealment modifier (+8 to Defense). The cloud will persist for 1d3+6 rounds (1d3+1 in windy conditions).

Tranquilizer: Anyone caught in the 6-meter blast radius of a Tranq grenade must make a Fortitude save (DC 15) or immediately fall unconscious. This save must be made each round the character remains within the blast radius of the grenade and the gas persists. The gas will persist for 1d3+6 rounds (1d3+1 in windy conditions).

Aerosol: These grenades release an anti-laser aerosol that will impose a -4 to hit modifier for anyone using a laser weapon within the grenade's blast radius. The aerosol will persist for 1d6+6 rounds (1d3+3 in windy conditions).

ROCKET ASSISTED MULTI-PURPOSE (RAM) GRENADES

RAM grenades have a built-in booster system, which ignites upon firing, vastly increasing the velocity (and thus the range) of the round. RAM grenades may be fired from special launchers and as rifle grenades from the ACR and the gauss rifle. RAM grenades are available of any type: Flechette/Fragmentation, HEAP, Smoke, Tranquilizer, or Aerosol.

ARMOR

Armor reduces the amount of damage a character takes from a hit, based on the type of armor worn. The rating for a set of armor is equal to the damage dice reduction value of the armor in combat when you are hit.

Critical Hits: Each time a character that is wearing armor suffers a critical hit, the rating of their armor is degraded by 1 point. When the rating of a set of armor is reduced to zero or less, the armor has lost all of its effectiveness and no longer offers any protection.

Armor Rating: The value is the armor bonus added to a character's AC, and the damage reduction factor when determining lifeblood damage if an attack does strike the character.

Maximum Dex Bonus: This number is the maximum Dexterity bonus to AC that this type of armor allows. Heavier armors limit mobility, reducing a character's ability to dodge blows.

Armor Check Penalty: Anything heavier than leather impacts the ability to use some skills.

MODERN ARMOR

	Armor Rating	Max Dex Bonus	Armor Check Penalty	Cost	Weight	TL	Speed 9m	Speed 6m
Light Armor								
Jack	2	+8	0	Cr50	1kg	5	9	6
Mesh	3	+5	-1	Cr150	2kg	7	9	6
Flak jacket	4	+6	0	Cr100	1kg	7	9	6
Reflec */**	0/6	+8	0	Cr1500	1kg	10	9	6
Medium Armor								
Ablat */***	2/5	+5	-1	Cr75	2kg	9	6	3
Cloth	6	+4	-2	Cr250	2kg	6	6	3
Combat Env Suit	6	+2	-3	Cr1500	3kg	10	6	3
Vac Suit								
Combat Armor	7	+3	-4	Cr20,000	18kg	11	6	3
Combat Armor	7	+5	-1	Cr30,000	10kg	12	6	3
Combat Armor	8	+6	0	Cr60,000	6kg	14	6	3
Hostile Env Suit	5	+2	-3	Cr18,000	40kg	12	6	3
Hostile Env Suit	7	+3	-4	Cr150,000	25kg	14	6	3
Tailored Vac Suit	2	+6	-0	Cr9000	-	14	9	6
Vac Suit	4	+0	-5	Cr9000	8kg	9	6	3
Vac Suit	3	+2	-3	Cr8000	2kg	12	6	3
Vac Suit	2	+4	-2	Cr7000	-	14	6	3
Other								
The following accessories may be added to Vac Suits of any type, Combat Environment Suits, Combat Armor, and Battle Dress.								
Chameleon	+2 to AC			Cr1000	-	12	-	-
Chameleon	+4 to AC			Cr5000	-	14	-	-
Psionic Shielding	Immunity to Psi attacks			Cr4000	-	12	-	-

* First number is the base armor rating, the second number is the armor rating vs. laser weapons.
** Can be worn under most other types (except Combat Armor and Battle Dress), adding its rating to the rating of the other armor. Reflec may not be worn under combat armor and battle dress.
*** Unlike other types of armor, the armor rating (vs. lasers) of Ablat is reduced by 1 point every time a laser weapon hits it. Thus after 5 hits by any type of laser, the Ablat armor will be rendered useless (against any type of attack).

Cost: The cost of the item in Credits (Cr).

Weight: The weight of the item in kilograms.

TL: The earliest tech level at which this item first becomes available.

Speed: The maximum speed of a character when wearing this type of armor.

Armor Structural Integrity: The SI rating of armor is equal to its armor rating.

ARCHAIC ARMOR

These types of armor are fairly effective against melee attacks and attacks by bows or crossbows; their full AC bonus applies against such attacks. Against modern firearms, lasers, and energy weapons they do not fare as well; their AC bonus should be halved against these forms of attacks. This reduced value is listed in parenthesis next to the standard AR.

MODERN ARMOR

Modern armor is effective against most forms of attack, from archaic melee weapons and bows to modern weaponry.

TL0 ARMOR

Hide: This armor is prepared from multiple layers of leather and animal hides. It is stiff and difficult to move in.

TL1 ARMOR

Breastplate: A breastplate covers the front and back. It comes with a helmet and matching greaves (plates to cover the lower legs). A light suit or skirt of studded leather beneath the breastplate protects limbs without restricting movement much.

Leather: The breastplate and shoulder protectors of this armor are made of leather that has been stiffened by boiling in oil. The rest of the armor is softer and more flexible leather.

Padded: Padded armor features quilted layers of cloth and batting.

Studded Leather: This armor is made from tough but flexible leather (not hardened leather as with normal leather armor) reinforced with close-set metal rivets.

Scale Mail: This is a coat and leggings (and perhaps a separate skirt) of leather covered with overlapping pieces of metal, much like the scales of a fish. It includes gauntlets.

TL2 ARMOR

Banded Mail: This armor is made of overlapping strips of metal sewn to a backing of leather and chainmail. The strips cover vulnerable areas, while the chain and leather protect the joints and provide freedom of movement. Straps and buckles distribute the weight evenly. It includes gauntlets.

Chain Shirt: A shirt of chainmail protects the torso while leaving the limbs free and mobile. A layer of quilted fabric underneath it prevents chafing and cushions the impact of blows. It comes with a steel cap.

Chainmail: This armor is made of interlocking metal rings. It includes a layer of quilted fabric underneath it to prevent chafing and to cushion the impact of blows. Several layers of mail are hung over vital areas. Most of the armor's weight hangs from the shoulders, making chainmail uncomfortable to wear for long periods of time. It includes gauntlets.

Full Plate: This armor consists of shaped and fitted metal plates riveted and interlocked to cover the entire body. It includes gauntlets, heavy leather boots, and a visored helmet. Buckles and straps distribute the weight over the body, so full plate hampers movement less than splint mail even though splint is lighter. Full plate is also known as field plate.

Half-Plate: This armor is a combination of chainmail with metal plates (breastplate, epaulettes, elbow guards, gauntlets, tasses, and greaves) covering vital areas. Buckles and straps hold the whole suit together and distribute the weight, but the armor still hangs more loosely than full plate. It includes gauntlets.

Splint Mail: This armor is made of narrow vertical strips of metal riveted to a backing of leather that is worn over cloth padding. Flexible chainmail protects the joints. It includes gauntlets.

TL5 ARMOR

Jack: A natural (cured) or synthetic leather jacket or body suit covering the torso and upper arms and legs. Jack is somewhat better than ordinary clothing or bare skin when defending against blades.

TL6 ARMOR

Cloth: A heavy-duty body suit tailored from ballistic cloth. The fabric absorbs impact energy, distributing the blow over the body of the target and possibly resulting in bruising. Cloth armor is almost the best and the most versatile modern armor available.

TL7 ARMOR

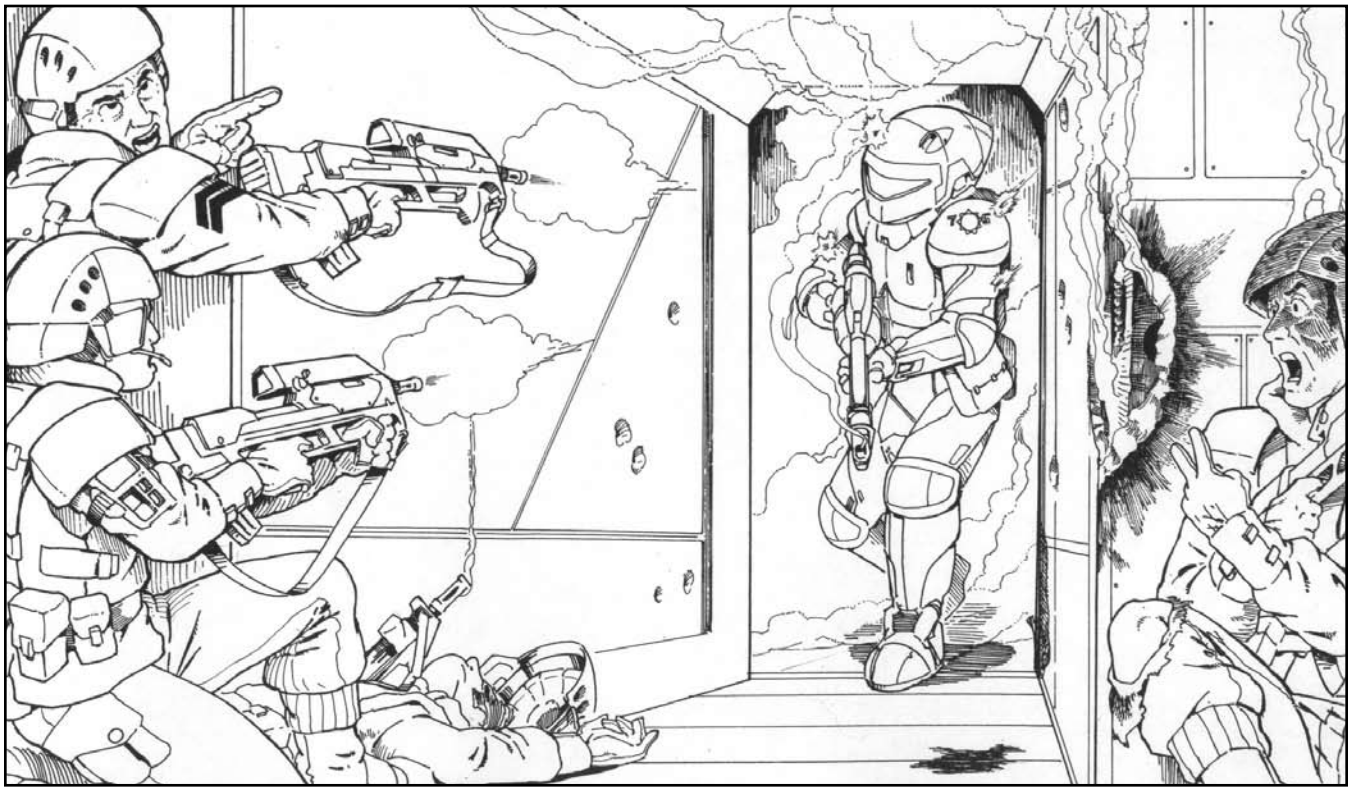
Flak Jacket: A less expensive military version of ballistic cloth armor, generally only covering the torso and groin.

Mesh: A jacket or body suit made of natural or synthetic leather and reinforced with a lining of flexible metal mesh, similar to chain mail but lighter and stronger. Mesh reduces or stops penetration by blades and has some effectiveness against guns; it is ineffective against laser fire.

TL9 ARMOR

Ablat: Ablat is a cheap alternative to reflec, and is fashioned from a material that will ablate (vaporize) when hit by laser fire. The ablation of the material carries away the energy of the laser, and protects the wearer. Continued fire against ablat degrades its effectiveness, but the armor is cheap and easily replaceable. Ablat also has some value against other forms of attack.

Vac Suit: The personal vacuum or space suit is designed to protect the individual from vacuum, tainted or noxious atmospheres, and some radiation situations. It carries its own communicators, oxygen tanks for six hours, and other basic survival appurtenances. Use of a vac suit requires Armor Proficiency (Vac Suit). Being armored against space debris and similar hazards, a vac suit acts much like cloth armor when subject to attacks. Vac suits are relatively bulky, and weigh 8 kilograms; the weight counts against personal weight allowances. This weight is reduced 2 kilograms per tech level as the suit gains increasing sophistication. For example, a TL 10 vac suit weighs 6 kilograms, and a vac suit at tech level 13+ adds no apparent weight.



TL10 ARMOR

Combat Environment Suit: A neck to toe air-tight, loose fitting suit constructed of ballistic cloth. Generally worn open at the neck and wrists, the combat environment suit can be sealed by donning gauntlets and a clear flexible plastic head bag, thus giving complete protection against most chemical agents, tainted atmospheres, biological agents, and a moderate defense against radiation.

Reflec: Reflective material on a plastic base can be tailored into a body suit which is ineffective against most weapons, but superior in defense against laser fire. Unlike other forms of armor, reflec is worn under other clothing. Reflec is expensive and often difficult to obtain.

TL11 ARMOR

Combat Armor: Combat armor is a complete vac suit-like array of metal and synthetic armor. Combat armor is strictly military and not available on the open market; it is issued to troop units and elite mercenary battalions. Before combat armor can be worn, the user must have the Armor Proficiency (Vac Suit) feat.

TL12 ARMOR

Chameleon: This technology can be applied to any vac suit, combat environment suit, Combat Armor, or Battle Dress. It is designed to mimic the color, temperature, and shading of the wearer's current physical environment, helping to render them difficult to track by both the naked eye and IR systems. First available at TL12, a more advanced version becomes available at TL14.

Hostile Environment Suit: A hardened version of the vac suit, offering heavier protection from the elements and physical damage in hostile environments such as nearby volcanic activity or within a corrosive. HE Suits are heavier and more expensive than Combat Armor, but nearly as effective and available to the general public.

TL13 ARMOR

Battle Dress: The ultimate in individual protection, Battle Dress is an advanced and powered version of combat armor. Battle Dress enhances the strength and senses of individuals wearing it with variable feedback personal controls, servo-powered limbs, and various kinds of electronic assistance. Rather than being listed under the armor tables, Battle Dress is actually considered a vehicle and is detailed as such (pg. 285)

TL14 ARMOR

Tailored Vac Suit: A tailored vac suit is very much what it sounds. Made of a lightweight but strong material, the suit is tailored to the user allowing for a more comfortable fit and allowing the wearing much more freedom of mobility than with a standard vac suit. A tailored vac suit may not be used by anyone other than the person is was tailored to fit.

SHIELDS

Type	AC Bonus	Armor Check Penalty	Cost	Weight	TL
Buckler	+1 to AC	-1	Cr15	2kg	1
Shield, small, wooden	+1 to AC	-1	Cr3	2kg	1
Shield, small, steel	+1 to AC	-1	Cr9	2.5kg	1
Shield, small, ballistic	+1 to AC	0	Cr15	1kg	5
Shield, large, wooden	+2 to AC	-2	Cr7	4.5kg	1
Shield, large, steel	+2 to AC	-2	Cr20	16.5kg	1
Shield, large, ballistic	+2 to AC	-1	Cr25	2kg	6
Shield, tower, wooden	Provides Cover*	-10	Cr30	20.5kg	1
Shield, tower, steel	Provides Cover*	-10	Cr30	20.5kg	1
Shield, tower, ballistic	Provides Cover*	-5	Cr50	5kg	7

* A tower shield can provide cover as per the Cover rules. The user may expose as little or as much of their body as you wish.

Buckler: This small metal shield is strapped to the forearm, allowing it to be worn and still use the hand. A bow or crossbow can be used without penalty. An off-hand weapon can be used, but a -1 penalty on attack rolls is imposed because of the extra weight on your arm. This penalty stacks with those for fighting with the off hand and, if appropriate, for fighting with two weapons. In any case, if a weapon is used in the off-hand, the character doesn't get the buckler's AC bonus for the rest of the round.

Small Shield: A small shield's light weight lets a character carry other items in that hand (although the character cannot use weapons).

Large Shield: A large shield is too heavy to use the shield hand for anything else.

Shield, Tower: This massive wooden shield is nearly as tall as the wielder. Basically, it is a portable wall meant to provide cover. It can provide up to total cover, depending on how far a character comes out from behind it.

EQUIPMENT

The following section lists examples of common equipment. Given the enormous number of variations in design, alternate technologies and the possibility of manufacturing a given item at higher or lower tech levels, it is impossible to list specifics of every possible piece of equipment. The objects listed are presented as indications of common qualities and values.

Each listing notes the object's name, followed by its technological level, a price in Credits, and a basic description. The technological level indicates local technology required to manufacture something with the capabilities listed. Price and weight are for an item manufactured by an

EQUIPMENT SI

Size	Weight or Volume	Base SI	Additional SI (round down)	Weight in Pounds (d20 size)
Fine	up to 0.05	0	0.1 per 0.005 over 0.005	0.11 (1/8)
Diminutive	0.05 to 0.5	1	0.1 per 0.05 over 0.05	1.1 (1)
Tiny	0.5 to 5	2	0.3 per 0.5 over 0.5	11 (8)
Small	5 to 30	5	0.5 per 2.5 over 5	66 (60)
Medium	30 to 250	10	1.5 per 22 over 30	550 (500)
Large	250 to 2000	25	2.5 per 175 over 250	4400 (4000)
Huge	2000 to 15,000	50	2.5 per 1300 over 2000	33,000 (32,000)

EQUIPMENT

	TL	Cost	Weight
Personal Equipment			
Artificial Gill	8	Cr4000	4 kg
Cold Weather Clothing	1	Cr200	4 kg
Combination Mask	5	Cr150	1kg
Filter Mask	3	Cr10	0.5kg
Oxygen Tanks	5	Cr500	5 kg
Protective Suit	5	Cr700	5 kg
Respirator	5	Cr100	0.5kg
Swimming Equipment	3	Cr200	1kg
Underwater Air Tanks	5	Cr800	5 kg
Personal Devices			
Artificial Psionic Shield Helmet	8	Cr4000	1 kg
Bull-Horn	5	Cr120	5 kg
Hand Calculator	7	Cr10	1 kg
Hand Computer	11	Cr1000	0.5 kg
Handcuffs	2	Cr25	0.3 kg
Inertial Locator	9	Cr1200	1.5 kg
Long Range Communicator	6	Cr500	15 kg
Magnetic Compass	3	Cr10	negligible
Medium Range Communicator	5	Cr200	10 kg
Metal Detector	6	Cr300	1 kg
Radiation Counter	5	Cr250	1 kg.
Short Range Communicator	5	Cr100	5 kg
Wrist Watch	4	Cr25+	negligible
Vision Aids			
Binoculars	3	Cr75	1 kg
Cold Light Lantern	6	Cr20	0.25 kg
Electric Torches	5	Cr10	0.5 kg
Gas or Oil Lamp	2	Cr10	0.5 kg
IR Goggles	6	Cr500	0.25kg
Light Intensifier Goggles	7	Cr500	0.25kg
Torches	1	Cr1	0.25 kg
Tools			
Carpentry Tool Set	2	Cr300	25 kg
Chain Saw	6	Cr500	8 kg
Disguise Kit	7	Cr1,000	5 kg
Electronic Tool Set	7	Cr2000	5 kg
Janitorial Kit	5	Cr250	10kg
Lock Pick Set	4	Cr10	0.25kg
Mechanical Tool Set	5	Cr1000	20 kg
Medical Kit	7	Cr1000	10 kg
Metalwork Tool Set	4	Cr1500	50 kg
Shelters			
Advanced Base	8	Cr50,000	6000 kg
Pre-Fabricated Cabin	6	Cr10,000	4000 kg
Pressure Tent	7	Cr2000	25 kg
Tarpaulin	1	Cr10	2 kg
Tent	2	Cr200	3 kg
Food and Overhead Per Day			
Average Restaurant Meals	-	Cr10	-
Excellent Restaurant Meals	-	Cr(1d4+1) x10	-
Prepare Own Meals	-	Cr5	1kg
Canned or Packaged Rations	-	Cr20	0.5kg
Dehydrated Rations	-	Cr25	0.2kg
Dismal Lodging	-	Cr2	-
Average Lodging	-	Cr6	-
Good Lodging	-	Cr8	-
Excellent Lodging	-	Cr10	-

interstellar society of tech level 10-15; items produced at lower tech levels will probably be bulkier and more expensive. An item with no weight or size given can be carried or worn without difficulty. Additional lines of explanation are given where considered necessary.

Equipment Structural Integrity: The SI rating of a piece of equipment (excluding armor, weapons, or vehicles) is based on its weight as listed on the Equipment SI table.

The following listing may be considered a shopping list for PCs. When they originally outfit themselves for an adventure, each may purchase or acquire items from this list in preparation for action or mishap. For the most part, this list does not include weaponry, and all items are generally available for purchase without difficulty on worlds with a sufficient technology level (on other worlds, they may be available as imports at higher prices). Often, the base price for these items will be higher or lower. The Referee may wish to use the trade and speculation rules for percentage price changes.

TL0 EQUIPMENT

First Aid Kit: At TL0, a first aid kit consists of little more than material for a splint, and a few herbs and plants that are reputed to have medicinal qualities, but it is better than nothing. At higher tech levels, the quality of materials and drugs included in the kit improves significantly, greatly increasing the odds of successful treatment. Higher tech kits cost considerably more.

FIRST AID KITS

Tech Level	Cost	Medical DC Modifier
TL0-3	Cr100	+2
TL5-7	Cr125	+/-0
TL8-12	Cr250	-2
TL13-15	Cr500	-4
TL16+	Cr1999	-6

TL1 EQUIPMENT

Cold Weather Clothing: Protects against frigid weather (-20º Celsius or below). Adds a +5 circumstance bonus to all Fortitude saves against cold weather exposure. Reduce the weight by 1kg for every 5 TL.

Tarpaulin: A canvas or waterproof cloth sheet used to create a temporary shelter 2 by 4 meters. Protects against precipitation and can withstand light winds.

Torches: Last about one hour and illuminate 6-meter radius, producing a thick, heavy smoke.

TL2 EQUIPMENT

Carpentry Tool Set: Includes basic tools necessary to cut, shape and build with wood. Required for the use of the Craft skill when working with wood, without suffering a -2 circumstance penalty.

Gas or Oil Lamp: Last about 6 hours on a half-liter of oil or gas, and will illuminate a 5-meter radius to the equivalent of normal daylight.

Handcuffs: Higher tech levels produce stronger and lighter designs. To slip out of a pair of handcuffs requires a Dexterity check (DC25). To break a pair of handcuffs requires a successful Strength check (DC25 +1 per 2 TL). To pick a mechanical lock requires a successful T/Mechanical skill check (DC20 +1 per TL), while electronic locks require a successful T/Electronics skill check (DC25 +1 per TL over TL9). Apply a -4 circumstance penalty if the person wearing the cuffs attempts to pick the lock.

Tent: Basic shelter for two persons offering protection from precipitation, storms, and temperatures down to 0º Celsius, and withstanding light to moderate winds. Larger, more elaborate tents capable of sheltering more people, higher winds or colder temperatures weigh and cost more.

TL3 EQUIPMENT

Binoculars: Binoculars magnify the appearance of objects being viewed through them, effectively increasing the visual range of the user. The effective field of view is reduced however as the magnification increases. Price stays the same across tech levels, though the weight may be reduced through the use of lighter weight components.

BINOCULAR MAGNIFICATION

Tech Level	*Magnification*
TL3-4	x5
TL5-6	x10
TL7-9	x50
TL10-12	x100
TL13+	x1000

Filter Mask: A filter set that allows an individual to breathe tainted atmospheres (types 4, 7, and 9). Also protects against the inhalation of heavy smoke or dust.

Swimming Equipment: Includes swim fins, wet suit, face mask. Protects against the effects of cold (5º Celsius or below), along with improving speed and maneuverability underwater; add +2 to all Swim skill checks in these situations when wearing proper swimming equipment.

Magnetic Compass: Indicates direction of magnetic north, if any exists.

TL4 EQUIPMENT

Lock Pick Set: Allows picking of ordinary mechanical locks. Picking a lock takes 3 rounds and requires a successful T/Mechanical skill check (DC based on the type of lock). Lockpicks are illegal on worlds of law level 8+; on such worlds the cost rises to Cr100 or more.

Metalwork Tool Set: Includes basic tools necessary for metalworking, welding, shaping. Required for the use of the Craft skill when working with metal, without suffering a -2 circumstance penalty.

Wrist Watch: Price determines quality and functionality.

TL5 EQUIPMENT

Bull-Horn: Amplifies voice allowing it to carry up to half a kilometer away, but is very bulky and awkward to carry.

Combination Mask: A combination of both filter mask and respirator, which allows breathing of very thin, tainted atmospheres (type 2), plus all atmospheres listed under filter and respirator masks.

Electric Torch: The common flashlight. It is battery powered and will last for about 6 hours of continuous use. A torch produces a wide cone of light up to 18 meters long with a radius of 6 meters at the end of the beam. Later TL models have adjustable beams allowing them to also produce a tight beam of light up to 36 meters long, with a 1 meter radius, or be used to illuminate a circle of 10 meter radius.

Field Medical Kit: Contains drugs, surgical supplies, and diagnostic materials for use by doctors and field medics. Reduces the DC required for most T/Medical skill checks. Higher tech level kits cost more but offer a better range of treatment options and quality of care, increasing the odds of successful treatment.

FIELD MEDICAL KITS

Tech Level	*Cost*	*Medical DC Modifier*
TL5-7	Cr1000	-2
TL8-12	Cr1250	-4
TL13-15	Cr2500	-6
TL16+	Cr5000	-8

Janitorial Kit: TL5, Cr250. Includes a vacuum cleaner, chemical storage and dispensing systems, along with other basic cleaning tools and supplies.

Mechanical Tool Set: TL5, Cr1000. Includes basic tools necessary to repair and alter mechanical devices. Required for the use of the T/Mechanical skill without suffering a -2 circumstance penalty.

Oxygen Tanks: A complete set of compressed oxygen tanks, which allow independent breathing in smoke, dust,

gas, or exotic (type A) atmosphere. Two tanks last 6 hours. Refill of proper atmospheric mixture for race cost Cr20.

Radiation Counter: Indicates presence and intensity of radioactivity within a 30-meter radius. The indicating signal will grow stronger as it gets closer to the source.

Respirator: A small compressor that allows an individual to breathe in very thin atmospheres (type 3).

Underwater Air Tanks: Equivalent to oxygen tanks but designed for use underwater. Two tanks last 6 hours. Refill of proper atmospheric mixture for race and expected depth cost Cr20.

TL6 EQUIPMENT

Chain Saw: Motorized saw for cutting and shaping trees. The chain saw could possibly be used as a weapon, but at a -4 penalty (-2 if the character has the Weapon Proficiency (Swordsman) or Brawling feat) to hit and inflicting 2d6 damage (x2).

Cold Light Lantern: A fuel cell powered version of the electric torch, but will last 3 days with continuous use. Produces a wide cone of light up to 18 meters away with a radius of 6 meters at the end of the beam. Also capable of producing a tight beam of light up to 36 meters away with a 1 meter radius or be used to illuminate a 10 meter radius.

IR Goggles: Allows wearer to see heat sources (infrared radiation) in even darkness up to 18 meters away. Quality of vision is necessarily distorted. The presence of light does not affect this capability.

Metal Detector: Indicates presence of metal within a 3 meter radius (including underground), with the indicating signal growing stronger as it gets closer to the source.

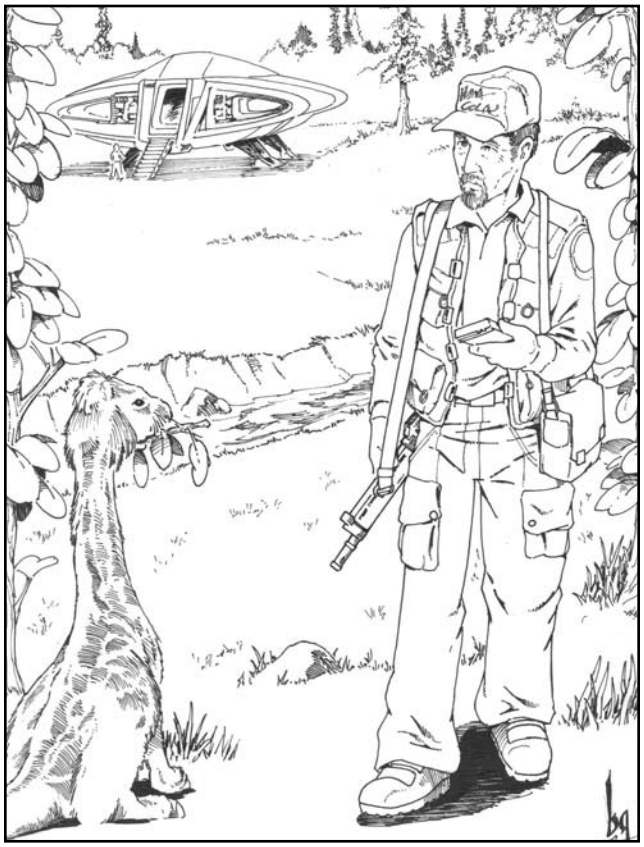
Pre-Fabricated Cabin: Modular unpressurized quarters for 6 persons and capable of withstanding light to severe winds. Offers excellent shelter from precipitation, storms, and temperatures down to -10º Celsius. Requires 8 man-hours to erect or dismantle. There are 16 modules, each, 1.5m wide by 1.5m long by 2m high that can be organized into any layout required. Dismantled and ready for shipment, the cabin weighs 4 tons.

TL7 EQUIPMENT

Disguise Kit: Allows change of personal appearance on a temporary basis. Required for the use of the Disguise skill without suffering a -2 circumstance penalty.

Electronic Tool Set: TL7, Cr2000. Necessary tools for basic electronic assembly and repair. Required for the use of the T/Electronics skill without suffering a -2 circumstance penalty.

Hand Calculator: Provides basic mathematical calculations. The hand calculator is the basic tool of any competent astrogator and a weapon of last resort when the ship's computer is down. If the astrogator has a calculator handy, the penalty for no astrogation computer when plotting a course is reduced to only +4 on the DC.



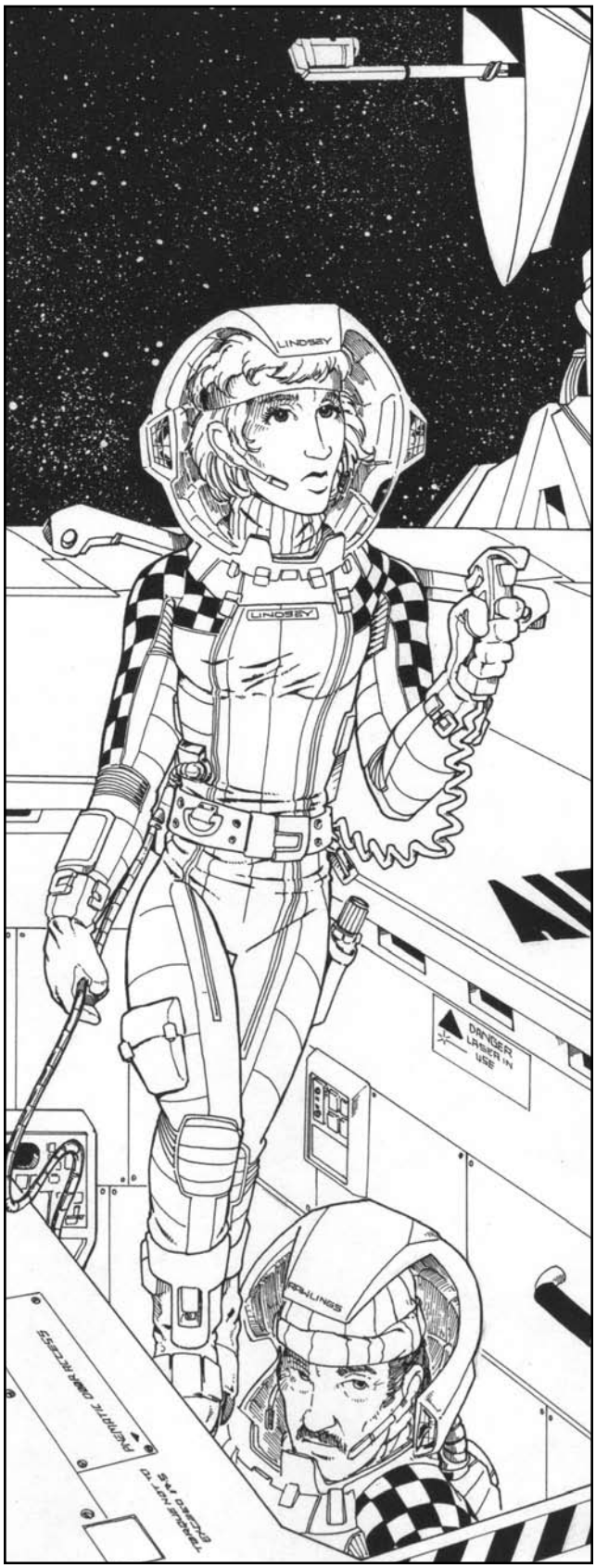
Light Intensifier Goggles: Allows clear, monochrome vision up to 18 meters in anything less than total dark. While some light is required to produce this effect, anything approaching normal daylight conditions severely degrades the clarity of the view and the range.

Pressure Tent: Basic pressurized shelter for two persons, providing standard atmosphere and conditions, along with protection from precipitation, storms, and up to strong winds. There is no airlock: the tent must be depressurized to enter or leave it.

TL8 EQUIPMENT

Advanced Base: Modular unpressurized quarters for 6 persons and capable of withstanding anything less than hurricane force winds. Offers excellent shelter from precipitation and all but the most extreme of temperature ranges. Requires 12 man-hours to erect or dismantle. There are 16 modules, each, 1.5m wide by 1.5m long by 2m high that can be organized into any layout required. Dismantled and ready for shipment, the advanced base weighs 6 tons.

Artificial Gill: Extracts oxygen from water allowing the wearer to breathe for an unlimited time while submerged under water. Functions only on worlds with thin, standard, or dense (type 4 through 9) atmospheres.



Artificial Psionic Shield Helmet: Acts as a shield against psionic forces (see Psionic Shiled, pg. 189).

Vac Suit: Must be worn in vacuum, trace, exotic, or corrosive atmospheres. May also be worn in very thin or tainted atmospheres if desired. Includes oxygen tanks, short-range communicators, and other required equipment.

TL9 EQUIPMENT

Inertial Locator: Indicates direction and distance traveled from the starting location.

TL11 EQUIPMENT

Hand Computer: The 'handcomp' provides the services of a small computer, plus serves as a computer terminal when linked (by its integral radio, network interface jack, or by other circuit) to a standard computer. If an astrogator has a handcomp handy, the penalty for no astrogation computer when plotting a course is reduced to only +2 on the DC.

FOOD AND OVERHEAD

The following are indications of the prices for food and basic survival:

BASIC CUISINE ON A DAILY BASIS

Food is available in a variety of forms and qualities. Prices indicated are per person.

Restaurant meals of ordinary quality cost Cr10 per day. Excellent quality meals range in price from Cr20 to Cr50 per person. Travellers' Aid Society facilities provide excellent quality meals to members and guests for Cr20.

Food purchased from vendors for preparation at home costs about Cr5 per day, and weighs about 1 kg.

Preserved foods for rations on expeditions may be canned or packaged (Cr20 per day, weighs .5 kg) or dehydrated (Cr25 per day, weighs .2 kg, dependent on locally supplied water).

SUBSISTENCE ON A LONG TERM BASIS

In situations where time passes quickly, personal survival or subsistence costs can be assumed to be the values given below:

Starvation Level: A person must consume at least 1kg of food per day or they will begin starving. A day's ration of canned, packaged, or dehydrated food is equal to the 1kg of standard fare, regardless of actual weight. A character can survive for a number of days equal to their Constitution before starting to suffer the effects of starvation, but they will not heal from any injuries during this period. For each extra day spent beyond this period with insufficient food supplies, a character will lose 1 point of Lifeblood.

Subsistence Level: A character spending less than required by their Social Standing on food and lodging are considered to be existing at subsistence level. While at this level, their Social Standing will be temporarily lowered to a value equal to the level of support the character can afford plus their original Social Standing bonus. For example a character with a normal Social Standing of 12 can currently only afford to spend Cr600 per month on food and lodging. This amount is enough to support a normal Social Status of 6. Adding his original Social Status bonus of +1, the character has a temporary Social Status of 7 until they can afford to once again spend enough to support their true status.

Ordinary Level: A character must spend Cr100 per point of Social Standing each month on food and lodging to support the lifestyle that comes with their status.

High Living: A character that spends Cr250 per point of Social Standing a month or more is considered to be living the high life, the best of foods, high quality lodging, etc. Of course, what is high living to someone with a Social Standing of 3 is quite different than someone with a Social Standing of 15...

Starships: Passengers and crewmembers have their food and lodging provided.

FOOD AND OVERHEAD

	Cost per Day	*Weight*
Average Restaurant Meals	Cr10	-
Excellent Restaurant Meals	Cr(1d4+1) x10	-
Prepare Own Meals	Cr5	1kg
Canned or Packaged Rations	Cr20	0.5kg
Dehydrated Rations	Cr25	0.2kg
Dismal Lodging	Cr2	-
Average Lodging	Cr6	-
Good Lodging	Cr8	-
Excellent Lodging	Cr10	-

COMMUNICATIONS

Communication is the lifeblood of any civilization, yet it is taken for granted by most citizens... until it breaks down.

Long Range Communicator: Back-pack mounted radio capable of ranges up to 500 km and contact with ships in orbit. Ten separate channels. At tech level 7 reduce the weight to 1.5 kg and it becomes belt or sling mounted.

Medium Range Communicator: Belt-mounted or sling carried radio set capable of up to 30 km range, and contact with official radio channels. Five separate channels. At tech level 7, reduce the weight to 500 grams.

Short Range Communicator: Belt-mounted radio capable of 10 km range (much shorter underground or underwater). Three separate channels. At tech level 7 reduce the weight to 300 grams and it becomes hand-held.

Personal Communicator: A hand-held, single channel communication device. On world with a tech level of 8 or higher a personal communicator is able to tap into the world's satellite communication network and with the proper address, contact any other communicator in the world (for a fee). The channel is private, but not secure and may be monitored on some worlds. Usually network access can be arranged at the local starport for a small fee. On worlds with a tech level of 7 or less, personal communicators will not work.

PERSONAL COMMUNICATIONS EQUIPMENT

	TL	*Cost*	*Weight*	*Range*
Long Range Communicator	6	Cr500	15 kg	500 km
Medium Range Communicator	5	Cr200	10 kg	30 km
Short Range Communicator	5	Cr100	5 kg	10 km
Personal Communicator	8	Cr250	0.3 kg	Special

MEDICINE AND BIOTECHNOLOGY

TREATMENT 'IN THE FIELD'

Damage to lifeforms must be healed, either naturally, through the intervention of a medical practitioner, or via a technological device.

Natural Lifeblood Healing: Lifeblood heals naturally at a rate of 1 point per week of rest. For longer-term healing, the total recovery period from a given set of wounds is equal

to one week per point of Lifeblood lost, minus the character's constitution modifier, with a minimum of 1 week total recovery. Thus a character resting up after taking 7 points of Lifeblood damage would be completely healed after 5 weeks if his constitution modifier was +2 (7 minus +2 = 5), and 8 weeks if it were -1 (7 minus -1 = 8).

Natural Stamina Healing: Stamina is automatically recovered at a rate of (1 point + Constitution modifier per character level) per hour of rest. If the character has a negative Constitution modifier, the character will require a number of hours equal to (numeric value of Con modifier +1) to heal 1 point of Stamina, that it takes the character to recover a single Stamina point. For example a character with a 16 Con (+3 modifier) would recover stamina at a rate of 4 points per hour of rest, while a character with a 6 Con (-2 Modifier) would heal at a rate of 1 point per 3 hours of rest.

First Aid: A character that has the T/Medical skill may attempt to treat unconscious (0 or fewer Stamina points) and dying (0 or fewer Lifeblood points) victims. A successful T/Medical skill check (DC15) will revive unconscious victims (raising their Stamina to 1), and stabilize dying characters (raising their Lifeblood to 1). Applying first aid is a full round action. If the character treating the victim has a medical kit to hand, they may add +2 to these medical skill checks.

Medical Drug: Heals 3d6 Stamina, 1d4 Lifeblood. If the Medical Drug is taken more than once in a 24-hour period there is a high risk of overdose. The user must make a Fortitude saving throw (DC20) or immediately fall unconscious (reduce Stamina to 0) and suffer 3d6 Lifeblood damage.

Medical Drug TL8 Cr100 per dose

Personal Medikit: A personal medikit is basically a small personal electronic pharmacy tailored to a specific user's body chemistry. When worn (usually on upper arm, thigh, or lower back) it is always active and monitoring the wearer's bio-signs for any changes. As needed the medikit will dispense anti-toxins, antibiotics, stimulants, sedatives, and other pharmaceuticals needed to keep the user at peak efficiency. This has the added benefit of boosting the user's natural base healing rate from 1 Stamina point per hour to 2. Under normal (adventuring) conditions a personal medikit will need to be recharged every 4 weeks. Of course heavier demands on the medikit may considerably reduce the available drug supply much sooner.

In the event of poisoning or infection, a personal medikit will impart a +5 bonus to all Fortitude saving throws against the effects of such dangers.

Most medikits are also equipped to store and dispense a single dose of Medical Slow drug should it ever be needed. If the wearer is ever dying (0 Lifeblood or lower), the medikit will automatically use the Medical Slow drug if it is available and there is not a risk of overdose. The user can activate the Medical Slow at any time if needed. If desired, this can be replaced with a dose of Slow, Combat, or Medical drugs instead.

ENVIROTECH

The technological abilities of a civilization will dictate what sort of structures can be built. It is always possible that a world that has a particular capability will not use it, or that unusual or "natural" solutions to construction and environmental technology will be implemented. The universe is full of surprises. However, this section should give an indication of what is possible or most common at any given tech level.

Cities

TL 5	'Modern' Cities
TL 7	Underground Cities
TL 8	Orbital Settlements (up to pop digit 2; hundreds of inhabitants)
TL 9	Orbital Settlements (any size)
TL 9	Arcologies
TL 10	Undersea/ice Cities

Seismic Detection and Control

TL 8	Seismic prediction
TL 10	Early Seismic control
TL 15	Reliable seismic control

Gravitic Structures

TL 11	Small and experimental structures
TL 12	Free floating gravitic structures
TL 13	Stationary gravitic cities up to 1 kilometer in altitude
TL 14	Free-floating gravitic cities up to 10 km in altitude
TL 15	Free-floating gravitic cities up to orbital altitude

Terraforming

TL 12	Up to 10,000 square kilometers
TL 15	Entire Hemispheres
TL 16	Global

MEDICAL CARE

Medical Procedure	*DC*
Aid a choking victim	5
Staunch bleeding/apply tourniquet	5
Administer injection/IV	5
Cardio/Pulmonary Resuscitation	5
Set broken limb/rib	5
Venomous bite/sting treatment	10*
Apply/remove stitches	10
Tracheotomy	15
Treat non-terminal virus	10
Treat terminal virus	15
Treat non-terminal disease	20
Treat terminal disease	25
Treat non-terminal cancer	30
Treat terminal cancer	35
Routine surgery (remove bullet, appendicitis)	25**
Serious surgery (amputation, heart surgery)	30**
Major surgery (brain surgery)	35**

Modifiers	*DC*
Under fire	+15
Rushed	+10
Anti-toxin Available	-10
Hi-Tech Hospital	-15
Mid-Tech Hospital	-10
Lo-Tech Hospital	-5
Hi-Tech Field Hospital	-10
Mid-Tech Field Hospital	-5
Hi-Tech Surgical Field Kit	-5
Lo-Tech Surgical Field Kit	+5
No Surgical tools	+10
Chronic Condition	+5

*Slows the spread of a poison

It is very dangerous to attempt to use a Medikit that has been tailored to another person's body chemistry. If such an attempt is made two Fortitude saving throws must be made. If the first saving throw (DC15) fails, the user immediately suffers a Traumatic Shock injury (1d6 Lifeblood damage, ignore the second saving throw). If the second saving throw (DC10) fails, the medikit simply does not work for the user. If both saving throws are successful, the medikit will function normally for the user.

Personal Medikit	*TL12*	*Cr15,000*
Basic Supplies		*Cr500 (specialized drugs must be pur chased separately)*

AutoDoc: An autodoc is a small self-contained diagnostic, pharmaceutical, and surgical system about the size of a Low Berth chamber or large coffin. Often found on starships, it is capable of diagnosing and treating disease, infection, injuries and other medical conditions as if a qualified doctor of Skill rank 12 was attending the patient.

Autodoc	*TL13*	*Cr1,000,000* *0.5 tons*
Supplies		*Cr100,000*

Capabilities

Heals all Stamina in one hour

Speeds the base natural healing of Lifeblood to 5 per week

Broken Bones	DC10	
Minor Surgery	DC15	
Routine Surgery	DC20	
Reanimation	TL14	Within 15 Minutes of death

MEDICAL CARE

Medical science is capable of great feats in preserving and maintaining the health and well-being of individuals. The services of medically trained individuals are in great demand. Skill ranks in T/Medical skill represent steps in increasingly better ability and knowledge.

T/Medical skill rank 4 is sufficient to qualify a character for the position of medic on a starship crew. A character with a Medical (Doctorate) degree and a T/Medical skill rank of 4 or higher is sufficient for a character to be called doctor, and assumes a license to practice medicine which includes writing prescriptions, handling most ailments, and dealing with other doctors on a professional level.

If the patient is being treated for a life-threatening condition and the T/Medical check fails, the patient must make a Fortitude save (DC15) or they will die immediately.

OTHER PROCEDURES

Advanced Genetic Engineering: The capability of designing and creating bioengineered lifeforms adapted for various purposes (including sentience) becomes available at TL 14. While such bioengineering is with animal lifeforms on most worlds, there are those that have and do bioengineer all types of lifeforms including humans and other advanced races for adaptation to hostile environments for colonization. Most of these adaptations have been for Water Worlds.

Growth Quickening: The development of Growth Quicken at TL 10 offers a significant advance for medical science, enabling much more rapid healing of damaged and the growth of new tissues. Such accelerated healing requires proper medical facilities and care (i.e.: a qualified hospital or an autodoc).

Lifeblood Healing	*TL*
1.5 per week	10
2 per week	11
3 per week	12
5 per week	13
7 per week	14
10 per week	15

Limb Regeneration: This type of treatment is not always successful. The patient must make a Fortitude save (DC 10) for the treatment to work. If failed, further attempts at regeneration of that limb may not be tried. The patient must also make an addition Fort Save (DC 5) if the first save fails. If this second save fails the patient will have been determined to be one of the rare few for whom regeneration therapy will not work.

Limb	*Cost*
Toe	Cr10,000
Finger	Cr25,000
Foot	Cr50,000
Hand	Cr100,000
Forearm	Cr100,000
Shin	Cr100,000
Entire arm	Cr250,000
Entire leg	Cr500,000

Time to Full Growth	*TL*
One year	9
8 months	10
6 months	11
4 months	12
2 months	13
1 month	14
1 week	15

Nerve Refusion: Paralysis due to spinal injuries is finally eliminated, as nerve refusion becomes feasible at TL 11. Major neural damage through strokes, lack of oxygen and other causes can now be surgically repaired.

Reanimation: At TL 13 medical science has made significant strides in the ability to reanimate dead tissue, with the length of viable recovery time increasing at each TL thereafter, depending on the method used to preserve the body. The body must be preserved as quickly as possible to avoid brain damage. For every 5 minutes that passes before a preservation method is applied, the victim must make a Fortitude save (DC15) or lose one level of experience permanently. Once preserved, the victim may be transported to the nearest auto-doc or medical facility for possible reanimation.

Once in the hands of qualified medical care, the victim may be reanimated. To survive reanimation, the victim must make a Fortitude saving throw, the DC of which is based on the type of preservation used, and the length of time since death has occurred.

Method of Preservation	*Victim Fortitude Save*
None	15 + 1 per 5 minutes beyond the first 5 minutes after death
Low berth	15 + 1 per week beyond the first week after death
Brainblock	15 + 1 per hour beyond the first hour after death.

Decrease the DC by 2 points for every TL of the medical facility used above 13.

RNA Implants: At tech level 12, on most worlds, RNA memory implants become available. These implants chemically induce 'memories' of unacquired skills or skill levels into the recipient individual. The result is a new skill or rank. The advantage of this is easily seen. A person need no longer study to obtain a skill. Just one set of injections, and in a few weeks, the new skill is acquired. There are, however both limits and limitations.

Only one "implant" should be performed per year in the case of standard skills.

All non-criminally related skills can be obtained on most worlds of TL12 or greater. The price generally ranges from Cr3,000 to Cr10,000. (Criminal skills are ones such as Bribery, Forgery, etc. These can still be obtained on worlds with a law level of 1 or lower.) No skill rank may be increased past a level of 5 by implants. Ranks higher than this require hands on experience to fine-tune an existing skill.

If a player should get an implant, a Fortitude saving throw (DC10) should be made to achieve a successful implant. A modifier of +1 if someone with T/Medical skill rank of 8 or higher administering the injection, and modifier of +1

if world where it is administered is TL15+. Failure means no skill is gained, though it still counts as one implant for that year, AND the doctor must still be paid for the implant.

Should a player choose to go for a second skill rank or more, subtract a modifier of -4 from the Fortitude saving throw for each successive implant within the 12-month period following the last implant. The modifiers are cumulative. If a failure is rolled, the character must immediately make a Will saving throw (DC15) to avoid insanity. If this is the case, the character must now go through rehabilitative therapy.

Other uses have been found for RNA implants as well. A player can get a High School education or lesser college degree in just one injection or, less legally, a new personality. Many intelligence agencies employ spies, saboteurs, or assassins with "faked" implanted personalities designed to make them blend in with the local populace, even when being occasionally scanned for surface thoughts by psionically talented individuals. (As a side note the 'personality' implants count separately from skill implants when determining how many one can have in a year. They tend to be used to obliterate pre-existing implants of personality; there is no modifier for additional ones after the first when determining failure or the possibility of resultant insanity.)

DRUGS

Anagathics: Anagathics are a specialized drug treatment that can halt the effects of aging in its tracks. The drug must be taken regularly each month for as long as the age retarding effects are desired. It takes approximately one year of regular dosage for the full effect to develop. This means that during the first year on Anagathics a character will continue to age normally. After that first year, as long as the regular monthly dose is taken, the character will no longer age and remain at their present physical age.

Once past the first year, a character can miss one month without suffering ill effects, but if a character misses two or more successive dosages, they must abstain completely for one year before, once again restarting the treatments, including the one-year build-up period.

Anagathics TL15 Cr200,000 per dose

Broad Spectrum Anti-Toxin: The common cold and many other diseases and infections start to become a thing of the past at TL 12 and beyond. Universal, broad spectrum Anti-Toxins become widely available and prove effective against all but the rarest of diseases.

Antitoxin TL12+ Cr250

Potency of Anti-Toxins	*TL*
+5 to Fort saves	12
+5 to Fort saves, or may take 10	13
+10 to Fort saves	14
+10 to Fort saves, or may take 20	15

Combat Drug: +4 Strength, +5 Lifeblood. Lasts for 30 combat rounds, after which the user must make a Fortitude saving throw (DC15) or their Stamina is reduced to 1. If Stamina is already at 1 or below, the character suffers a Traumatic Shock and suffers 1d6 Lifeblood damage. If the Combat Drug is taken more than once in a 24-hour period there is a high risk of overdose. The user must make a Fortitude saving throw (DC25) or immediately fall unconscious (reduce stamina to 0) and suffer 3d6 lifeblood damage.

Combat Drug TL9 Cr750 per dose

Fast Drug: Fast drug speeds up the apparent passage of time for the user, to the point that 60 days will pass for the user as 1 day. The drug slows the metabolism of the user by a factor of 60, reducing the effect of aging and reducing the need for consumable supplies such as food, water, and air during the period the user is under the effects of the drug. An antidote does exist which can be taken to cancel the remaining effects of Fast Drug.

Fast Drug TL9 Cr2000 per dose
Antidote T L12 Cr900 per dose

Medical Slow Drug: Patient is rendered immediately unconscious in a coma-like state for the next 20+1d6 hours. If the patient is already dying, the slow drug will only stabilize their condition for the period of the coma, ensuring no further deterioration of life signs. If the patient is not dying and merely injured the slow drug will heal all Stamina points, and (4 + the patient's Constitution modifier) in Lifeblood points. If more than one dose of slow drug is taken within a week period there is a high probability of a severe overdose. The user must make a Fortitude saving throw (DC25) or immediately fall unconscious (reduce stamina to 0) and suffer 3d6 lifeblood damage.

Medical Slow TL7 Cr100 per dose

Slow Drug: Twice normal speed and double the normal actions allowed each combat round. The effects last for 40 combat rounds, after which the user must make a Fortitude saving throw (DC15) or their Stamina is reduced to 1. If Stamina is already at 1 or below, the overdose causes 1d6 lifeblood damage.

Slow Drug TL8 Cr5000 per dose

CLONING

	TL Min	Cr (1,000s)
Skin	12	10
Hand	13	100
Foot	13	100
Arm	13	250
Leg	13	500
Internal Organ	13	100-1,000
Entire Body	13	25,000

Chance of Defects

There is always a chance of a problem with a cloned part, perhaps an error in the growth regulation, an undetected flaw or defect in the sample core, etc. This risk lessens with TL. The first % represents a chance of just an outright and obviously defective clone. The cloning attempt may be tried again. The second % represents the chance of a successful transplantation but to still have an undetected flaw in the new clone part that may flare up at any time.

Tech Level	Bad Clone	Hidden Defect
TL 12	75%	25%
TL 13	50%	10%
TL 14	25%	5%
TL 15	10%	1%

Social Repercussions of Cloning

Full body clones are illegal just about everywhere.

CYBERTECHNOLOGY

PSEUDO-BIOLOGICAL ENHANCEMENTS

At TL 15 pseudo-biological enhancements that are indistinguishable from the biological original become available, but for a price. Any such enhancements are at 10 times the listed cost in pseudo-biological form.

Rejection

Each week during the first four weeks after having the cybernetic enhancement installed, the patient must make a Fortitude saving throw (DC20) or their body begins to reject the implant. Anti-rejection medication is usually prescribed (+10 save modifier) at a cost of Cr2500 per weekly dose required during the first four weeks. After the first month with the implant, the patient need only check for rejection each month for the next 11 months for possible rejection. Monthly doses of anti-rejection medication may be taken to reduce this possibility. After the first year, a check only need be made on the character's birthday for possible rejection, but a regularly monthly dose of medication is still required for any reduction in the possibility of rejection.

Social Repercussions of Cybernetic Enhancements

For the most part, cybernetic enhancements are accepted within society within what would be considered human limitations. War veterans with cybernetic replacement limbs and faculties are not considered unusual, out of the ordinary, or otherwise given much consideration. Enhancements installed for performance and non-medical related issues are not looked at in quite so pleasant terms on most worlds however. While that exact social and legal reaction to such non-medical enhancements varies from world to world, Brain Implants (or Cyberjacks) are almost universally outlawed.

COMPUTERS AND ELECTRONICS

Once computing devices are created and introduced, they become almost indispensable. Higher-tech versions of computers generally perform the same tasks, only better and faster. New capabilities do appear at high tech levels.

Voice Transcription

Beginning at TL 8 most computer systems are capable of accepting verbal input from their users with reasonable reliability. At the same time, computer synthesized speech also becomes widespread. In almost all cases however there is some form of manual input, typically a keyboard, available.

Datalinks

Starting around TL 8, the personal datalink begins to come into widespread use among most citizens. A datalink allows a user to communicate with anyone, anywhere on a world, anytime, via text, video, voice or combination thereof. Messages may be recorded, sent, received or stored directly with the datalink. Most worlds of TL 8 or higher have some form or Worldnet functioning that may also be accessed via a personal datalink, allowing instant access to local news, library data, and other information that may be of use to travellers.

TL 8	
Cost	Cr1000
TL 10	
Cost	Cr500
TL 12	
Cost	Cr1500 with built-in Translator

Translators

Small, lightweight translation devices capable real-time translation of spoken language becomes widely available by TL 12. These devices can be programmed to translate a multitude of languages, with local language chips available on most worlds of TL 12 or higher. These universal chips

CYBERNETIC ENHANCEMENTS

	TL Min	Str Mod	Dex Mod	Cr (1,000s)
Limbs				
Arm, very light (normal human)	8	+0	+0	500
Arm, light	10	+2	-1	600
Arm, medium	12	+4	-2	750
Arm, heavy	12	+8	-3	1,000
Tentacle, very light	10	-1	+2	750
Tentacle, light	12	+0	+0	1,000
Tentacle, medium	14	+2	+0	1,200
Tentacle, heavy	14	+4	+1	1,500
Organs				
		Con Mod		
Minor Organs	9	+1		100-1,000
Major Organs	8	+2		1,000-10,000
Eyes				
Normal Human	11			1,000
Telescopic Sight	12			2,000
Twilight Sight	12			2,000
Infrared Sight	13			3,000
Holorecording	14			1,000
Auditory				
Normal Human	8			500
Extra Sensitivity	9			700
Olfactory				
Normal Human	12			1,500
Extra Sensitivity	13			2,000
Communications				
Subcutaneous Transponder	8			10
Subcutaneous Communicator, Distant Range	9			25
Subcutaneous Communicator, Very Distant Range	10			50
Subcutaneous Communicator, Regional Range	11			100
Subcutaneous Communicator, Continental Range	12			250
Brain Implants				
Cyberjacking, direct human/computer data interfacing*	14			

*Allows the user to act as a living computer and able to interface with computer systems and run software within their heads. Such a direct interface has a profound impact on computer reaction and processing times, and an equally profound effect on computer enhanced skill use such as piloting, navigation, targeting, and more. There is also the risk of frying one's brain while jacked...

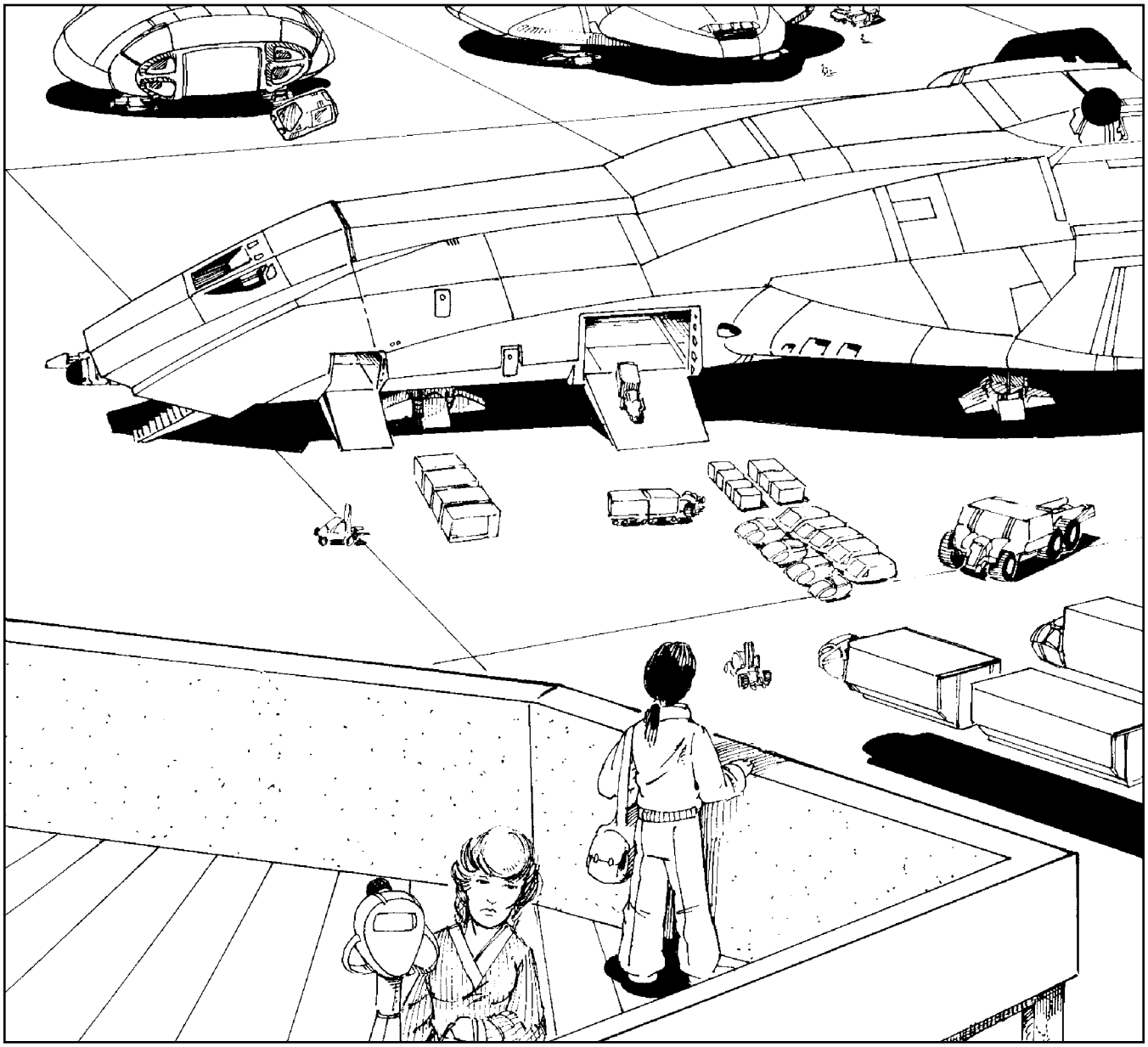
can be loaded into a translator allowing the user to listen and speak at about the ability of a native who has been offworld for a number of years.

TL 12

Cost Cr1000

Holovids

Holographic projection by a personal computer becomes fairly standard around TL 13. Holographic interfaces and "smart" holosystems soon follow. These tailor the output of the computer to what a viewer is doing or saying, allowing a message to be sent by Xboat and delivered interactively even though the sender is months away. "Holo-



Presentations" become a standard mode of communication at TL 14.

TL 13 Basic Holovid interface
Cost Cr 3000
TL 14 Advanced Holovid interface
Cost Cr 5000

VEHICLES AND STARSHIPS

Vehicles and starships are constructed at many different tech levels. As a rule, more advanced components allow smaller, faster, more powerful or more reliable systems, but a given vehicle type can be constructed in a variety of ways, and using very different materials. The design systems incorporate these tech-dependent factors. Computer, Starship and Vehicle design are covered seperately in the Design Sequences chapter starting on pg. 223.

DESIGN SEQUENCES

This chapter contains design rules for computers, vehicles and starships. The design process is very similar for all three.

USING THE DESIGN SYSTEMS

The vehicle and starship design systems were created to be as simple and easy to use as possible, while still allowing for a vast range of creativity. By picking and selecting from a varying set of systems, components, drives, and other features, it is quite simple and easy to design anything from a personal grav vehicle to a million-ton Jump-capable dreadnaught.

Many systems and components have a simple base cost and size, no matter what size ship or vehicle you are installing them into. You pay the same cost and size loss for each one of these types of items installed. Other systems, particularly drives and armor, have a cost and size based on a percentage of the overall hull or chassis size being used. The technological level of the vehicle or ship itself may also affect the size requirements of some systems and components.

Most of the data needed to construct vehicles and starships has been compiled into easy-to-consult tables based on various common options. If you are designing a vehicle or ship that uses a hull or chassis size not listed, select components from the various smaller sizes that add up to the hull or chassis size you wish to construct.

For example, you are designing a 550-ton starship and need to determine the cost and size requirements to install armor on the ship up to an armor factor of 4. Consulting the ship armor table, you will see that there is no entry for a 550-ton hull. But there is a listing for a 500-ton hull and a 50-ton hull. If you add the costs, size, etc for both the 500 and 50-ton hull listings, you have the cost, size and other data for your 550-ton ship.

Unless designing very large ships, you should need nothing more than scratch paper to do a bit of addition, subtraction, and record keeping when designing a vehicle or ship.

UNITS IN THE DESIGN SEQUENCES

All T20 design sequences use common units:

Cost is given in Credits (Cr) or Kilocredits (KCr) or Megacredits (MCr)

Volume is given in vl, which represents about 10 liters of volume or 0.01 cubic meters of space.

Weight is in grams (g) or Kilograms (Kg)

Displacement is given in Displacement Tons. Displacement is used for large vehicles like starships and spacecraft, which are rated by their displacement; e.g. 400-ton Subsidized Merchant, 5,000-ton Destroyer. One Displacement ton is equal to the volume taken up by one ton of liquid hydrogen. This is approximately 14 cubic metres or 1400 volume. Displacement tons do not indicate weight or mass.

Energy Requirements and Power System Outputs are given in Energy points (EP)

DESIGNING COMPUTERS

OPEN GAMING CONTENT NOTE

The rules presented in this chapter on the design and operation of computers, vehicles, small craft, and starships are not Open Gaming Content, however any item created using the rules are considered Open Gaming Content. Basically you cannot explain how to create an item as described under these rules, but you may freely publish and distribute the final item data and information under the terms of the Open Gaming License.

SPECIAL FEATURES OF COMPUTER DESIGN

Computer Hardware: Computer systems are, in and of themselves, little use. It is the software that they run (and any systems it operates) that makes them valuable. However, the capabilities of any given computer system are defined by its hardware. An advanced system can be used to run various software packages to fulfil various roles. A less advanced system is far more limited and may be restricted to a single, fixed, software package.

Computing Power Units (CPU): The capability of a computer is rated in Computing Power Units (CPU). The size and complexity of a computer core will determine its CPU rating. Multiple units of a given core type will give greater CPU rating. Cores of increasing tech level need less power and result in a higher CPU rating for the same mass and volume, allowing computer systems to be smaller and/or more powerful.

COMPUTER CORES

Type	TL	Cost (Cr)	Volume*	EP	CPU Output
Electromechanical	5	1000	13.5	0.9	1
Linear	7	250	1.35	0.09	2
Parallel	9	200	0.54	0.012	10
Synaptic	11	150	0.27	0.012	10
Advanced Synaptic	13	100	0.135	0.009	10
Positronic	16	100	0.0135	0.0009	2.5

COMPUTER CORES

Various types of computers may be built depending on the local technology available. Note that a lower technology type computer can always be built on a higher technology world if desired (and in some cases this is cost effective), but a higher technology type computer may not be built on a world with a lower technology rating.

Five types of computer core are normally possible. Units of different types may not normally be mixed in a given computer core.

Electromechanical: Bulky and primitive, early model computers ranging from strange mechanical contraptions to sophisticated vacuum tube systems and other early electronics. Min. TL is 5, cost is Cr1000, volume is 13.5vl,

COMPUTER TYPE AND MODEL

Model	Base INT	CPU Req.	Total PP	Max PP	Min TL
Basic Computer (Type B)					
0	0	1	1	1	5
1	0	2	2	1	5
2	0	5	3	2	5
3	0	10	4	2	5
4	0	20	5	3	5
5	1	30	6	3	5
6	1	40	7	4	5
7	1	50	8	4	5
8	1	75	9	5	5
9	1	100	10	5	5
Advanced Computer (Type A)					
0	2	150	11	6	5
1	2	200	12	6	5
2	2	250	13	7	5
3	2	300	14	7	5
4	2	350	15	8	5
5	3	400	16	8	5
6	3	450	17	9	5
7	3	500	18	9	5
8	3	600	19	10	5
9	3	700	20	10	5

Model	Base INT	CPU Req.	Total PP	Max PP	Min TL
Master Computer (Type M)					
0	4	800	21	11	5
1	4	1000	28	11	5
2	4	3000	35	12	5
3	5	6000	42	12	5
4	5	10,000	49	13	5
5	6	15,000	57	13	5
6	6	21,000	65	14	5
7	6	28,000	73	14	5
8	7	36,000	81	15	5
9	7	45,000	99	15	5
Expert Computer (Type E)					
0	8	55,000	108	16	5
1	8	66,000	117	16	5
2	9	78,000	126	17	7
3	9	91,000	135	17	9
4	10	105,000	145	18	10
5	10	120,000	155	19	11
6	11	136,000	165	20	12
7	11	153,000	175	21	13
8	12	171,000	186	22	14
9	12	190,000	197	23	15

LOGIC PROGRAMS

Logic Program	Int	Dex	TL	Cost	PP	Requirements
Bootstrap	-2	-2	5	x2	0	None
Simple Operating System	-1	-1	5	250	1	None
Low Basic Logic	+0	+0	7	1000	2	Limited Verbal Command
High Basic Logic	+1	+1	9	3000	5	Limited Verbal Command
Low Autonomous Logic	+2	+2	11	7000	10	Basic Verbal Command
High Autonomous Logic	+4	+4	13	25,000	15	Basic Verbal Command
Low Artificial Intelligence	+6	+6	15	80,000	20	Full Verbal Command
High Artificial Intelligence	+8	+8	17	250,000	30	Full Verbal Command

INT: The amount to modify the computer's base intelligence score by.
DEX: The amount to modify the computer's base dexterity score by.
TL: The minimum technology level needed to use this type of logic program.
Cost: The cost in credits to buy/have designed this type of logic program.
PP: The number of processing power points that must be supplied to run this program.
Requirements: The minimum type of command software that must be installed and running to use this program.

and EP required is 0.9 per unit installed. Each unit produces 1 CPU of output.

Linear: The first true fully electronic digital computers. Advances in technology have moved computers that once filled entire rooms onto a user's desktop, onto their laps, and even into their hands. Min. TL is 7, cost is Cr250, volume is 1.35vl, and EP required is 0.09 per unit installed. Each unit produces 2 CPU of output.

Parallel: The advanced digital computer, still found in great use. Min. TL is 9, cost is Cr200, volume is 0.54vl, and EP required is 0.012 per unit installed. Each unit produces 10 CPU of output.

Synaptic: An early attempt at developing a unit that mimics the inductive reasoning of a human brain. Min. TL is 11, cost is Cr150, volume is 0.27vl, and EP required is 0.012 per unit installed. Each unit produces 10 CPU of output.

Positronic: A breakthrough in computing, the positronic brain is finally capable of not only reproducing the inductive and intuitive reasoning of the human brain. It also manages to lead to much smaller component sizes. Min. TL is 16, cost is Cr100, volume is 0.0135vl, and EP required is 0.0009 per unit installed. Each unit produces 2.5 CPU of output.

TYPE AND MODEL

The type and model rating of a computer are initially based on their total raw CPU power. The higher the total CPU capacity, the more capable the computer is and the higher its type and model rating will be. Using the Computer Type and Model table, find the computer's CPU rating (rounding down if necessary). The computer will fall under one of four types, Basic (B), Advanced (A), Master (M), and Expert (E), and will have a model rating that ranges from 0 to 9.

This table will also let you know the computer's base intelligence score, the total processing power (PP) points available for use, and the maximum amount of processing power that may be applied to any single given task at one time. Processing Power or PP points can be thought of as a skill point pool for a computer, which it draws on to run the various software and programs available to it each round.

Model: The model number rating. Note that this model number rating resets to 0 when a computer's type rating is improved (Simple to Basic, Basic to Master).

Base INT: This is the base INT score of a computer of this type and model rating. The Logic and Command programs installed may adjust this score up or down. When a computer's model and/or type rating improve, if its INT score is less than the listed Base INT, it should be raised to equal the listed score.

CPU Req: The total amount of raw CPU power that must be available to the computer to earn this type and model rating. For logicomps, this is the total amount of raw CPU power plus any earned experience points required.

Total PP: This is the total amount of Processing Power (PP) points available for use by the computer each round. These PP points may be distributed as needed to run any number of programs.

Max PP: The maximum number of PP points that may be applied to any single task involving the use of a skill based program each round. This may not exceed the rated

COMMAND PROGRAMS

Command Program	Int	TL	Cost	PP	Requirements
Keyboard/Manual Interface	-2	5	10	0	Basic Operating System
Graphical User Interface	-1	7	100	1	Basic Operating System
Limited Verbal Command	+0	7	500	2	Low Basic Logic
Basic Verbal Command	+1	9	1000	5	High Basic Logic
Full Verbal Command	+2	11	5000	10	Low Autonomous Logic

INT: The amount to modify the computer's base intelligence score by.
TL: The minimum technology level needed to use this type of command program.
Cost: The cost in credits to buy/have designed this type of command program.
PP: The number of processing power points that must be supplied to run this program.
Requirements: The minimum type of logic software that must be installed and running to use this program.

PP capacity of the program being run. This limitation does not apply to the use of Command, Logic, or other types of programs used by the computer.

LOGIC PROGRAMS

Logic programs determine how a computer handles the tasks required of it. They range from simple operating systems capable of little more than acting as a personal computer to sophisticated Artificial Intelligence programs that can learn and develop like any normal character.

Bootstrap: A bootstrap can be added to any other non-logic program, allowing that program to be run on a computer without a normal logic program installed and running. Bootstrapping doubles the cost of the software program it is added to.
Simple Operating System: The most basic of all logic programs, the simple operating system allows only the most basic and rudimentary data manipulation and presentation. Programs are limited to more basic types of programs such as word processing, file and data transfer, simple communications, etc. All critical or sensitive decision making is left to the user for the most part. Unless an improved command software interface is installed, data input and control is typically via keyboard using an explicit, but limited command structure, while data output is via some form of visual interface or physical printing device.
Basic Logic: The computer is capable of storing all data accumulated by its sensors and other input devices, but is incapable of analyzing or learning anything from that information. The limited decision making capabilities of this logic program only allow it to process data as it pertains to its immediate situation, such as negotiating obstacles and recognizing objects. If it could not go around the obstacle, or once it recognized an object, it will require further active or preprogrammed commands as to what actions to take next.

For low basic logic programs, unless there is an operator or supervising computer, the DC for any task is increased by +5.

All basic logic programs require at least the limited verbal command program to be installed and running.
Autonomous Logic: Commonly referred to as a logicomp, computers equipped with this type of logic programming are capable of operating independently and actually learning from their activities and earning experience. However unlike a normal character, when awarded experience by the referee, a logicomp with a high autonomous logic program must divide the given experience in half before applying the remainder to its accumulated experience total. If the logicomp is running the low autonomous logic program, you must divide the given experience by 10 before being added it to the computer's accumulated experience total.

Rather than having a class and earning levels, logicomps improve in model number and occasionally improve their type classifications. The base CPU output of the computer and the accumulated experience point totals are added together, and the result is compared to the Computer Type and Model table above to see if the computer has improved its model number or type rating. As the logicomp improves in rating it becomes capable of greater total processing capacity per round and an improved maximum single task processing. This type of logic program will also require additional data storage capacity for the experience it will accumulate (see Experience Data Storage).

The autonomous logic programs require at least the Basic Verbal Command program to be installed and running.
Artificial Intelligence: The robot is capable of reasoning, drawing conclusions, or even originating ideas and concepts that are outside the current realm of programming. While their sentience is often (hotly) debated, they may easily be mistaken for such by all but the most knowledgeable of roboticists.

Once designed, built, and its initial programming installed and running, an AI is treated like any normal character and capable of taking a class and earning levels. They do not advance on the standard Computer Type and Model table. Low Artificial Intelligence computers must divide their earned experience in half before adding to its previously accumulated experience.

The artificial intelligence logic programs require the Full Verbal Command program to be installed and running. This type of logic program will also require additional data storage capacity for the experience it will accumulate (see Experience Data Storage).

EXPERIENCE DATA STORAGE

Type	*TL*	*Storage*	*Volume*	*Cost*
Electromechanical	5	10 XP	1.35	1000
Magnetic	7	10 XP	1.35	100
Advanced Magnetic	8	100 XP	0.135	500
Optical	9	100 XP	0.135	250
Synaptic	11	1000 XP	0.0135	250
Holographic	13	10,000 XP	0.00135	500

TL: The minimum technology level at which this type of storage device may be used.
Storage: The amount of accumulated experience points this type of storage device can hold.
Volume: How much additional volume of space this type of storage device will add to the size of the computer.
Cost: The cost per storage unit of this type installed into a computer.

COMMAND PROGRAMS

Command programs provide a computer with its ability to decode and analyze the meaning of the commands given to it.

Keyboard/Manual Interface: The user must manually type in or otherwise manually input the command into the computer system. This most basic of interface devices does not require any PP points to run as this functionality is automatically built into all computers. If this is the only method available of interfacing with the computer, its INT score is reduced by -2 points. At lease the basic operating system must be installed and running to use this command program.
Graphical User Interface: A very user-friendly manual interface using graphics and simple iconic command systems to ease the use of and increase the speed of use of a computer system. Because of its limited manual capabilities however, the base intelligence of a GUI command program is reduced by -1 point. At least the basic operating system must be installed and running to use this command program.
Limited Verbal Command: The computer is capable of understanding a limited set of verbal commands (100 words/commands). These commands must be spoken and enunciated very clearly or they may be misinterpreted or ignored by the computer. Colds, foreign accents, and other issues that may affect the voice of the command speaker can cause even more difficulty. At least the low basic logic program must be installed and running to use this command program.
Basic Verbal Command: The computer can interpret and understand a limited verb-object sentence type commands, such as “get the book” or “show the starport data”. These commands must still be spoken and enunciated very clearly or they may be misinterpreted or ignored by the computer. Colds, foreign accents, and other issues that may affect the voice of the command speaker can still cause even more difficulty. Because of its improved verbal understanding, the base intelligence of a computer is increased by +1 point. At least the high basic logic program must be installed and running to use this command program.
Full Command: The computer is capable of understanding and correctly interpreting most natural language commands of varying complexity. Accents, colds or other issues that might affect the speakers voice are rarely a problem. Because of its near complete verbal comprehension capabilities, the base intelligence of a computer is increased by +2 points. At least the low autonomous logic program must be installed and running to use this command program.

DATA STORAGE

Computers capable of earning experience (logicomps and AIs), must allocate additional data storage capacity for the experience points they will earn and accumulate over the lifetime of their existence (or until memory wiped). Earned experience is really raw data that the computer has recorded and stored within its available storage memory for later reference and analysis. The type of data storage system available depends on the technology available.

HARDWIRING AND DEDICATED PROGRAMMING

A computer may be hardwired with programming dedicated to the performance of a specific set of tasks. Such a computer cannot be reprogrammed and is incapable of earning experience at any type or model rating. Hardwiring

reduces the number of units required for the computer core and data storage by 25%. The CPU output and storage capacity of the computer does not change. All programming must be selected and specified before the computer is built. These reductions apply to hardware only. Software and ability score costs and requirements are not affected.

For example a TL7 Linear Computer with 10CPU, built on a TL7 world, would require:

10 Linear units
13.5vl
Cr2500
0.9EP
20 CPU Output

If that same computer were hardwired, excluding the cost of software/programming, it would only require:

7.5 Linear units (25% fewer because the computer is hardwired)
10.13vl
Cr1875
0.68 EP
20 CPU Output

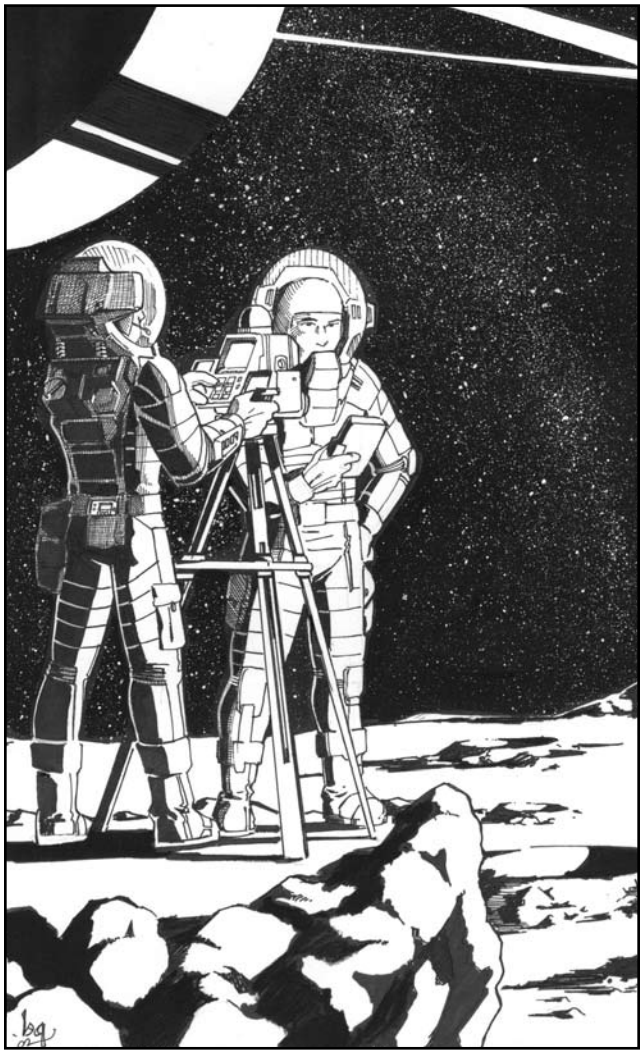
ADVANCED TECHNOLOGY

There are some advantages in using a fairly low-tech computer design but building it under higher technological standards, due to the effects of miniaturization and standardization. If you design a computer using a technology that is 1 or more TL below that which is actually available, you may elect to take advantage of one of these effects, but not both. For example you could elect to reduce the size and power requirements of the computer by going with miniaturization, or you could go for the lower cost through taking the standardization option, but you could not do both.

Miniaturization: High technology allows systems to be miniaturized. Each TL above the minimum (up to a maximum of +4 TLs) required to build a given type of core or data storage reduces the required volume and EP of the computer by 10%. The CPU output, storage capacity, and cost are not affected.

For example a TL7 Linear Computer with 10CPU, built on a TL7 world would require:

10 Linear units
13.5vl
Cr2500
0.9EP
20 CPU Output



That same computer built on a TL8 world would only require:

10 Linear units
12.15vl (10% less because the TL is 1 higher than the required TL of 7)
Cr2500
0.81 EP (10% less because the TL is 1 higher than the required TL of 7)
20 CPU Output

Standardization: As technology progresses, what were once cutting-edge technologies become more standardized and commonly available to the general population. This has the effect of reducing the costs of a computer even further as industries supporting the production of a specific type begin to proliferate. These reductions apply to hardware only. Software and ability score costs and requirements are not affected. There is a 3 TL limit to the amount of standardization that can be applied.

COST REDUCTION BY TL DIFFERENCE

+TL	Cost Reduction
1	-25%
2	-50%
3+	-90%

For example:

Original TL7 Computer
10 Linear units
13.5vl
Cr2500
0.9EP
20 CPU Output

TL8 Version
10 Linear units
13.5vl
Cr1875 (25% cheaper because the TL is 1 higher than the required TL of 7)
0.9EP
20 CPU Output

TL9 Version
10 Linear units
13.5vl
Cr1250 (50% cheaper because the TL is 2 higher than the required TL of 7)
0.9EP
20 CPU Output

TL10 Version
10 Linear units
13.5vl
Cr250 (90% cheaper because the TL is 3 higher than the required TL of 7)
0.9EP
20 CPU Output

TL11 Version
10 Linear units
13.5vl
Cr250 (remains at 90% cheaper because the TL 3 or more higher than the required TL of 7)
0.9EP
20 CPU Output

INTELLIGENCE

The type and model rating of a computer, along with the type of logic and command software that has been installed determine the overall intelligence of the system. Note that a computer's INT score may not exceed its TL.

INT = B + L + C

Where:

B = the base INT score of the computer based upon its type and model rating.

L = the INT modifier for the type of Logic Program installed and running.

C = the INT modifier for the type of Command Program installed and running.

EDUCATION

A computer's EDU score is based on its intelligence, the number of skill programs it has installed, the capacity of those skill programs, and whether or not it has the Library Data software installed.

Factor	Modifier
INT 4+	+1
INT 10+	+2
INT 16+	+4
Library Data program installed	+4
Per 4 skill programs installed	+1
If any single skill program has a capacity of 5 or more	+1
If three or more skill programs have a capacity of 5 or more	+2

COMPUTER SOFTWARE

The purpose of most computer systems is to run software applications. The following are standard software programs, in common use throughout the Traveller universe.

DEFENSIVE PROGRAMS

Defensive software is most commonly encountered aboard starships and vehicles that have defensive systems for it to control. Robots and fixed installations may also run similar programs.

Anti-Missile
Type: Defensive
Cost: 1000
PP Capacity: 2
Effect: Any laser based weapon system that has not already fired, may attempt to fire at and destroy incoming missiles, with a +2 bonus due to the extended final targeting by the computer during the missiles approach. A variant of this program is used to control projectile weapons used in anti-aircraft or anti-missile applications. The two are not interchangeable.

Auto/Evade
Type: Defensive
Cost: 5000
PP Capacity: 1

Effect: Allows the computer to produce small random movements in the vehicle course, making it more difficult to target and hit and providing a +2 bonus to the vessel's AC (not AR).

ECM
Type: Defensive
Cost: 4000
PP Capacity: 3
Effect: Provides an additional +2 bonus to AC against weapon systems that are using an electronic targeting system, and a +2 synergy to all T/Sensor or T/Communications skill check involving defensive jamming.

Return Fire
Type: Defensive
Cost: 5000 + 50 per weapon system supported.
PP Capacity: 1
Effect: When a vessel is hit by energy weapon fire while the return fire program is running, it may fire any of its own energy based weapon systems that have not already fired this round, in return with a +2 bonus. This bonus is derived from the fact that the incoming attack itself provided pinpoint targeting accuracy for the return fire system. These attacks are always under direct computer control because of the timing required to execute them.
Special: Energy based weapon systems only.

OFFENSIVE PROGRAMS

Offensive programs control weapon systems or assist the operators of such systems. To gain benefits from it, a program must be running for each weapon system in use. A weapon system is defined here as: an individual weapon or a set of linked weapons within a turret or barbette, a bay weapon or a spinal mount. E.g. a ship with two turrets and a bay weapon, running only one Predict program, must choose whether to apply the Predict bonus to one or the other turret, or the bay.

Double Fire
Type: Offensive
Cost: 4000
PP Capacity: 4
Effect: Allows any weapon system (except missile launchers and sandcasters) to fire twice per round, if enough power is available.

Gunner Interact
Type: Offensive
Cost: 1000
PP Capacity: 1
Effect: Allows a single 'live' gunner to apply their Gunnery skill rank when handling an appropriate weapon system, rather than depending upon the computer to control the shots.

Predict
Type: Offensive
Cost: 7500
PP Capacity: 2
Effect: Provides a +2 synergy bonus to all gunnery skill checks for supported weapon systems.
Requirements: Weapons Systems program must be running.

Select
Type: Offensive
Cost: 3000
PP Capacity: 1
Effect: This program aids in the targeting of specific areas on an enemy vessel, allowing a gunner to use the Called Shot action with the weapon system.
Requirements: The gunner interact program must be running in support of the gunner.

Weapons Systems
Type: Offensive
Cost: 4000
PP Capacity: 1
Effect: Only one instance of this program needs to be running regardless of the number of weapon systems that are actually supported. Provides very basic targeting information to all supported weapon systems, enabling them to be used during an engagement. Without a running targeting program, nothing outside of visual range may be targeted.

MISCELLANEOUS PROGRAMS

Miscellaneous programs are run on computers of all kinds.

Library Data
Type: Miscellaneous
Cost: 3000
PP Capacity: 1
Effect: For basic computers, this program acts as a reference library to any user who wishes to consult it. When a PC uses a Library Data program while searching for fairly general reference information, the PC will gain a +2 situation bonus to their Gather Information skill checks. In addition, this program also adds a +4 bonus to the EDU score of a computer.

Master
Type: Miscellaneous
Cost: 5000
PP Capacity: 5

Effect: Unlike the server program, the master program allows one computer to take over control of another computer (the slave) either directly or more typically via remote connection, and have access to all PP points, programs, or other data available to the enslaved computer. For security purposes, this type of control typically requires the master computer to have access to a specific control code for the computer to be enslaved. Without the code, the master computer is powerless to control the remote computer. Each slave unit controlled (after the first) requires an additional PP point to be expended per round by the master computer.
Requirements: The master computer must have some manner of transferring data and commands between itself and its slaved units.

Normal Skills
Type: Miscellaneous
Cost: 1000 per effective point of skill rank
PP Capacity: 1 per effective point of skill rank
Effects: A computer may be initially programmed with most any skill that is available to a normal character, but they do not suffer the typical maximum skill rank limitations. Instead, a computer may be programmed with a skill rank in a given skill up to a limit based on its type and model number ranking. All normal modifiers such as ability scores and other effects apply to a computer's skill programming.
Requirements: None

Server
Type: Miscellaneous
Cost: 2500
PP Capacity: 3
Effect: A server is capable of acting as a repository of both software and processing power that connected client computers may draw upon as needed. Each round a client may request the use of a program or a portion of the available PP points on the server. Each request for PP points will further reduce the total amount of PP available from the server. In some situations where demand on the server is very heavy, some requests may have to be postponed until a subsequent round. Requests will pool up in a queue and are handled on a first come, first serve basis. Requests for the use of a program on a server will not place any additional PP demand on the server.

Valet
Type: Miscellaneous
Cost: Cr3000
PP Capacity: 2
Effects: A computer (typically a robot) with this programming is capable of functioning as the personal servant or valet of its owner/master. It is capable of handling tasks such as keeping notes and messages, minor errands, light cleaning, and other basic domestic duties.
Requirements: The Personality Interface program must be installed and running.
Special: This program counts as a skill program for purposes of determining the computer's EDU score.

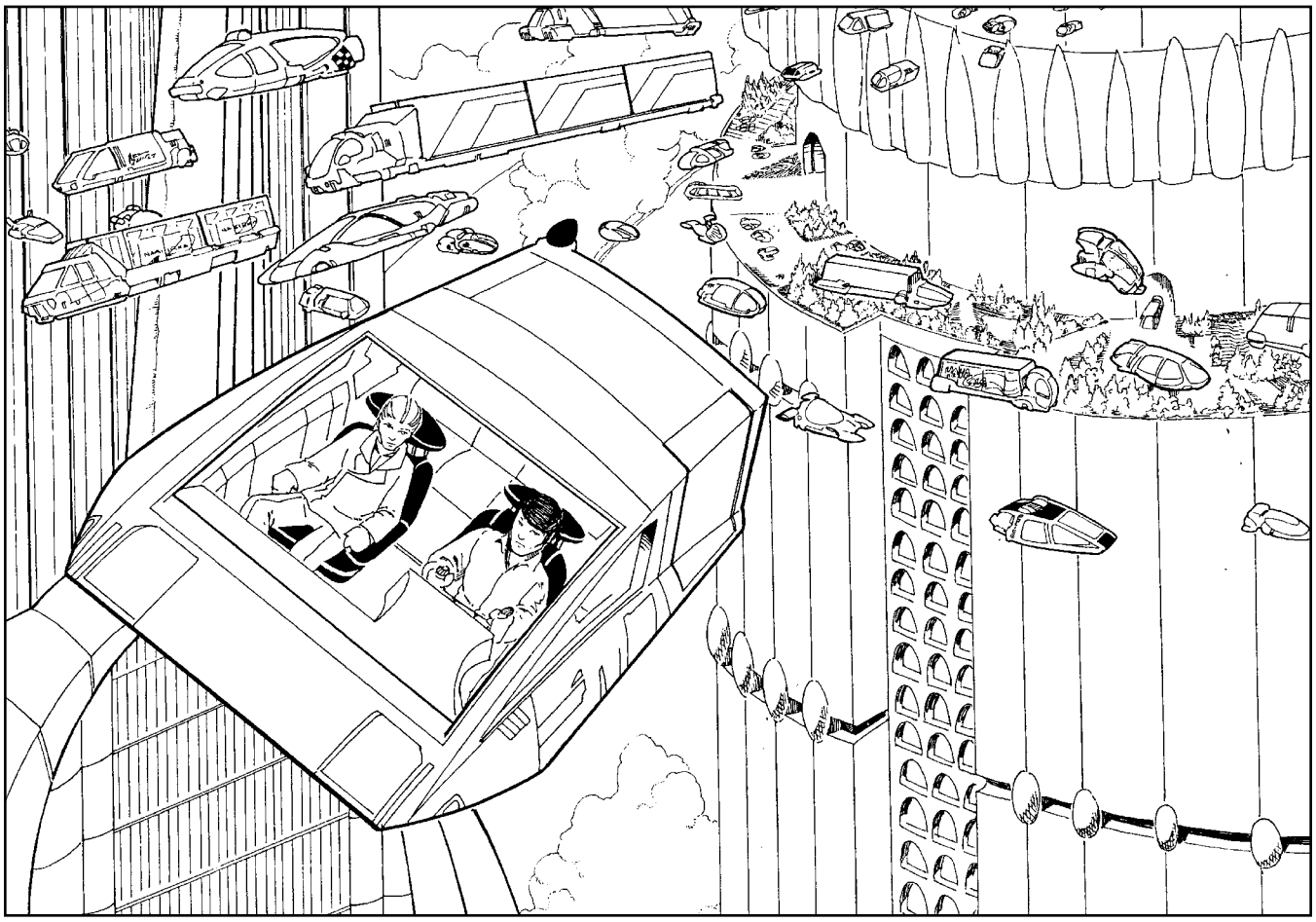
USER INTERFACE PROGRAMS
Any computer system that is intended to be programmed or to interact with people will require some form of user interface. More sophisticated interfaces allow easier use for untrained users, and generally more pleasing interactions.

Language Module
Type: User Interface
Cost: 1000
PP Capacity: 5
Effect: The computer can comprehend a specific spoken language. These modules are installed to provide the computer access to languages other then the default language provided by the appropriate voice recognition software. If a voder is available to the computer it may also provide verbal data and information output.

Personality Interface
Type: User Interface
Cost: 10,000
PP Capacity: 1
Effects: Gives an intelligent computer an effective Charisma score. Cost and PP requirements are per 2 points of Charisma.
Requirements: A voder and the standard voice recognition software must be installed and running before this program may be utilized. Must have an INT score of 3 or higher.

Etiquette and Protocol
Type: User Interface
Cost: 50,000
PP Capacity: 4
Effects: Allows an intelligent computer with a Charisma score of 10 or higher to also have an effective Social Standing. Cost is per point of total Social Standing, and CPU requirements list the base CPU requirements for a SOC score of 10 along with the CPU requirements for each point of SOC over 10.
Requirements: Personality Interface program. Must have an INT score of 10 or higher.

VESSEL OPERATIONS PROGRAMS
Starships and space vessels (and other large vehicles) use computer software to fulfill specific operational requirements.



Anti-Hijack
Type: Operations
Cost: 1000
PP Capacity: 1
Effect: Aids in the prevention of stowaways and hijackings. Anyone attempting to hide aboard or enter the restricted area of a vessel equipped with this program must make a Hide skill check (DC15) to avoid being detected by the software. Similarly, anyone attempting to enter or bypass a security system aboard the vessel or the security of the computer itself must make an additional appropriate skill check (DC15) to avoid the program detecting the bypass attempt, regardless of whether the attempt was successful or not.

Generate
Type: Operations
Cost: 8000
PP Capacity: 1
Effect: Produces a flight plan for the Jump program based on the input of the astrogator. Without this program, it would take an astrogator approximately 24 hours minus the astrogator's T/Astrogation skill rank, per 1 point of jump distance, to create the flight plan manually. For example, it would take someone with a T/Astrogation skill rank of 16, some 32 hours to plot a Jump-4 flight plan (24 - 16 = 8 * 4 = 32).

Jump
Type: Operations
Cost: see below
PP Capacity: see below
Effects: This program is required to operate the jump drives of a starship so that the ship may travel through interstellar space. The jump drive itself determines which version of the program is required. A ship equipped with a Jump-1 drive will require the Jump-1 program, etc.

Version	*PP*	*Cost*
Jump-1	23	100,000
Jump-2	30	300,000
Jump-3	37	400,000
Jump-4	41	500,000
Jump-5	44	600,000
Jump-6	52	700,000

COMPUTER ACCESSORIES

CONTROL PANELS AND TERMINALS

Control panels and terminals have no computer processing power of their own; rather they allow a user to remotely issue commands to a larger and more powerful central computer (or server) and echo the results upon the panel or terminal screen. Unless a computer is Intelligent (INT 3+) and capable of acting on its own, one or more control panels or terminals must be installed to allow users to interface with and command it.

Basic Mechanical: Min TL is 5, cost is Cr10000, volume is 1.35vl, and has a throughput of up to 5CPU per unit installed.

Advanced Mechanical: Min TL is 6, cost is Cr10000, volume is 1.35vl, and has a throughput of up to 8CPU per unit installed.

Electronic: Min TL is 7, cost is Cr1000, volume is 1.35vl, and has a throughput of up to 10CPU per unit installed.

Advanced Electronic: Min TL is 9, cost is Cr1000, volume is 1.35vl, and has a throughput of up to 100CPU per unit installed.

Dynamic: Min TL is 11, cost is Cr2000, volume is 1.35vl, and has a throughput of up to 200CPU per unit installed.

Holographic: Min TL is 13, cost is Cr1000, volume is 1.35vl, and has a throughput of up to 240CPU per unit installed.

VEHICLE DESIGN

A vehicle is basically defined as any means of conveyance that does not leave the lower orbit of a planet. Air/rafts, ground cars, tanks, jet fighters, and submarines would all be considered vehicles, but an interstellar or even an interplanetary vessel would not be considered a vehicle under these rules (separate rules cover the design of such vessels, see Spacecraft and Starship Design, pg. 253).

SPECIAL FEATURES OF VEHICLE DESIGN

Components and Sub-Assemblies: Vehicles (and Starships, Small Craft etc), are generally made up of a chassis (or frame) plus several very different sub-assemblies. These include primary systems such as power and drive systems, electronic systems such as an autopilot computer, and peripheral systems such as air conditioning for crew comfort.

Thrust: Thrust is a measure of the amount of power delivered by the vehicle's drive train. The actual means of delivery are quite varied, including ducted fans, wheels, legs and contragravity systems. The characteristics of various drive systems determine the ratio of energy to thrust they can deliver. Greater thrust correlates to more speed, at a rate depending upon the mass of the vehicle.

INSTALLATION AND MAINTENANCE

If a vehicle is purchased from a dealer, it can be assumed to come complete and in working order. However, if characters are constructing a vehicle to a custom design, a T/Mechanical check must be made when installing some types of systems to ensure they have been installed properly. Use the table below to determine the appropriate DC. A successful check indicates the system has been installed and tested with no problems found. Failure indicates that the system does not work properly and must be reinstalled. At the Referee's option, the roll can be made secretly. If it is failed by up to 3 points, the system seems to work well enough but will begin to display insidious faults after a period of use. More serious failures will be obvious immediately. Installations will typically take 1d6 hours. The same system can be used when vehicle components are pulled for routine or emergency maintenance.

Installations	*DC*
Other	10
Drive Train	15

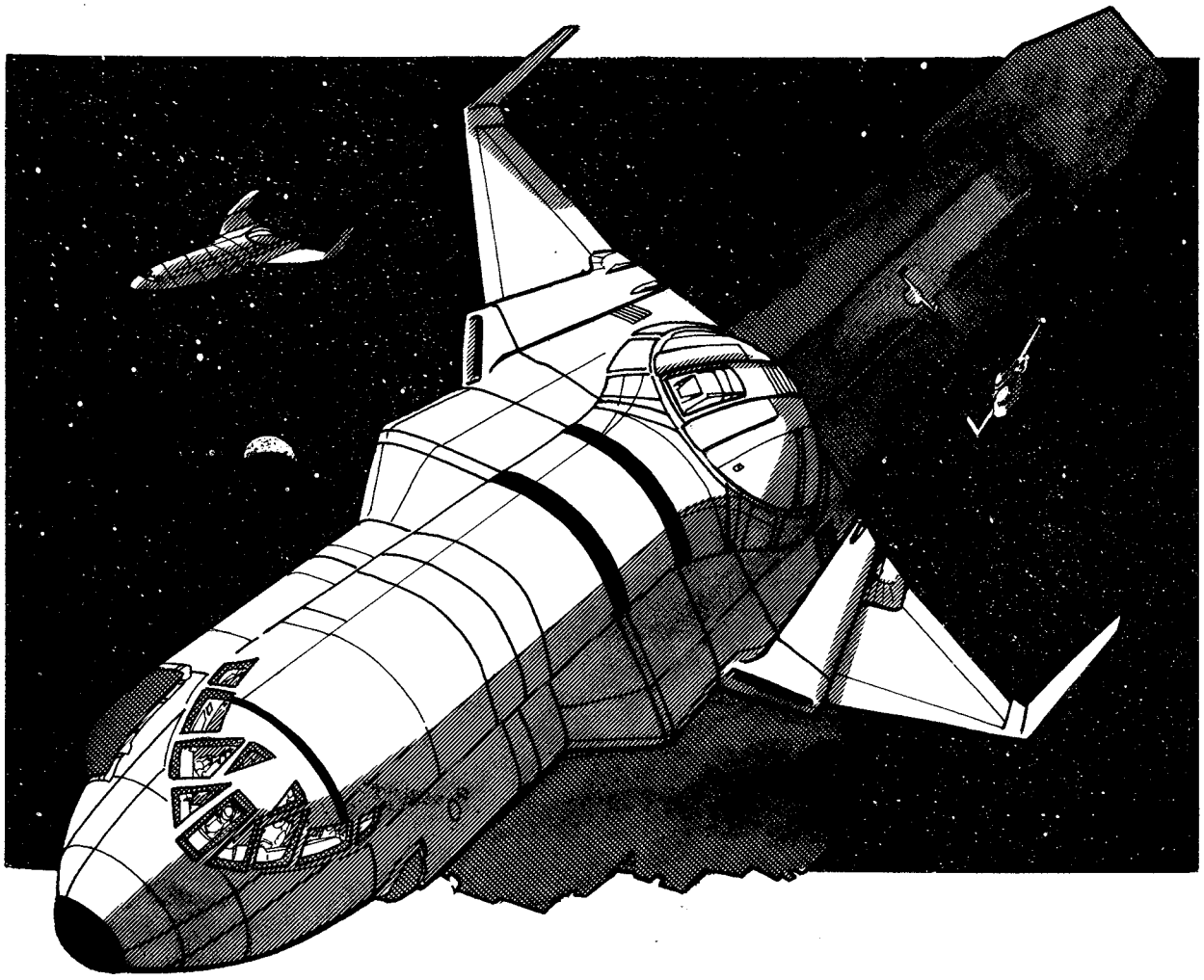
Other Modifiers	*Adjustment*
Sufficient Vehicle Shops	+1 to skill check roll
Per 5% understaffed on needed crew	-1 to skill check roll

DESIGN PHILOSOPHY

Vehicles are normally designed with a particular purpose and environment in mind. Most are intended to transport something around (passengers, cargo, a weapon system) and to give some form of protection from the environment (this can mean anything from a wind shield to heavy armor plate).

Civilian vehicles are rarely designed with combat use in mind, though many "frontier" types have offroad mobility as good as that of any military vehicle. The more sturdy frontier vehicles such as the ATV are as well protected as some low-tech military vehicles, and more mobile. Many are used as APCs by mercenary units unable to afford specialist military vehicles. For the most part, however, civilian vehicles are designed for a friendly environment. They provide transport and possibly one or more of the following: reliability, rugged terrain capability, hostile environment support, high speed, rapid acceleration, economy, comfort, prestige.

Military vehicles are similarly built to a particular requirement. Rugged terrain performance is a given. The vehicle's mission determines its other characteristics. A



lightly armed and armored recon vehicle has to be much faster than a heavy assault tank; a cargo carrier needs little protection but a heavy chassis to carry weight. Many militaries like to buy a vehicle for use in many roles, with variants acting as APC, field ambulance, artillery tractor, cargo hauler and command post. This makes maintenance cheaper and easier, and improves spares availability. However, front-line military vehicles are often designed with no regard to cost.

VEHICLE COMPONENTS

All vehicles are made up of several sub-systems. Any vehicle design will include some or all of the following:

1) Chassis: All vehicles require a chassis, which forms the body or shell of the vehicle into which everything else is either attached or installed.

2) Armor: Vehicles may be armored to protect them from damage due to enemy fire or other hazards such as hostile environments. While not required, armor is important if the vehicle will be used in situations where the occupants might come under fire.

3) Drive Train: The drive train is the type of locomotion the vehicle uses to move itself. This can be anything from wheels, tracks, or legs, to anti-gravity plates, jet thrusters, or propellers. Select the appropriate drive train for the vehicle you are designing. Note that some drive trains require that you install at least 2 of the specified type (specifically wheeled, tracked, and legged vehicles). You may always install more than the required number of drive train systems as redundant backup systems, or even to improve the handling of a vehicle in some cases.

4) Power Plant: All vehicles require a power plant, without which it would not be a vehicle but a sculpture. Most components installed into a vehicle will require some amount of power to function. The larger the power plant installed, the more power the vehicle generates each turn with which it may power its installed systems and components. A vehicle's power plant also plays a significant part in the maximum speed a vehicle is capable of achieving.

CHASSIS SIZE TABLE

Chassis Size (vl)	Size	Cost (Cr)	Build Time	Thrust Required	Base Armor Volume (vl)
1	Tiny	1	1 hour	0.001 per 1kph	0.01
5	Tiny	5	1 hour	0.005 per 1kph	0.05
10	Small	10	1 day	0.01 per 1kph	0.1
50	Medium	50	1 day	0.05 per 1kph	0.5
100	Medium	100	1 week	0.1 per 1kph	1
500	Large	500	1 week	0.5 per 1kph	5
1000	Large	1000	1 month	1 per 1kph	10
5000	Huge	5,000	1 month	5 per 1kph	50
10,000	Huge	10,000	6 months	10 per 1kph	100
50,000	Gargantuan	50,000	6 months	50 per 1kph	500
100,000	Gargantuan	100,000	12 months	100 per 1kph	1000
500,000	Colossal	500,000	12 months	500 per 1kph	5000
1,000,000	Colossal	1,000,000	24 months	1000 per 1kph	10,000

5) Appendages: Manipulatory appendages designed for either power, strength and carrying capacity, or light, delicate work may be installed on any vehicle. These appendages may be used to move cargo and equipment or even handle delicate surgery with the proper programming or controller.

6) Weapons: Many vehicles are equipped with defensive and offensive weaponry. Anything from a simple light machinegun to the incredibly devastating meson gun may be mounted on a vehicle, providing it is capable of carrying and powering it.

7) Sensors: Even the best of pilots and drivers can't be aware of everything going on around them, so various types of sensor and detection systems have been developed for use with vehicles.

8) Other Equipment and Features: Almost any other feature or system not presented in the earlier sections can be added, ranging from small staterooms, passenger couches and crew bunks to sophisticated systems such as autodocs.

9) Robot Brains: Robots may also be designed using the vehicle system. A robot has the same requirements as a vehicle and may install the same components, but a robot must also have a 'brain' installed to control its independent function. A vehicle with a robotic brain to direct its functions may be considered a "robotic vehicle" or a "transport robot"; its function is the same in both cases.

CHASSIS

The first step in designing any vehicle is to determine the size of the chassis that will be used. The chassis determines how large a vehicle is, and is the maximum limit to the size of equipment, personnel and cargo it may carry or have installed within. Vehicles, and thus their chassis, are rated in terms of their volume (vl). A 100vl chassis is roughly the equivalent size of a human being. Vehicles can truly be of any maximum size, but few are much larger than 100,000,000vl.

Sample Chassis Types: Here are a few sample types of chassis for commonly recognized vehicles (empty chassis only).

Basic Chassis Samples	Average Size	Cost
Ground Car	2000-5000vl	Cr4000-10,000
Air/raft	4,000vl	Cr8,000
Jet Fighter	8500vl	Cr17,000
All Terrain Vehicle	10,000vl	Cr20,000
Grav Tank	40,000vl	Cr80,000
Battleship	30,000,000-40,000,000vl	MCr60-80

To find the cost of a particular size chassis, find the listing for the chassis size desired on the table above. For odd sized chassis not listed, simply add the appropriate listed smaller sized chassis as need to find the actual price. For example, when designing a vehicle with a 522vl chassis you would add the price for one 500vl chassis, two 10vl chassis, and two 1vl chassis.

Cost: Cost is listed in Credits. When building an odd size chassis not listed, add all portions together to determine the total cost of the chassis. Our 522vl chassis from the example above would cost Cr522 (Cr500 + Cr10 + Cr10 + Cr 1 + Cr1). This does not include the cost of any other components or subsystems that will be installed later.

Build Time: The approximate time required to build a vehicle of the given size. When building an odd size chassis not listed, use the greatest build time for the largest listed portion as the total build time. For example, our 522vl chassis would take 1 week to be constructed, as 1 week is the greatest build time of all portions (500vl, 10vl, and 1vl). The build time includes the installation of all subsystems and components.

Manned Control System: A vehicle that will be operated directly by a person or creature who is enclosed within the vehicle requires a minimum control space of 110vl or 20% of the total chassis size, whichever is greater. These control systems assume space for the operator (up to 100vl in size) and cost Cr2.5 per vl. Control systems for larger operators would require correspondingly greater amounts of control systems and space to accommodate their increased size and bulk.

If the operator is to ride on the outside of the vehicle, (e.g. on a motorcycle or grav bike) the control space size and cost is the same as for a remote-control system.

Our 522vl vehicle will require us to set aside 110vl for the operator and control systems. Note that we are using the minimum required value because 20% of 522vl is only 104.4vl. These control systems would cost us Cr275.

Remote Control Systems: A vehicle that will be operated remotely requires only 10% of the total chassis size, and there is no minimum size required. The downside is that remote control systems cost Cr5 per vl installed, twice as much as manned control systems. Some method of communication with the control systems must also be installed. If our 522vl vehicle were to be remotely controlled rather than manned, we would only have to set aside 52.2vl for control systems but our cost would be almost as much, at Cr261.

Thrust Required: The amount of thrust required depends upon how fast the vehicle is to go. The Chassis Size Table indicates the amount of thrust that must be generated by the vehicle's drive train (selected later) in order to move the vehicle at a maximum speed of 1 kph. If greater speed is desired, extra thrust must be provided. Thus for a 1000vl chassis vehicle to have a maximum speed of 100 kph, the vehicle must produce 100 units of thrust. For an odd size chassis not listed, add the Thrust requirements for all portions. Our 522vl chassis would require 52.2 units of thrust to move at a maximum speed of 100 kph (0.5 + 0.01 + 0.01 + 0.001 + 0.001 = 0.522 * 100 = 52.2)

Armor Factoring: Any vehicle, including non-military vehicles may install armor, but it is not required for most non-military types unless protection from hostile environments, predators etc is desired. The defensive value of the armor installed depends on the Armor Rating (AR) selected. The higher the AR bonus value installed the greater the level of protection afforded. A vehicle may install as high an AR in armor as the builder can afford and has room for, up to a limit equal to the available technological level. For example a TL15 vehicle could install up to an AR of 15, while a TL6 vehicle would be limited to a maximum AR of 6. This reflects improvements in armor design such as composite materials. In addition, advanced armor takes up less space for the same protection value.

TL4-9 Armor: Multiply the chassis Base Armor Volume by 4.

TL10-11 Armor: Multiply the chassis Base Armor Volume by 3.

TL12-13 Armor: Multiply the chassis Base Armor Volume by 2.

TL14+ Armor: Multiply the chassis Base Armor Volume by 1.

Armor Rating (AR): Without armor, a vehicle's AR rating is 0. To achieve the first layer of armor (AR of 1), a vehicle must install twice the Base Armor Volume specified for the chassis and TL of the armor. For example a TL12, 200-ton vehicle has a Base Armor Volume of 4, so to get an AR of 1 it must install 8 vl of armor.

Once the first layer of armor is installed, the vehicle need only allocate an amount of space equal to the Base Armor Volume specified for the chassis and TL of the armor per +1 improvement in the vehicle's AR. Following our previous example, the same TL12, 200-ton vehicle could improve its AR to a maximum of 12 (limited by its TL) after installing an additional 44 vl of armor (for a total of 52 vl).

Cost: At all TLs, applying armor to a vehicle costs a basic Cr 3,000 plus Cr 9 per vl installed. Advances in technology give better protection per vl, so the same level of protection is cheaper as well as less bulky at high TLs.

Chameleon Armor: Chameleon armor first becomes available at TL13 and allows a vehicle to blend it with both its physical and atmospheric surroundings making it much harder to spot visually or detect with scanners. At TL13 this type of armor adds +2 to the DC of any Spot or T/Sensor skill check made against the vehicle, and adds an additional +1 to the effective Armor Class (AC not AR) of the vehicle making it harder to hit. Chameleon armor does not increase the AR of a vehicle against incoming damage. At TL14 these bonuses increase to +4 DC for any Spot or T/Sensor check against the vehicle and adds +2 to the AC.

Cost for chameleon armor is Cr10 per vl size of the total chassis at TL13, and Cr20 per vl size of the chassis at TL14. For example, a 1000vl vehicle with TL13 chameleon armor would cost an extra Cr10,000. If it were to install TL14 chameleon armor instead, it would cost an extra Cr20,000.

HOW FAST DO YOU WANT TO GO?

This is a good point to determine what you want the maximum speed of your vehicle to be. The basic chassis table determines the amount of thrust required to move the vehicle chassis at a speed of 1kph. If more thrust is available the vehicle can move faster. For example, a vehicle built using a 64,510vl chassis would require 64.51 units of thrust to move it at a maximum speed of 1kph:

Chassis	*TH*
50,000vl	50
10,000vl	10
4,000vl	4
500vl	0.5
10vl	0.01
64,510vl	64.51

Each additional 64.51 units of thrust that can be applied will improve the maximum speed of the vehicle by 1kph. So for our 64,510vl vehicle to move at a maximum speed of 90kph, a total of 5805.9 units of thrust must be available.

If you find that you cannot provide sufficient thrust or power to move the vehicle at the desired speed, you will either need to reduce your speed expectations, or increase the size of the chassis.

CHASSIS CONFIGURATION

The configuration of the chassis of a vehicle is important in determining its overall speed and range. Streamlining makes a vehicle much more aerodynamic, allowing it to move through an atmosphere easier with less resistance, but sacrifices some interior volume. An airframe, usually reserved for aircraft and watercraft, takes streamlining a step further, maximizing the vehicle's aerodynamic potential at a further cost in terms of internal space.

If a vehicle operates faster than the maximum rated safe speed it steadily becomes much harder to control, requiring the operator to make a Driving or Pilot skill check (DC15) or lose control of the craft.

Standard Chassis: A standard chassis has a maximum safe speed of 320 kph; the operator suffers a -1 control check penalty for every 30kph (or fraction thereof) of speed above 320kph. Unless specified otherwise, all vehicles are considered to be of a standard configuration.

Partially Streamlined Chassis: A partially streamlined chassis has a maximum safe speed of 600 kph; the operator suffers a -1 control check penalty for every 20kph (or fraction thereof) of speed above 600kph. Partial streamlining doubles the Basic Chassis cost.

Streamlined Chassis: A streamlined chassis triples the Basic Chassis cost and provides +1 maximum Agility for aircraft or watercraft, +10% maximum speed and cruising range for all vehicles. This Agility bonus does not add to the Agility score itself; rather it increases the maximum possible Agility of a vehicle based on the type of drive train installed. For aircraft, this bonus applies only when flying within a standard or dense atmosphere. A streamlined chassis has a maximum safe speed of 800kph; the operator suffers a -1 control check penalty for every 30kph (or fraction thereof) of speed above 800kph.

Airframe Chassis: An airframe quadruples the Basic Chassis cost and provides +2 maximum Agility for aircraft or watercraft, +20% maximum speed and cruising range for all vehicles. This Agility bonus does not add the Agility score itself; rather it increases the maximum possible Agility of a vehicle based on the type of drive train installed. This bonus applies only for aircraft flying within a thin, standard, or dense atmosphere. An airframe chassis has a maximum safe speed of 1100kph; the operator suffers a -1 control check penalty for every 10kph (or fraction thereof) of speed above 1100kph.

Humanesque: When designing a robot under 200kg, it may be desirable to give it a more human (or other racial) form if the robot will require interaction with the given form of life. This form is typically very vague with no specific features, much like a blank store mannequin. Adds +2 to the base CHA of the robot if it has the Personality software module installed and running. This configuration will double the final cost of the robot, not just the chassis.

Humaniform: A much more refined version of the humanesque robot chassis, nearly indistinguishable from a

real version of the given lifeform itself. Skin tone, texture, color, temperature, etc., simulate the real lifeform quite realistically. Adds +4 to the base CHA of the robot if it has the Personality software module installed and running. Add +2 to the base SOC of the robot if it has the Etiquette and Protocol software module installed and running. This configuration will increase the final price of the robot to 8x its original total price (not just the chassis).

DRIVE TRAINS

While the power plant of a vehicle is what generates the energy necessary to power all of its systems, the drive train is what actually makes it go by producing Thrust (TH) converted from the energy provided by a powerplant (selected later).

Drive trains are bought and installed in increments called Drive Train Units (DTU). Multiple DTU may be installed as a single drive train, or as multiple drive trains, each able to function independently but providing the same amount of total thrust when all are operating at 100%. There is usually a penalty in size and cost however when splitting a drive train into multiple sections. All drive trains require Energy Points (EP) from a powerplant.

By selecting one of the drive trains below, you should be able to recreate most any type of vehicle from ground cars, to tanks, to aircraft and more.

Wheeled: Wheeled vehicles are the most commonly encountered types throughout charted space because of their reasonable handling characteristics and relatively low cost and power requirements. Most wheeled vehicles use four wheels, but some use as few as two or as many as 18 or more. The more pairs of wheels installed the better the handling capability of the vehicle.

First available at TL4, each Wheel DTU produces 10 units of thrust (TH) per EP of power applied per round, takes up 11vl per unit installed and costs Cr25.

Regardless of the number of DTU installed, the number of wheels used must be specified at design time. Any number of wheels may be specified for a wheeled drive train, usually (but not always) in pairs. The first two wheels do not require any additional volume or cost, but each additional wheel will add 0.5vl of volume per DTU and add Cr12.5 to the cost of each drive train unit. The total thrust of the drive train is divided by the number of wheels installed to determine the thrust produced by each wheel.

Tracked: Using large tracks wrapped around a flexible suspension system, vehicles utilizing this type of drive train handle much better than their wheeled counterparts in rough terrain, but have a more limited top speed. At least two tracks must be installed and additional pairs of tracks may also be installed as needed.

First available at TL5, each Track DTU produces 5 units of thrust (TH) per EP of power applied per round, takes up 9vl per unit installed and costs Cr12.5.

Regardless of the number of DTU installed, the number of tracks must be specified at design time. At least two tracks must be designated for any tracked drive train and more, usually (but not always) in pairs, may be added as desired. The first two tracks do not require any additional volume or cost, but each subsequent track installed will add 0.75vl to volume and Cr62.5 to the cost of each DTU. The total thrust of the drive train is divided by the number of tracks installed to determine the thrust produced by each track.

Legs: Vehicles that are designed to use flexible-limb legs are the most capable of handling rough types of terrain. Most vehicles are designed to use 2 to 8 legs, with 4 legs being the most common. A minimum of two legs must be installed, but there are no pair requirements beyond the first two for legged vehicles, thus it is possible to design a vehicle that utilizes 5 legs rather than 4 or 6.

First available at TL8, each Leg DTU produces 15 units of thrust (TH) per EP of power applied per round, takes up 42vl and costs Cr4500.

Regardless of the number of DTU installed, the number of legs must be specified at design time. At least two legs must be designated for any legged drive train and more, usually (but not always) in pairs, may be added as desired. The first two legs do not require any additional volume or cost, but each subsequent leg installed will add 10.5vl of volume per DTU and add Cr1125 to the cost of each DTU. The total thrust of the drive train is divided by the number of legs installed to determine the thrust produced by each leg.

Rotary Wing: A rotary wing aircraft (e.g. a helicopter) uses a rapidly rotating set of blades to generate lift and acceleration. Because of their design, rotary wing craft are capable of hovering in place.

First available at TL5, each Rotary Wing DTU produces 6 units of thrust (TH) per EP of power applied per round, takes up 2.5vl per unit installed and costs. Cr400 per unit.

Regardless of the number of DTU installed, the number of rotors used must be specified at design time. Any number of rotors may be specified for a Rotary drive train, usually (but not always) in pairs. The first rotor does not require any additional volume or cost, but each additional rotor will add 0.25vl of volume and Cr100 to the cost of each DTU. The total thrust of the drive train is divided by the number of rotors installed to determine the thrust produced by each rotor.

Air Cushion: Air cushion vehicles (or hovercraft) use a ducted fan system to produce a cushion of compressed air on top of which the vehicle rides. A hovercraft is quite mobile, capable of traversing fairly rugged terrain and even relatively calm bodies of water.

VEHICLE DRIVE TRAINS

Drive Train	Allow Multiple	Min TL Level	Thrust (TH) Generated	Power (EP) Required	Size/Volume	Cost	Max Agility
Wheeled	Yes	TL4	10 TH	1 EP	11vl	Cr25	4
Tracked	Yes	TL5	5 TH	1 EP	9vl	Cr12.5	3
Legs	Yes	TL8	15 TH	1 EP	42vl	Cr4500	5
Rotary Wing	Yes	TL5	6 TH	1 EP	2.5vl	Cr400	5
Air Cushion	No	TL6	4 TH	1 EP	1.5vl	Cr420	5
Propeller	Yes	TL4	20 TH	1 EP	5vl	Cr1250	5
Jet	Yes	TL5	80 TH	1 EP	10vl	Cr8000	6
Grav	No	TL8	100 TH	1 EP	4vl	Cr46,000	4
Water, Surface	No	TL4	20 TH	1 EP	25vl	Cr125	2
Water, Subsurface	No	TL5	5 TH	1 EP	10vl	Cr125	1

First available at TL6, each Air-Cushion DTU produces 4 units of thrust (TH) per EP of power applied per round, takes up 1.5vl per unit installed and costs Cr420 per unit.

Propeller: Propeller-driven vehicles use one or more drive trains mounted in a pusher (rear mounted) or puller (forward mounted) configuration. Propeller drive trains do not need to be installed in pairs.

First available at TL4, each Propeller DTU produces 20 units of thrust (TH) per EP of power applied per round, takes up 5vl per unit installed and costs Cr1250 per unit.

Regardless of the number of DTU installed, the number of propellers used must be specified at design time. Any number of propellers may be specified for a Propeller drive train. The first propeller does not require any additional volume or cost, but each additional propeller will add 0.5vl of volume and Cr125 to the cost of each DTU. The total thrust of the drive train is divided by the number of propellers installed to determine the thrust produced by each propeller.

Jet: A much more powerful and maneuverable type of aircraft, jets are capable of speeds similar to those attainable by grav vehicles.

First available at TL5, each Jet DTU produces 80 units of thrust (TH) per EP of power applied per round, takes up 10vl per unit installed and costs Cr8000 per unit.

Regardless of the number of DTU installed, the number of jets used must be specified at design time. Any number of jets may be specified for a Jet drive train. The first jet does not require any additional volume or cost, but each additional jet will add 0.1vl of volume and Cr1500 to the cost of each DTU. The total thrust of the drive train is divided by the number of jets installed to determine the thrust produced by each jet.

Grav: Almost as common as ground cars on higher technology worlds are antigravity or contragravity vehicles, more often referred to as 'grav' vehicles. Of all the drive trains available, grav modules offer the best speed and maneuverability for a vehicle.

First available at TL8, each Grav DTU produces 100 units of thrust (TH) per EP of power applied per round, takes up 4vl per unit installed and costs Cr46,000 per unit.

Water: Watercraft come in two types; surface and subsurface vehicles. Both use similar styles of propulsion, but subsurface vessels (when below the surface) are much slower than their surface counterparts.

Surface: First available at TL4, each Surface DTU produces 20 units of thrust (TH) per EP of power applied per round, takes up 25vl per unit installed and costs Cr125 per unit.

Subsurface: First available at TL5, each Subsurface DTU produces 5 units of thrust (TH) per EP of power applied per round, takes up 10vl per unit installed and costs Cr125 per unit.

Multiple: The drive train can be subdivided into multiple, independent sections usually at an increase to the cost and size of the drive train.

Tech Level: The minimum technological level at which this type of drive train is commonly available.

Thrust Generated: The amount of thrust (TH) generated per Drive Train Unit (DTU) installed for every 1 Energy Point (EP) applied to the drive train.

Size/Volume: The amount of size/volume each installed DTU requires within the chassis.

Cost: The cost in Credits per DTU installed.

Max Agility: The maximum agility rating for a vehicle equipped with this type of drive train.

POWER PLANTS

Every vehicle must have a power plant to supply the energy needed by all the various installed components, particularly the drive train. If you want a fast vehicle, not only do you need a drive train capable of producing the necessary thrust, but you must also have a power plant capable of producing the energy needed to feed the drive train to capacity. If a vehicle has an undersized power plant, it is going to be limited by the maximum amount of power it actually delivers to the drive train, rather than the maximum rated speed for the drive train itself.

Various types of power plants are available depending upon the available technology. Each of the power technologies available below represents the smallest size unit possible for that type. Any size power plant may be installed equal to or greater than this smallest size to produce the required power for a vehicle.

Steam: Available at TL4, early versions of these power plants typically use wood, coal, or other readily available combustible fuel source to heat water and produce power using steam pressure. Bulky, noisy, temperamental, and quite dangerous if the boiler builds up too much pressure, steam engines are nonetheless a vital part of any developing technological society in its early stages of industrialization.

A steam power plant unit requires 25vl, produces 1 EP per round, costs Cr25, and requires 0.25vl of fuel per hour of operation.

Internal Combustion: When the smaller and more efficient internal combustion engine becomes available at TL5, most steam applications are relegated to antiquity. These hearty power plants remain a common fixture even in many higher technology societies.

An internal combustion engine unit requires 5vl, produces 1 EP per round, costs Cr50, and requires 0.5vl of fuel per hour of operation.

Turbine: Available at TL7, the turbine is a refinement and improvement of the internal combustion engine, providing more power, more efficiently, in a smaller package, but at a higher cost.

A turbine power plant unit requires 2vl, produces 1 EP per round, costs Cr100, and requires 0.25vl of fuel per hour of operation.

Fuel Cells: Chemical fuel cells first become available at TL9, and offer similar performance to the turbine, and much improved performance over the internal combustion engine, but these early alternatives are quite a bit more expensive.

A fuel cell unit requires 2vl, produces 1 EP per round, costs Cr300, and requires 0.15vl of fuel per hour of operation.

Advanced Fuel Cells: By TL12 new, more advanced fuel cell power systems become available and offer a much better alternative to earlier power plants.

An advanced fuel cell unit requires 1.5vl, produces 1 EP per round, costs Cr100, and requires 0.05vl of fuel per hour of operation.

Fission: These early nuclear power plants become available at TL7 and produce incredible amounts of power very efficiently, but still require very large amounts of space at this stage, and can produce catastrophic disasters if damaged or allowed to melt down. In addition, a fission plant produces an amount of highly radioactive waste equal to its fuel consumption that must be stored and ultimately disposed of safely.

A fission power plant unit requires 6000vl, produces 1000 EP per round, costs MCr1.32, and requires 140vl of fuel per month of operation.

Early Fusion: A much safer and cleaner alternative to fission plants, fusion first becomes available at TL8. Fusion plants are not subject to the risk of meltdown, nor do they produce any toxic (or other) waste material that must be dealt with.

An early fusion power plant unit requires 450vl, produces 100 EP per round, costs KCr100, and requires 150vl of fuel per month of operation.

Modern Fusion: By TL13 research and manufacturing advances have begun to produce fusion power systems in smaller sizes, with the same efficiency of larger models.

A modern fusion power plant unit requires 30vl, produces 10 EP per round, costs Cr6600, and requires 15vl of fuel per month of operation.

Advanced Fusion: At TL15, research and modernization once again allow for the construction of even smaller fusion plants of amazing power and efficiency.

An advanced fusion power plant unit requires 1.5vl, produces 1 EP per round, costs Cr330, and requires 1.5vl of fuel per month of operation.

High Tech Fusion: The ultimate in fusion power becomes available at TL16 offering the smallest power plant possible before the advent of antimatter plants.

A high tech fusion power plant unit requires 0.5vl, produces 1 EP per round, costs Cr330, and requires 1.5vl of fuel per month of operation.

Antimatter: Even fusion is nearly rendered obsolete with the availability of antimatter power systems at TL17. Cheap, requiring little fuel, and capable of producing tremendous amounts of power from even the smallest of systems, antimatter is at once the ultimate power system and an incredible danger. Should even the smallest amounts of antimatter escape the containment systems the results would be catastrophic to all people and items within a fairly sizable radius of the power plant.

An antimatter power plant unit requires 0.2vl, produces 1 EP per round, costs Cr110, and requires 0.001vl of fuel per year of operation.

VEHICLE POWER PLANTS

Power Plant Type	Minimum Tech Level	Unit Size	Power Output	Unit Cost	Fuel Required Per Unit
Steam	TL4	25vl	1 EP	Cr25	0.25vl per hour
Internal Combustion	TL5	5vl	1 EP	Cr50	0.5vl per hour
Turbine	TL7	2vl	1 EP	Cr100	0.25vl per hour
Fuel Cells	TL9	2vl	1 EP	Cr300	0.15vl per hour
Advanced Fuel Cells	TL12	1.5vl	1 EP	Cr100	0.05vl per hour
Fission	TL7	6000vl	1000 EP	MCr1.32	140vl per month
Early Fusion	TL8	450vl	100 EP	KCr100	150vl per month
Modern Fusion	TL13	30vl	10 EP	Cr6600	15vl per month
Advanced Fusion	TL15	1.5vl	1 EP	Cr330	1.5vl per month
High Tech Fusion	TL16	0.5vl	1 EP	Cr330	1.5vl per month
Antimatter	TL17	0.2vl	1 EP	Cr110	0.001vl per year

FUEL TANKS AND OPERATIONAL DURATION

The amount of 'fuel' onboard a vehicle determines how long it can operate without needing to be refueled. It is up to the designer of the vehicle to determine how long this will be, based on need and available space. Every power plant has a specific rate of fuel consumption per hour. To determine how much fuel tankage will be required, multiply the number of hours of operation a vehicle is to be capable of by the fuel requirements of the installed power plant.

For example, a vehicle is designed with a power plant that consumes a total of 14vl of fuel per hour of operation. If the designer wants the vehicle to be capable of operating for up to 10 hours before requiring it to be refueled, a total of 140vl of fuel tanks must be instaledl to accommodate the needed fuel.

Operational Duration (in Hours) X Total Power Plant Fuel Requirements = Fuel Tankage Required (in volume).

Fuel tanks do not add to the cost of a vehicle, but their volume must be accounted for in the final designs.

BATTERIES

Rechargeable battery packs are available to supply power to vehicles for a limited duration. They hold a specific number of EPs that may be used by the vehicle before the battery is drained and must be recharged. 1 battery unit can discharge up to 1 EP for 1 hour. Thus a battery that will provide 1 EP every hour for 24 hours would require a storage capacity of 24 EP. A 24-hour, 7-day a week, 1 EP battery would have a storage capacity of 168 EP.

Recharging may be accomplished by hooking the battery into any available power plant/supply, at a rate of 1 EP recharged per round the battery is hooked to the power supply.

Crude Battery: These bulky, cumbersome contraptions are quite inefficient, but do work. First available at TL5, they cost Cr200, take up 0.4vl, and store 1 EP per unit.

Basic Battery: By TL9, batteries are quite common for small tasks, and have some use in larger applications, being far more efficient than their earlier counterparts. Basic batteries cost Cr35, take up 0.1vl, and store 1 EP per unit.

Modern Battery: The modern battery becomes available at TL11, and continues in wide use at later technological levels. These batteries cost Cr30, take up 0.04vl, and store 1 EP per unit.

VEHICLE BATTERIES

Battery Type	Minimum Tech Level	Unit Cost	Unit Volume	Unit Storage Capacity
Crude	TL5	Cr2	0.4vl	1 EP
Basic	TL9	Cr0.25	0.1vl	1 EP
Modern	TL11	Cr0.30	0.04vl	1 EP
Advanced	TL14	Cr0.50	0.01vl	1 EP

ENVIRONMENTAL CONTROLS

Facilities	TL	Cost	Energy	Size Requirements
Pressurized Interior	5	Cr25	0.025EP	1vl per 20vl of chassis size (5%)
Climate Control	7	Cr50	0.01EP	1vl per 100vl of chassis size (1%)

Advanced Battery: A more advanced battery system becomes available at TL14, but while smaller, the cost is higher per unit at a volume of 0.01vl and a cost of Cr50. Storage capacity remains at 1 EP per unit however.

PASSENGER AND CREW FACILITIES

Unless you are designing a robot or remotely controlled vehicle, you will need to provide facilities for the crew (other than the pilot/driver) and passengers that may be carried aboard.

ENVIRONMENTAL CONTROLS

Pressurized Interior: The interior of a vehicle may be equipped to be pressurized against an outside atmosphere. Without such a feature, if a vehicle is operated in a Vacuum, Trace, Very Thin, Tainted, Exotic, Corrosive, or Insidious atmosphere, the crew and passengers will be required to wear appropriate survival equipment.

It is assumed that the environmental facilities will be able to support a number of passengers equal to the normal passenger load of the vehicle for a period of time equal to four times the operational duration of the vehicle on a full tank of fuel. So a pressurized vehicle with an operational range of 10 hours at cruising speed, could provide a sealed environment for its passengers for up to 40 hours.

Pressurized Interiors can be installed on any vehicle of TL5. Pressurizing each 20vl of chassis size costs Cr25, requires 0.025EP per round and takes up 1vl.

Climate Control: A climate control system will allow the vehicle to be operated under conditions ranging from dry desert heat to high humidity swamps to frozen tundra without difficulty. Provides a +5 circumstance bonus to most checks relating to bad weather. This feature does not pressurize the interior of the vehicle; rather it circulates and controls the temperature and humidity of the interior air. One unit must be installed per 100vl of chassis size (unless the vehicle is to be without any form of climate control). First available at TL7, each unit costs Cr50, requires 1vl and 0.01EP per round.

FACILITIES

A number of facilities are available for accommodating crew and passengers, depending on the requirements of the vehicle and the needs of the users.

Passenger Saddle: A saddle is a mount on the exterior of a vehicle suitable for a driver/pilot or passenger to safely ride upon. Cost is Cr25 and volume required is 10vl per saddle installed.

Passenger Stand: A passenger stand is usually just a pole running from the ceiling to the floor of the vehicle. Up to 6 passengers may cluster around the pole, using it as a brace against the force of the acceleration and deceleration of the vehicle. Handhold straps may also be available around the pole. Passenger stands are typically found in mass-transit vehicles where accommodating the maximum number of passengers is highly desirable and violent maneuvers are not expected. This often creates rather crowded conditions, which limits the time a passenger can be expected to tolerate such conditions to about 10 minutes. Cost is Cr10 and volume is 5vl for the pole and 100vl per position around the stand. Handstraps add Cr1 to the cost but do not increase the required volume.

Passenger Seating: A standard passenger seat with basic restraining harness, found in most short range private and commercial vehicles. Cost is Cr100 and volume is 110vl per seat installed. These costs assume a human sized passenger; they should be adjusted proportionately for larger or smaller creatures.

Passenger Couch: A harnessed acceleration couch to protect passengers from the dangers of high-G maneuvers, typically found in fast, highly maneuverable atmospheric craft such as rockets and fighter aircraft. Cost is Cr2000 and volume is 200vl per (human-sized) couch installed.

Passenger Bunk: Little more than a padded cushion, cot, or hammock big enough for a human to lie down and rest (if they don't move about too much...). A drape or screen may be available for some privacy, and there is room to store about 25vl in personal cargo and possessions. Cost is Cr250 and volume is 150vl per bunk installed.

Privacy Cubicle: Not much bigger than a small fresher, the privacy cubicle does offer a passenger bunk (see above) and a small storage unit able to hold up to 100vl of personal goods. The ability to lock a cubicle offers a bit more privacy than an open bunk, and a modicum of security for items stored within (although a determined thief could force the door rather easily). Cost is Cr4000 and volume is 500vl per cubicle installed.

VEHICLE PASSENGER AND CREW FACILITIES

Facilities	*Size*	*Cost*
Passenger Saddle	10vl	Cr25
Passenger Stand	See description	Cr10
Passenger Seating*	110vl	Cr100
Passenger Couch*	200vl	Cr2000
Passenger Bunk*	150vl	Cr250
Privacy Cubicle	500vl	Cr4000
Small Cabin	2000vl	Cr8000
Galley Facilities	200vl	Cr1000
Fresher Facilities	200vl	Cr750
Low Berth	500vl	KCr50
Engineering Shop	1000vl	KCr20
Vehicle Shop	1000vl	KCr10
Laboratory	800vl	KCr50
Sickbay	1000vl	KCr100
Autodoc	2000vl	MCr1

*These represent the minimum free space (vl) required to accommodate the passenger in rather cramped conditions. Roomier accommodations may be added by increasing the size and cost by x2 or x3. If a passenger is expected to spend more than 8 hours in the facilities at a time, multiply the size and cost by x4. This extra volume reflects roomier and more comfortable facilities and larger and more accommodating access to the facility, lounges and common areas etc. in other parts of the vehicle.

Size: The number of free kilograms that must be available in the chassis to accommodate the equipment.

Cost: Cost in Credits.

Small Cabin: Smaller than a hotel room, the small cabin nevertheless provides quite adequate accommodations for one (even two if they are very familiar with one another) passenger or crewmember for short periods of no more than a week at a time. The cabin is typically equipped with a bunk (possibly double-bunked), a chair, a storage unit capable of holding up to 250vl of goods, and retractable/recessed/concealed toilet facilities. Cost is Cr8000 and volume is 2000vl per cabin installed.

Low Berth: Cryosleep capsules used to transport passengers in suspended animation. One capsule can accommodate one passenger. Cost is Cr50,000 and volume is 500vl per capsule installed.

Galley: Food storage (up to 100vl) and preparation facilities for up to four passengers or crew for each galley. Cost is Cr1000 and volume is 200vl per galley installed.

Fresher: A basic fresher provides toilet and washbasin facilities for one passenger per fresher unit installed. Cost is Cr750 and volume is 200vl per fresher. Shower/bathing facilities may be added for an additional cost of Cr100 and added volume of 150vl

Engineering Shop: Can accommodate one mechanic, and will add +1 to any T/Engineering skill checks made when attempting repairs. Cost is KCr20 and volume is 1000vl per shop installed.

Vehicle Shop: Can accommodate one mechanic, and will add +1 to any T/Mechanical, T/Electronic, or T/Gravitics skill checks made when attempting repairs. Cost is KCr10 and volume is 1000vl per shop installed.

Laboratory: Can accommodate one scientist working within, adds +1 to any Research skill checks made while conducting experiments or investigations using its resources. Cost is KCr50 and volume is 800vl per lab installed.

Sickbay: Can accommodate one patient and one physician working within, adds +1 to any T/Medical skill checks made while using its resources. Cost is KCr100 and volume is 1000vl per lab installed.

Autodoc: Can accommodate one patient within. Cost is MCr1 and size is 2000vl per unit installed.

APPENDAGES

Specialized arms and tentacles (referred to as appendages) for tasks such as moving cargo, manipulating objects, or lifting equipment may be installed onto any vehicle. Grappling appendages are usually designed for cargo handling and such duties requiring lifting power but not fine control, while manipulatory appendages are designed for fine control and handling of small and delicate devices.

The maximum Strength of an appendage is effectively unlimited, but the maximum Dexterity for any appendage is equal to the Tech Level (TL) at which the appendage is built, regardless of the number of appendage units that are installed and make up the individual arm. When manipulating an appendage on a vehicle, the operator may add his or her own Dexterity bonus to any skill or other checks required for its use. This is particularly useful when attempting to control the powerful, but unwieldy heavy grappling appendages. The Strength of an appendage is only limited by the type of appendage installed and its size.

Appendage Unit: Strength is 1, cost is Cr100, volume is 0.5vl, requires 0.1 EP in power per round. Appendage strength is cumulative with the number of units installed. For example, 10 units installed would give an appendage with a Strength of 10, cost of Cr1000, volume of 5vl, and requiring 1EP per round to operate.

All appendages, regardless of the number of units installed, have a minimum Dexterity score of 1, and may have maximum Dexterity score equal to the TL at which is was built. The designer may specify what Dexterity rating he wishes the appendage to have within this range, but the higher the Dexterity rating, the greater the overall cost of the appendage. Multiply the Dexterity score times the base cost to determine the total cost for the appendage.

Appendage Cost Formula: (STR Score x Cr100) x DEX Score = Total Cost in Credits.

Using our example from previously (STR 10 appendage, Cr1000), it automatically has a DEX of 1. If this were to be increased to a DEX of 10, the cost of the arm would rise to Cr10,000 (Base cost of Cr1000 x DEX 10).

High Pressure Pump: Used for generating high-pressure streams of water for fire fighting or crowd control. Uses 200 liters of water per minute. Being hit by the stream of water will knock creatures over unless they make a Reflex save (DC20 - range in meters). Cost is Cr250, volume is 4vl, and requires 0.5EP per round.

Low Pressure Pump: Used for moving volumes of liquid like fuel or water, up to 50 liters per minute. Cost is Cr50, volume is 2.5 vl, and requires 0.1EP per round.

Toolkits: The various toolkits listed under personal equipment (see pg. 210) may be adapted as maneuverable appendages under the control of an operator within the vehicle or by a computer. Double the cost of the toolkit, and the volume required will be equal to the weight of the toolkit. Power required to operate the toolkit will equal the size in volume x 0.01EP. For example to adapt a Mechanical Tool Set, the cost would be Cr2000, volume would be 20vl, and it would require 0.02EP per round to operate.

Winch: A winch consists of a cable with a hook and a motor to wind the cable in. Strength is 1, Cost is Cr10, volume is 0.2 vl, requires 0.01EP in power. Winch Strength is cumulative with the number of units installed. For example, 10 units installed would give a winch with a Strength of 10, cost of Cr100, volume of 2vl, and requires 0.1EP per round.

WEAPON MOUNTS

A vehicle may mount all sorts of weapon systems, but they must be installed into some form of mounting. This may be anything from bolting a machinegun to the fender of a ground vehicle, to a small manned turret, to a massive fusion gun turret mounted on a grav tank. Weapons (and other components in the case of turrets) installed into a mount do not count against the available space in a vehicle. The space for the weapon has already been accounted for in the design of the mount selected to house the weapon.

Appendages: Installed appendages can be used as a form of weapon mount. An appendage may have installed weaponry up to a volume equal to the appendage's Light Load carrying capacity (determined by its Strength). Multiple weapons are typically of the same type and are generally linked, allowing them to all fire at the same target using a single attack roll. For each linked weapon (over 1), add 1 die of damage.

Each weapon may also be fired individually. If each weapon has its own fire computer installed, all weapons may be fired once per round. If there is only a single fire control computer and/or a gunner, only one weapon may be fired per round.

Pintle Mounts: Pintle mounts can hold any type of combat rifle or heavier personal weapon. They may not be equipped with vehicle weapon systems. They consist of little more than a mounting rod affixed to the floor of the vehicle and must be manned by a live gunner. A pintle mounted weapon can usually be rotated 360 degrees, and elevated up to a 90 degree angle.

1vl of space for the pintle mount must be allocated for every 100vl of size of the weapon to be mounted. Cost is Cr1 per 1vl of space required. Only one weapon at a time may be attached to a pintle mount. Space to accommodate the gunner, fire control computer, or ammunition must be allocated separately.

A pintle mount offers no protection to a gunner firing the attached weapon. Some versions may be installed with cover (50%), but this adds +50vl to the required volume for the mount, and cost an additional Cr500.

Fixed Mounts: Fixed mounts are weapons that have been permanently fixed to the outer frame or bed of a vehicle. They cannot traverse, and must be aimed by aligning the vehicle with the intended target. A fixed weapon pointed to the front of a vehicle (the most common type of fixed weapon) will always fire at targets directly in front of the vehicle. A fixed mount must allocate 0.1vl of space every 1vl of weapon size to be mounted, and cost is Cr5. No more than 1 fixed mount may be installed per 200vl of total vehicle chassis.

Up to two weapons of the same type may be installed within a fixed mount if there is enough space. These weapons are generally (but not always) linked, allowing them to all fire at the same target using a single attack roll. Each weapon may also be fired individually. Space to accommodate a gunner, fire control computer, or ammunition must be allocated separately.

A fixed mount offers no protection to a gunner firing

the attached weapon. Some versions may be installed with cover (50%), but this adds +50vl to the required volume for the mount, and cost an additional Cr500.

Cupola: A cupola is an enclosed version of the fixed mount similar in design to a turret but unable to move, and must be aimed by aligning the vehicle with the intended target. The advantage of a cupola over a regular fixed mount is that it is enclosed within the chassis of the vehicle itself offering any gunner within the same armor protection as anything else within the vehicle. A cupola must allocate 1.1vl of space every 1vl of weapon size to be mounted, and cost is Cr5 per 1vl of total size. Space to accommodate a gunner, fire control computer, or ammunition must be allocated separately.

Up to two weapons of the same type may be installed within a cupola if there is enough space. These weapons are generally (but not always) linked, allowing them to all fire at the same target using a single attack roll. Each weapon may also be fired individually. Space to accommodate a gunner, fire control computer, or ammunition must be allocated separately.

Turrets: Turrets are mechanized weapons mounts, typically manned by a gunner although computer controlled auto turrets are available. A fire control computer with sufficient CPU power must be installed to control one or more auto turrets. Heavy turrets are capable of a greater tra-

VEHICLE WEAPON MOUNTS

Type	*Size*	*Cost*	*EP*	*Rotation/Elevation*
Manned Pintle Mount	1vl per 100vl	1/vl	-	R360, E90
Fixed Mount	0.1vl per 1vl	5/vl	-	None
Cupola	1.1vl per 1vl	5/vl	-	None
Standard Turret	1.2vl per 1vl	10/vl	0.001 per 1vl	R180, E45
Heavy Turret	1.4vl per 1vl	10/vl	0.002 per 1vl	R360, E90

Size: Volume requirements per 1vl of accommodation for gunners, fire control computers, weapon systems, and ammunition.

Cost: Cost is Credits per 1vl of space allocated.

EP: Energy point requirements per round to operate a turret. Energy required to power any computers and/or weapon systems are in addition to this amount.

Rotation/Elevation: The range of maximum rotation and weapon elevation/declination possible with this type of mount.

verse and elevation range than their lighter counterparts, but are otherwise pretty much the same. No more than 40% of the available volume of a chassis may be allocated for one or more turrets.

While built out of the overall chassis itself, a turret is considered a separate but integrated part of a vehicle. Space must be allocated from the main chassis body in an amount equal to 1.2vl for every 1vl of internal space available within the turret itself. The extra 0.2vl is used to house the gearing and other mechanisms needed to give the turret its ability to rotate and elevate. Weapons, gunners, fire control computers, ammunition, or other items may be designated as contained within the turret rather than the body of the vehicle itself, as long as there is enough room to hold it all. In addition, a turret must be supplied with 0.001EP of power and a cost of Cr10 for every 1vl of total turret size.

A heavy turret version is also available with a greater range of rotation and elevation, but the size and energy requirements increase to 1.4vl and 0.002EP respectively. Cost remains the same.

Up to four weapons of the same type may be installed within the tonnage already allocated for the turret (they do not count further against the remaining available space in the vehicle). These weapons are generally (but not always) linked, allowing them to all fire at the same target using a single attack roll. For each linked weapon (over 1), add 1 die of damage. Each weapon may also be fired individually. If each weapon has its own fire computer installed, all weapons may be fired once per round. If there is only a single fire control computer and/or a gunner, only one weapon may be fired per round.

Turret Example: A vehicle with a 10,000vl chassis may have a maximum size turret of 4000vl (40% limit). We decide to go a little smaller and settle on a turret that will have an internal volume of 3000vl. This will take up 3600vl of space from the chassis itself (3000vl X 1.2vl) to account for the gearing systems that drive the rotation of the turret, leaving a remaining available chassis space total of 6400vl for other components. Components can also be installed within the space allocated to the turret itself. Our turret we just installed has 3000vl worth of space that can be filled with weapons and other components. Unlike other mountings, a turret can house equipment other than weapons and fire control computers, such as sensors or communications equipment.

WEAPONS

The following weapons may be installed into an available weapon mount. Cost is listed in Credits figured at TL 14 or higher. Area of effect is radius in meters.

Mountable Personal Weapons: Any personal weapon can be mounted on a vehicle. Normally, only heavier types such as machine-guns, grenade launchers and plasma guns are fitted to vehicle mounts. See the descriptions found in the section on Available Weapons (pg. 199).

Mortars: First available at TL5, the basic mortar is an elevated firing tube into which a prepared round is typically dropped and fired. The tube controls the firing angle and thus the range at which the round will land. Mortars are usually fairly light and portable when not mounted on a vehicle.

Lasers: Similar in design to a personal laser but much larger in scale to accommodate the range and power

VEHICLE MOUNTED WEAPONS

	Power	Min TL	Size	Cost	Damage	Area of Effect	Rate of Fire	Range	Ammo Volume Vl/Rnds	Ammo Cost Cr/Rnds
Mountable Personal Weapons										
Light Machinegun	0	6	5.5vl	1200	1d12 (1d12-5*)	-	20	60m	2.5/100	120/100
Autocannon	0	8	300vl	10,000	6d10 (1d10*)	-	10	111m	100/200	1000/200
VRF Gauss Gun	0	10	2000vl	200,000	2d12 (1d12-4*)	-	100	111m	10/1000	200/1000
*damage vs vehicles										
Standard Vehicle Weapons										
Light Mortar	0	5	10vl	300	1d10	3	1:2	150m	4	20
Medium Mortar	0	5	20vl	7,500	2d12	5	2:3	240m	6	35
Heavy Mortar	0	5	150vl	15,000	3d12	10	1:3	450m	15	50
Very Heavy Mortar	0	5	2000vl	40,000	4d12	20	1:10	600m	100	100
Light Laser	1	7	50vl	2500	1d10	-	1	Sensor	-	-
Medium Laser	1	7	100vl	3500	3d10	-	1	Sensor	-	-
Heavy Beam Laser	2	7	1000vl	1,000,000	6d8	-	1	Sensor	-	-
Heavy Pulse Laser	2	7	1000vl	500,000	6d10	-	1	Sensor	-	-
Light Artillery	0	5	500vl	5000	5d12	2	2:3	705m	6	50
Field Artillery	0	5	900vl	10,000	6d12	4	1:3	1.2km	15	75
Medium Artillery	0	5	2000vl	20,000	7d12	9	1:5	1.2km	40	100
Heavy Artillery	0	5	9000vl	40,000	8d12	18	1:10	1.5km	100	200
Light Mass Driver	2	11	12,000vl	500,000	7d12	25	4	2.1km	15	35
Medium Mass Driver	4	10	20,000vl	1,500,000	9d12	30	4	2.31km	40	50
Heavy Mass Driver	10	9	50,000vl	4,000,000	6d20	35	4	2.46km	150	150
Light MRL (100 tubes)	0	11	60vl	500	1d8	3	1/4/10/20/100	900m	5	10
Medium MRL (40 tubes)	0	6	1800vl	5000	3d8	10	1/4/10/20	1.2km	50	50
Heavy MRL (100 tubes)	0	10	1000vl	5000	6d8	20	1/4/10/20/100	2.1km	20	60
Light Plasma Cannon*	20	10	4000vl	1,000,000	3d12	5	1	450m	-	-
Medium Plasma Cannon*	40	11	6000vl	2,000,000	6d12	10	1	1.2km	-	-
Heavy Plasma Cannon*	80	12	7000vl	5,000,000	9d12	15	1	2.1km	-	-
Light Fusion Cannon*	40	12	4000vl	1,500,000	3d20	8	1	750m	-	-
Medium Fusion Cannon*	80	13	6000vl	3,000,000	6d20	12	1	1.8km	-	-
Heavy Fusion Cannon*	160	14	7000vl	10,000,000	9d20	21	1	3km	-	-
Meson Accelerator	240	15	60,000vl	30,000,000	9d20	50	1	6km	-	-

Power: The power required to fire this weapon (if any).
Min TL: The earliest technological level at which these weapons become available.
Size: The volume required inside a vehicle to fit this type of weapon. May be installed in the allotted tonnage of a turret (if any).

***Energy Weapon Size and Power Modifiers by TL**

The TL listed for each of these weapons is the earliest TL that they are available, however the Size and Power requirements are based on TL14 or higher versions of the weapon. For earlier TL models (when available), consult the chart below to determine the actual Size and Power requirements. These modifiers do not apply to personal class weapons mounted on a vehicle.

Actual TL	*Size and Power Modifier*
TL 10 or less	x5 Size, X2 Power
TL 11	x4 Size, X1.5 Power
TL 12	x3 Size, X1.5 Power
TL 13	x2 Size
TL 14 or greater	x1 Size

Cost: The cost of this weapon in Credits (Cr).
Damage: The base damage this weapon will inflict with a successful attack on another vehicle.
Area of Effect: Some weapons are capable of inflicting their damage over a given area rather than just a specific target. Normally, anyone within the listed area of effect must make a Reflex save (DC20). If successful, the victim only suffers half damage. Anyone within twice the given area of effect must also make a successful Reflex save (DC10) or suffer half the normal damage. If successful, victims in the outer radius of effect suffer no damage at all.
Rate of Fire: How many shot may be fire per round from the weapon.
Range: The range increment for this type of weapon.
Ammo Volume: How much space (vl) the given number of rounds will take up within a vehicle. For example, 2.5/100 would mean ammo for this weapon requires 2.5vl of space for every 100 rounds of ammo carried. If only a single value is listed, that is the volume required for a single round.
Ammo Cost: How much the given amount of ammo will cost in Credits. For example, 120/100 would mean ammo for this weapon costsCr120 for every 100 rounds of ammo carried. If only a single value is listed, that is the cost for a single round.

needed for attacks against armored vehicles and other targets. Vehicle mounted lasers first become available at TL7.

Artillery: An artillery piece is basically an oversized mortar designed for greater range and power, typically mounted on a tow carriage or a self-propelled vehicle (e.g. a tank). Early models are muzzle loaded and are much more prone to misfires and other problems. Later models are breech-loading designs using prepared rounds, greatly increasing the rate of fire and reducing the chance of mishap.

Mass Drivers: Magnetic linear accelerators capable of propelling a projectile at very high velocities, at long ranges, and at rapid rates of fire. These devastating weapons begin to appear at TL9.

Multiple Rocket Launchers (MRLs): Early crude versions of the MRL first appear at TL6 and are rather large and bulky, firing a missile larger than most standard artillery rounds of the era. At later TLs the MRL becomes much smaller and more powerful. In some regions MRLs completely replace artillery in the field.

Plasma and Fusion Cannon: Massively upsized versions of the PGMP or FGMP personal fusion weapons, suitable for use on the modern tactical battlefield. These power-hungry cannon first become available at TL10 and TL12 respectively.

Meson Accelerators: These early TL15 weapons generate high-energy mesons that can be directed against a target. Mesons have very short lives, but can be manipulated to last for specific durations by accelerating them towards relativistic speeds. In combat, the gunner's task is primarily to determine the duration of the mesons based on the range so that the final point of decay is within the hull/chassis/body of the target. Because of their nature, mesons pass through armor, rock, ice, and any other matter without effect. Damage occurs only at the point of decay (i.e. the target).

ELECTRONICS

Various electronic and sensor systems may be installed into a vehicle giving it a much wider range of capabilities and benefits to its occupants and/or drivers.

VISUAL SYSTEMS

Unless view ports are made available there must be some means of a pilot, driver, and gunner to see where they are going and/or what they are shooting at.

Window or View Port: A window or view port may be installed in a vehicle, and take up no actual space or volume. All chassis come with an automatic allowance towards windows and viewports worth Cr200 for every 250vl of chassis size (round down). Additional units have a cost of Cr200 per personal-sized (roughly 0.25 to 0.5 square meters) viewing area, times the maximum atmosphere the window or view port is rated for use. A vacuum rated personal view port has a cost of Cr400. For example, the standard ground car (2000vl) has a window/view port allowance of Cr1600, or enough for 8 windows rated for an atmosphere of 1. Two windows making up the front windshield, two windows that form the back windshield, and four windows for the driver and passengers (two windows on each side).

Video: Provides a standard video representation of everything within the field of view and the range of the recorder. First available at TL7, cost of Cr600 per unit, volume is 0.4vl, requires 0.03EP of power, and has a base clear range of view of 100m. At least one video monitor is required to display the video feed.

Video Monitor: More that one video display monitor may be fed by a single video system feed. A monitor adds +Cr100 to the cost, +0.5vl to the required volume, and +0.02EP to the power requirements.

HUD: A Heads-Up-Display, first available at TL7, may be installed in place of a video display monitor, reducing the volume required for standard video systems. Each HUD adds +KCr10 to the cost, +0.1vl to the required volume, and +0.01EP to the power requirements.

Holographic: Provides a high-resolution, 3-dimensional representation of everything with the field of view and range of the recorder. First available at TL13, cost of Cr2000 per unit, volume is 1.5vl, requires 0.1EP of power, and has a base clear range of view of 100m. At least one holo display is required to view the holo feed.

*Holo Display***:** More than one holo display monitor may be fed by a single holo system feed. Each display adds +Cr500 to the cost, +0.1vl to the required volume, and +0.05EP to the power requirements.

Infrared (IR): The addition of infrared detection capabilities to a visual system allows a vehicle to detect, track, or navigate around obstacles based on variations in local temperatures. IR capabilities are first available at TL6, add +Cr1500 to the cost, +1vl to the required volume, and +0.03EP to the required power of a video or holo visual system.

Lights: May be added to the interior (dash, overhead, compartment, etc.) or the exterior (headlight, spot beam, etc.) of a vehicle. A light unit costs Cr5. Volume is 0.2vl, and it requires 0.01EP per round. Vehicle lights will illuminate an area of up to 1.5m, or project a beam up to 3m. Multiple lights may be installed to increase the area of illumination, to create a longer beam length from a single lamp, or simply to provide light sources in multiple locations along or within the vehicle. Lighting systems have a maximum area of illumination of 150m and a maximum beam length of 300m.

Light Intensification (LI): LI systems amplify any ambient light (including nothing more than starlight) into

something approaching normal daylight conditions, allowing a vehicle to operate a full capability at night or in very low light situations. An LI system would not work in a situation where there is no light available at all, such as underground. First available at TL7, LI capability add +Cr500 to the cost, +0.2vl to the required volume, and +0.01EP to the required power of a visual system (video or holographic).

Increasing Visual Range: The base range of these visual systems may be increased. For each 100m increase in range, double the cost, increase the size of the unit by 0.1vl in volume, and add 0.01 to the power requirements. For example, to increase the range of a video system from 100m to 1100m range would multiply the cost by x10, increase the size by 1vl, and increase the power requirements by +0.01. The upgraded video unit would thus cost Cr6000, have a volume of 1.4vl, and require 0.13EP of power.

VEHICLE VISUAL SYSTEMS

Type	*Cost*	*Size*	*Power*	*Range*	*TL*
Window/View Port	200	-	-	Sight	1
Light	5	0.2	0.01	1.5/3m	4
Video	600	0.4	0.03	100m	7
Monitor	+100	+0.5	+0.02	-	7
HUD	+10,000	+0.1	+0.01	-	7
Holovideo	2000	1.5	0.1	100m	13
Display	+500	+0.1	+0.05	-	13
IR Capability	+1500	+1	+0.03	-	6
LI Capability	+500	+0.2	+0.01	-	7

Cost: The base cost of the system in credits at the given range capability.

Size: The free volume (vl) that must be available in the chassis to accommodate the system.

Power: The power requirements in Energy Points (EPs) per round to use this system.

Range: The base range of the system at the listed base price. See Increasing Visual Range for increasing a system's base range.

TL: The minimum technology level required to find such a system available for barter or purchase.

PRIMARY SENSOR SYSTEMS

Sonar: A more advanced version of the auditory sensor capable of detecting sounds at greater distances and over a broad range of wavelengths. Underwater, sonar becomes even more effective due to the effects of sound in this environment. A sonar operator may add +1 to all Listen checks for sounds with using the sonar in passive mode, and a +2 bonus to Listen checks when using the sonar in active mode. Passive sonar scans are undetectable, while active sonar scans are automatically detected by other vehicles similarly equipped with sonar and within their detection range. Sonar units first appear at TL6 and cost Cr5000. Volume is 4vl. Sonar requires 0.05EP of power per round. It has a base range of 1km and a maximum range of 50km.

Radar: Standard radar detection systems may be operated in active or passive mode. A radar unit, available at TL 6, costs Cr250,000. Volume is 5vl. Radar requires 0.25EP of power per round and has a base range of 5km. A radar system is required for computer aided attacks.

Ladar: An undetectable (except to the target) tight beam version of the radar system (using a laser instead of radio-frequency emissions) used for pinpoint object targeting and tracking. Ladar is impossible to jam. A ladar unit, available at TL8, costs MCr2.5m. Volume is 5vl. Ladar requires 0.025EP of power per round and has a base range of 5km. Ladar must be used in conjunction with radar systems, but provides a +1 bonus to all vehicle attack rolls (gunner and computer based).

Densitometer: A densitometer is capable of producing a density map of the interior of an object up to the range of the system. Densitometers are very useful in mapping mineral deposits, cave systems, underground rivers, etc. When used for prospecting skill checks, the operator may add +1 to all P/Prospecting skill checks. A densitometer, first available at TL11, costs KCr750. Volume is 1vl. A densitometer requires 0.4EP of power per round and has a base range of 5km.

Neutrino: Neutrino sensors are designed to detect the presence of fission or fusion reactions within the range of the system. A neutrino sensor, available at TL11, costs KCr60. Volume is 4vl. Neutrino sensors require 1EP of power per round and have a base range of 5km.

Neural Activity: Neural activity sensors can be used to detect lifeforms within range of the system, and classify

VEHICLE SENSOR SYSTEMS

Type	Cost	Size	Power	Base Range		TL
Sonar	Cr5000	4	0.05	Close	1km	6
Radar	KCr250	5	0.25	Short	5km	6
Ladar	MCr2.5	5	0.025	Short	5km	8
Densitometer	KCr750	1	0.4	Short	5km	11
Neutrino	KCr60	4	1	Short	5km	11
Neural Activity	KCr20	0.1	0.2	Close	1km	13

Cost: The base cost of the system in credits at the given range capability.
Size: The space (vl) that must be available in the chassis to accommodate the system.
Power: The power requirements in Energy Points (EPs) per round to use this system.
Range: The base range of the system at the listed base price. See Increasing Sensor Range for increasing a system's base range.
TL: The minimum technology level required to find such a system available for barter or purchase.

them based on their level of brain activity. A neural sensor, available at TL13 or higher, costs KCr20. Volume is 0.5vl. Neural Activity Sensors require 0.2EP of power per round and have a base range of 1km.

Increasing Sensor Range: The base range of these sensor systems may be increased. For each range level of increase, double the cost, size, and power requirements. For example, to increase the range of a radar system from Short (5km) to Long (500km) range would multiply the cost, size, and power requirements by x4 (+x2 to increase from short to medium range, +x2 to increase from medium to long range). The upgraded radar unit would thus cost MCr1, have a volume of 20vl, and require 1EP of power per round.

COMMUNICATION SYSTEMS

Voder: A vehicle or robot equipped with a voder is capable of relaying data and information through speech. The earliest models, available at TL7, have a very metallic, monotone, and obviously synthesized voice that is often difficult to understand if the listener is not following along closely. As technology improves so does the quality of the 'voice' produced by a voder, allowing for male and female voices, and even certain accents may be recreated. A voder unit costs Cr1200, volume is 0.5vl, and it requires 0.03EP of power per round.

Radio Receiver: A radio receiver is only capable of receiving radio transmissions and broadcasts over a wide range of frequencies. It is not capable of broadcasting. A radio receiver costs Cr50, volume is 0.3vl, and it requires 0.01EP of power per round. The receiver has a base range of reception of 5km.

Radio, 2-way: A standard radio set capable of both broadband reception and broadcasting. A 2-way radio costs Cr75, volume is 0.1vl, and it requires 0.2EP of power per round. The unit has a base range of 5km.

Tight Beam Laser: A tight beam laser offers a virtually undetectable form of communications. A laser comm. unit costs Cr1200, volume is 1vl, and it requires 0.05EP of power per round. The unit has a base range of 5km.

Maser: A maser communication system is very similar to the tight beam laser in capability, but since it uses microwaves instead of visual light, it is unaffected by the conditions that can hamper laser based systems. A maser comm. unit costs Cr2400, volume is 1.5vl, and it requires 0.1EP in power per round. The unit has a base range of 5km.

Meson: With the advance of controlled meson decay technologies, the meson communicator offers the most advanced form of secure, long-range communications. Meson beams are capable of passing through anything, including planets, thus it is possible to communicate with someone on the other side of a planet (without the use of satellites) by using an extreme range meson communicator, if the coordinates of the receiver are known. A meson comm. unit costs Cr250,000, volume is 5vl, and it requires 0.5EP of power per round. The unit has a base range of 500km.

Increasing Communication Range: The base range of these communications systems may be increased. For each range level of increase, double the cost, size, and power requirements. For example, to increase the range of a 2-way radio system from Short (5km) to Long (500km) range would multiply the cost, size, and power requirements by x4 (+x2 to increase from short to medium range, +x2 to increase from medium to long range). The upgraded

VEHICLE COMMUNICATION SYSTEMS

Type	Cost	Size	Power	Range		TL
Voder	1200	0.5	0.03	-	-	7
Radio Receiver	50	0.3	0.01	Short	5km	5
Radio, 2-way	75	0.5	0.02	Short	5km	5
Tight Beam Laser	1200	1	0.05	Short	5km	8
Maser	2400	1.5	0.1	Short	5km	8
Meson	250,000	5	0.5	Long	500km	15

Cost: The base cost of the system in credits at the given range capability.
Size: The space (vl) that must be available in the chassis to accommodate the system.
Power: The power requirements in Energy Points (EPs) to use this system.
Range: The base range of the system at the listed base price. See Increasing Communication Range for increasing a system's base range.
TL: The minimum technology level required to find such a system available for barter or purchase.

radio unit would thus cost Cr300, have a volume of 2vl, and require 0.08EP of power.

SECONDARY SENSOR SYSTEMS

Auditory Sensor: Auditory sensors have about the same capability as the human ear for detecting sound. This type of sensor allows the operator to make a Listen check to hear any noise within range of the sensor. An Auditory Sensor system costs Cr200. Volume is 0.2vl and it requires 0.01EP of power per round. The system has a base range of 50m.

Olfactory Sensor: This type of sensor, first available at TL9, allows for the replication of the human range of olfactory sensation (smell). An olfactory sensor system costs Cr1500. Volume is 0.5vl and it requires 0.05EP in power each round. The system has a base range of 3m and a maximum range of 1km.

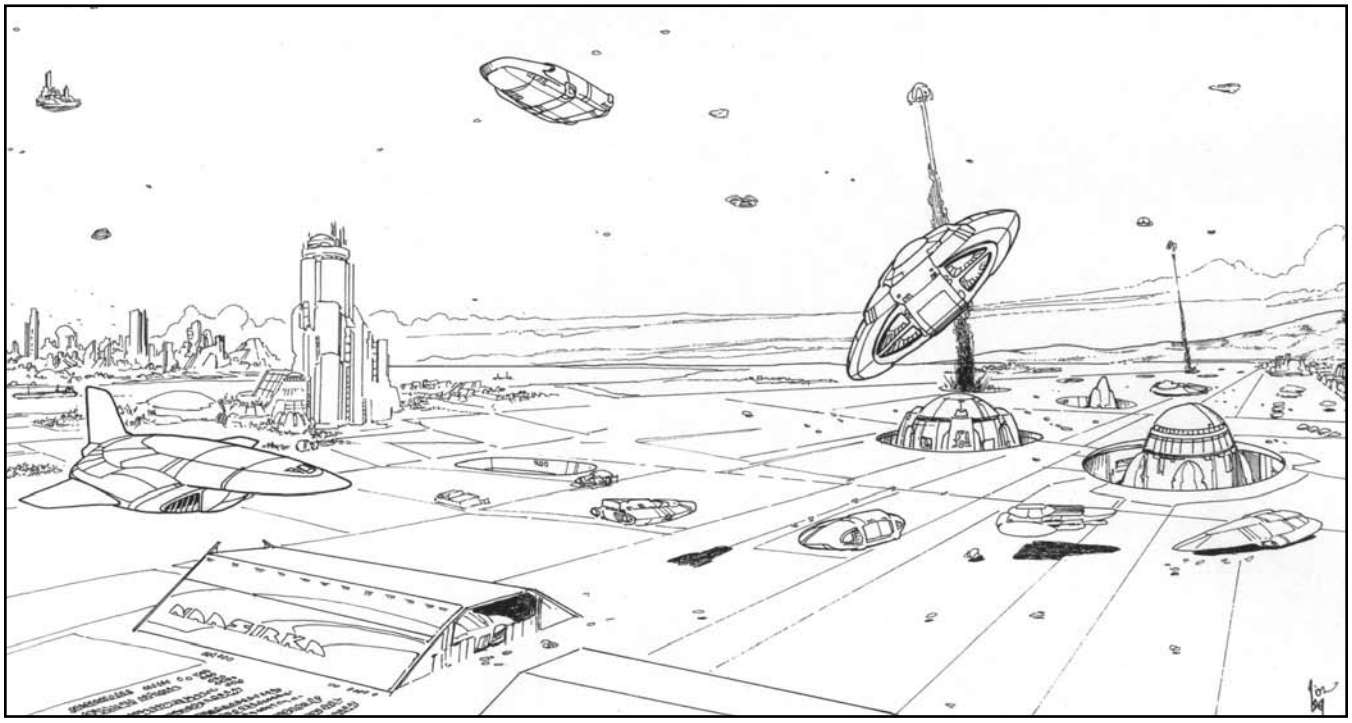
Enhanced Olfactory: The enhanced version of the olfactory sensor allows a wider more specific ability to detect specific scents and airborne particles at a longer range. Enhanced Olfactory Sensors cost Cr2000, have a volume of 1vl and require 0.1EP in power each round. They have a base range of 1km and a maximum range of 5km. Operators using an enhanced olfactory sensor may add +2 to all Spot checks involving scents or smells. Enhanced olfactory sensors are available beginning at TL10.

Tactile Sensor: Tactile sensors installed into a vehicle appendage are capable of feeding back standard human tactile response to the operator (i.e. the

SECONDARY SENSOR SYSTEMS

Type	Cost	Size	Power	Range		TL
Auditory Sensor	200	0.2	0.01	Close	50m	5
Olfactory	1500	0.5	0.05	Close	3m	9
Enhanced Olfactory	2000	1	0.1	Close	1km	10
Tactile	3000	1	0.2	-	-	8
Enhanced Tactile	6000	2	0.3	-	-	9

Cost: The base cost of the system in credits at the given range capability.
Size: The space (vl) that must be available in the chassis to accommodate the system.
Power: The power requirements in Energy Points (EPs) to use this system.
Range: The base range of the system at the listed base price. See Increasing Lighting and Increasing Olfactory Range for increasing a system's base range.
TL: The minimum technology level required to find such a system available for barter or purchase.



operator can 'feel' what the appendage is touching). Tactile sensors become available at TL8, and must be installed into an appendage. Each sensor has a cost of Cr3000, volume of 1vl, and requires 0.2EP of power each round.

Enhanced Tactile Response: An improved version of the tactile sensor that gives a +2 bonus to all DEX ability checks and DEX based skill checks when using a vehicle appendage for fine manipulation (such as performing surgery). These sensors each have a cost of Cr6000, volume of 2vl, and require 0.3EP of power per round. ETR sensors are only available at TL9 and later.

Increasing Lighting: The base range of a light source may be increased. For each 1.5/3m increase in range, add Cr5 to the cost, increase the size of the unit by 0.02vl in volume, and double the power requirements. For example, to increase the range of a light from 1.5/3m to 15/30m range would add Cr50 to the cost, increase the size by +0.2vl, and increase the power requirements by +0.1. The upgraded light unit would thus cost Cr100, have a volume of 0.4vl, and require 0.11EP of power.

Increasing Olfactory Range: The base range of an olfactory sensor may be increased to 1km or 5km by doubling the size, cost, and power requirements.

THE BOTTOM LINE

Once all components and systems have been selected, the design can be finalized by calculating its performance within the game system.

AGILITY RATING

If the installed Power Plant produced excess Energy Points beyond those required, the excess power may be used to increase the agility of the vehicle itself while in combat. This represents the vehicle's ability to make violent maneuvers to avoid being hit in combat. It is applied in two ways, it acts as an Initiative bonus in combat and it also acts as an AC bonus to the vehicle's defense in combat. A vehicle's Agility rating may never exceed the maximum agility listed for its Drive Train type plus any agility modifiers due to a streamlined or airframe chassis configuration.

Agility Rating: Extra Energy Points / (1 per 250vl of vehicle). Round any resulting fractions down.

E.g. a 1850 vl vehicle with 25 extra energy points:
This gives 25 divided by 7.4 (1850 / 250 = 7.5)
25 divided by 8 gives 3.378, rounded to 3.

ARMOR CLASS

The armor class (AC) of a vehicle begins at a base value of 10. Add to this the Agility rating of the vehicle, its Armor Rating and its Size Modifier. For example a vehicle with an Agility of 3 and an Armor Rating of 2 would have an Armor Class of 15.

Armor Class (AC): 10 + Agility Rating + Armor Rating + Size Modifier

STRUCTURAL INTEGRITY

The structural integrity or SI rating of a vehicle represents the amount of damage it may withstand (whether

VEHICLE STRUCTURAL INTEGRITY

Size	*Weight or Volume*	*Base SI*	*Additional SI (round down)*	*Weight in Pounds (d20 size)*
Fine	up to 0.05	0	0.1 per 0.005 over 0.005	0.11 (1/8)
Diminutive	0.05 to 0.5	1	0.1 per 0.05 over 0.05	1.1 (1)
Tiny	0.5 to 5	2	0.3 per 0.5 over 0.5	11 (8)
Small	5 to 30	5	0.5 per 2.5 over 5	66 (60)
Medium	30 to 250	10	1.5 per 22 over 30	550 (500)
Large	250 to 2000	25	2.5 per 175 over 250	4400 (4000)
Huge	2000 to 15,000	50	2.5 per 1300 over 2000	33,000 (32,000)
Gargantuan	15,000 to 115,000	75	2.5 per 10,000 over 15,000	253,000 (250,000)
Colossal	115,000 to 1,315,000	100	1.5 per 12,000 over 115,000	253,000 or more
Enormous	1,315,000+	250	2.5 per 12,000 over 1,315,000	2,893,000 or more

caused by accidents, attacks or other means) before being destroyed. The SI of any vehicle is based on its size and is determined by the chart above.

VEHICLE SPEED

The maximum speed of a vehicle can be determined by dividing the total Thrust output of the drive train by the Thrust Requirement of the chassis itself. For example: a 10,000vl chassis vehicle has installed a tracked drive train capable of producing 800 Thrust. The Chassis Size Table indicates that a 10,000vl chassis has a Thrust Requirement of 10 per 1kph of speed, thus the maximum speed for this vehicle would be 80kph (800 / 10 = 80).

Maximum Speed: Total Thrust Output / Chassis Thrust Requirement

Standard Acceleration: One-tenth of maximum speed. A vehicle's maximum acceleration is equal to its standard acceleration X its Agility rating.

Other levels of speed for a vehicle are derived as follows:

Very Slow (Stall) Speed: Up to one-tenth of maximum speed. This is stall speed for vehicles employing jet or propeller drive trains.

Slow Speed: Very slow to one-quarter of maximum speed. This is also usually the take-off and landing speed of aircraft.

Cruising Speed: Slow to one-half of maximum speed

Fast Speed: Cruising to three-quarters of maximum speed.

Max Speed: Fast to maximum speed.

Off-Road Speed: Determine the off-road speed factor based on the type and number of drive trains installed as shown.

VEHICLE RANGE

The range listed for most vehicles is based on its cruising range. This value is determined by multiplying the operation duration of a vehicle by the top cruising speed of the vehicle. For example, a vehicle with a 14 hour operational duration and a top cruising speed of 75kph, would have a range of 1050km before refueling is necessary.

SPACECRAFT AND STARSHIP DESIGN

The only real difference between a vehicle and a space vessel is that a spacecraft is capable of maneuvering and operating in interstellar space. A starship takes this further; a starship can enter Jump Space and move to a different star system. Note that vessels intended to travel between the stars in normal space (at sublight speeds, and taking years to get there) are considered to be "space vessels" in these rules because they cannot enter Jump Space.

OFFROAD SPEED

Drive Train Type	*Maximum Off-road Speed*
Wheeled	Very Slow
Tracked	Slow + 5kph or Cruising speed, whichever is slower.
Legged	Cruising
Hovercraft	Slow + 10kph or Cruising speed, whichever is slower.
Per Additional pair of Drive Trains over 1	+5kph

SPECIAL FEATURES OF SPACECRAFT AND STARSHIP DESIGN

Displacement: The size of a starship or spacecraft is rated in displacement tons (t) rather than vl, since they are much bigger than most vehicles. Larger ships may be rated in kilotons (Kt)

Designations: Starship design tends to follow a procedure quite similar to that used for vehicles, but spacefaring vessels are subdivided into several types for ease of classification:

Starships are vessels capable of traveling through Jump space under their own power. Starships must be over 99 tons in displacement, but otherwise can be of any size.

Spacecraft: Also known as spaceships, spacecraft are large vessels that are not capable of entering Jump Space under their own power.

Small Craft: Small space vessels of 99t or less displacement, often carried aboard other vessels, are known as Small Craft. Because all small craft are not large enough to carry a jump drive, all small craft are also considered spacecraft.

Big Craft: Larger craft intended to be carried aboard another vessel are known as Big Craft. The only difference between a Big Craft and a Space Vessel is whether the craft is carried aboard (and thus subordinate to) another vessel.

Hull Weight: To determine the weight of a ship simply multiply by 1.35 to determine weight in metric tons or mTons (multiply by 1350 to determine weight in kilograms).

USP: Spacecraft and Starship data is presented in a shorthand form called a Universal Ship Profile (USP). A USP gives critical data such as hull size and Jump capability at a glance.

DESIGN PHILOSOPHY

Anyone designing a starship will have a clear role in mind for it, though this role may be quite broadly defined. While the expense involved guarantees that extraneous systems are not added, there is a strong argument for a vessel to have a reasonable range of capabilities. One-trick ponies are an expensive luxury and are found only in the military. However, vessels will be focused on a particular mission. In very broad terms, the most common missions are: Military, Commercial and Specialist.

Commercial and Specialist ships are built as big as they need to be for their mission, assuming the builder can afford them.

Commercial vessels are generally classified according to their size and role. Ships of 100-2000 tons are usually referred to as Merchants (Or Free Traders, if privately owned), while those over 2000 tons are usually termed “Freighters”, “Liners” or “Freightliners”. Very large ships may have titles such as Bulk Transporters or Megafreighters. Some smaller ships do claim these rather grand titles, such as the 600-ton Liner.

Commercial ships are designed to be as economical as possible, and to last a long time between refits. They may carry some armament, but for the most part they are built on the “removal van” model. The overriding concerns are ease of loading and the ability to haul as much cargo as possible at the cheapest possible price.

Specialist ships are designed for a particular mission, which can be just about anything. They are optimised for that mission, and carry whatever other systems are necessary to make it possible. Thus a lab ship has the best scientific equipment available, a courier has high-Jump drives. A survey vessel carries sensors and vehicles. Jump capability or cargo capacity come a long way second in most such designs, unless it is vital to the mission (such as an exploration or courier ship).

Military ships vary greatly, since the military mission has many sub-roles that must be filled. Ships tend to be named for their role rather than size, which can cause some confusion. For example, powerful interstellar states typically build Heavy Cruisers that are larger (and more capable) than the entire fleets of smaller powers. Planetary and minor-power navies cannot afford anything approaching the size of vessels employed by these larger navies, but of course will name their ships however they like. Thus the Escort Destroyers of a major power may be the same size as the Command Cruiser of one of their allies. A lone light cruiser of the Imperial Grand Fleet may be able to take out a whole planetary navy of so-called Battleships and Assault Dreadnaughts.

Military ships are built to many designs with an infinite number of variations. Even transport vessels are built tougher than their civilian counterparts. Most military ships are fast and mount good electronics and sensors in addition to the obvious armament. The main missions are:

- Patrol/Escort: Small ships intended to police the spaceways and deter piracy. These are the commonest ships in any fleet.
- Strike: Fast, well-armed but relatively fragile ships intended for raiding and strike operations
- Cruiser: General-purpose major warships. Cruisers do most of the navy’s work
- Line-of-Battle: Powerful ships such as battleships and dreadnoughts designed to destroy an enemy’s major units
- Carrier or Tender: A lightly armed ship that transports smaller combat ships
- Assault: Ships designed to land troops on a world, and/or to support them there.
- Tanker: Ships designed to carry and supply fuel to other vessels

• Logistics: Ships that carry supplies for a fleet or squadron but do not fight
• Transport & Supply: Large and small freight-carrying vessels.
• Courier: Small, fast ships that carry information.

As a general rule, most navies classify ships roughly on size:

• 100-1000 tons: Close Escorts, Patrol Ships, Couriers
• 1000-10,000 tons: Escorts, Destroyers
• 10-40 kilotons: Light Cruisers, Light Carriers
• 40-100 kilotons: Cruisers, Heavy Cruisers, Strike Carriers
• 100kt +: Fleet Units (Battleships, Dreadnoughts, Fleet Carriers)
• 500kt: The very largest warships.

This is not always the case, however. For example, the term "cruiser" is often given to some very small ships, and can be misleading. In this case it is a reference to the long cruises such vessels undertake on patrol or piracy-suppression duty.

Non-starships (those without Jump engines), also known as spacecraft, can be very large. Various names are given to non-starships. While these are actually interchangeable, most have become associated with a particular class of vessel. The common usage is:

• Launch: A slow, 20-ton utility passenger/cargo craft. Available in a lifeboat variant and as the Gig, a faster, armed version used mainly by the military
• Ship's Boat: A fast, 30-ton utility craft used by many starships
• Pinnace: A long-range 40-ton streamlined small craft
• Cutter: A common, 50-ton craft used mainly by starports and customs services. The cutter can take a variety of slot-in modules, making it suitable for anything from cargo handling to rescue work; customs inspection and even some military action
• Shuttle/Lighter: A streamlined 95t design is most common but these cargo & passenger transfer vessels come in many shapes and sizes

Larger non-starships do exist. Non-Jump-capable freighters ply the routes between the secondary holdings of a major system. There are also many types of military non-starship:

• Fighter: A small (5-50 ton) vessel armed with light weapons. Mainly useful for patrol and security work
• Gunship/System Defense Boat: A larger, heavily armed non-starship designed to patrol and defend a local region
• Monitor: The non-jump equivalent of cruisers and battleships are termed Monitors
• Battle Rider: A specialist Monitor designed to be carried between star systems by a tender

Non-starships, ton for ton, can carry more armament and cargo than their jump-capable brethren.

TECHNOLOGY LEVEL

The technology level of a shipyard is based on the technological level of the world that it serves. Normally a ship cannot be built using components of a higher technology level than the shipyard itself; a TL12 shipyard can only build a ship with up to TL12 components. However, if there are higher tech level shipyards available at nearby star systems, it is possible to construct a higher technology ship, but high-tech components will have to be built elsewhere and shipped in at twice their normal cost. This will delay production by 20-50%.

SHIP HULLS

Once a role for the ship, its general size and its tech level have been decided upon, components can be purchased. The first requirement is a hull suitable to contain all the other components. The construction of any ship begins with the hull. The hull forms the shell into or onto which the remaining components of the ship are installed. Two types of hulls are available; manufactured and planetoid. Manufactured hulls are constructed out of high-tech composite materials, while planetoids are simply large hollowed-out asteroids. For obvious reasons, planetoid hulls are far less expensive than their manufactured counterparts but they also waste a lot of interior space. Planetoid hulls can be "Buffered" to make them more resilient. This simply means leaving more waste space (rock) to strengthen the vessel.

To design a ship using a hull size not listed, simply add the data from the appropriate hull sizes that total the size of your ship.

Example 1: To construct a 350-ton ship, simply add the data from the 100-ton entry three times (100 + 100 + 100 = 300), and add the data for the 50-ton entry once (300 + 50 = 350).

Example 2: To design a 73,000-ton ship, add the 50,000-ton entry once, the 10,000-ton entry twice (50,000 + 10,000 + 10,000 = 70,000), and the 1000-ton entry three times (70,000 + 1000 + 1000 + 1000 = 73,000).

The construction time for a custom hull is equal to the construction time of the next higher listed hull size.

Note that while any size hull can be constructed, all Jump-capable starships must have a minimum size hull of 100 tons.

MANUFACTURED HULLS

Hull	Required Computer	Build Time	Bridge**	Cylinder	Needle/ Wedge	Cone	Close Struct	Sphere	Flatten Sphere	Disp Struct
1	Model 1	3	0.02/0.2	0.1	0.12	0.11	0.06	0.07	0.08	0.05
5	Model 1	4	0.1/1	0.5	0.6	0.55	0.3	0.35	0.4	0.25
10	Model 1	5	0.2/2	1	1.2	1.1	0.6	0.7	0.8	0.5
50	Model 1	7	1/10	5	6	5.5	3	3.5	4	2.5
100	Model 1	9	2	10	12	11	6	7	8	5
200	Model 1	11	4	20	24	22	12	14	16	10
400	Model 1	14	8	40	48	44	24	28	32	20
500	Model 1	18	10	50	60	55	30	35	40	25
600	Model 1	22	12	60	72	66	36	42	48	30
800	Model 2	25	16	80	96	88	48	56	64	40
1000	Model 2	27	20	100	120	110	60	70	80	50
5000	Model 3	36	100	500	600	550	300	350	400	250
10,000	Model 4	48	200	1000	1200	1100	600	700	800	500
50,000	Model 5	52	1000	5000	6000	5500	3000	3500	4000	2500
100,000	Model 5	56	2000	10,000	12,000	11,000	6000	7000	8000	5000
500,000	Model 6	58	10,000	50,000	60,000	55,000	30,000	35,000	40,000	25,000
1,000,000	Model 6	60	20,000	100,000	120,000	110,000	60,000	70,000	80,000	50,000

** Amounts shown are for calculation reference only. A starship must allocate a minimum of 20 tons in bridge space, while small craft must allocate a minimum of 4 tons for bridge space.

MANUFACTURED HULLS

When constructing a manufactured hull, it is necessary to consider not only the size of the hull itself, but how the hull will be configured. This will affect the Streamlining (or lack thereof) of the ship and thus its ability to enter a world or gas giant's atmosphere, and thus whether or not it may land and take off from a world with an atmosphere.

Hull: The displacement tonnage of the ship if immersed in liquid hydrogen. Also represents the available space in tons for installing other equipment, systems, and components, storing fuel, etc.

Required Computer: The minimum model computer that must be installed to run the ship.

Build Time: How long the ship will take to build from start to finish, in months.

Bridge: The required amount of tonnage that must be allocated to bridge control for this size hull. For starships, if this tonnage is below 20 tons for the entire ship, a minimum of 20 tons must be allocated anyway. For small craft, at least 4 tons must ultimately be allocated toward bridge space. For example a 100-ton ship would require 20 tons of bridge space allocated, even though the table specifies 4 tons. But an 1100-ton ship would require 24 tons of bridge space, using the 1000-ton hull and the 100-ton hull specifications.

Cylinder: A cylindrical hull shape, which may be somewhat flattened or flared. Cylinders only offer partial streamlining. This is the standard hull design and costs are as listed. USP Code 3. Cost listed is in Megacredits (MCr).

Needle/Wedge: A somewhat 'flattened' version of the Cone. Like the Cone, a Needle/Wedge is also fully streamlined. The Needle/Wedge configuration will increase the cost of the hull by 20% (this is already factored into the costs listed in the Manufactured Hulls Table). USP Code 1. Cost listed is in Megacredits (MCr).

Cone: Similar to the Cylinder, but tapering to something of a point at one end. Cones are fully streamlined. Design and construction of a ship using a Cone configuration will increase the cost of the hull by 10% (this is already factored into the costs listed in the Manufactured Hulls Table). USP Code 2. Cost listed is in Megacredits (MCr).

Close Structure: A Close Structure is only partially streamlined. The term is used for vessels that consist of a number of similarly or differently-shaped structures joined without significant projections. Close Structured configurations reduce the cost of the hull by 40% (this is already factored into the costs listed in the Manufactured Hulls Table). USP Code 4. Cost listed is in Megacredits (MCr).

Sphere: Literally a perfectly round hull, though possibly with some projections. A Sphere is only partially streamlined. Using a Sphere based ship design will reduce the cost of the hull by 30% (this is already factored into the costs listed in the Manufactured Hulls Table). USP Code 5. Cost listed is in Megacredits (MCr).

Flattened Sphere: A " flying saucer". The Flattened Sphere is fully streamlined. A Flattened Sphere configuration will reduce the cost of a hull by 20% (this is already factored into the costs listed in the Manufactured Hulls Table). USP Code 6. Cost listed is in Megacredits (MCr).

Dispersed Structure: A Dispersed Structure is completely unstreamlined. The term is used for ships that have several awkwardly shaped parts sticking out at various points. Components are often connected by narrow accessways and struts rather than a solid hull. Dispersed Structures reduce the cost of the hull by 50% (this is already factored into the costs listed in the Manufactured Hulls Table). USP Code 7. Cost listed is in Megacredits (MCr).

PLANETOID HULLS

Planetoids (asteroids, small moonlets, etc.) may be transported to an orbital shipyard for use as a ship's hull. The interior will be hollowed out providing space for drives, power plants, and other equipment and features needed for the operation of the ship as per a manufactured hull.

Although such planetoids are pretty much free for the taking in any star system, there is still a cost involved in transporting the planetoid into orbit and the fusion tunneling and excavation of the planetoid itself. Towing is usually available at a standard fee of Cr100 per ton of planetoid moved into orbit. Excavation will typically run Cr1000 per ton excavated (not total tonnage of the planetoid).

The main drawback with planetoids is that a fair bit of their tonnage must remain unused to maintain structural integrity. Standard planetoids lose 20% of their available possible tonnage to this waste space, while a buffered planetoid designed to withstand greater combat damage loses 30% of its available tonnage to waste space. For example, a 100 ton planetoid would only have a maximum available tonnage for drives and other features of 80 tons (100 x 20% = -20 tons). A 100 ton buffered planetoid would only have a maximum available tonnage of 70 tons (100 x 30% = -30 tons).

Hull: The displacement tonnage of the ship if immersed in liquid hydrogen. Also represents the available space in tons (less any wasted space) for installing other equipment, systems, and components, storing fuel, etc.

Required Computer: The minimum model computer that must be installed to run the ship.

Build Time: How long the ship will take to build from start to finish, in months.

Bridge: The required amount of tonnage that must be allocated to bridge control for this size hull. For starships, if this tonnage is below 20 tons for the entire ship, a minimum of 20 tons must be allocated anyway. For small craft, at least 4 tons must be ultimately allocated toward bridge space. For example a 100-ton ship would require 20 tons of bridge space allocated, even though the table specifies 4 tons. But an 1100-ton ship would require 24 tons of bridge space, using the 1000-ton hull and the 100-ton hull specifications.

MCr: The cost of the hull in Megacredits.

Planetoid: Wasted (unusable space) in tons for standard planetoid hulls.

Buffered: Wasted (unusable space) in tons for standard buffered planetoid hulls.

DRIVE REQUIREMENTS AND ARMOR FACTORING

Whether a manufactured or planetoid hull, if a ship is to do much more than act as a stationary platform, it must install jump and/or maneuver drives.

Hull: The size of the ship's hull in tons. For unlisted hull sizes, add the requirements for the appropriate entries totaling the ship's size. For example, when determining the drive and armor requirements for a 25,000-ton ship, use the entry for a 10,000-ton hull twice, and the entry for a 5,000-ton hull.

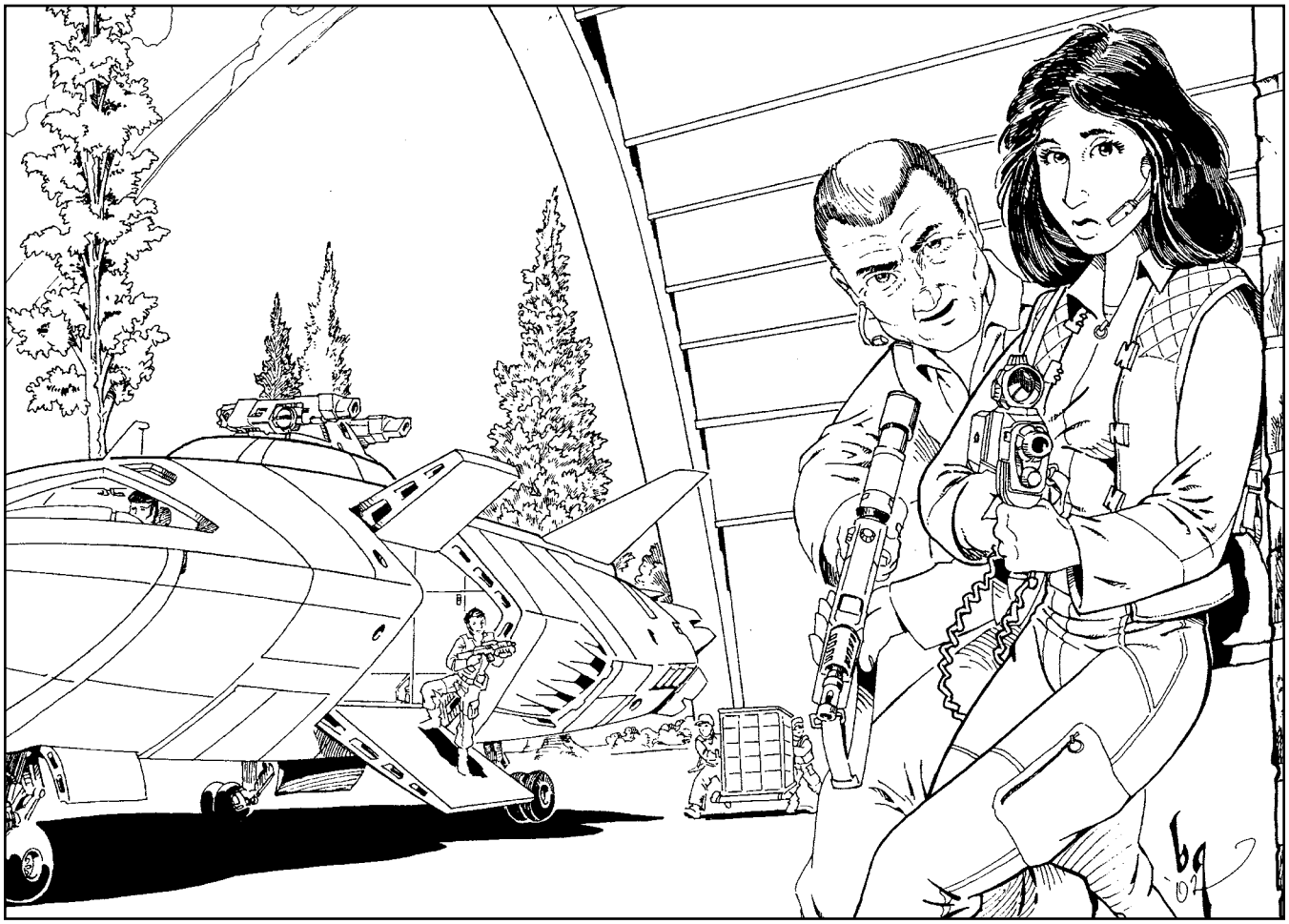
Drive Units: The minimum number of Jump Drive (for interstellar travel) and Maneuver Drive (for in-system travel) units that must be installed in the ship. Jump drives are not required on small craft and space ships. While most ships have maneuver drives it is possible to design a ship without them; a stationary orbital weapons platform for example.

Armor Factoring: If the ship is to be armored, this is the armor factor that must be used when calculating how much armor must be installed to achieve the desired Armor USP rating for the ship.

PLANETOID HULLS

Hull	*Required Computer*	*Build Time*	*Bridge***	*MCr*	*Planetoid*	*Buffered Planetoid*
1	Model 1	3	0.02/0.2	0.0011	0.2	0.3
5	Model 1	4	0.1/1	0.0055	1	1.5
10	Model 1	5	0.2/2	0.011	2	3
50	Model 1	7	1/10	0.055	10	15
100	Model 1	9	2	0.11	20	30
200	Model 1	11	4	0.22	40	60
400	Model 1	14	8	0.44	80	120
500	Model 1	18	10	0.55	100	150
600	Model 1	22	12	0.66	120	180
800	Model 2	25	16	0.88	160	240
1000	Model 2	27	20	1.1	200	300
5000	Model 3	36	100	5.5	1000	1500
10,000	Model 4	48	200	11	2000	3000
50,000	Model 5	52	1000	55	10,000	15,000
100,000	Model 5	56	2000	110	20,000	30,000
500,000	Model 6	58	10,000	550	100,000	150,000
1,000,000	Model 6	60	20,000	1100	200,000	300,000

** Amounts shown are for calculation reference only. A starship must allocate a minimum of 20 tons in bridge space, while small craft must allocate a minimum of 4 tons for bridge space.



DRIVES AND ARMOR

Hull	Drive Units**	Armor Factoring
1	0.02	0.01
5	0.1	0.05
10	0.2	0.1
50	1	0.5
100	2	1
200	4	2
400	8	4
500	10	5
600	12	6
800	16	8
1000	20	10
5000	100	50
10,000	200	100
50,000	1000	500
100,000	2000	1000
500,000	10,000	5000

** Ships under 100 tons may not install a jump drive. For such vehicles, this applies to maneuver drives only.

HULL TONNAGE AND CLASSIFICATION USP CODES

A ship is classified by its tonnage and function as expressed by a USP code. Find the tonnage of your ship on the table (pg. 260) to determine both codes. For civilian vessels, select the closest appropriate classification for the size and function of the ship under Civilian Classifications. Military ships would obviously use the Military Classifications column instead.

HULL TONNAGE AND CLASSIFICATION USP CODES

Hull USP Code	*Tonnage*	*Civilian Classifications*	*Military Classifications*
0	to 99		
1	100-199	Seeker (J), Scout/Courier (S)	Scout/Courier (S)
2	200-299	Far Trader (A2), Free Trader (A), Yacht, (Y) Safari Ship (K)	
3	300-399		Close Escort (CE)
4	400-499	Subsidized Merchant (R), Corsair (P), Lab Ship (L)	Patrol Cruiser (T), System Defense Boat (SDB)
5	500-599		
6	600-699	Subsidized Liner (M)	
7	700-799		
8	800-899	Mercenary Cruiser (MC)	
9	900-999		
A	1000-1999		Escort (E), Destroyer (D)
B	2000-2999	Freighter (R2) or Liner (M2)	
C	3000-3999		
D	4000-4999		
E	5000-5999		
F	6000-6999		
G	7000-7999		
H	8000-8999		
J	9000-9999		
K	10,000-19,999		Light Cruiser (LC), Light Carrier (LCV)
L	20,000-29,999		
M	30,000-39,999		
N	40,000-49,999		Cruiser (C), Heavy Cruiser (HC), Strike Carrier (SCV)
P	50,000-74,999		
Q	75,000-99,999		
R	100,000-199,999		Battleship (B), Dreadnaught (BD), Fleet Carrier (FCV)
S	200,000-299,999		
T	300,000-399,999		
U	400,000-499,999		
V	500,000-699,999		
W	700,000-899,999		
X	900,000-999,999		
Y	1,000,000+		
Z	Reserved		

HULL STRUCTURAL INTEGRITY

The SI rating of any small craft or starship is based on its size as determined by the Hull Structural Integrity table, pg. 261.

HULL STREAMLINING

Depending on the configuration you selected for a ship's hull, it will either be Unstreamlined, Partially Streamlined, or Fully Streamlined. Streamlined hulls can be constructed in an Airframe configuration, for even better performance in atmosphere.

Streamlined: The streamlined hull configuration allows a ship to function and maneuver in the atmosphere of any world, including take-off and landings. In an atmosphere, a streamlined ship's top speed is 2-G.

Partially Streamlined: These configurations allow a ship to function and maneuver in the upper atmosphere of worlds with an atmosphere of Very Thin (2) or heavier, but they may not land on such worlds. In an atmosphere a partially streamlined ship has a top speed of 1-G.

Unstreamlined: An unstreamlined ship may not enter any part of a Very Thin (2) or heavier atmosphere for any reason.

HULL STRUCTURAL INTEGRITY

Hull Size	*Structural Integrity Points SIs (round down)*
1-9 tons	50 + 2.5 per additional 1 ton
10-99 tons	75 + 2.5 per additional 10 tons
100-999 tons	100 + 15 per additional 100 tons
1000-9999 tons	250 + 25 per additional 1000 tons
10,000-99,999 tons	500 + 25 per additional 10,000 tons
100,000-999,999 tons	750 + 25 per additional 100,000 tons
1,000,000+ tons	1000 + 100 per additional 1,000,000 tons

AIRFRAME ATMOSPHERIC SPEEDS

Maneuver Drive	*Maximum*	*Cruising*	*Nap-Of-The-Earth*
1-G	3500kph	2625kph	875kph
2-G	4700kph	3525kph	1175kph
3-G	5300kph	3975kph	1325kph
4-G	5600kph	4200kph	1400kph
5-G	5800kph	4350kph	1450kph
6-G	5900kph	4425kph	1475kph

Atmospheric Density	*Speed Modifier*
Vacuum, Trace, or Very Thin	x 2
Thin	x 1.5
Dense	x 0.75
Very Dense	x 0.25

UPGRADING STREAMLINING

Most hull configurations begin either Partially or Fully Streamlined. The only hull configuration that begins as unstreamlined is a Dispersed Structure, and it may never be streamlined under any circumstances. Upgrading a Partially Streamlined hull to a Fully Streamlined hull costs Cr5000 per tonnage size of the hull and will increase the required Flight Avionics Computer by 1 Model. For example, to upgrade a 100-ton Cylinder configuration hull to a Fully Streamlined hull would cost Cr500,000 extra (5000 x 100 = 500,000), and the installed Flight Avionics computer must be a Model/1bis rather than just a Model/1.

AIRFRAMES

Airframe hulls are designed for maximum performance within an atmosphere. A ship with an airframe hull may use its full acceleration rating within an atmosphere (see the Airframe Atmospheric Speeds table above). An airframe must begin with a Fully Streamlined hull (automatic or improved to that level), add 10% to the cost of the hull, add +1 to the minimum Model Flight Avionics computer required, and allocate the following tonnage for control surfaces from the available hull space.

THE BRIDGE

When designing a ship the term 'bridge' is used to represent all of the command and control systems on board a vessel. In essence everything needed to run and control the vessel's subsystems and make it all work, with the exceptions of the main computer, power plant, and drives. The minimum Bridge required is already determined for the standard hulls listed earlier, but for custom sized hulls here are the minimum requirements:

The tonnage and cost for the bridge of a ship may be allocated among the following areas as per their normal cost and size requirements:

1) Main command and control bridge. This is the heart and soul of a vessel's control and operation, typically housing at least the commander's stations, helm and navigation controls, along with the communications and sensor station. A minimum of 10 tons must be allocated to the main command and control bridge, though larger ships will in almost all cases have correspondingly larger command and control bridges if not secondary bridges installed.
3) Command (non-passenger) Workstations and Terminals
4) Airlocks
5) Ship's Locker
6) Engineering Shops
7) Vehicle Shops
8) Laboratories
9) Sickbays

STREAMLINING UPGRADE COSTS

	Unstreamlined	*Partially Streamlined*	*Fully Streamlined*
Cylinder	-	Auto	Cr5000/ton
Needle/Wedge	-	-	Auto
Cone	-	-	Auto
Closed	-	Auto	Cr5000/ton
Sphere	-	Auto	Cr5000/ton
Flat Sphere	-	-	Auto
Dispersed	Auto	X	X

AIRFRAME CONTROL SURFACES

Hull Size	*Tonnage Lost to Control Surface*
1 ton	0.05
10 tons	0.5
100 tons	5
1000 tons	50
5000 tons	250
10,000 tons	500
100,000 tons	5000
1,000,000 tons	50,000
Custom Hull	5% of total Hull Size

SHIP'S COMPUTER

A ship's computer actually consists of 4 systems; the Main Computer along with the Flight Avionics, Sensor, and Communications subsystems. Each of these systems will, in most cases, include 2 or more backups. These backups are included in the cost of the computer system.

MAIN COMPUTER

Any spaceship or starship must install at minimum a Model/1 Main Computer to handle the operation of the ships and integration of the avionics, sensor, and communications subsystems. The Model number of the computer must also be sufficient to support the Jump and

CUSTOM SIZED HULL MINIMUM REQUIREMENTS

Ship Type	*Required Tonnage*	*Minimum Tonnage*	*Cost*
Starship or Spaceship	2% of Ship's total tonnage	20 tons	Cr5,000 per ton of Ship
Small craft	20% of Ship's total tonnage	4 tons	Cr25,000 per ton of Bridge installed

PROCESSING POWER (TOTAL/MAX)

Computer Model	Min TL	Cost	Size	EPs	Jump Support	Flight Avionics Support	Sensors and Comm. Support	Free CPU Output
Model/1	5	*	0.1	0	Jump-1	Model/1	Model/1	28/11
Model/1bis	6	*	0.1	0	Jump-2	Model/2	Model/1	32/7
Model/2	7	*	0.2	0	Jump-2	Model/2	Model/2	35/12
Model/2bis	8	*	0.2	0	Jump-3	Model/3	Model/2	38/9
Model/3	9	*	0.3	1	Jump-3	Model/3	Model/3	42/12
Model/4	10	*	0.4	2	Jump-4	Model/4	Model/4	49/13
Model/5	11	*	0.5	3	Jump-5	Model/5	Model/5	49/13
Model/6	12	*	0.6	5	Jump-6	Model/6	Model/6	57/13
Model/7	13	*	0.7	7	Jump-6	Model/7	Model/7	57/13
Model/8	14	*	0.8	9	Jump-6	Model/8	Model/8	57/13
Model/9	15	*	0.9	12	Jump-6	Model/9	Model/9	65/14

* Cost is determined after selecting the Flight Avionics, Sensors, and Communications subsystems. See Final Costs, pg. 264.

Flight Avionics subsystems, thus the Model number of the ship's computer must equal or exceed the Model number of either of these subsystems (whichever is higher). Ships smaller than 100 tons may install a computer up to a maximum model number equal to the size of the hull divided by 10. Thus, a 20-ton vessel could install at best a Model/2 computer, while an 80-ton vessel could install up to a Model/8 computer.

The computer is also required to support and aid Jump navigational plotting, synchronizing and initiating the Jump drives, and maintain the ship's integrity while in Jump space. The Model number of the computer also equals the farthest Jump the ship is capable of (i.e.: a starship equipped with a Model/2 computer could do at most a single Jump-2 at one time. A Model/5 computer would allow up to a Jump-5).

BIS Computers: A 'bis' version of the Model/1 and Model/2 computer is available. A 'bis' computer acts as one model level higher for determining Jump and Flight Avionics support, but acts as its normal model number for sensor and communications support. For example a Model/2 bis computer could support a Jump-3 and a Model-3 Flight Avionics subcomputer, but can still only support Model/2 Sensor and Communications systems. Double the final cost for a BIS computer.

FLIGHT AVIONICS

The size of a spaceship or starship determines the required Model of Flight Avionics that must be installed to be able to properly fly the craft. Streamlining and Airframe designs will also further increase these requirements to allow for complete control while operating within an atmosphere.

Streamlined Hulls: If the type of hull being used is not automatically streamlined, add +1 to the Minimum Flight Avionics Model Number required. If Flight Avionics is below minimum, apply a -1 Agility penalty for each model number below the minimum of the ship's flight avionics system when flying within in an atmosphere.

Airframe Hulls: If the type of hull being used was automatically streamlined to begin with, add +1 to the Minimum Flight Avionics Model Number required, otherwise add +2 to the minimum Model required. If Flight Avionics is below minimum, apply a -1 Agility penalty for each model number below the minimum of the ship's flight avionics system when flying within in an atmosphere.

FLIGHT AVIONICS

Ship Size	Minimum Model #	Min TL	Size	Cost Factor
1-600 tons	Model/1	5	0.4	0.9
601-1000 tons	Model/2	7	0.8	1.8
1001-4000 tons	Model/3	9	1.2	2.7
4001-10,000 tons	Model/4	10	1.6	3.6
10,001-50,000 tons	Model/5	11	2.0	4.5
50,001-100,000 tons	Model/6	12	2.4	5.4
100,001+ tons	Model/7	13	2.8	6.3
100,001+ tons	Model/8	14	3.2	7.2
100,001+ tons	Model/9	15	3.6	8.1

SHIP SENSORS

Sensor Range	Minimum Model #	Min TL	Size	Cost Factor	
Close Range	Model/1	5	0.3	0.6	
Short Range	Model/2	7	0.6	1.2	
Medium Range	Model/3	9	0.9	1.8	
Long Range	Model/4	10	1.2	2.4	
Very Long Range	Model/5	11	1.5	3	
Extreme Range	Model/6	12	1.8	3.6	
System Wide	Model/7	13	2.1	4.2	
1 Parsec	Model/8	14	2.4	4.8	Passive, very basic system survey data
2 Parsecs	Model/9	15	2.7	5.4	Passive, very basic system survey data

SENSORS

Sensors are required on every starship or spaceship as safe navigation is nearly impossible without them. The range and quality of the sensors installed depends on the Sensor Model selected.

COMMUNICATIONS

At a minimum, all spacecraft and starships must install a Model/1 communications subsystem, which provides close range communications and the required transponder code system. Ships caught with altered or deliberately disabled transponder systems are dealt with harshly by the authorities.

FIBER OPTIC BACKUP (FIB)

Fiber optic backups (FIB) for the entire system may be installed to harden the system against the effects of radiation damage. Such radiation protection increases the size and cost of the entire system (Main Computer and ALL subsystems) by x2.

FINAL COSTS

Once the Main Computer, Flight Avionics, Sensor, and Communications models have been selected, the final costs can be determined. Add the Cost Factor of all the subsystems and multiply that total by the Model Number of the Main Computer. This is the final cost in MCr.

Final Cost: Main Computer Model Number x Total Cost Factor of All Subsystems (Flight Avionics, Sensors, and Communications)

DRIVES AND POWER PLANTS

These systems are the heart of any ship. The power plant provides the energy required to make the vessel capable of travel either using maneuver drives to cross interplanetary distances or Jump drives to voyage between the stars.

JUMP DRIVES

A Jump Drive is required for any interstellar craft, and may only be installed on ships of 100-tons in size or

COMMUNICATIONS

Communication Range	Minimum Model #	Min TL	Size	Cost Factor	
Close Range	Model/1	5	0.2	0.5	
Short Range	Model/2	7	0.4	1	
Medium Range	Model/3	9	0.6	1.5	
Long Range	Model/4	10	0.8	2	
Very Long Range	Model/5	11	1	2.5	
Extreme Range	Model/6	12	1.2	3	
System Wide	Model/7	13	1.4	3.5	
System Wide	Model/8	14	1.6	4	
System Wide	Model/9	15	1.8	4.5	
Maser	+1 to the Minimum Communications Model Number required. Ignores atmospheric conditions				
Meson	+2 to the Minimum Communications Model Number required. Multiply installed Communications Model price by x5. Can penetrate anything but meson screens				

larger. It is the means by which a ship may cross the vast distances involved in interstellar travel in a matter of days rather than decades or centuries. Jump drives require large amounts of fuel to power the ship across the threshold into Jump Space; fully 10% of the ship's total tonnage per Jump potential of the drive.

The size of the ship's hull determines the number of jump units that must be installed in a ship to allow it to enter Jump space (see the Drives and Armor table on pg. 259). All installed units must be of the same type.

In rare cases, a ship may have more than one jump drive installed as a backup or secondary system. This second drive must also meet the installed jump unit requirements based on the size of the ship's hull. Only one Jump drive may be actively used at any given time.

Jump-1 Drive Unit: Consists of the jump grid, jump capacitor, and actual drive unit. Cost is MCr4. Requires 1 ton of space, a supply of 0.5 EP per round, and 5 tons of dedicated Jump Fuel. Not available before TL9. Propels the ship 1 parsec (3.27 light years) in distance while a week is spent in jump space.

Jump-2 Drive Unit: Consists of the Jump grid, Jump capacitor, and actual drive unit. Cost is MCr6. Requires 1.5 tons of space, a supply of 1 EP per round, and 10 tons of dedicated Jump Fuel. Not available before TL11. Propels the ship 2 parsecs (6.54 light years) in distance while a week is spent in Jump space.

Jump-3 Drive Unit: Consists of the Jump grid, Jump capacitor, and actual drive unit. Cost is MCr8. Requires 2 tons of space, a supply of 1.5 EP per round, and 15 tons of dedicated Jump Fuel. Not available before TL12. Propels the ship 3 parsecs (9.81 light years) in distance while a week is spent in Jump space.

Jump-4 Drive Unit: Consists of the Jump grid, Jump capacitor, and actual drive unit. Cost is MCr10. Requires 2.5 tons of space, a supply of 2 EP per round, and 20 tons of dedicated Jump Fuel. Not available before TL13. Propels the ship 4 parsecs (13.08 light years) in distance while a week is spent in Jump space.

Jump-5 Drive Unit: Consists of the Jump grid, Jump capacitor, and actual drive unit. Cost is MCr12. Requires 3 tons of space, a supply of 2.5 EP per round, and 25 tons of dedicated Jump Fuel. Not available before TL14. Propels the ship 5 parsecs (16.35 light years) in distance while a week is spent in Jump space.

Jump-6 Drive Unit: Consists of the Jump grid, Jump capacitor, and actual drive unit. Cost is MCr14. Requires 3.5 tons of space, a supply of 3 EP per round, and 30 tons of dedicated Jump Fuel. Not available before TL15. Propels the ship 6 parsecs (19.62 light years) in distance while a week is spent in Jump space.

JUMP FUEL OPTION: In campaigns where the Referee wishes to make interstellar trade and commerce more economically feasible, reduce the Jump Fuel requirements by one-half. A Jump-4 ship would then only require 10 tons of fuel per drive unit. Please note however that because this is an optional rule, all published ship designs will not use it. Use of this optional will also greatly affect the suitability of starships previously designed for use with Classic Traveller, in T20.

Jump Drive USP Rating: A ship's Jump Drive USP rating is equal to its maximum range in parsecs.

JUMP DRIVES

Type	TL	Cost	Size	EP	Fuel
Jump-1	9	MCr4	1 ton	0.5	5 tons
Jump-2	11	MCr6	1.5 tons	1	10 tons
Jump-3	12	MCr8	2 tons	1.5	15 tons
Jump-4	13	MCr10	2.5 tons	2	20 tons
Jump-5	14	MCr12	3 tons	2.5	25 tons
Jump-6	15	MCr14	3.5 tons	3	30 tons

MANEUVER DRIVES

If a ship is to be capable of independent movement in normal space (as opposed to Jump Space), maneuver drives are required. Although unusual, there are some ship designs that do not have maneuver drives installed. Xboats (Express Messenger Boats) are one example. Maneuver drives do not require fuel directly; instead they draw their energy from the vessel's installed power plant (which must be fueled).

The Drives and Armor table on pg. 259 determines the number of maneuver drive units that must be installed based on the size of the ship's hull. All installed units must be of the same type.

1-G Maneuver Drive Unit: Costs MCr1.5 per unit, requires 1 ton of space, and requires 0.5 EP in power per round. Becomes available at TL7. The ship may accelerate or decelerate at a maximum of 1-G per round.

2-G Maneuver Drive Unit: Costs MCr1.75 per unit, requires 2.5 tons of space, and requires 1 EP in power per round. Becomes available at TL7. The ship may accelerate or decelerate at a maximum of 2-Gs per round.

3-G Maneuver Drive Unit: Costs MCr2 per unit, requires 4 tons of space, and requires 1.5 EP in power per

MANEUVER DRIVES

Type	TL	Cost	Size	EP
1-G	7	MCr1.5	1 ton	0.5
2-G	7	MCr1.75	2.5 tons	1
3-G	8	MCr2	4 tons	1.5
4-G	8	MCr2.75	5.5 tons	2
5-G	8	MCr3.5	7 tons	2.5
6-G	9	MCr4.25	8.5 tons	3

round. Becomes available at TL8. The ship may accelerate or decelerate at a maximum of 3-Gs per round.

4-G Maneuver Drive Unit: Costs MCr2.75 per unit, requires 5.5 tons of space, and requires 2 EP in power per round. Becomes available at TL8. The ship may accelerate or decelerate at a maximum of 4-Gs per round.

5-G Maneuver Drive Unit: Costs MCr3.5 per unit, requires 7 tons of space, and requires 2.5 EP in power per round. Becomes available at TL8. The ship may accelerate or decelerate at a maximum of 5-Gs per round.

6-G Maneuver Drive Unit: Costs MCr4.25 per unit, requires 8.5 tons of space, and requires 3 EP in power per round. Becomes available at TL9. The ship may accelerate or decelerate at a maximum of 6-Gs per round.

Maneuver Drive USP Rating: A ship's Maneuver Drive USP rating is equal to its maximum possible acceleration in Gs.

POWER PLANT

All vessels regardless of size and purpose require the installation of a Power Plant. The installed Power Plant must produce enough power in the form of Energy Points (EP) to power either the ship's maneuver drive or Jump drive at full capacity at any given time. Since a ship does not use its maneuver drives while in jump space, it is not necessary for the power plant to have to supply power to both systems at the same time.

The power plant should also produce enough EP to power any install subsystems such as weapons, screens, and other facilities. If a ship does not produce enough EP to power all of its systems, the chief engineer will have to reroute power from one system to another as needed. Most ships are designed with power plants large enough to handle all the system aboard the ship operating at the same time (with the exception of the maneuver or Jump drive as appropriate).

TL7 Fission Power Plant: Produces 1 EP per round, volume is 2 tons per unit, cost is MCr6 per unit, and requires 1 tons of fuel per 4 weeks of operation per unit installed. Unused EPs are lost at the end of each round and may not be carried over as surplus into the next round. Not available before TL7.

TL-9 Fusion Power Plant: Produces 1 EP per round, volume is 1.5 tons per unit, cost is MCr4.5 per unit, and requires 1 tons of fuel per 4 weeks of operation per unit installed. Unused EPs are lost at the end of each round and may not be carried over as surplus into the next round. Not available before TL9.

TL13 Fusion Power Plant: Produces 1 EP per round, volume is 1 tons per unit, cost is MCr3 per unit, and requires 1 tons of fuel per 4 weeks of operation per unit installed. Unused EPs are lost at the end of each round and may not be carried over as surplus into the next round. Not available before TL13.

TL15 Fusion Power Plant: Produces 2 EP per round, volume is 1 ton per unit, cost is MCr3 per ton, and requires 1 ton of fuel per 4 weeks of operation per unit installed. Unused EPs are lost at the end of each round and may not be carried over as surplus into the next round. Not available before TL15.

TL16 Fusion Power Plant: Produces 3 EP per round, volume is 1 ton per unit, cost is MCr3 per ton, and requires 1 ton of fuel per 4 weeks of operation per unit installed. Unused EPs are lost at the end of each round and may not be carried over as surplus into the next round. Not available before TL16.

TL17 Antimatter Power Plant: Produces 8 EP per round, volume is 1 ton per unit, cost is MCr1 per ton, and requires 0.1 tons of fuel per year of operation per unit installed.

Ship's Agility: Once you have calculated the required Energy Point cost of all installed components, if the installed Power Plant produced excess Energy Points beyond those required, these may be used to increase the agility of the ship itself while in combat. This represents the ship's ability to make violent maneuvers to avoid being hit in combat. A ship's Agility rating may never exceed the installed Maneuver Drive rating.

Ship's Agility Rating: Extra Energy Points / (1 per 100 tons of ship). Round fractions down.

Optionally, the formula: Extra Energy Points x (100 / total ship tonnage) may be used. Some referees may find this second formula easier to use with spreadsheets and basic calculators, but it will cause some minor differences when applied to non-standard ship tonnages.

FUEL

Jump and Power Plant fuel are available in unrefined and refined versions. Unrefined fuel is little more than plain water or atmospheric gases from a gas giant. Refined fuel is unrefined fuel that has been processed and purified into liquid hydrogen.

Streamlined ships may draw unrefined fuel for free from any available water source (including ice) on a world,

asteroid, or even a comet. On some worlds however this may be illegal, or may require a permit first. Make a basic check using the Law Level of the world as a DC. If the check is successful, no permits are needed and no restrictions exists. If the check fails, a permit and fee will usually be required before refueling will be allowed. If the check fails by 10 points or more, refueling outside of the starport is illegal. Once the ship has landed near such a water based fuel supply, the crew may begin pumping the unrefined fuel aboard, a process that will take approximately 4 hours to complete.

Streamlined and partially streamlined ships that are equipped with Fuel Scoops may skim the upper atmosphere of gas giants to collect unrefined fuel for free. The upper atmosphere of a gas giant is not the most hospitable place in the world for a starship, requiring the pilot to make a successful Pilot skill check (DC15) to avoid complications. Refueling from a gas giant will normally take approximately 10 hours to complete.

Fuel Scoops: No extra tonnage cost, but cost Cr1000 per ton of ship

UNREFINED FUEL

Unrefined fuel, while often free for the taking is dangerous to use, and can often result in malfunctions and Misjumps. Fuel Purification plants can be installed on ships and are capable of refining the raw fuel into pure liquid hydrogen or refined fuel. It takes a single fuel purification plant 20 - Plant TL hours to refine 200 tons of fuel. Multiple purification plants may be installed to increase the amount of fuel that may be processed at any given time.

TL: The minimum technological level at which a subsystem or component first becomes available.
Tons: The number of tons of space that must be available in the hull to accommodate the subsystem or component.
Cost: Cost is listed in Credits.

FUEL PURIFICATION PLANTS

TL	Tons	Cost
8	10	40,000
9	9	38,000
10	8	36,000
11	7	34,000
12	6	32,000
13	5	30,000
14	4	28,000
15	3	30,000

SHIP POWER PLANTS

Type	*TL*	*Cost*	*Size*	*EP*	*Fuel*
Fission	7	MCr6	2 tons	+1	1 ton
Fusion	9	MCr4.5	1.5 tons	+1	1 ton
Fusion	13	MCr3	1 ton	+1	1 ton
Fusion	15	MCr3	1 ton	+2	1 ton
Fusion	16	MCr3	1 ton	+3	1 ton
Antimatter	17	MCr1	1 ton	+8	0.1 tons

DROP TANKS

Reusable drop tanks may be fitted to the outside of any ship to increase its range. The fuel from the drop tanks is fed to the Jump Drives just before jump and the tanks jettisoned when the fuel transfer is complete. Obviously, such tanks must be replaced each time they are used. Jettisoned tanks are almost always recovered, usually by the company that manufactures and sells them, which allows the cost to be kept down somewhat.

When installed and attached to a ship they increase the ship's overall tonnage, thus reducing the effectiveness of the ship's maneuver drives. When the tanks are jettisoned, the ship will regain its normal maneuvering capabilities.

Drop tanks can be used in two ways:

The ship can jump, pump fuel from its drop tanks into its now-empty internal storage, and jump again with or without dropping the tanks. Dropping the tanks may increase jump range for the second jump. In this case it is quite safe to jump, as the ship can maneuver away from its now-empty and dropped tanks.

Alternatively, the fuel from drop tanks can be used along with or instead of internal jump fuel. Since most of the Jump fuel is used up in initiating the Jump, the tanks can be drained and blasted free just as the ship is about to jump, leaving some fuel in the internal tanks to maintain the Jumpfield. Using drop tanks in this manner increases the risk of a Misjump, as the vessel will be jumping in proximity to the discarded tanks. Because of the risk, this method is never used by commercial ships. In the OTU, drop tanks are not available for commercial ships until the 1100s.

L-Hyd Drop Tanks: TL15; Cr10,000 + Cr1000 per ton of fuel capacity

SHIP DEFENSES

While the hull of a small craft or starship is sufficient to protect it from micrometeorites, low-level radiation, and other common hazards of space travel, they are not designed to provide much in the way of defense against

enemy attacks. To provide such defense a ship must install hull armor, electronic screens, or both.

STANDARD HULL ARMOR

The hull of a ship may be armored and reinforced to withstand greater damage in combat situations. Ships of any configuration except a Dispersed Structure (Hull USP 7) may be armored. If no armor is installed a ship is considered to have a Hull Armor USP rating of 0. Planetoids (Hull USP 8) have an automatic base Hull Armor USP rating of 3, Buffered Planetoids (Hull USP 9) enjoy an automatic based Hull Armor USP rating of 6, and both may be armored additionally from there.

A ship with a manufactured hull may never have an Armor USP rating greater than the Tech Level of the ship itself. Ships based on a planetoid hull have a maximum Armor USP rating of 3 + the Tech Level of the ship, while Buffered Planetoids have a maximum Armor USP rating of 6 + the Tech Level of the ship.

TL7-9 Armor: Weight is 4 tons per unit. Base cost is KCr300 plus KCr400 per unit installed.

TL10-11 Armor: Weight is 3 tons per unit. Base cost is KCr300 plus KCr300 per unit installed.

TL12-13 Armor: Weight is 2 tons per unit. Base cost is KCr300 plus KCr200 per unit installed.

TL14+ Armor: Weight is 1 ton per unit. Base cost is KCr300 plus KCr100 per unit installed.

Armor USP Rating: Without armor, a ship's Armor USP rating is 0. To achieve the first layer of armor (Armor USP rating of 1), a ship must install twice as many armor units as the armor factor specified for the hull size and TL of the armor. For example a TL12, 200-ton ship with an Armor USP rating of 1 must have installed 8 units of armor.

Once the first layer of armor is installed, the ship need only allocate an amount of space equal to the armor factor specified for the hull size and TL of the armor per +1 improvement in the ship's Armor USP rating. Following our previous example, the same TL12, 200-ton ship could improve its Armor USP rating to a maximum of 12 (limited by its TL) after installing an additional 44 units or armor (for a total of 52 units).

SCREENS

Ships may deploy various types of defensive screens capable of reducing or eliminating the damage from certain types of attacks. Screens are considered a passive defense system; they are either on or off. When on they function continuously without having to be reactivated each time they need to be used. In combat the USP rating of the screen is used in place of the Armor rating of the ship where appropriate.

Nuclear Dampers: Nuclear dampers suppress nuclear explosions, effectively rendering missiles equipped with nuclear warheads useless. Note that nuclear dampers will not defeat the effects of a distant detonation. Thus a ship with nuclear dampers can still suffer blast damage from a warhead detonating some distance away so long as there is a medium (e.g. an atmosphere) to carry the blast effect. Similarly, missiles that detonate at a distance and use nuclear energy to generate laser pulses will still affect the screened ship. A direct hit with a nuclear warhead will not, however.

Meson Screens: Meson screens are effective against Meson Gun attacks.

Force Fields: Also known as Black Globe Generators, these devices envelop a ship in an energy-absorbing screen capable of absorbing all incoming and outgoing energy, in any form. The energy is captured by the screen and redirected into large capacitors installed on the ship.

A Jump Drive has energy capacitors already built-in and may be used for storing energy redirected by a Black Globe. Additional capacitors are also available and may be purchased and installed as desired. A Jump drive has capacitors equal in size to (0.5% x Jump USP Rating) x Hull Tonnage. So a Jump-3 capable 200-ton ship would have 3 tons of capacitors, while a Jump-3 capable 200,000 ton ship would have 3000 tons in capacitors. Extra capacitors are available for MCr4 per ton. A 1-ton capacitor (in a Jump drive or not) can store up to 36 Energy Points.

Black Globes are not commercially available; they are either recovered artifacts or experimental versions installed on highly classified military ships. While Black Globes are the ultimate in defensive screens, they also are a bit problematical.

NUCLEAR DAMPERS

Tons	*EPs*	*MCr*	*TL*	*USP*
50	10	50	12	1
15	20	40	13	2
20	30	45	13	3
8	40	30	14	4
10	50	35	14	5
12	60	38	14	6
10	70	30	15	7
15	80	40	15	8
20	90	50	15	9

Tons: The number of tons of space that must be available in the hull to accommodate the subsystem or component.

EPs: The power requirements in Energy Points (EPs) to use this component or subsystem.

MCr: Cost is listed in Megacredits.

TL: The minimum technological level that at which a subsystem or component first becomes available.

MESON SCREENS

Tons	EPs	MCr	TL	USP
90	0.2	80	12	1
30	0.4	50	13	2
45	0.6	55	13	3
16	0.8	40	14	4
20	1	45	14	5
24	1.2	50	14	6
20	1.4	40	15	7
30	1.6	50	15	8
40	1.8	60	15	9

Tons: The number of tons of space that must be available in the hull to accommodate the subsystem or component.

EPs: The power requirements in Energy Points (EPs) to use this component or subsystem, for every 100 tons of ship size. For example a 20,000 ton ship with a factor 4 meson screen would require 160 EPs (0.8 x (20,000 / 100)).

MCr: Cost is listed in Megacredits.

TL: The minimum technological level that at which a subsystem or component first becomes available.

They stop any energy from getting in, but they also stop it from getting out. A ship within a Black Globe is effectively blind, its sensors and communications will fail to penetrate the globe. Weapons fire will be treated just as if they were an enemy attack.

BLACK GLOBE GENERATORS

Tons	EPs	MCr	TL	USP
10	-	400	15	1
15	-	600	15	2
20	-	800	15	3
25	-	1000	15	4
20	-	-	16	5
30	-	-	16	6
35	-	-	16	7
20	-	-	17	8
20	-	-	17	9

Tons: The number of tons of space that must be available in the hull to accommodate the subsystem or component.

EPs: The power requirements in Energy Points (EPs) to use this component or subsystem.

MCr: Cost is listed in Megacredits.

TL: The minimum technological level that at which a subsystem or component first becomes available.

SHIP WEAPONS

While it is not surprising that a military ship would be armed, even private ships often install weapons for defensive (and sometimes offensive) purposes. Pirates and similar hazards, while not as common as popular vid shows portray, are a threat to starships. Weaponry is thus considered desirable in some areas.

WEAPON TYPES

The following various types of weapon systems may be installed on small craft and starships:

Sandcaster: A sandcaster is not a weapon, but a fairly basic defense system designed to protect the craft that fires it in a defensive envelopment of ceramic particles known as “sand”. This sand absorbs laser energy and obscures the target vessel, giving a measure of defense against incoming missiles and energy weapons. Sand fired defensively by a ship will continue at the original course and speed of the ship. If the ship does not accelerate, decelerate, or change course, the ship will stay within the defensive cloud for a time until it drifts apart.

Missiles: Missiles are available with two types of warheads, a standard high explosive or plasma warhead, and a nuclear warhead. Nuclear missiles also inflict radiation damage against a target.

Bomb-Pumped Laser Missiles: In some areas, nuclear-pumped laser warheads are also used. These weapons use a nuclear device to generate energy for a cluster of laser pulses. Since they detonate short of a ship, such weapons are not defeated by nuclear dampers and do no radiation damage. Laser missiles are similar in effect to close-range laser fire. Successful defensive energy weapon fire on the missile will destroy it before detonation, and any other defenses that affect laser fire will work against the laser pulses.

Mining Laser: A low-powered beam laser suitable for asteroid mining. A mining laser may be used as a weak offensive or defensive weapon if needed.

Beam Laser: A weapons-grade beam laser designed for defensive applications. If need be a beam laser can be used for offense.

Pulse Laser: A weapons-grade pulsed laser designed for both offensive and defensive use.

Plasma Weapon: A high-energy system suitable for short range offensive power. Fires a stream of superheated plasma.

Particle Accelerators: A particle accelerator fires a stream of charged or neutral particles; usually electrons or hydrogen nuclei, at high velocities. These weapons inflict both standard and radiation damage against a target.

Fusion Weapon: A further refinement of the plasma weapons, fusion weapons bring the ionized gas to the point of fusion before discharging the beam.

Meson Weapons: A meson gun generates high-ener-

SMALL CRAFT AND STARSHIP WEAPON TYPES

Weapon Type	*Damage Dice*	*Threat Range***	*Critical Damage*	*Special Damage (dice)*
Missile	d6	18	x1	
Nuclear Missile*	d6	17	x2	Radiation (d12)
Bomb-Pumped Laser Missile***	d10	19	x1	
Mining Laser	d6	20	x1	
Beam Laser	d8	20	x1	
Pulse Laser	d10	19	x2	
Plasma	d12	18	x2	
Particle Accelerator	d12	17	x1	Radiation (d10)
Fusion	d20	16	x5	
Meson	d20	15	x10	Radiation (d12)

* All missiles do a base 5d6 damage +1d6 per USP factor (not added to Radiation damage)

** If spinal mount, increase Threat Range by 5.

*** Treat bomb-pumped laser missiles as 1d6 (+1 extra hit per USP Factor) from a pulse laser with no radiation damage.

Damage Dice: The number of damage dice to be rolled equals the USP code rating of the attacking weapon system. For example, a USP code 6 Pulse Laser would inflict 6d10 damage against its target if it hits. Major weapons (i.e.: spinal mounts) always roll 16 dice for damage regardless of their actual USP code rating.
Threat Range: If the natural attack roll is this value or higher, a critical threat has occurred. A second attack roll should be made using the same modifiers as the original attack roll. If this second roll is also a successful hit, a critical hit is scored.
Critical Damage: The extra damage inflicted by a critical hit with this weapon.
Special Damage: Any radiation damage that may be inflicted by this weapon, specifying the type of damage dice to use.

gy mesons that can be directed against a target. Mesons have very short lives, but can be manipulated to last for specific durations by accelerating them towards relativistic speeds. In combat, the gunner will determine the necessary duration of the mesons so that the final point of decay is within the hull/chassis/body of the target. Because of their nature, mesons pass through armor, rock, ice, and any other matter without effect. Damage occurs only at the point of decay (i.e. the target).

SHIP'S ORDNANCE AND STORAGE

While most starship weaponry is energy based, missiles and sandcasters once fired must be reloaded from available stocks. A ship must be sure to provide adequate stores of this ordnance, lest they be caught short at a critical moment in battle!

Missile Magazine: A missile magazine is normally installed alongside the turret or bay mounting the weapon system itself, to reduce the distance the ordnance must travel. A magazine can hold up to 20 missiles (standard or nuclear), and is armored (AR1) in case of accidental detonation of the magazine by enemy fire. A ship may install as many missile magazines as needed and can be fit aboard.

Sand Canisters: A standard single reload for a sandcaster system. Sand canisters do not require any protective storage as they are non-explosive.

Standard Missiles: A missile equipped with a standard high explosive warhead.

Nuclear Missiles: A missile equipped with a nuclear warhead. Nuclear missiles are generally only found on military ships and are illegal for civilians to possess in most jurisdictions.

Bomb-Pumped Laser Missiles: Also illegal for civilian use, bomb-pumped laser missiles are preferred by some navies and ignored by others.

HARDPOINTS

Hardpoints are external weapon fittings that can be installed upon a ship's hull. One hardpoint may be installed per 100 tons not otherwise allocated to large weapon systems (weapon bays and spinal mounts).

Vessels smaller than 100 tons may install a single hardpoint. Hardpoints require no tonnage but cost Cr100,000 for each hardpoint. Hardpoints must be designated when the ship is designed and may not be added after construction is begun.

Turrets: One turret (any type) may be installed per available hardpoint on the ship. A turret can be added or replaced at any time to an existing hardpoint. For example, a 100-ton ship with 1 hard point installed and a single laser turret installed on that hard point, could be upgraded to mount a double or triple turret at any time, or the turret could be completely removed if desired.

Weapon Bays: Subtract 10 potential hardpoints for every weapon bay (50 or 100 ton) installed. For example, a ship with 20 100-ton weapon bays installed would lose 200 potential hardpoints. One weapon bay, regardless of size, may be installed per 1000 tons of ship. Round all tonnage down to the nearest 1000 tons. For example a 1900 ton ship may install only 1 weapon bay. Weapon bays may not normally be mounted in ships smaller than 1000 tons.

Major Weapons (Spinal Mounts): Subtract one potential hardpoint for every 100 tons of major weapons system installed. For example, a ship sporting a 5000 ton spinal mounted meson gun would lose 50 potential hardpoints. Only one Major weapon system may be installed on a ship regardless of the size of the ship.

HARDPOINTS OPTION: When determining potentially available hardpoints, subtract the total Major Weapon (Spinal Mount) and Weapon Bay tonnage installed from the total Hull tonnage. Use this new total when calculating hardpoint availability at 1 per 100 tons, and ignore the Major Weapons and Weapons Bays modifiers. Please note however that because this is an optional rule, all published ship designs will not use it. Use of this rule will also greatly affect the suitability of starships previously designed for use with Classic Traveller, in T20.

BAY WEAPON OPTION: Ships have been designed in previous versions of Traveller that squeezed weapon bays into vessels smaller than 1000 tons. Optionally, a single 50-ton bay may be fitted into any ship big enough to carry it. Such a vessel loses half its potential hardpoints. Since vessels of this type have been used in Traveller materials in the past, T20 vessels may occasionally be created which use this rule.

TURRET WEAPONS

Turrets are available in single, double, and triple weapon configurations and may mount lasers (beam or pulse), energy weapons (plasma or fusion), sand casters, particle accelerators, and missile racks. Ships with 10 or fewer turrets may mix the types of weapons mounted in each turret. Plasma and Fusion guns and Particle Accelerators cannot be mixed with any other weapon in a given turret.

Popup turrets take up considerably more room, as they are designed to remain hidden within the body of the ship until needed, at which time they 'pop out' and go into action. Because of their secretive nature most authorities frown upon them

Missile Racks and Sandcasters: These are launchers for that particular type of ordnance, and do not include the ordnance itself. Missiles and Sand Canisters must be purchased separately. Each Missile Rack or Sandcaster can hold up to 3 shots in internal magazines.

BARBETTES

Barbettes are really little more than an extra-large turret. One barbette may be installed per available hardpoint. Barbettes may only mount particle accelerators.

STARSHIP AND SMALL CRAFT ORDNANCE

Item	*Tons*	*Cost*
Missile Magazine	1	100,000
Sand Canisters	0.05(50kg)	400
Standard Missiles	0.05 (50kg)	5,000
Nuclear Missiles	0.05 (50kg)	50,000
Bomb-Pumped Missile	0.05 (50kg)	75,000

Tons: The number of tons of space that must be available in the hull to accommodate the subsystem or component.
Cost: The cost of the item in Credits.

TURRET TYPES

Type	*Cost*	*Notes*
Single	0.5	-
Double	0.75	-
Triple	1	-
Popup	x5	Double the size requirements for installed weaponry.

Cost: The cost of the turret in Megacredits (MCr).

AVAILABLE TURRET WEAPONS

Installed Weapons	Tons	EPs	MCr	Min TL	+1 TL Mod	+2 TL Mod	USP = # Required Installed 1	2	3	4	5	6	7	8	9	Range
Missile Rack	1	0	0.75	7	13+	-	1	3	6	12	18	30	-	-	-	90,000km
Mining Laser	1	0.5	0.5	7	13+	-	1	4	8	-	-	-	-	-	-	15,000km
Beam Laser	1	1	1	7	13+	-	1	2	3	6	10	15	21	30	-	30,000km
Pulse Laser	1	1	0.5	7	13+	-	1	3	6	10	21	30	-	-	-	45,000km
Plasma Gun	2	1	1.5	10	11+	12+	1	4	10	16	20	-	-	-	-	4500km
Fusion Gun	2	2	2	12	14+	-	-	-	-	1	4	10	16	20	-	4500km
Sandcaster	1	0	0.25	7	8+	10+	1	3	6	8	10	20	30	-	-	-
Particle Accelerator	3	5	3	15	-	-	-	1	2	4	6	8	10	-	-	30,000km

Tons: The tonnage of the turret based on the type of weaponry it contains, regardless of the actual number of weapons mounted in it. Particle accelerators may only be singly mounted (i.e. one weapon in a turret). Plasma and Fusion guns may be installed in single or dual mounts.
EPs: The Energy Point requirement for each weapon mounted on the ship of that type.
Min TL: The minimum tech level at which this type of weapon may be installed.
+1 TL Mod: If all installed weapons of this type are at the TL indicated or higher, the USP rating for those weapons is increased by 1.
+2 TL Mod: If all installed weapons of this type are at the TL indicated or higher, the USP rating for those weapons is increased by 2. This modifier is not cumulative with the +1 TL Mod.
USP = # Required Installed: The number of weapons that must be installed in a battery, or turret, to achieve the desired USP rating (1-9).
Range: The range at which this weapon may engage a target without penalty.

BARBETTES

Installed Weapons	Tons	EPs	MCr	Min TL	+1 TL Mod	+2 TL Mod	USP = # Required Installed 1	2	3	4	5	6	7	8	9	Range
PA Barbette	5	5	4	14	-	-	1	2	4	6	8	10	-	-	-	30,000km

Tons: The tonnage of the barbette.
EPs: The Energy Point requirement for each weapon mounted on the ship of that type.
Min TL: The minimum tech level at which this type of weapon may be installed.
+1 TL Mod: If all installed weapons of this type are at the TL indicated or higher, the USP rating for those weapons is increased by 1.
+2 TL Mod: If all installed weapons of this type are at the TL indicated or higher, the USP rating for those weapons is increased by 2. This modifier is not cumulative with the +1 TL Mod.
USP = # Required Installed: Show the number of weapons that must be installed in a battery to achieve the desired USP rating (1-9).
Range: The range at which this weapon may engage a target without penalty.

BAY WEAPONS

Weapon bays are large areas near the skin of a ship's hull that mount large weapon systems. These weapon systems can be easily installed and removed as need arises. Bays must be built into the ship during initial construction and may not be added once a ship has already been built, though a ship can be built with empty bays and fitted-out later. Bays are available in 100 and 50 ton versions. The cost of the bay itself is included in the listings for bay weapons. Only one bay (regardless of size) may be installed per 1000 tons of ship size.

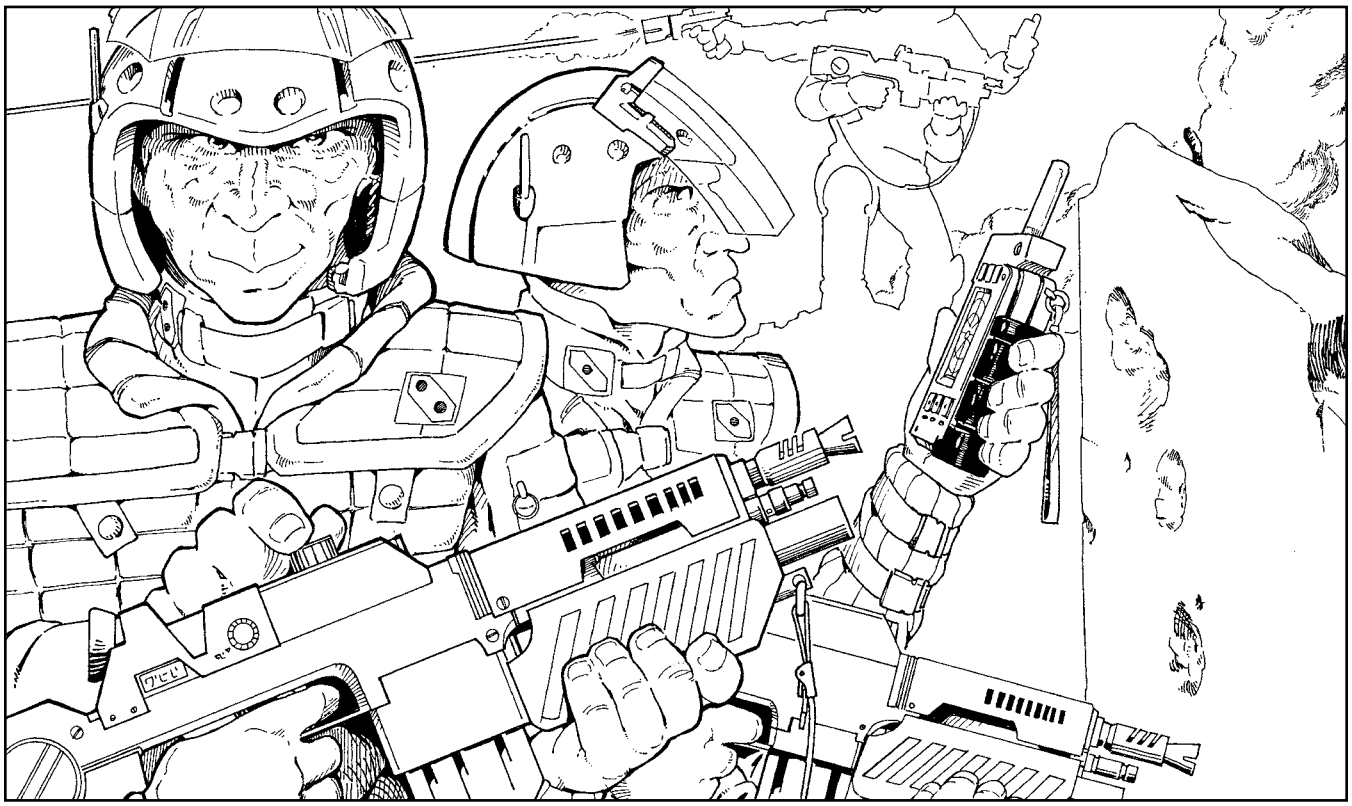
SPINAL MOUNTS

Spinal mounts are the heaviest weapon available to a starship, and run along the length of a vessel's structure (hence the name). They may only be installed on ships larger than 1,000 tons in size. Spinal weapons may either be a particle accelerator or a meson gun. Because they form the spine of the ship, upon which everything else is built, only a single spinal mounted weapon may be installed.

If a particle accelerator is selected as the spinal mount, then particle accelerator weapons may not be installed in other bays, barbettes, and turrets. Similarly, if a meson gun is selected, then meson guns may not be installed in other bays, barbettes, and turrets.

SHIP'S VEHICLES

Any vehicle, small craft (1-99 tons), or large craft (100+ tons) that is permanently carried aboard another ship and available for use by the crew of the ship is classified as a ship's vehicle.



BAY WEAPONS

	Tons	EPs	MCr	USP/Attack Bonus by Tech Level 7	8	9	10	11	12	13	14	15	Range
100 Ton Bay	100	-	1										
Meson Gun	-	200	70	-	-	-	-	-	-	3	5	9	45,000km
Particle Accelerator	-	60	35	-	6	6	7	7	8	8	9	9	60,000km
Repulsor	-	10	10	-	-	-	2	4	6	7	8	9	-
Missile	-	0	20	7	7	7	8	8	9	9	9	9	90,000km
Nuclear Missile	-	0	20	7	7	7	8	8	9	9	9	9	90,000km
50 Ton Bay	50	-	0.5										
Meson Gun	-	100	50	-	-	-	-	-	-	-	-	4	30,000km
Particle Accelerator	-	30	20	-	-	-	3	3	4	4	5	5	45,000km
Repulsor	-	5	6	-	-	-	-	-	-	-	3	5	-
Missile	-	0	12	-	-	-	7	7	8	8	9	9	90,000km
Nuclear Missile	-	0	12	-	-	-	7	7	8	8	9	9	90,000km
Plasma Gun	-	10	5	-	-	-	4	5	6	6	6	6	15,000km
Fusion Gun	-	20	8	-	-	-	-	-	7	8	9	9	15,000km

Tons: The amount of free tonnage that must be available in the hull in order to accommodate this weapon.
EPs: The number of energy points required to maintain and fire this weapon.
MCr: The cost of the weapon in Megacredits.
TL: The minimum technological level at which this weapon is available.
USP: The combat rating of this weapon based on its technological level.
Range: The range at which this weapon may effectively engage a target without penalty.

PARTICLE ACCELERATOR SPINAL MOUNT

Tons	EPs	MCr	Damage	TL	USP	Range
5500	500	3500	16d12	8	10	105,000km
5000	500	3000	16d12	9	11	105,000km
4500	500	2400	16d12	10	12	105,000km
4000	600	1500	16d12	11	13	105,000km
3500	600	1200	16d12	12	14	105,000km
3000	600	1200	16d12	13	15	105,000km
2500	700	800	16d12	14	16	105,000km
2500	700	500	16d12	15	17	105,000km
5000	800	3000	16d12	10	18	105,000km
4500	800	2000	16d12	11	19	105,000km
4000	800	1600	16d12	12	20	105,000km
3500	900	1200	16d12	13	21	105,000km
3000	900	1000	16d12	14	22	105,000km
2500	900	800	16d12	15	23	105,000km
4500	1000	2000	16d12	12	24	105,000km
4000	1000	1500	16d12	13	25	105,000km
3500	1000	1200	16d12	14	26	105,000km
3000	1000	1000	16d12	15	27	105,000km

Tons: The amount of free tonnage that must be available in the hull in order to accommodate this weapon.
EPs: The number of energy points required to maintain and fire this weapon.
MCr: The cost of the weapon in Megacredits.
Damage: The damage the weapon will inflict if it hits a target.
TL: The minimum technological level at which this weapon is available.
USP: The combat rating of this weapon
Range: The range at which this weapon may engage a target without penalty.

COMPONENTS

Accommodations for the storage, launch, recovery, and maintenance of ship's vehicles must be provided.

Vehicle Hanger: Vehicles carried aboard a starship or small craft must allocate storage space equal to the size of the vehicle (in tons).

Small Craft Hanger: A starship may carry other small craft (craft under 100-tons) within their hulls as long as a Small Craft Hanger has been made available for it. If the ship carrying the small craft displaces 1000 tons or less, the small craft hanger must be at least as large (100%) as the small craft (in tons) it is meant to house.

If the mothership is larger than 1000 tons in size, the small craft hanger must allocate an amount of space equal to 130% of the size of a smaller ship that will be housed within. For example, to store a 40-ton Pinnace aboard a starship, a small craft hanger of 52 tons or larger must be provided.

Large Craft Hanger: A starship may carry other smaller starships (craft over 100-tons) within their hulls as long as a Large Craft Hanger has been made available for it. The large craft hanger must allocate an amount of space equal to 110% of the size of smaller ship that will be housed within. For example, to store a 100-ton Scout/Courier aboard a larger starship, a large craft hanger of 110 tons or larger must be provided.

Maintenance Shop: 1 shop can accommodate up to 20 mechanics. Maintenance shops are not required, but add +2 to any attempt at repairing a vehicle or small craft. A vehicle shop requires 10 tons of space and has a cost of MCr2.

External Docking Mount: To conserve interior deck space, it is possible to mount a small or large craft on the outside of another ship. Rather than taking up space from the hull, whenever a craft is docked to the ship the size of the craft is added to the hull size of the ship for purposes of determining acceleration, jump capability, fuel use, etc. An external docking mount does require a small amount of interior space from the mothership's hull. This is equal to 30% of the size of the craft to be docked. For example, to

MESON GUN SPINAL MOUNT

Tons	EPs	MCr	Damage	TL	USP	Range
5000	500	10,000	16d20	11	10	75,000km
8000	600	12,000	16d20	11	11	75,000km
2000	600	3000	16d20	12	12	75,000km
5000	700	5000	16d20	12	13	75,000km
1000	700	800	16d20	13	14	75,000km
2000	800	1000	16d20	13	15	75,000km
1000	800	400	16d20	14	16	75,000km
2000	900	600	16d20	14	17	75,000km
1000	900	400	16d20	15	18	75,000km
8000	1000	10,000	16d20	12	19	75,000km
5000	1000	3000	16d20	13	20	75,000km
4000	1000	800	16d20	14	21	75,000km
2000	1000	600	16d20	15	22	75,000km
8000	1100	5000	16d20	13	23	75,000km
7000	1100	1000	16d20	14	24	75,000km
5000	1100	800	16d20	15	25	75,000km
8000	1200	2000	16d20	14	26	75,000km
7000	1200	1000	16d20	15	27	75,000km

Tons: The amount of free tonnage that must be available in the hull in order to accommodate this weapon.
EPs: The number of energy points required to maintain and fire this weapon.
MCr: The cost of the weapon in Megacredits.
Damage: The damage the weapon will inflict if it hits a target.
TL: The minimum technological level at which this weapon is available.
USP: The combat rating of this weapon
Range: The range at which this weapon may engage a target without penalty.

install an external docking mount capable of carrying a 40-ton small craft would require 12 tons of hull space in the mothership.

An external docking mount will reduce the streamlining of a small craft or starship by one factor (i.e. streamlined to partially streamlined, etc). This streamlining penalty can be avoided by doubling the cost of the mount to reflect the extra care and expense of working the mount directly into the streamlining of the mothership itself.

Launch Facilities: Any ship with at least one large or small craft hanger is also considered to have a launch facility from which one craft (of any size) may be launched or recovered per turn. There is no cost or size requirement for this facility, but only one is available per 10,000 tons in size of the mothership. For example, a 20,000-ton starship can have up to two separate launch facilities available and could launch or recover up to two large or small craft per turn.

Launch Tubes: Rapid launch facilities typically used for the fast launching and recovery of fighters and other military craft. A launch tube must allocate at least 25 times the tonnage of the largest craft that will use the facility. For example, to install a launch tube capable of launching and recovering craft up to 40 tons in size, the launch tube itself must be 1000 tons in size.

CREW REQUIREMENTS

The size of the crew and the positions required to be filled aboard a vessel depend on its size.

SMALL CRAFT

Small craft are 1-99 ton, non-jump capable ships. A small craft only requires 1 crewmember, the pilot. One or more gunners may be added as crew members as needed. The bridge installed on the craft automatically includes space and accommodations for two crew members in the form of two small craft couches.

STANDARD VESSELS

A standard vessel is any ship of 100 to 1000 tons in size, jump capable or not, and requires the following crew

SHIP'S VEHICLES, COMPONENTS

Component	Size	Cost
Vehicle Hanger	-	-
Small Craft Hanger	100%/130%	2,000 per ton
Large Craft Hanger	110%	2,000 per ton
Maintenance Shop	10 tons	2,000,000 each
External Docking Mount	30%	4,000 per ton
Launch Facilities	-	-
Launch Tubes	x25	2000 per ton

Size: The size, in tons that must be allocated to accommodate this component. See the descriptions for Hangers, Docking Mounts, and Launch Tubes.
Cost: The cost of the component in Credits per given amount.

for proper, safe operation.

Pilot: All ships require at least one pilot. This is a command position.

Astrogator: 1 Astrogator is needed aboard any vessel that uses Jump drive. Astrogator is a required crew position on a vessel of 201 tons or larger. Ships of 200 tons and smaller can allow the computer to handle the task (utilizing pre-plotted Jump coordinates), or the Pilot may handle it if he or she has any T/Astrogation skill rank. Astrogator is a command position.

Engineer: 1 Engineer is required per 35 tons of Jump Drive, Maneuver Drive, and Power Plant installed. A ship with fewer than 35 tons of drives installed does not require an engineer.

Steward: 1 Steward is required per 8 high passengers, or 50 middle passengers (or non-command crew). A steward is required even if there is only 1 high passenger aboard, but if there are none then a Steward is not required if there are less than 50 middle passengers or non-command crew on board.

Medic: 1 Medic is required per ship of 200 tons or more. An additional medic is required for every 120 passengers and crew in excess of 120.

Gunner: As required.

CAPITAL VESSELS

Any vessel displacing over 1000 tons is considered a Capital vessel. Because of their large size, these types of ships typically require a much larger crew for safe and efficient operation making them costly to run. Most ships of this size will be owned by militaries or very large corporations, and crewed by their personnel.

Command Officers: A capital vessel requires the following command personnel to oversee the rest of the crew's operation:

Captain (Commanding Officer): 1 per ship

Executive or First Officer: 1 per ship

Helm Officer: 2 per ship. Requires Pilot skill and the Vessel/Starship feat.

Astrogation Officer: 2 per ship Requires T/Astrogation skill

Medical Officer: 1 per ship. Requires T/Medical skill.

Flight Officer: 1 per ship if the ship carries extra crew for any small craft on board. Requires Pilot skill

Gunnery Officer: 1 per ship. Requires Gunnery skill.

Communications Officer: 1 per ship. Requires T/Communications skill.

Engineering Officer: 2 per ship. Requires T/Engineering skill.

Command Crew: There should be 1 support personnel/ratings for every 2 command officers. On ships of 20,000 tons or larger this number should be increased to 5 support personnel/ratings for every 10,000 tons of ship.

AVAILABLE SMALL CRAFT

The small craft listed here are presented in detail starting on pg. 311.

SHIP'S VEHICLES, SMALL CRAFT

Small Craft	Tons	MCr	Speed	Crew	Cargo
Launch	20	9.842	1-G	2	9.5
Ship's Boat	30	30.362	6-G	2	3.2
Pinnace	40	45.522	5-G	2	5.1
Cutter	50	51.422	4-G	2	1.4(+30)
Fuel Module	30	1			
ATV Module	30	1.8			
Open Module	30	2			
Slow Boat	30	25.682	3-G	2	8.4
Slow Pinnace	40	26.722	2-G	2	16.8
Shuttle	95	54.42	3-G	2	44.6
Fighter	10	27.3	6-G	1	2.2

Medical Crew: 1 additional medic is required to support the ship's Medical officer for every 250 crew members or middle passengers, and every 120 high passengers on board.

Engineering Crew: There should be 1 engineering petty officers for every 100 tons of Jump Drive, Maneuver Drive, and Power Plant tonnage (combined) installed over 200 tons.

Gunnery Crew: Each Defensive Screen device (Force Field, Nuclear Damper, Meson Screen) installed requires 4 crew to operate. Weapon Bays require 2 crew each for normal operation. Turrets require a crew of 1 per battery (regardless of size. Major weapons (Spinal Mounts) require a crew of 1 per 100 tons of major weapon installed. There should also be at least one petty officer overseeing each battery, screen, or major weapon installation.

Flight Crew: In addition to the crew for each craft carried onboard the ship, there should be at least 1 mechanic per craft. Each Launch Tube installed requires an additional 10 crew members to oversee launch and recovery operations. If there are more than 3 vehicles (ATVs, air/rafts, etc.) carried aboard the ship, the flight crew will include the crews for each vehicle, along with an additional 1 mechanic per 3 vehicles.

Service Crew: These are the ratings that handle the mundane day to day operations of the ships to keep it running such as maintenance, supply, security, food services, and other essential but less than noteworthy functions. You should allow for 3 service crew per 1000 tons of ship. Thus a 20,000 ton ship would require 60 service crew. On ships with a complement of Ship's Troops (see below), this can be reduced to only 2 service crew per 1000 tons of ship.

Ship's Troops: Most military ships over 1,000 tons have a marine (or military) contingent on board acting as security and available for ship's defense and boarding actions. Depending on the actual role and function of the ship, the actual number of Ship's Troops aboard will range from 3 per 100 tons of ship, all the way to 3 per 1000 tons of ship.

AVAILABLE VEHICLES

The vehicles listed here are presented in detail starting on pg. 284.

SHIP'S VEHICLES, VEHICLES

Vehicle	*Tons*	*Cost*	*Notes*
Ground Car	2	5400	TL 5+
ATV (Wheeled)	8	48,840	TL 12+
ATV (Tracked)	8	47,240	TL 12+
Hovercraft	6	143,600	TL 7+
Air/Raft	5	273,200	TL 8+
Speeder	6	MCr3.974	TL 8+
G-Carrier	8	502,880	TL 8+

ACCOMMODATIONS AND FITTINGS

Accommodations and provisions must be made for any crew or passengers in the form of sleeping accommodations, privacy, personal hygiene, medical care, and other needs.

Stateroom: While a stateroom typically houses a single passenger, they can be equipped to accommodate up to 2 passengers (at a discounted rate), or 2 crew members. Staterooms actually average 2.5 tons, with the additional tonnage being used for life-support (1/2 ton), corridors, access ways, the galley, and recreation areas. The Captain of a ship is always allowed to have a private stateroom. Other command crew and officers are also usually given their own staterooms. When necessary, a stateroom may be used to hot-bunk 4 crew members or non-commercial passengers, but this only allows each access for half a day. A stateroom requires 4 tons of space and cost Cr500,000.

Small Cabin: Can accommodate 1 middle passenger or crew member. Like the stateroom, a small cabin is actually only about 1 ton, with the additional tonnage used elsewhere as corridors, etc. When necessary, a small cabin may be used to accommodate 2 crew members or non-commercial passengers, but this only allows each access for half a day. A small cabin requires 2 tons of space and cost Cr250,000.

Low Berth: Travel via cryogenic suspension capsule. Can accommodate 1 low passenger. Travel via Low Berth is not entirely without risk (see Low Passage pg. 343). A low berth requires 0.5 tons of space and cost Cr50,000.

Emergency Low Berth: Similar to a standard low berth, but capable of accommodating up to 4 people. The chance of survival is the same as in a normal Low Berth, except that only one saving roll is made for all passengers within. They each apply their Fortitude saving throw modifiers for their character, but they share the same single 1d20 roll. An emergency low berth requires 1 ton of space and has a cost of Cr100,000.

Small Craft Couch: Provides acceleration protection and life-support for a single passenger or crew member. These accommodations are not designed for prolonged use (over 24 hours). A small craft couch requires 0.5 tons

of space and has a cost of Cr25,000.

Engineering Shop: 1 shop can accommodate up to 20 engineers. Engineering shops are not required, but add +2 to any Technical: Engineering, Mechanical, Electronic, or Gravitic repairs attempted. An engineering shop requires 6 tons of space and has a cost of MCr1.

Laboratory: A single laboratory can accommodate up to 2 scientists. Labs are not required, but add +2 to any Research conducted within. A lab requires 8 tons of space and has a cost of MCr5.

Sickbay: A sickbay can handle up to 2 patients at a time. While not required, a sickbay adds +2 to any T/Medical skill checks made while treating patients within. An installed sickbay requires 8 tons of space and has a cost of MCr5.

AutoDoc: A small self-contained diagnostic, robotic medical system about the size of a Low Berth chamber or large coffin. See Medical Technology (pg. 217). An autodoc requires 0.5 tons of space and has a cost of MCr1.

Airlock: At least one airlock is required in any small craft or starship, and more than one is usually installed allowing for passengers to embark and disembark from one location while not having to avoid cargo being loaded or unloaded through the cargo airlock. One airlock is provided on every hull built at no additional charge, and takes no space as it is already factored into the total hull tonnage available. Any airlocks beyond this first must be bought and installed separately.

Fresher: A personal hygiene cubical providing basic facilities for cleansing and the relief of bodily waste. Freshers are already provided for in a stateroom, but at least 1 is required for every 10 passengers or crew traveling in lesser accommodations (except low berth).

Cargo Space: Cargo space is basically any remaining tonnage on a ship not used by another subsystem, component, fuel tank, etc. To designate such areas as 'cargo space' costs nothing.

STARSHIP/SMALL CRAFT ACCOMMODATIONS AND FITTINGS

Accommodation	*Tons*	*Cost*
Stateroom	4	500,000
Small Cabin	2	250,000
Low Berth	0.5	50,000
Emergency Low Berth	1	100,000
Small Craft Couch	0.5	25,000
Engineering Shop	6	1,000,000
Vehicle Shop	10	2,000,000
Laboratory	8	5,000,000
Sickbay	8	5,000,000
Autodoc	0.5	1,000,000
Airlock	3	5000
Fresher	0.5	2000
Cargo Space	Any	None

Tons: The number of tons of space that must be available in the hull to accommodate the subsystem or component.
Cost: The cost of the item in Credits.

FINALIZING DESIGNS AND CONSTRUCTION

BATTERIES

Ships with more than one turret containing the same number and type of weapon installed may group them into batteries. Ships with more than ten turrets of the same type must group them into batteries. A battery may contain as few as one and as many as ten turrets. A mixed turret (i.e.: two or more different weapons installed in the same turret) may not be grouped into a battery, and each weapon in the turret is considered a single battery unto itself. Each battery may fire once per round.

For example, a ship has eighty triple beam lasers turrets. They may be grouped into 80 batteries of one turret (attack bonus of +3), 40 batteries of two turrets (attack bonus of +4), 16 batteries of five turrets (attack bonus of +6), or 8 batteries of ten turrets (attack factor of +8). Other configurations are possible, but these constitute the optimal configurations based on the Turret Weapons table.

BLUEPRINTS

If the ship to be built is a new design that has never been constructed before, a Naval Architect is needed to take the requirements and produce a workable design and blueprints to build from. These blueprints will cost 1% of the final price of the ship, and take four weeks to draw. The plans can be hurried, reducing the time required to draw them to only two weeks, but this will raise the architect's fee to 1.5%. A qualified Naval Architect is anyone with the Naval Architect feat (see pg. 107 for more information).

SHIPYARDS

Shipyards capable of constructing starships (ships with

a jump drive) are available at most worlds with a Class A starport. Spaceships (ships without a jump drive) may be built at the shipyards found at most Class A and Class B starports.

PAYING FOR IT ALL

Most ship purchases are typically financed rather than paid in full at the time of delivery, though such arrangements can be made for a 10% cash discount.

USED SHIPS

Given the cost of most new ships, a used ship may be a bit more affordable (though probably not much...) than a new one. A used version of a ship will usually be for sale at a price roughly equal to 90% of the original price minus an additional 10% per 10 years of age (or fraction thereof).

FINANCING

As long as the person attempting to finance the purchase has no (accessible) criminal history and appears of good reputation, a loan for a new or used ship can usually be secured with a 20% down payment and the ship itself as collateral. A ship loan will be for a period of 40 years, with a monthly payment equal to 1/240th of the total price of the ship. If paid out regularly over the entire 40-year loan period, the eventual total cost paid for a ship will be 220% of its original price.

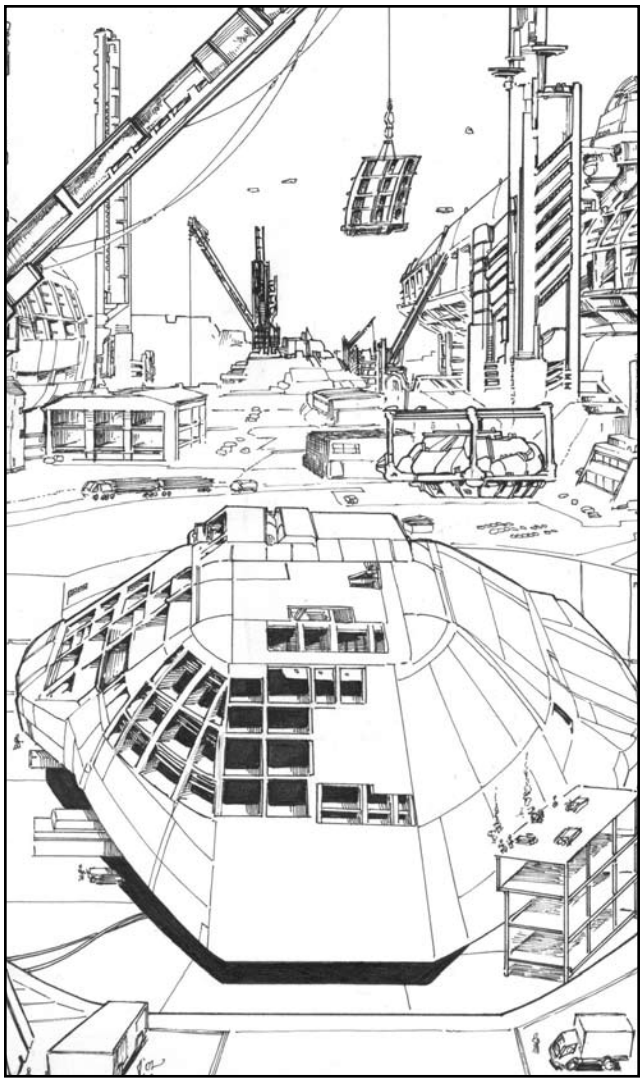
Taking Over a Payment: A payment (and thus ownership and title) may be taken over by a new party, but the lending agency will usually require two conditions. Any payments that are currently behind must be paid to date, and twelve additional payments (1 years worth) are required at the time of the transfer to show the good faith of the new owner.

Late Payments and 'Skips': Late payments are fined a 10% penalty per month late. If a payment is more than 12 months late, the lending agency will usually report the ship and owner as 'skipped' and turn the account over to a bounty-hunting agency for collection.

Depreciation: The value of a newly constructed ship decreases by 10% immediately upon purchase. If properly maintained (routine or annual maintenance), the value of the ship will decrease at a rate of 1% for every two years of age. Without proper maintenance this rate of depreciation rises to 1% for every year of age.

CREATING DECKPLANS

Deckplans for a ship can easily be drawn out on square grid graph paper, at a scale of 1.5 meters per square. This assumes 1.5 meters per side with a clearance (height) of 3 meters. One ton of displacement on a ship is based on the weight of Hydrogen (not water), and is equal to approximately 14 cubic meters. One 'map square' (1.5 meters x 1.5 meters x 3 meters) is approximately 6.75 cubic meters, thus two map squares equals one ton on a ship.



By using this scale, ship components and compartments can be drawn in relative detail on the deckplans using their listed tonnage. By counting the squares on a deckplan that have already been mapped in, the accuracy of the plans can be checked. Ideally, this should total no more than twice the hull tonnage of the ship when all squares have been counted. If the final count comes within 20% of the specified hull tonnage x 2, then they should be considered acceptable.

Remember that when allocating space for staterooms and cabins, only a portion of the listed tonnage is actually used for the stateroom itself. The remainder is used for common areas, corridors, galleys, and other accommodations for the crew and passengers.

STANDARD DESIGNS

This chapter contains examples of standard computers, vehicles and spacecraft in use throughout the Traveller universe.

VEHICLE DATA BLOCK

Every vehicle uses the following data block for easy reference to commonly used information during play. They have been designed to fit well on a standard 3"x5" index card. The information presented in the leftmost column is that which will be most used during normal operation of travel, trade, and commerce. The information in the middle column is the data that will be most needed when the vessel is engaged in combat. The rightmost column is used to detail the vehicle's offensive weapon systems. At the bottom of each block will be a listing of any other equipment or supplies installed or stored aboard the vessel, that have not already been detailed.

Class:	EP Output:	
Cost:	Agility:	
Tech Level:	Initiative:	
Size:	AC:	
Streamlining:	AR:	
Pressurized?	SI:	
Climate Control?	Visual:	
Drive Train:	Crew:	
Passengers:	Sensors:	
Cargo Space:	Fuel:	
Range:	Comm.:	
Speeds:		
Acceleration =		
Offroad =	Very Slow =	Slow =
Cruising =	Fast =	Maximum =
Other Equipment:		

TAS Form 3.1v (Condensed)

Vehicle Data (Commercial)

STARSHIP AND SPACECRAFT DATA BLOCK

Every starship and spacecraft uses the following data block for easy reference to commonly used information during play. They have been designed to fit well on a standard 3"x5" index card. The information presented in the leftmost column is that which will be most used during normal operation of travel, trade, and commerce. The information in the middle column is the data that will be most needed when the vessel is engaged in combat. The rightmost column is used to detail the ship's offensive weapon systems. At the bottom of each block will be a listing of any other equipment or supplies installed or stored aboard the vessel, that have not already been detailed.

Class:	EP Output:
Tech Level:	Agility:
Size:	Initiative:
Streamlining:	AC:
Jump Range:	Repulsors:
Acceleration:	Nuclear Dampers:
Fuel:	Meson Screens:
Duration:	Black Globes:
Crew:	AR:
Staterooms:	SI:
Small Cabins:	Main Computer:
Bunks:	Sensor Range:
Couches:	Comm. Range:
Low Berths:	
Cargo Space:	Cost:
Atmospheric Speeds:	NoE =
Cruising =	Maximum =
Other Equipment:	

TAS Form 3.1 (Condensed)

Ship's Data (Commercial)

STANDARD COMPUTERS

HAND COMPUTER

0.135vl. A small hand-held computer system, complete with miniature keyboard and view screen. While technically these types of computers can be built at any TL, the effective computer power of a hand computer before TL9 is negligible. Even at this point they are little more than glorified address books with limited computing capability. It is not until about TL11 that the true hand computer becomes a standard part of most societies and capable of any real processing power.

Type	*TL*	*Units*	*Cost*	*Volume*	*EP*	*CPU*	*Model*	*INT*	*PP*
Parallel	9	x0.25	50	0.135	0.003	2.5	B1	0	2/1
Synaptic	11	x0.5	75	0.135	0.006	5	B2	0	3/2
Adv. Synaptic	13	x1	100	0.135	0.009	10	B3	0	4/2
Positronic	16	x10	1000	0.135	0.009	25	B4	0	5/3

PORTABLE COMPUTER

1.35vl. A lightweight portable computer, complete with a full sized keyboard and small view screen. Until about TL 8 or 9, these small computers are found only in use among high ranking businessmen, executives, and government officials, but they soon become fairly commonplace with the general population. Portable computers (Portacomps) start to be replaced by the hand computer at TL11.

Type	*TL*	*Units*	*Cost*	*Volume*	*EP*	*CPU*	*Model*	*INT*	*PP*
Linear	7	x1	250	1.35	0.09	2	B1	0	2/1
Parallel	9	x2.5	500	1.35	0.03	25	B4	0	5/3
Synaptic	11	x5	750	1.35	0.06	50	B7	1	8/4
Adv. Synaptic	13	x10	1000	1.35	0.09	100	B9	1	10/5
Positronic	16	x100	10,000	1.35	0.09	250	A2	2	13/7

STANDARD DESKTOP COMPUTER

13.5vl. The desktop computer can be found at most TL and is never really replaced due to its reasonable power to size ratio when compared to other types of computers.

Type	*TL*	*Units*	*Cost*	*Volume*	*EP*	*CPU*	*Model*	*INT*	*PP*
Linear	7	x10	2500	13.5	0.9	20	B4	0	5/3
Parallel	9	x25	5000	13.5	0.3	250	A2	2	13/7
Synaptic	11	x50	7500	13.5	0.6	500	A7	3	18/9
Adv. Synaptic	13	x100	10,000	13.5	0.9	1000	M1	4	28/11
Positronic	16	x1000	100,000	13.5	0.9	2500	M1	4	28/11

MINIFRAME COMPUTER

135vl. Miniframes are typically found powering the computer networks for businesses, manufacturing plants, research facilities, and other locations where massive computing power is required, and size is not a major issue.

Type	*TL*	*Units*	*Cost*	*Volume*	*EP*	*CPU*	*Model*	*INT*	*PP*
Electromechanical	5	x10	10,000	135	9	10	B3	0	4/2
Linear	7	x100	25,000	135	9	200	A1	2	12/6
Parallel	9	x250	50,000	135	3	2500	M1	4	28/11
Synaptic	11	x500	75,000	135	6	5000	M2	4	35/12
Adv. Synaptic	13	x1000	100,000	135	9	10,000	M4	5	49/13
Positronic	16	x10,000	1,000,000	135	9	25,000	M6	6	65/14

AUTOPILOT COMPUTER

(Hardwired) A basic computer system capable of operating a single vehicle or vessel type safely, and with access to limited emergency maneuvers intended to bring the vehicle back under control rather than undertaking automated combat maneuvers. Software is hardwired; the computer cannot be transferred to a different type of vehicle.

Type	*TL*	*Units*	*Cost*	*Volume*	*EP*	*CPU*	*Model*	*INT*	*PP*
Linear	7	x112.5	28,125	151.87	10.12	300	A3	2	14/7
Parallel	9	x22.5	4500	12.15	0.27	300	A3	2	14/7
Synaptic	11	x22.5	3375	6.07	0.27	300	A3	2	14/7
Adv. Synaptic	13	x22.5	2250	3.04	0.202	300	A3	2	14/7
Positronic	16	x90	9,000	1.21	0.081	300	A3	2	14/7

Software	*PP Cap*	*Cost*	*INT Mod*	*Ability Mod.*	*Total Skill Mod.*
*Low Basic Logic	2	1000	+0	-	-
*Limited Verbal Interface	2	500	+0	-	-
Driving	5	5000	-	-4 (Int)	+1
Navigation	5	5000	-	-5 (Edu)	+0
Totals	14	11,500	+0	-	-

*always operating

TARGETING COMPUTER

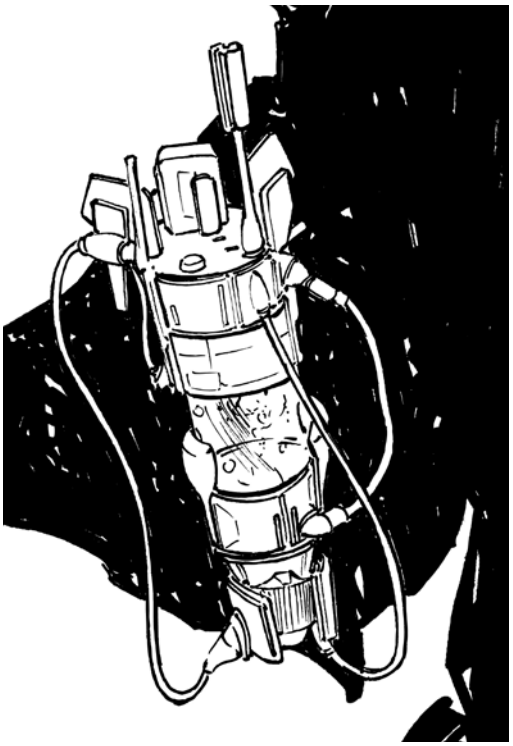
(Hardwired). A basic fire control computer capable of controlling missiles and other weapon systems. Programs are hardwired and cannot be upgraded.

Type	*TL*	*Units*	*Cost*	*Volume*	*EP*	*CPU*	*Model*	*INT*	*PP*
Linear	7	x168.75	42,187	227.81	15.19	450	A6	3	17/9
Parallel	9	x33.75	6750	18.22	0.405	450	A6	3	17/9
Synaptic	11	x33.75	5062.5	9.11	0.405	450	A6	3	17/9
Adv. Synaptic	13	x33.75	3375	4.56	0.304	450	A6	3	17/9
Positronic	16	x135	13,500	1.82	0.121	450	A6	3	17/9

Software	*PP Cap*	*Cost*	*INT Mod*	*Ability Mod.*	*Total Skill Mod.*
*Low Basic Logic	2	1000	+0	-	-
*Limited Verbal Interface	2	500	+0	-	-
Gunner Interact	1	1000	-	-	-
Predict	2	7500	-	-	-
Select	1	3000	-	-	-
Return Fire	1	5000	-	-	-
Anti-Missile	2	1000	-	-	-
Weapons Systems	1	4000	-	-	-
Gunnery	5	5000	-	-5 (Wis)	+2 (+2 Predict)
Totals	17	28,000	+0		

*always operating

MODEL/M1 ROBOT BRAIN



TL12. Cr23,600. A fairly universal 'brain' used in many types of robots, with a reasonable intelligence, a few basic skills, and the ability to learn as it works. This model currently has enough data storage to hold up to 10,000 experience points. More storage capacity may be added as needed. Only the basic programming itself is provided. Additional skill programs or other software must be purchased and installed separately. Twenty of the brains 28 total PP points are constantly devoted to supporting its intelligence, leaving only 8 PP free for use with other programs.

Computer Core

Units:	Synaptic x100
Size:	24.3vl (10% reduction due to miniaturization)
Cost	Cr15,000
Total PP	28
Max PP	11
EP:	1.08 (10% reduction due to miniaturization)
CPU Output:	1000 (Model/1 Master Computer)

Data Storage

Units	Synaptic x10
Storage Capacity	10,000XP
Size:	0.135vl
Cost	Cr2,500

Software

Programming	Cost	PP	Notes
Low Autonomous Logic	Cr7000	10	Int +2, Dex +2
Full Verbal Command	Cr5000	10	Int +2
Cost	Cr12,000	20	

Abilities

Str -, Dex +2, Con -, Int 8 (-1), Wis 0 (-5), Edu 1 (-5), Cha 0 (-5), Soc (-5)

Total Cost:	Cr29,500 (Cr23,600)
Total Size:	24.435vl
Total EP:	1.08

STANDARD VEHICLES AND ROBOTS

All of the following vehicles and robots are commonly available (unless otherwise noted), and have been designed from the ground up using the T20 vehicle design system. Vehicles may be used as described, or be customized using the design system rules.

Vehicle and Robots Table:

Vehicle/Robot	*TL*	*Cost*	*Size*	*Max Speed*	*SI*	*AC*
Personal Robot	13	Cr98,801.2	100vl	10kph	14	10
Battledress	13	Cr71,655.2	300vl	10kph	25	23
Jeep	5	Cr2760	1000vl	120kph	35	10
Ground Car	5	Cr5440	2000vl	150kph	50	9
Small Cargo Truck	5	Cr12,320	5000vl	120kph	57	8
Wheeled ATV	12	Cr49,680	10,000vl	100kph	65	8
Tracked ATV	12	Cr48,080	10,000vl	80kph	65	8
Wheeled AFV	12	Cr71,080	10,000vl	100kph	65	14
Tracked AFV	12	Cr69,480	10,000vl	80kph	64	14
Hovercraft	7	Cr347,200	8000vl	150kph	61	11
Primitive Biplane	4	Cr11,840	1000vl	200kph	35	10
Cargo Plane	4	Cr364,000	10,000vl	600kph	65	8
Cargo Jet	7	MCr1.794	12,000vl	1320kph	69	8
Helicopter	5	Cr82,760	5000vl	250kph	55	8
Air/raft	8	Cr273,200	6000vl	120kph	57	8
Pressurized Air/raft	8	Cr376,000	8000vl	120kph	61	8
GCarrier	8	Cr506,880	10,000vl	120kph	65	14
Speeder	8	MCr3.950	8000vl	1320kph	61	8
Grav Belt	12	Cr9,292	200vl	120kph	12	11
Small Steamship	4	Cr334,600	150,000vl	60kph	104	2
Hydrofoil	7	Cr197,200	60,000vl	100kph	86	6
Submersible	6	MCr1.872	500,000vl	40kph (20kph)	148	2

ROBOTS AND AUGMENTED ARMOR

PERSONAL SERVICE ROBOT (PERCY)

Medium (Intelligent) Robot

TL13, Cr98,801.2, 100vl. The personal service robot, (PSR), also called a Purser (Per-Ser) or just simply a Percy, is an early robotic design that first begins to appear with the development of the synaptic computers. Its vaguely human-like appearance combined with its protocol, etiquette, and personality interfaces make the Percy well suited for a wide range of tasks that require constant interfacing with people in the performance of their duties. In private use, the Percy serves admirably as a butler, housekeeper, cook, or similar repetitive or remedial tasks. In commercial use PSRs are found in positions as waiters, cooks, and janitors. Percys also undertake jobs that may be too hazardous for a person, but which are not too complex for the Percy's limited programming. The Percy can operate for up to 72 hours before its fuel cells will require refueling.

Combat Statistics

Str 10, Dex 12, Wis 0, Int 8, Cha 10, Edu 5, Soc 0
Initiative: +0 Agility: 0 AC: 10 AR: 0 SI: 14
Off-road: 7.5kph, Very Slow: 1kph, Slow: 2.5kph, Cruising: 5kph, Fast: 7.5kph, Maximum: 10kph

TL12 Design Specifications

Installed Components	*Size*	*Cost*	*EP*	*CPU/SP*	*Range*
100vl Chassis	+100	100	-	-	
Drive Train, Legged (2)	-2.814	301.5	-0.067	-	
Adv. Fuel Cell	-9	600	+6	-	
Fuel	-21.6	-	-	-	72 hours
Holovideo Visual	-1.5	2000	-0.1	-	100m
Auditory Sensors	-0.2	200	-0.01	-	50m
Olfactory Sensor	-0.5	1500	-0.05	-	1km
Sensors, Enhanced Tactile	-4	12,000	-0.6	-	
Voder	-0.5	1200	-0.03	-	
Appendage (Str 10, Dex 10)	-5	10,000	-1		
Appendage (Str 10, Dex 10)	-5	10,000	-1		
Model/M1 Robot Brain (Int 8)	-24.435	23,600	-1.08	-	
Totals	+25.451	Cr61,501.5			

Software Installed	*PP*	*Cost*	*Notes*
Personality Interface (Cha 10)	5*	50,000	Cha 10
Library Data Inter.	1*	3000	Edu +4
Valet	2	3000	
Cooking	2	2000	P/Cooking-2
Driving	2	2000	Driving-2 (Ground Car)
Cleaning	2	2000	P/Janitorial-2
* Must constantly be running			
Totals	-	123,501.5 (Cr98,801.2 with 20% standard design discount)	

BATTLE DRESS

Large Augmented Armor

TL13, Cr71,655.2, 300vl. Battle Dress is a suit of personal armor similar in construction to Combat Armor. What sets Battle Dress apart is the fact that it is fully powered, in effect being a personal vehicle that is worn rather than driven.

Battle Dress consists of an armored frame, servo-assisted limbs, a sensor package and (sometimes) built-in weaponry. The armor is available in various configurations, from light, fast recon suits to heavy assault configurations capable of stopping almost any weapon on the battlefield. However, even the heaviest Battle Dress does not turn the wearer into an invulnerable tank. Battle Dress-equipped troops still function as infantry (albeit infantry who can shrug off smallarms fire and even some support weapons); they can thus go where tanks cannot, make use of low cover etc. Battle Dress requires special training to use and is not available to civilians.

The statistics given here are for standard TL 13 medium Battle Dress.

BATTLE DRESS

Class: Augmented Armor	**EP Output:** 12 (6.825 excess)
Cost: Cr71,655.2	**Agility:** 4 (+4 EP)
Tech Level: 13	**Initiative:** +5 (+5 agility)
Size: Large (300vl)	**AC:** 23 (+10 armor, +4 agility, -1 Size)
Streamlining: Standard	**AR:** 10
Pressurized? Yes	**SI:** 25
Climate Control? Yes	**Visual:** Holovideo (1km), Infrared (1km), Light Intensification (1km)
Drive Train: Legged (2)	
Crew: 1	
Passengers: 0	**Sensors:** Auditory (50m), Tactile
Cargo Space: 3.7vl	
Fuel: 28.8vl	
Range: 48 hours	**Comm.:** 2-way Radio (5km)
Speeds:	
Acceleration = 1kph	
Offroad = 7.5kph	Very Slow = 1kph / Slow = 2.5kph
Cruising = 5kph	Fast = 7.5kph / Maximum = 10kph

Other Equipment: 2 appendages (STR 20/+5, DEX 10/+0).

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL13 Design Specifications

Installed Components	*Size*	*Cost*	*EP*	
300vl Chassis	+300	300	- -	
Control Systems	-110	275	- -	
TL13 Armor (AR10)	-66	3594	- -	
Pressurized Interior	-15	375	-0.375	-
Climate Control	-3	150	-0.03	
Drive Train, Legged (2)	-8.4	900	-0.2	-
Adv. Fuel Cell	-18	1200	+12	-
Fuel	-28.8	-	- -	
Appendage (Str 20, Dex 10)	-10	20,000	-2	-
Tactile Sensor	-1	3000	-0.2	-
Appendage (Str 20, Dex 10)	-10	20,000	-2	-
Tactile Sensor	-1	3000	-0.2	-
Holovideo Visual	-24.3	36,000	-1.26	1km
LI Video	-	-	- -	
IR Video	-	-	- -	
Holo Display	-0.1	500	-0.05	
Auditory Sensors	-0.2	200	-0.01	50m
Radio, 2-way	-0.5	75	-0.02	5km
Totals	*+14*	*Cr89,569 (Cr71,655.2 with 20% standard design discount)*		

GROUND VEHICLES

JEEP

Large Ground Vehicle

TL5, Cr2760, 1000vl. A self-powered wheeled vehicle based on the ground car (see below) concept, but designed for off-road and rugged terrain use. Typically, a jeep has a cruising range of 600km at a speed of 60 kph, and has a maximum speed of 120 kph. Off-road performance is better than the standard ground car, though jeeps (other than specialist luxury models) lack creature comforts to the point where some are truly excruciating to drive. Fuel for a jeep depends on local tech level and fuel sources; it is usually chemical fuel (hydrocarbons or hydrogen), or an electric battery. A jeep can carry a driver and up to three additional passengers plus luggage (124vl). Luxury models (which are as comfortable as any ground car on the market) may be available at higher prices. The basic jeep is unpressurized, and may indeed be open-topped. Jeeps are designed to be somewhat tolerant of atmospheric and environmental conditions; they will not usually malfunction when transferred to another world, so long as it is reasonably similar to their world of origin.

JEEP

Class: Ground Vehicle	**EP Output**: 20 (7.9 excess)
Cost: Cr2760	**Agility**: 1 (+1 EP)
Tech Level: 5	**Initiative**: +1 (+1 agility)
Size: Large (1000vl)	**AC**: 10 (+1 agility, -1 size)
Streamlining: Standard	**AR**: 0
Pressurized? No	**SI**: 35
Climate Control? N	**Visual**: Headlights (Beam 12m), Brakelights (Area 1.5m)
Drive Train: Wheeled (4)	
Crew: 1	
Passengers: 3	**Sensors**:
Cargo Space: 124vl	
Fuel: 100vl	
Range: 600km	**Comm.**:
Speeds:	
Acceleration = 12kph	
Offroad = 20kph	Very Slow = 12kph	Slow = 30kph
Cruising = 60kph	Fast = 90kph	Maximum = 120kph
Other Equipment:	

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL5 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
1000vl Chassis	+1000	1000	-
Controls	-200	500	-
Drive Train, Wheeled (4)	-144	600	-12
Int. Combustion Power Plant	-100	1000	+20
Fuel	-100	-	-
Passengers Seating (3)	-330	300	-
2 Headlights, Beam (12m)	-1.6	40	-0.08
2 Brakelights, Illumination	-0.4	10	-0.02
Cargo/Luggage	-124	-	-
Totals	*0*	*Cr3450 (Cr2760 with 20% standard design discount)*	

GROUND CAR

Large Ground Vehicle

TL5, Cr5440, 2000vl. An ordinary self-powered wheeled vehicle suitable for local use in civilized areas or on roads. Typically, a ground car has a cruising range of 1050 km at a speed of 75 kph, and has a maximum speed of 150 kph. If capable of off-road travel at all, speed is generally limited to 15 kph. Fuel for a ground car depends on local tech level and fuel sources; it is usually chemical fuel (hydrocarbons or hydrogen), or an electric battery. Most ground cars require a driver, although at higher tech levels some luxury models may be equipped to steer themselves (and on highly civilized worlds, driving under human control is illegal in cities). A car can carry five additional passengers plus luggage (268vl). Other models (convertibles, sports models, limousines, trucks, motorcycles, unicycles, vans, etc.) may be available at varying prices. The basic ground car is unpressurized. Ground cars are mass production items manufactured for a specific world; they will tend to malfunction when transferred to a world not similar to their world of origin.

At TL7, an optional Climate Control system becomes available for a cost of Cr800. It requires 20vl of space and 0.2EP of power.

GROUND CAR

Class: Ground Vehicle	**EP Output:** 35 (4.9 excess)	
Cost: Cr5440	**Agility:** 0	
Tech Level: 5	**Initiative:** +0	
Size: Large-Huge (2000vl)	**AC:** 9 (-1 size)	
Streamlining: Standard	**AR:** 0	
Pressurized? No	**SI:** 50	
Climate Control? TL7 Option	**Visual:** Headlights (Beam 12m), Brakelights (Area 1.5m)	
Drive Train: Wheeled (4)		
Crew: 1		
Passengers: 5	**Sensors:**	
Cargo Space: 268vl		
Fuel: 245vl		
Range: 1050km	**Comm.:**	
Speeds:		
Acceleration = 15kph		
Offroad = 25kph	Very Slow = 15kph	Slow = 37kph
Cruising = 75kph	Fast = 112kph	Maximum = 150kph
Other Equipment:		

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL5 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
2000vl Chassis	+2000	2000	-
Controls	-400	1000	-
Drive Train, Wheeled (4)	-360	1500	-30
Int. Combustion Power Plant	-175	1750	+35
Fuel	-245	- -	
Passengers Seating (5)	-550	500	-
2 Headlights, Beam (12m)	-1.6	40	-0.08
2 Brakelights, Illumination	-0.4	10	-0.02
Cargo/Luggage	-268	- -	
Totals	*+0*	*Cr6800 (Cr5440 with 20% standard design discount)*	

SMALL CARGO TRUCK

Huge Ground Vehicle

TL5, Cr12,320, 5000vl. A typical, no-frills commercial delivery/cargo truck with a 2500kg cargo capacity. The truck only has room for one passenger other than the driver. These cargo trucks have an average speed of 60kph and are capable of top speeds reaching 120kph. At cruising speed, a cargo truck has a range of 480km.

At TL7, an optional Climate Control system becomes available for a cost of Cr2000. It requires 50vl of space and 0.5EP of power.

SMALL CARGO TRUCK

Class: Ground Vehicle	**EP Output:** 65 (4.9 excess)	
Cost: Cr12,320	**Agility:** 0	
Tech Level: 5	**Initiative:** +0	
Size: Huge (5000vl)	**AC:** 8 (-2 size)	
Streamlining: Standard	**AR:** 0	
Pressurized? No	**SI:** 57	
Climate Control? TL7 Option	**Visual:** Headlights (Beam 12m), Brakelights (Area 1.5m)	
Drive Train: Wheeled (6)		
Crew: 1		
Passengers: 1	Sensors:	
Cargo Space: 2523vl		
Fuel: 260vl		
Range: 480km	Comm.:	
Speeds:		
Acceleration = 12kph		
Offroad = 12kph	Very Slow = 12kph	Slow = 40kph
Cruising = 60kph	Fast = 80kph	Maximum = 120kph
Other Equipment:		

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL5 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
5000vl Chassis	+5000	5000	-
Controls	-1000	2500	-
Drive Train, Wheeled (6)	-780	4500	-60
Int. Combustion Power Plant	-325	3250	+65
Fuel	-260	- -	
Passengers Seating (1)	-110	100	-
2 Headlights, Beam (12m)	-1.6	40	-0.08
2 Brakelights, Illumination	-0.4	10	-0.02
Cargo/Luggage	-2523	- -	
Totals	*+0*	*Cr15,400 (Cr12,320 with 20% standard design discount)*	

WHEELED ALL TERRAIN VEHICLE

Huge Ground Vehicle

TL12, Cr49,680, 10,000vl. An 8-wheeled vehicle intended for world surface exploration, or for transport across undeveloped areas. An all terrain vehicle (abbreviated ATV) has a range of 5000 km, cruises on roads at 50 kph, and can achieve a maximum speed of 100 kph. Off roads, speed depends on terrain; on open plain, it will approach normal road performance while in difficult terrain average speed will be 25 kph or less. An ATV may be powered by a battery recharged from a ship's power plant, or it may contain a small fusion pack requiring hydrogen or water for fuel. The ATV is designed to serve on many different worlds under widely varying conditions, including vacuum and insidious atmospheres, and high or low gravity. An ATV requires one driver and may carry up to 16 passengers. The interior of the vehicle is fully pressurized and contains complete (though cramped) eating, sleeping, and travel facilities for eight. The wheeled ATV typically has 8 large, gel-filled tires. These are self-sealing and provide sufficient buoyancy to allow the ATV to float in reasonably calm water. Slow headway can be made using water jet propulsion.

WHEELED ALL TERRAIN VEHICLE (ATV)

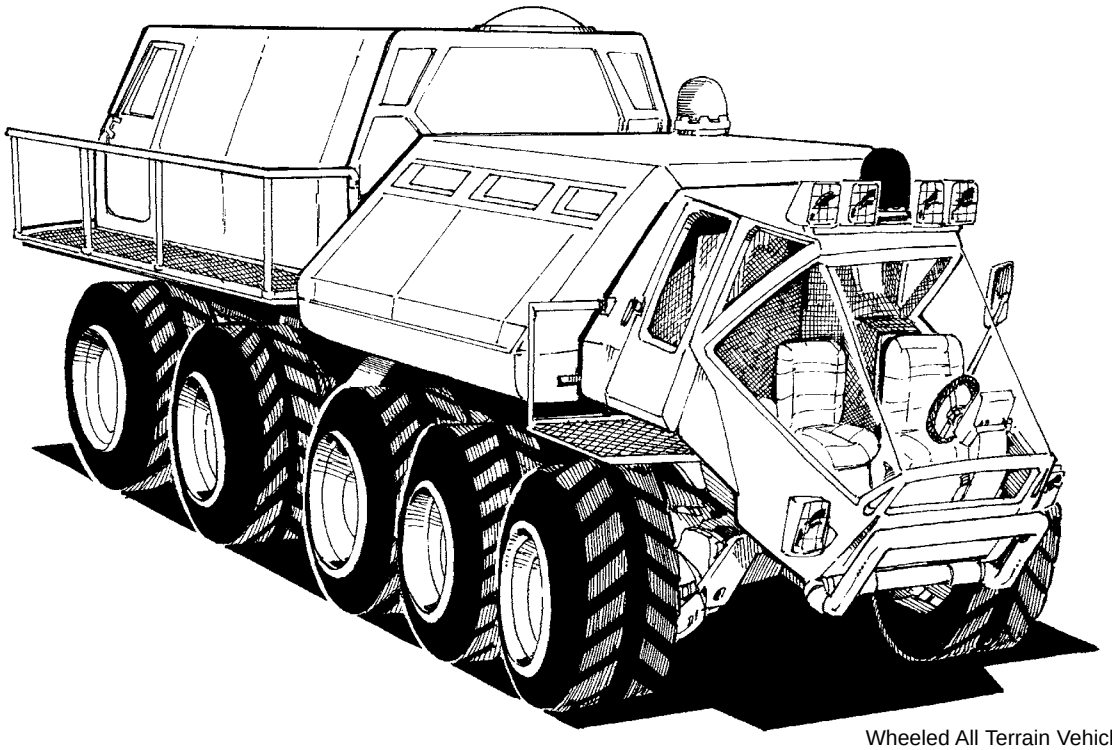
Class: Ground Vehicle	**EP Output:** 120 (6.4 excess)	
Cost: Cr52,880	**Agility:** 0	
Tech Level: 12	**Initiative:** +0	
Size: Huge (10,000vl)	**AC:** 8 (-2 size)	
Streamlining: Standard	**AR:** 0	
Pressurized? Yes	**SI:** 65	
Climate Control? Yes	**Visual:** Headlights (Beam 12m), Brakelights (Area 1.5m)	
Drive Train: Wheeled (8)		
Crew: 1		
Passengers: 8 (16)	**Sensors:**	
Cargo Space: 2138vl		
Fuel: 600vl		
Range: 5000km	**Comm.:**	
Speeds:		
Acceleration = 10kph		
Offroad = 25kph	Very Slow = 10kph	Slow = 25kph
Cruising = 50kph	Fast = 75kph	Maximum = 100kph

Other Equipment: Galley facilities for 16, fresher.

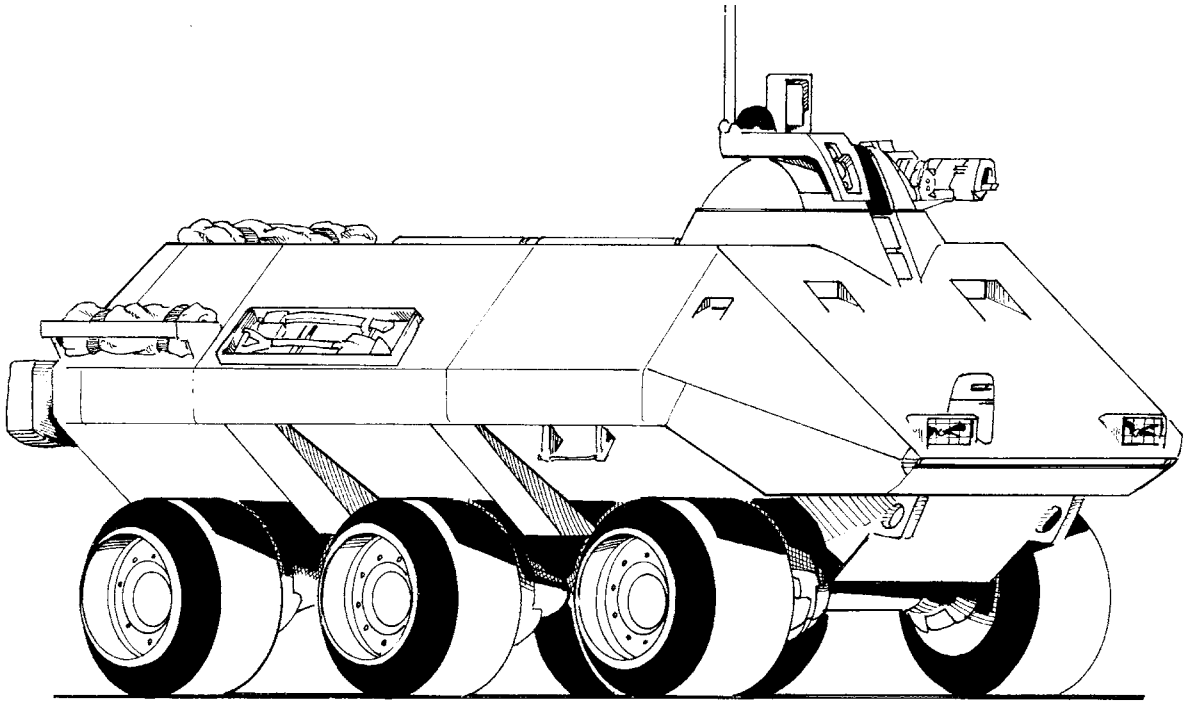
TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL12 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
10,000vl Chassis	+10,000	10,000	-
Pressurized Interior	-500	12,500	-12.5
Climate Control	-100	5,000	-1
Drive Train, Wheeled (8)	-1400	10,000	-100
Advance Fuel Cell	-180	12,000	+120
Fuel	-600	- -	
Controls	-2000	5000	-
Passengers Seating (8)	-880	800	-
Passengers Bunks (8)	-1200	2000	-
Galley Facilities (16)	-800	4000	-
Fresher Facilities (1)	-200	750	-
2 Headlights, Beam (12m)	-1.6	40	-0.08
2 Brakelights, Illumination	-0.4	10	-0.02
Cargo/Luggage	-2138	- -	
Totals	*+0*	*Cr62,100 (Cr49,680 with 20% standard design discount)*	



Wheeled All Terrain Vehicle, page 290



Wheeled Armored Fighting Vehicle, page 293

TRACKED ALL TERRAIN VEHICLE

Huge Ground Vehicle

TL12, Cr48,080, 10,000vl. The tracked ATV is a somewhat slower version of the wheeled ATV, but with better off-road speed and handling. An all terrain vehicle (abbreviated ATV) has a range of 5000 km, cruises on roads at 40 kph, and can achieve a maximum speed of 80 kph. Off roads, speed depends on terrain; on open plain, it will approach normal road performance, while in difficult terrain, average speed will be 25 kph or less. An ATV may be powered by a battery recharged from a ship's power plant, or it may contain a small fusion pack, requiring hydrogen or water for fuel. The ATV is designed to serve on many different worlds under widely varying conditions, including vacuum and insidious atmospheres, and high or low gravity. A tracked ATV requires one driver, and may carry up to 16 passengers. The interior of the vehicle is fully pressurized and contains complete (though cramped) eating, sleeping, and travel facilities for eight. Harsh terrain performance is better than for the wheeled variant, but a tracked ATV cannot float.

TRACKED ALL TERRAIN VEHICLE (ATV)

Class: Ground Vehicle	**EP Output:** 180 (6.4 excess)	
Cost: Cr51,280	**Agility:** 0	
Tech Level: 12	**Initiative:** +0	
Size: Huge (10,000vl)	**AC:** 8 (-2 size)	
Streamlining: Standard	**AR:** 0	
Pressurized? Yes	**SI:** 65	
Climate Control? Yes	**Visual:** Headlights (Beam 12m), Brakelights (Area 1.5m)	
Drive Train: Tracked (2)		
Crew: 1		
Passengers: 8 (16)	**Sensors:**	
Cargo Space: 1483vl		
Fuel: 1125vl		
Range: 5000km	**Comm.:**	
Speeds:		
Acceleration = 8kph		
Offroad = 25kph	Very Slow = 8kph	Slow = 20kph
Cruising = 40kph	Fast = 60kph	Maximum = 80kph

Other Equipment: Galley facilities for 16, fresher.

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL12 Design Specifications			
Installed Components	*Size*	*Cost*	*EP*
Chassis	+10,000	10,000	-
Pressurized Interior	-500	12,500	-12.5
Climate Control	-100	5,000	-1
Drive Train, Tracked (2)	-1440	2,000	-160
Advance Fuel Cell	-270	18,000	+180
Fuel	-1125	- -	
Controls	-2000	5000	-
Passengers Seating (8)	-880	800	-
Passengers Bunks (8)	-1200	2000	-
Galley Facilities (16)	-800	4000	-
Fresher Facilities (1)	-200	750	-
2 Headlights, Beam (12m)	-1.6	40	-0.08
2 Brakelights, Illumination	-0.4	10	-0.02
Cargo/Luggage	-1483	- -	
Totals	*+0*	*Cr60,100 (Cr48,080 with 20% standard design discount)*	

WHEELED ARMORED FIGHTING VEHICLE

Huge Ground Vehicle

TL12, Cr71,080, 10,000vl. Many designs of armored fighting vehicle (abbreviated AFV) exist, at a range of tech levels and capabilities. This representative design is similar to the wheeled ATV, and can be used as an exploration vehicle. It has a range of 5000 km, cruises on roads at 50 kph, and can achieve a maximum speed of 100 kph. Off roads, speed depends on terrain; on open plain, it will approach normal road performance, while in difficult terrain, average speed will be 13 kph or less. An AFV may be powered by a battery recharged from a ship's power plant, or it may contain a small fusion pack, requiring hydrogen or water for fuel. Mid-tech AFVs are local to a single world; higher-tech versions are usually designed to be tolerant of varying conditions and can thus serve on many worlds and under widely varying conditions, including vacuum and insidious atmospheres, and high or low gravity. An AFV requires one driver, may carry one additional crewmember that operates the weapon system, and is capable of transporting up to 22 soldiers. The interior of the vehicle is fully pressurized. Like its ATV cousin, the Wheeled AFV can float and make headway in calm water.

WHEELED ARMORED FIGHTING VEHICLE (AFV)

Class: Ground Vehicle	**EP Output:** 120 (2.2 excess)	
Cost: Cr71,080	**Agility:** 0	
Tech Level: 12	**Initiative:** +0	
Size: Huge (10,000vl)	**AC:** 14 (+6 armor, -2 size)	
Streamlining: Standard	**AR:** 6	
Pressurized? Yes	**SI:** 65	
Climate Control? Yes	**Visual:** Headlights (Beam 12m), Brakelights (Area 1.5m)	
Drive Train: Wheeled (8)		
Crew: 1		
Passengers: 22	**Sensors:**	
Cargo Space: 798vl		
Fuel: 600vl		
Range: 5000km	**Comm.:**	
Speeds:		
Acceleration = 10kph		
Offroad = 25kph	Very Slow = 10kph	Slow = 25kph
Cruising = 50kph	Fast = 75kph	Maximum = 100kph

Heavy Manned Turret: Medium Lasers (x3), Attack Bonus +0, Damage 5d10.

Other Equipment:

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL12 Design Specifications			
Installed Components	*Size*	*Cost*	*EP*
Chassis	+10,000	10,000	-
TL12 Armor (AR6)	-1400	15,600	-
Pressurized Interior	-500	12,500	-12.5
Climate Control	-100	5,000	-1
Drive Train, Wheeled (8)	-1400	10,000	-100
Advance Fuel Cell	-180	12,000	+120
Fuel	-600	- -	
Controls	-2000	5000	-
Passengers Seating (22)	-2420	2200	-
2 Headlights, Beam (12m)	-1.6	40	-0.08
2 Brakelights, Illumination	-0.4	10	-0.02
Heavy Manned Turret	-600	6000	-1.2
Medium Lasers (3)	(-300)	10,500	-3
Cargo/Luggage	-798	- -	
Totals	*+0*	*Cr88,850 (Cr71,080 with 20% standard design discount)*	

TRACKED ARMORED FIGHTING VEHICLE

Huge Ground Vehicle

TL12, Cr69,480, 10,000vl. The tracked AFV is a somewhat slower version of the wheeled AFV, but with better off-road speed and handling. It has a range of 5000 km, cruises on roads at 40 kph, and can achieve a maximum speed of 80 kph. Off roads, speed depends on terrain; on open plain, it will approach normal road performance, while in difficult terrain, average speed will be 20 kph or less. An AFV may be powered by a battery recharged from a ship's power plant, or it may contain a small fusion pack, requiring hydrogen or water for fuel. The AFV is designed to serve on many different worlds under widely varying conditions, including vacuum and insidious atmospheres, and high or low gravity. An AFV requires one driver, may carry one additional crewmember that operates the weapon system, and is capable of transporting up to 22 soldiers. The interior of the vehicle is fully pressurized but has no eating, sleeping, etc facilities for four. Tracked AFVs do not float.

TRACKED ARMORED FIGHTING VEHICLE (AFV)

Class: Ground Vehicle	**EP Output:** 180 (2.2 excess)	
Cost: Cr69,480	**Agility:** 0	
Tech Level: 12	**Initiative:** +0	
Size: Huge (10,000vl)	**AC:** 14 (+6 armor, -2 size)	
Streamlining: Standard	**AR:** 6	
Pressurized? Yes	**SI:** 65	
Climate Control? Yes	**Visual:** Headlights (Beam 12m), Brakelights (Area 1.5m)	
Drive Train: Tracked (2)		
Crew: 1		
Passengers: 22	**Sensors:**	
Cargo Space: 143vl		
Fuel: 1125vl		
Range: 5000kmComm.:		
Speeds:		
Acceleration = 8kph		
Offroad = 25kph	Very Slow = 8kph	Slow = 20kph
Cruising = 40kph	Fast = 60kph	Maximum = 80kph
Other Equipment:		

Heavy Manned Turret: Medium Lasers (x3), Attack Bonus +0, Damage 5d10.

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL12 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
Chassis	+10,000	10,000	-
TL12 Armor (AR6)	-1400	15,600	-
Pressurized Interior	-500	12,500	-12.5
Climate Control	-100	5,000	-1
Drive Train, Tracked (2)	-1440	2,000	-160
Advance Fuel Cell	-270	18,000	+180
Fuel	-1125	- -	
Controls	-2000	5000	-
Passengers Seating (22)	-2420	2200	-
2 Headlights, Beam (12m)	-1.6	40	-0.08
2 Brakelights, Illumination	-0.4	10	-0.02
Heavy Manned Turret	-600	6000	-1.2
Medium Lasers (3)	(-300)	10,500	-3
Cargo/Luggage	-143	- -	
Totals	*+0*	*86,850 (69,480 with 20% standard design discount)*	

AIR CUSHION VEHICLES

HOVERCRAFT

Huge Air Cushion Vehicle

TL7, Cr347,200, 8000vl. Hovercraft are supported on a cushion of air (at about 1 to 3 meters altitude). Usable only on worlds with an atmosphere of 4 or greater, a hovercraft is capable of cruise speeds of 75kph, with bursts of speed up to 150kph. Distance between refuelings is 375km. Hovercraft may move over both land and water with equal ease, but encounter difficulty with broken ground, precipices, or storms. A crew of one is sufficient to operate the vehicle; hovercraft can carry up to 15 passengers plus the operator. Cargo capacity is 2905kg. No armor or weaponry is generally provided.

HOVERCRAFT

Class: Air Cushion Vehicle	**EP Output:** 400 (98.47 excess)	
Cost: Cr347,200	**Agility:** 3	
Tech Level: 7	**Initiative:** +3 (+3 agility)	
Size: Huge (8000vl)	**AC:** 11 (-2 size, +3 agility)	
Streamlining: Standard	**AR:** 0	
Pressurized? No	**SI:** 61	
Climate Control? Yes	**Visual:** Spotlight (Beam 120m)	
Drive Train: Air Cushion		
Crew: 1		
Passengers: 15	**Sensors:** Radar (5km)	
Cargo Space: 2905vl		
Fuel: 500vl		
Range: 375km	**Comm.:** 2-way Radio (500km)	
Speeds:		
Acceleration = 15kph		
Offroad = 47kph	Very Slow = 15kph	Slow = 37kph
Cruising = 75kph	Fast = 112kph	Maximum = 150kph

Other Equipment:

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL7 Design Specifications			
Installed Components	*Size*	*Cost*	*EP*
8000vl Chassis	+8000	8000	-
Climate Control	-80	4000	-0.8
Drive Train, Air Cushion	-450	126,000	-300
Turbine Power Plant	-800	40,000	+400
Fuel	-500	- -	
Controls	-1600	4000	-
Passengers Seating (15)	-1650	1500	-
Spotlight, Beam (120m)	-8	200	-0.4
Radar	-5	250,000	-0.25
2-way Radio (500km)	-2	300	-0.08
Cargo/Luggage	-2905	- -	
Totals	*+0*	*Cr434,000 (Cr347,200 with 20% standard design discount)*	

AIRCRAFT

PRIMITIVE BIPLANE

Large Aircraft

TL5, Cr11,840, 1000vl. A very small early model aircraft. It can achieve a cruise speed of 100kph, with bursts up to a maximum of 200kph; range is 300km or roughly 3 hours flying time at cruising speed. The biplane's engine depends on chemical fuel. The plane carries two; the pilot and a passenger, and can also carry up to 549kg of cargo.

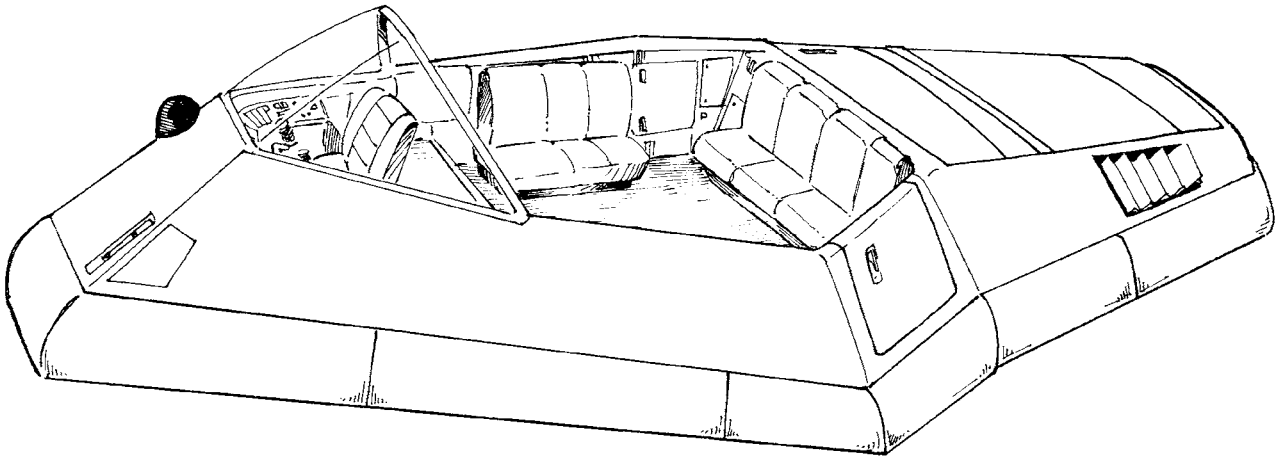
PRIMITIVE BIPLANE

Class: Aircraft	**EP Output:** 14 (4 excess)	
Cost:	**Agility:** 1	
Tech Level: 5	**Initiative:** +1 (+1 agility)	
Size: Large (1000vl)	**AC:** 10 (+1 agility, -1 size)	
Streamlining: Standard	**AR:** 0	
Pressurized? No	**SI:** 35	
Climate Control? No	**Visual:**	
Drive Train: Propeller		
Crew: 1		
Passengers: 1	**Sensors:**	
Cargo Space: 549vl		
Fuel: 21vl		
Range: 300km	**Comm.:**	
Speeds:		
Acceleration = 20kph		
Offroad = n/a	Stall = 20kph	Slow = 50kph
Cruising = 100kph	Fast = 150kph	Maximum = 200kph
Other Equipment:		

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL5 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
1000vl Chassis	+1000	1000	-
Drive Train, Propeller	-50	12,500	-10
Int. Combustion Power Plant	-70	700	+14
Fuel	-21	- -	
Controls	-200	500	-
Passengers Seats (1)	-110	100	-
Cargo/Luggage	-549	- -	
Totals	*+0*	*Cr14,800 (Cr11,840 with 20% standard design discount)*	



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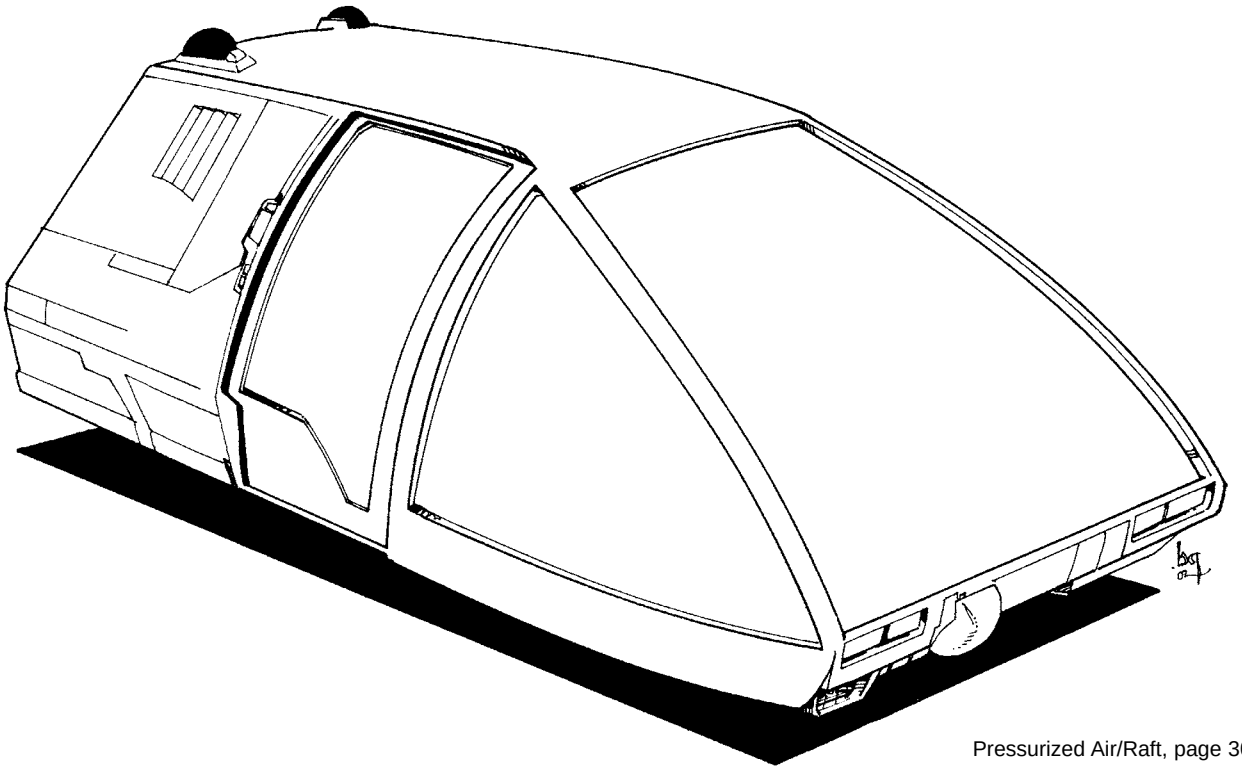


Pressurized Air/Raft, page 302

CARGO PLANE

Huge Aircraft

TL5, Cr364,000, 10,000vl. A twin propeller monowing aircraft intended for cargo transport. The plane cruises at 300kph (maximum speed is 600kph) with a range of 3600km. Fuel is standard chemical fuel. The craft requires a crew of two (only one of whom needs pilot skill and the appropriate vehicle feat) and carry six passengers and roughly 2 metric tons of cargo.

CARGO PLANE

Class: Aircraft	**EP Output:** 330 (29.92 excess)	
Cost: Cr364,000	**Agility:** 0	
Tech Level: 5	**Initiative:** +0	
Size: Huge (10,000vl)	**AC:** 8 (-2 size)	
Streamlining: Partial	**AR:** 0	
Pressurized? No	**SI:** 65	
Climate Control? No	**Visual:**	
Drive Train: Propeller (2)		
Crew: 2		
Passengers: 6	**Sensors:**	
Cargo Space: 1948vl		
Fuel: 1980vl		
Range: 3600km	**Comm.:** 2-way Radio (500km)	
Speeds:		
Acceleration = 60kph		
Offroad = n/a	Stall = 60kph	Slow = 150kph
Cruising = 300kph	Fast = 450kph	Maximum = 600kph
Other Equipment:		

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL5 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
10,000vl Chassis	+10,000	10,000	-
Partial Streamlining	-	10,000	-
Drive Train, Propeller (2)	-1650	412,500	-300
Int Combustion Power Plant	-1650	16,500	+330
Fuel	-1980	- -	
Controls	-2000	5000	-
Passengers Seats (7)	-770	700	-
2-way Radio (500km)	-2	300	-0.08
Cargo/Luggage	-1948	- -	
Totals	*+0*	*Cr455,000 (Cr364,000 with 20% standard design discount)*	

CARGO JET

Huge Aircraft

TL7, MCr1.794, 12,000vl. A twin jet monowing aircraft intended for cargo transport. The plane cruises at 660kph, has a maximum safe speed of 1100kph (technically 1320 but limited by the airframe configuration) with a range of 3960km. Fuel is standard chemical jet fuel. The craft requires a crew of two, only one of whom needs pilot skill and the appropriate vehicle feat, carries up to six passengers and roughly 5 metric tons of cargo.

CARGO JET

Class: Aircraft	**EP Output:** 230 (14.67 excess)	
Cost: Cr1,794,400	**Agility:** 0	
Tech Level: 6	**Initiative:** +0	
Size: Huge (12,000vl)	**AC:** 8 (-2 size)	
Streamlining: Airframe	**AR:** 0	
Pressurized? Yes	**SI:** 69	
Climate Control? No	**Visual:**	
Drive Train: Jet (2)		
Crew: 2		
Passengers: 6	**Sensors:** Radar (5km)	
Cargo Space: 5218vl		
Fuel: 345vl		
Range: 3960km	**Comm.:** 2-way Radio (500km)	
Speeds:		
Acceleration = 132kph		
Offroad = n/a	Stall = 132kph	Slow = 330kph
Cruising = 660kph	Fast = 990kph	Maximum = 1320kph
Other Equipment:		

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL6 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
12,000vl Chassis	+12,000	12,000	-
Airframe	-	36,000	-
Pressurized Interior	-600	15,000	-15
Drive Train, Jet (2)	-2200	MCr1.9	-200
Turbine Power Plant	-460	23,000	+230
Fuel	-345	- -	
Controls	-2400	6000	-
Passengers Seats (7)	-770	700	-
Radar	-5	250,000	-0.25
2-way Radio (500km)	-2	300	-0.08
Cargo/Luggage	-5218	- -	
Totals	*+0*	*Cr2,243,000 (Cr1,794,400 with 20% standard design discount)*	

HELICOPTER

Huge Aircraft

TL5, Cr82,760, 5,000vl. Single engine rotary wing aircraft capable of vertical take-off and landing, as well as maneuvering in tight places. The helicopter can cruise at 125kph with a top speed of 250kph; range is 750km at cruising speed or roughly 6 hours. The vehicle requires a crew of 1 (the pilot) and can carry 7 passengers and up to roughly additional 1 metric ton of cargo.

HELICOPTER

Class: Aircraft	**EP Output:** 225 (15 excess)	
Cost: Cr82,760	**Agility:** 0	
Tech Level: 5	**Initiative:** +0	
Size: Huge (5000vl)	**AC:** 8 (-2 size)	
Streamlining: Standard	**AR:** 0	
Pressurized? No	**SI:** 55	
Climate Control? No	**Visual:**	
Drive Train: Rotary Wing		
Crew: 1		
Passengers: 7	**Sensors:**	
Cargo Space: 905vl		
Fuel: 675vl		
Range: 750km	**Comm.:**	
Speeds:		
Acceleration = 25kph		
Offroad = n/a	Very Slow = 25kph	Slow = 62kph
Cruising = 125kph	Fast = 187kph	Maximum = 250kph
Other Equipment:		

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL5 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
5000vl Chassis	+5,000	5,000	-
Drive Train, Rotary WIng	-525	84,000	-210
Int Combustion Power Plant	-1125	11,250	+225
Fuel	-675	- -	
Controls	-1000	2500	-
Passengers Seats (7)	-770	700	-
Cargo/Luggage	-905	- -	
Totals	*+0*	*Cr103,450 (Cr82,760 with 20% standard design discount)*	

GRAV VEHICLES

AIR/RAFT

Huge Grav Vehicle

TL8, Cr273,200, 6000vl. A light anti-gravity ("grav") vehicle which uses null-grav modules (often known as "lifters") to counteract gravity for lift and propulsion. An air/raft can cruise at 60kph (but is extremely subject to wind effects), with some capable of higher speed to about 120kph. An air/raft can reach orbit in several hours (number of hours equal to planetary size digit in the UWP); passengers must wear vac suits for this journey. Interplanetary travel in an air/raft is not possible. Range on a world is effectively unlimited, requiring refueling once per week. An air/raft can carry the pilot and up to 3 passengers plus roughly 4 metric tons of cargo. They are usually unpressurized and open-topped.

AIR/RAFT

Class: Grav Vehicle	**EP Output:** 10 (2.8 excess)	
Cost: Cr273,200	**Agility:** 0	
Tech Level: 8	**Initiative:** +0	
Size: Huge (6000vl)	**AC:** 8 (-2 size)	
Streamlining: Standard	**AR:** 0	
Pressurized? No	**SI:** 57	
Climate Control? No	**Visual:**	
Drive Train: Grav		
Crew: 1		
Passengers: 3	**`Sensors:**	
Cargo Space: 4001.2vl		
Fuel: 420vl		
Range: 1 week	**Comm.:**	
Speeds:		
Acceleration = 12kph		
Offroad = n/a	Very Slow = 12kph	Slow = 30kph
Cruising = 60kph	Fast = 90kph	Maximum = 120kph
Other Equipment:		

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL8 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
6000vl Chassis	+6000	6000	-
Drive Train, Grav	-28.8	331,200	-7.2
Turbine Power Plant	-20	1000	+10
Fuel	-420	- -	
Controls	-1200	3000	-
Passengers Seats (3)	-330	300	-
Cargo/Luggage	-4001.2	- -	
Totals	*+0*	*Cr341,500 (Cr273,200 with 20% standard design discount)*	

PRESSURIZED AIR/RAFT

Huge Grav Vehicle

TL8, Cr376,000, 8000vl. A slightly larger, enclosed and pressurized version of the basic air/raft. Performance, cargo and passenger capacities are roughly the same as the basic air/raft.

PRESSURIZED AIR/RAFT

Class: Grav Vehicle	**EP Output:** 21 (0.6 excess)	
Cost: Cr376,000	**Agility:** 0	
Tech Level: 8	**Initiative:** +0	
Size: Huge (8000vl)	**AC:** 8 (-2 size)	
Streamlining: Standard	**AR:** 0	
Pressurized? Yes	**SI:** 61	
Climate Control? Yes	**Visual:**	
Drive Train: Grav		
Crew: 1		
Passengers: 3	**Sensors:**	
Cargo Space: 4627.6		
Fuel: 882vl		
Range: 1 week	**Comm.:**	
Speeds:		
Acceleration = 12kph		
Offroad = n/a	Very Slow = 12kph	Slow = 30kph
Cruising = 60kph	Fast = 90kph	Maximum = 120kph
Other Equipment:		

TAS Form 3.1v (Condensed)

Vehicle Data (Commercial)

TL8 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
8000vl Chassis	+8000	8000	-
Pressurized Interior	-400	10,000	-10
Climate Control	-80	4,000	-0.8
Drive Train, Grav	-38.4	441,600	-9.6
Turbine Power Plant	-42	2100	+21
Fuel	-882	- -	
Controls	-1600	4000	-
Passengers Seats (3)	-330	300	-
Cargo/Luggage	-4627.6	- -	
Totals	*+0*	*Cr470,000 (376,000 with 20% standard design discount)*	

GCARRIER

Huge Grav Vehicle

TL8, Cr506,880, 10,000vl. An enclosed military or quasi-military grav vehicle. The GCarrier is an armored air/raft type vehicle intended originally for troop carrier duties. Performance is similar to that of the air/raft, but the vehicle generally has a gun mount and is armored. It requires a crew of one (with pilot skill and the Vessel/grav feat), plus a gunner for the craft's weapon, if any. It can carry 14 persons (including the driver and gunner), plus roughly 1.1 metric tons of cargo.

GCARRIER

Class: Grav Vehicle	**EP Output:** 30 (0.3 excess)	
Cost: Cr506,880	**Agility:** 0	
Tech Level: 8	**Initiative:** +0	
Size: Huge (10,000vl)	**AC:** 14 (+6 armor, -2 size)	
Streamlining: Standard	**AR:** 6	
Pressurized? Yes	**SI:** 65	
Climate Control? Yes	**Visual:**	
Drive Train: Grav		
Crew: 2		
Passengers: 12	**Sensors:**	
Cargo Space: 1092vl		
Fuel: 1260vl		
Range: 1 week	**Comm.:**	
Speeds:		
Acceleration = 12kph		
Offroad = n/a	Very Slow = 12kph	Slow = 30kph
Cruising = 60kph	Fast = 90kph	Maximum = 120kph
Other Equipment:		

Heavy Manned Turret: Medium Lasers (x3), Attack Bonus +0, Damage 5d10.

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL8 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
10,000vl Chassis	+10,000	10,000	-
TL8 Armor (AC6)	-2800	28,200	-
Pressurized Interior	-500	12,500	-12.5
Climate Control	-100	5,000	-1
Drive Train, Grav	-48	552,000	-12
Turbine Power Plant	-60	3000	+30
Fuel	-1260	- -	
Controls	-2000	5000	-
Passengers Seats (14)	-1540	1400	-
Heavy Manned Turret	-600	6000	-1.2
Medium Lasers (3)	(-300)	10,500	-3
Cargo/Luggage	-1092	- -	
Totals	*+0*	*Cr633,600 (Cr506,880 with 20% standard design discount)*	

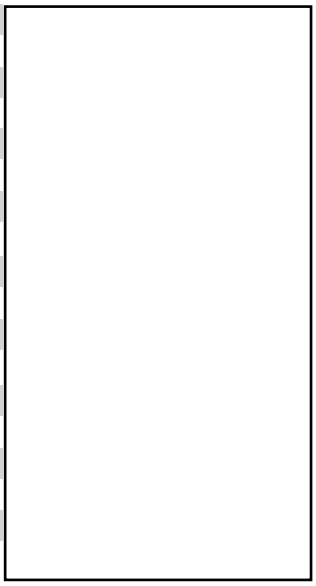
SPEEDER

Huge Grav Vehicle

TL8, MCr3.950, 8000vl. A streamlined grav-powered craft intended for high-speed transport between points on a world's surface. Similar in principle to the air/raft and the GCarrier, the speeder is streamlined and optimized for speed. It is capable of 720 kph cruise speed, with a top speed of 1320kph (though maximum safe speed is only 1100kph), and has a virtually unlimited range. Refueling is required only once per week. The speeder carries a pilot (who requires the pilot skill and the Vessel/grav feat), a single passenger, and 238kg of cargo. The speeder is capable of reaching orbit within an hour.

SPEEDER

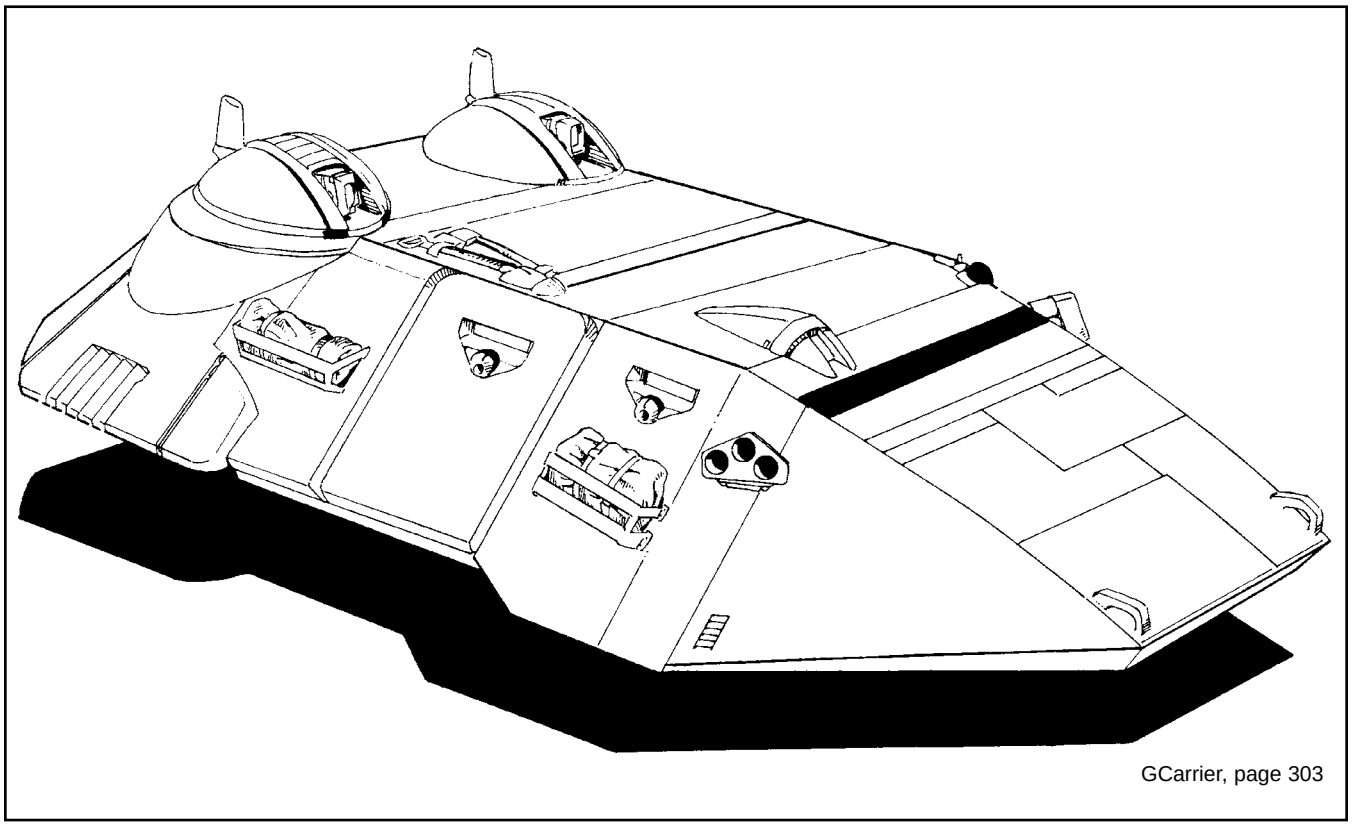
Class: Grav Vehicle	**EP Output:** 117 (0.2 excess)	
Cost: Cr3,950,240	**Agility:** 0	
Tech Level: 8	**Initiative:** +0	
Size: Huge (8000vl)	**AC:** 8 (-2 size)	
Streamlining: Airframe	**AR:** 0	
Pressurized? Yes	**SI:** 61	
Climate Control? Yes	**Visual:**	
Drive Train: Grav		
Crew: 1		
Passengers: 1	**Sensors:**	
Cargo Space: 238vl		
Fuel: 4872vl		
Range: 1 week	**Comm.:**	
Speeds:		
Acceleration = 132kph		
Offroad = n/a	Very Slow = 132kph	Slow = 330kph
Cruising = 660kph	Fast = 990kph	Maximum = 1320kph
Other Equipment:		



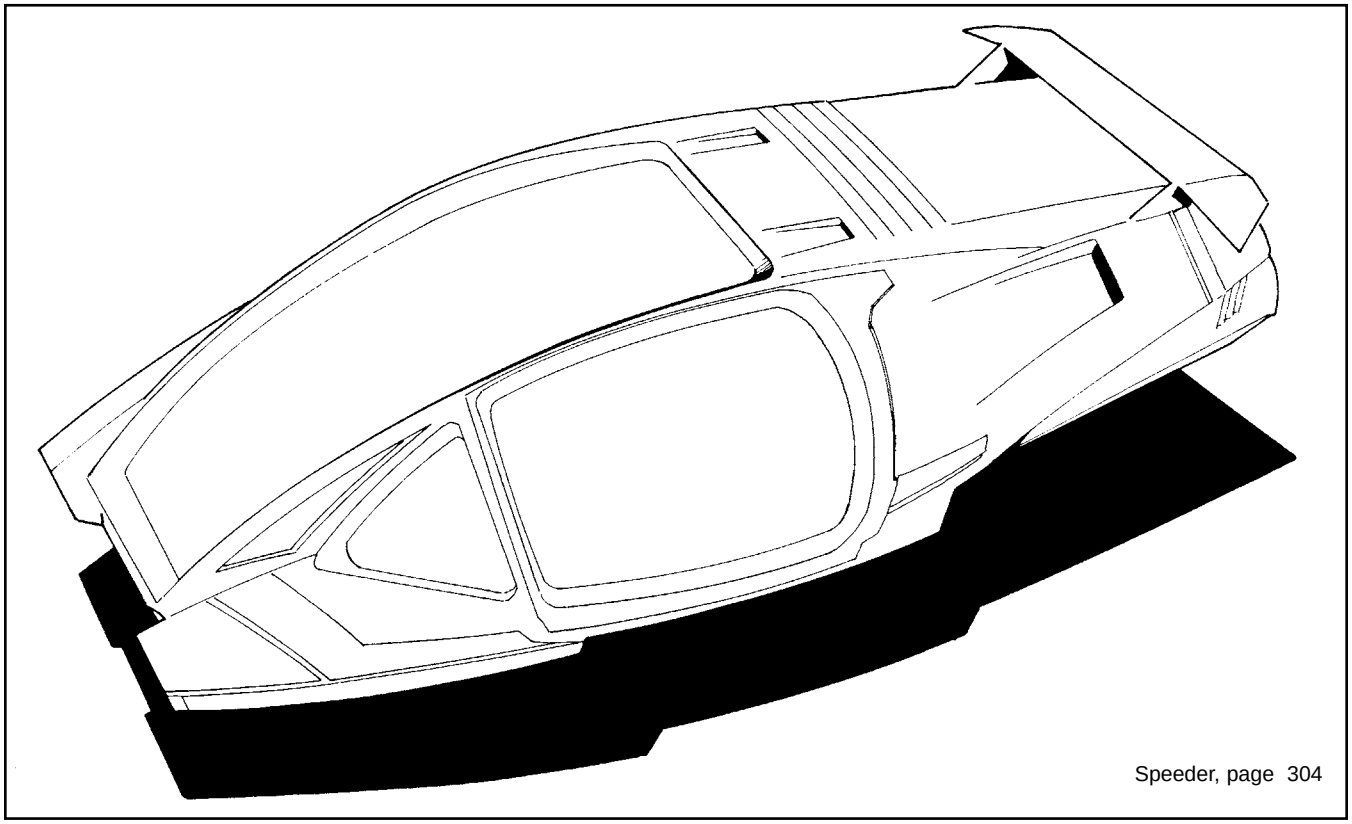
TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL8 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
8000vl Chassis	+8000	8000	-
Airframe	-	24,000	-
Pressurized Interior	-400	10,000	-10
Climate Control	-80	4,000	-0.8
Drive Train, Grav	-424	MCr4.876	-106
Turbine Power Plant	-234	11,700	+117
Fuel	-4914	- -	
Controls	-1600	4000	-
Passengers Seats (1)	-110	100	-
Cargo/Luggage	-238	- -	
Totals	*+0*	*Cr4,937,800 (Cr3,950,240 with 20% standard design discount)*	



GCarrier, page 303



Speeder, page 304

GRAV BELT

Medium Grav Vehicle

TL12, Cr9292, 200vl. Personal anti-gravity transportation using a single null-gravity module and a personal harness. Performance is similar in speed to the air/raft, but with a four-week operational range.

GRAV BELT

Class: Grav Vehicle	**EP Output:** 1 (0.76 excess)	
Cost: Cr9292	**Agility:** 1	
Tech Level: 12	**Initiative:** +1 (+1 agility)	
Size: Medium (200vl)	**AC:** 11 (+1 agility)	
Streamlining: Standard	**AR:** 0	
Pressurized? No	**SI:** 12	
Climate Control? No	**Visual:**	
Drive Train: Grav		
Crew: 1		
Passengers: 0	**Sensors:**	
Cargo Space: 53.94vl		
Fuel: 33.6		
Range: 4 weeks	**Comm.:**	
Speeds:		
Acceleration = 12kph		
Offroad = n/a	Very Slow = 12kph	Slow = 30kph
Cruising = 60kph	Fast = 90kph	Maximum = 120kph
Other Equipment:		

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL12 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
200vl Chassis	+200	200	-
Drive Train, Grav	-0.96	11,040	-0.24
Adv Fuel Cell Power Plant	-1.5	100	+1
Fuel	-33.6	- -	
Controls	-110	275	-
Cargo/Luggage	-53.94	- -	
Totals	*+0*	*Cr11,615 (Cr9292 with 20% standard design discount)*	

WATERCRAFT

SMALL STEAMSHIP

Colossal Watercraft

TL4, Cr334,600, 150,000vl. Vessels of this type vary widely; most are capable of 30 kph for up to a week of travel, and a maximum speed of 60kph. Fuel is some form of basic combustible. The ship can carry a crew of five, ten passengers, and approximately 46 metric tons of cargo.

SMALL STEAMSHIP

Class: Watercraft	**EP Output:** 460 (10 excess)	
Cost: Cr334,600	**Agility:** 0	
Tech Level: 4	**Initiative:** +0	
Size: Colossal (150,000vl)	**AC:** 2 (-8 size)	
Streamlining: Standard	**AR:** 0	
Pressurized? No	**SI:** 104	
Climate Control? No	**Visual:**	
Drive Train: Surface Water		
Crew: 5		
Passengers: 10	**Sensors:**	
Cargo Space: 46,730vl		
Fuel: 19,320vl		
Range: 1 week	**Comm.:**	
Speeds:		
Acceleration = 6kph		
Offroad = n/a	Very Slow = 6kph	Slow = 15kph
Cruising = 30kph	Fast = 45kph	Maximum = 60kph
Other Equipment:		

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL4 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
150,000vl Chassis	+150,000	150,000	-
Drive Train, Surface Water	-11,250	56,250	-450
Steam Power Plant	-11,500	11,500	+460
Fuel	-19,320	- -	
Controls	-30,000	75,000	-
Passenger Small Cabins (15)	-30,000	120,000	-
Galley Facilities (16)	-800	4000	-
Fresher Facilities (2)	-400	1500	-
Cargo/Luggage	-46,730	- -	
Totals	*+0*	*Cr418,250 (Cr334,600 with 20% standard design discount)*	

HYDROFOIL

Gargantuan Watercraft

TL7, Cr197,200, 60,000vl. The hydrofoil can cruise at 50kph, with bursts of speed to 100kph. The ship's engines depend on local fuel sources, such as hydrocarbons or electric batteries; with a full tank of fuel, a hydrofoil can operate for a week at cruising speed. A crew of three operates the craft, which carries eight passengers and nearly 5 metric tons of cargo.

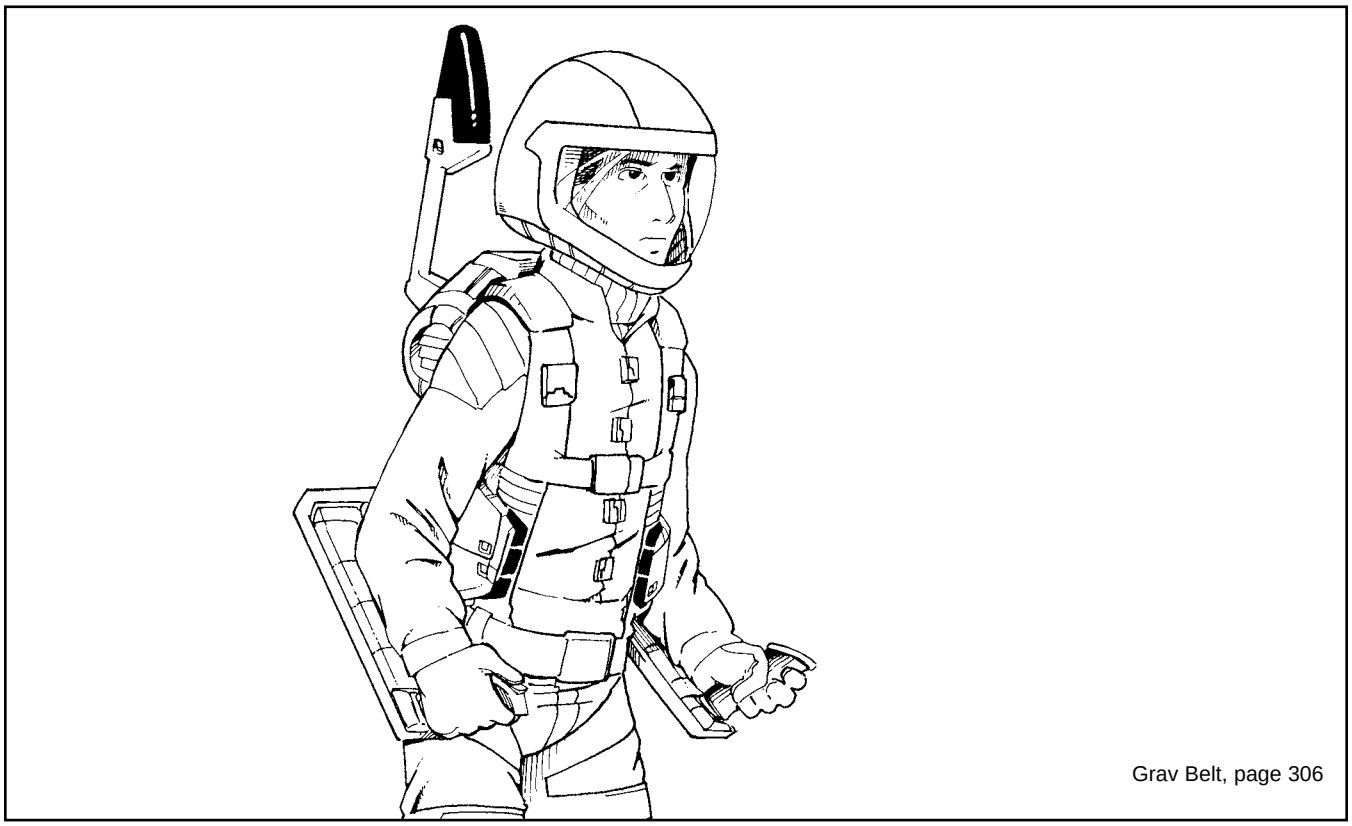
HYDROFOIL

Class: Watercraft	**EP Output:** 310 (10 excess)	
Cost: Cr197,200	**Agility:** 0	
Tech Level: 7	**Initiative:** +0	
Size: Gargantuan (60,000vl)	**AC:** 6 (-4 size)	
Streamlining: Standard	**AR:** 0	
Pressurized? No	**SI:** 86	
Climate Control? No	**Visual:**	
Drive Train: Surface Water		
Crew: 3		
Passengers: 8	**Sensors:**	
Cargo Space: 4,860vl		
Fuel: 13,020vl		
Range: 1 week	**Comm.:**	
Speeds:		
Acceleration = 10kph		
Offroad = n/a	Very Slow = 10kph	Slow = 25kph
Cruising = 50kph	Fast = 75kph	Maximum = 100kph
Other Equipment:		

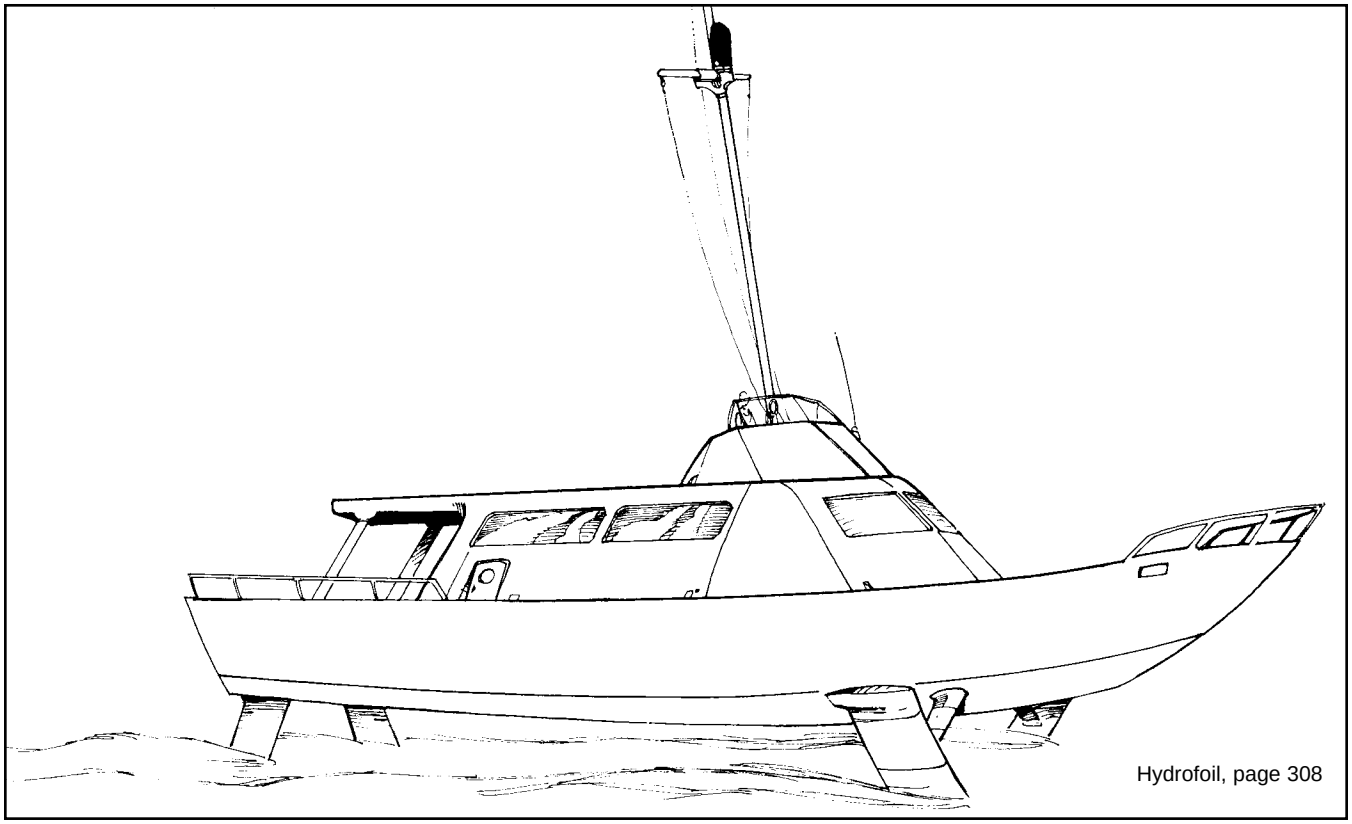
TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL7 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
60,000vl Chassis	+60,000	60,000	-
Drive Train, Surface Water	-7500	37,500	-300
Turbines	-620	31,000	+310
Fuel	-13,020	- -	
Controls	-12,000	30,000	-
Passenger Small Cabins (11)	-22,000	88,000	-
Cargo/Luggage	-4,860	- -	
Totals	*+0*	*Cr246,500 (Cr197,200 with 20% standard design discount)*	



Grav Belt, page 306



Hydrofoil, page 308

SUBMERSIBLE

Colossal Watercraft

TL6, MCr1.872, 500,000vl. Underwater vessels intended to avoid surface weather conditions for safety and convenience. On worlds with large water percentages (especially level A) submersibles ply the routes between underwater domed cities. The submersible is capable of a maximum speed of 40kph on the surface in good weather, and about half that underwater. It has an average 9-day endurance (72 hours submerged), and depends on local energy sources for refueling or recharging. It has a crew of five and facilities for ten passengers and approximately 51 metric tons of cargo.

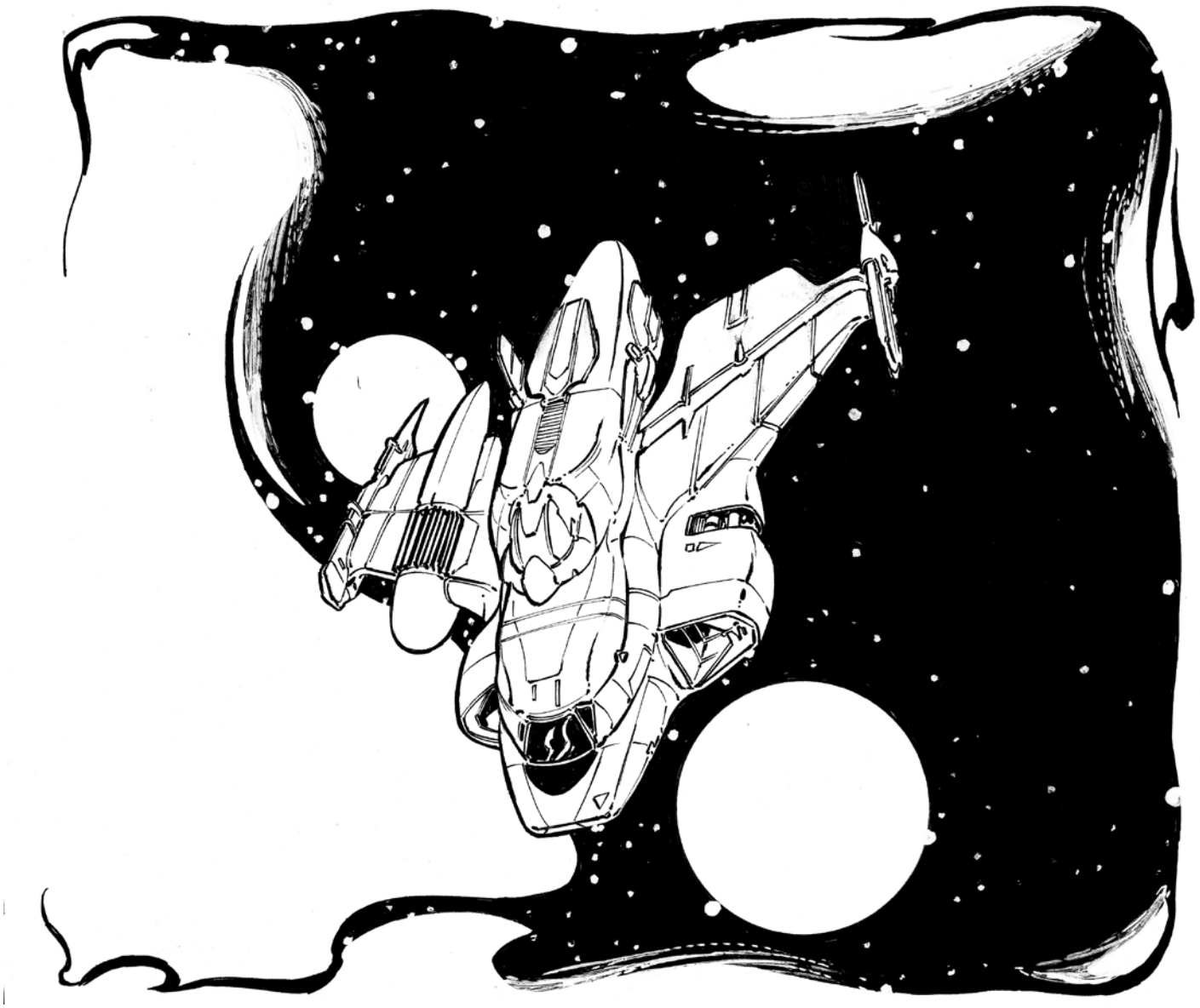
SUBMERSIBLE

Class: Watercraft	**EP Output:** 2650 (25 excess) / 1650 (25 excess)	
Cost:	**Agility:** 0	
Tech Level: 6	**Initiative:** +0	
Size: Colossal (500,000vl)	**AC:** 2 (-8 size)	
Streamlining: No	**AR:** 0	
Pressurized? Yes	**SI:** 148	
Climate Control? No	**Visual:**	
Drive Train: Water Surface/Subsurface		
Crew: 5		
Passengers: 10	**Sensors:**	
Cargo Space: 51,030vl		
Fuel: 178,200vl		
Range: 216 hours / 72 hours	**Comm.:**	
Speeds:		
Acceleration = 4kph		
Underwater = 20kph	Very Slow = 4kph	Slow = 10kph
Cruising = 20kph	Fast = 30kph	Maximum = 40kph
Other Equipment:		

TAS Form 3.1v (Condensed) **Vehicle Data (Commercial)**

TL6 Design Specifications

Installed Components	*Size*	*Cost*	*EP*
500,000vl Chassis	+500,000	500,000	-
Pressurized Interior	-25,000	625,000	-625
Drive Train, Surface Water	-25,000	125,000	-1000
Drive Train, Subsurface Water	-20,000	250,000	-2000
Int Combustion Power Plant	-8250	82,500	+1650
Crude Batteries	-76,320	381,600	+2650
Fuel	-178,200	- -	
Controls	-100,000	250,000	-
Passengers Small Cabins (15)	-15,000	120,000	-
Galley Facilities (16)	-800	4000	-
Fresher Facilities (2)	-400	1500	-
Cargo/Luggage	-51,030	- -	
Totals	*+0*	*Cr2,339,600 (Cr1,871,680 with 20% standard design discount)*	



SMALLCRAFT DESIGNS

SMALLCRAFT

Type	TL	Cost	Size	Acceleration	SI	AC
Launch (lifeboat)	9	MCr11.282	20 tons	1-G	77	12
Ship's Boat	9	MCr33.552	30 tons	6-G	80	15
Slow Boat	9	MCr27.842	30 tons	3-G	80	14
Pinnace	10	MCr48.402	40 tons	5-G	82	16
Slow Pinnace	9	MCr28.882	40 tons	2-G	82	14
Modular Cutter	9	MCr15.16	50 tons	2-G	92	11
ATV Module	-	MCr1.8	30 tons	-	-	-
Fuel Module	-	MCr1	30 tons	-	-	-
Open Module	-	MCr2	30 tons	-	-	-
Shuttle	10	MCr55.902	95 tons	3-G	96	13
Fighter	9	MCr11.88	15 tons	6-G	77	17

LAUNCH (LIFEBOAT)

Small Spacecraft

TL9, MCr11.282, 20 tons. The Launch is a small, slow vessel capable of fulfilling a wide range of roles from cargo and passenger transfer to lifeboat, search-and-rescue or starport utility work. Attempts to use a Launch as weapons platform is generally unsuccessful due to a lack of maneuverability. Typically a launch will be capable of 1G acceleration, has an operational duration of 4 weeks before needing to refuel, and can carry approximately 8 tons of cargo. It requires a crew of two, at least one of whom must have a Pilot skill rank of one or higher, and takes 5 months to build.

LAUNCH

Class: Smallcraft	**EP Output:** 0.4 (0.2 excess)
Tech Level: 9	**Agility:** 1 (+1 EP)
Size: Small (20 tons)	**Initiative:** +1 (+1 agility)
Streamlining: Streamlined	**AC:** 12 (+1 agility, +1 size)
Jump Range: None	**Repulsors:** None
Acceleration: 1-G	**Nuclear Dampers:** None
Fuel: 0.4 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 2	**AR:** 0
Staterooms: 0	**SI:** 77
Small Cabins: 1	**Main Computer:** Model/2
Bunks: 0	**Sensor Range:** Short (Model/2)
Couches: 2	**Comm. Range:** Short (Model/2)
Low Berths: 0	
Cargo Space: 8.1 tons	**Cost:** MCr11.282 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 200kph	Maximum = 375kph

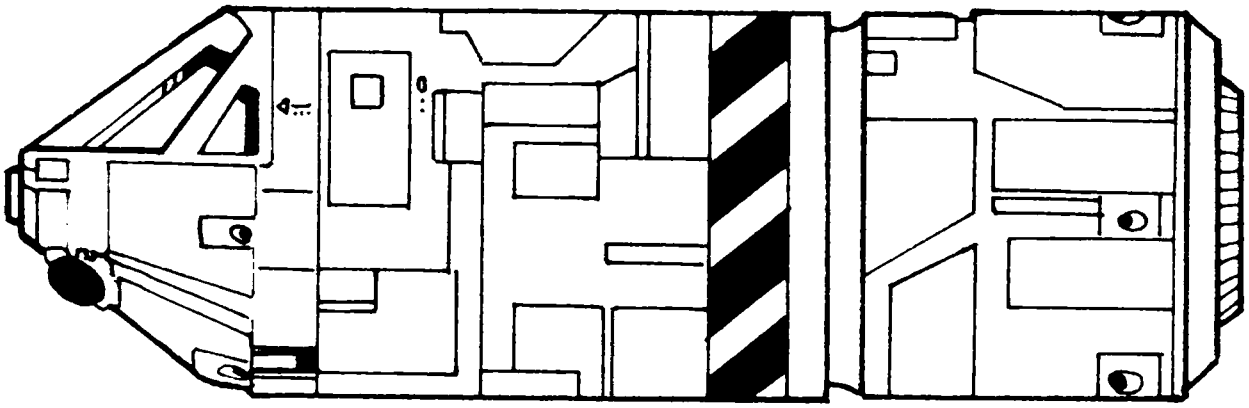
Other Equipment: Fresher, missile magazine

Triple Turret: empty

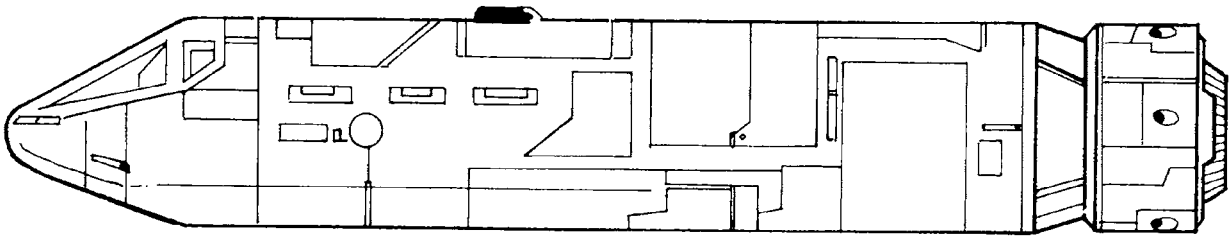
TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

TL9 Design Specifications

	Size	*Cost*	*EP*	*Notes*
20-ton streamlined cylinder hull	+20	MCr2.1	-	-
Bridge Controls	-4	MCr0.1	-	-
Model/2 Computer	-0.2	MCr8	-	Model/2
Flight Avionics	-0.8	(MCr1.8)	-	Model/2
Short Range Sensors	-0.6	(MCr1.2)	-	Model/2
Short Range Communications	-0.4	(MCr1)	-	Model/2
1-G Acceleration	-0.4	MCr0.6	-0.2 EP	-
TL9 Fusion Power Plant	-0.6	MCr1.8	+0.4 EP	-
Fuel	-0.4	-	-	-
2 Small Craft Couches	-1	MCr0.05	-	-
1 Small Cabin	-2	MCr0.25	-	-
Fresher	-0.5	MCr0.002	-	-
1 Hardpoint	-	MCr0.1	-	-
Triple Turret	-	MCr1	-	-
Missile Magazine	-1	MCr0.1	-	-
Cargo	-8.1	-	-	-
Totals	*+0*	*MCr14.102 (MCr11.282 with 20% standard design discount)*		



Launch (Lifeboat), page 312



Ship's Boat, page 314

SHIP'S BOAT

Small Spacecraft

TL9, MCr33.522, 30 tons. Larger and much faster than the Launch, the Ship's Boat has little room for cargo and is highly expensive. They are mainly used as "prestige" passenger shuttles, for military personnel transfers between vessels, and as rescue craft. The vessel requires a crew of two, at least one of whom must have at least a Pilot skill rank of one or higher, and requires 5 months to build.

SHIP'S BOAT

Class: Smallcraft	**EP Output:** 4 (1.2 excess)
Tech Level: 9	**Agility:** 4 (+4 EP)
Size: Small (30 tons)	**Initiative:** +4 (+4 agility)
Streamlining: Streamlined	**AC:** 15 (+4 agility, +1 size)
Jump Range: None	**Repulsors:** None
Acceleration: 6-G	**Nuclear Dampers:** None
Fuel: 4 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 2	**AR:** 0
Staterooms: 0	**SI:** 80
Small Cabins: 1	**Main Computer:** Model/3
Bunks: 0	**Sensor Range:** Medium (Model/3)
Couches: 2	**Comm. Range: Medium (Model/3)**
Low Berths: 0	
Cargo Space: 1.8 tons	**Cost:** MCr33.522 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 200kph	Maximum = 375kph

Other Equipment: Fresher, missile magazine

Triple Turret: empty

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

TL9 Design Specifications

	Size	*Cost*	*EP*	*Notes*
30-ton streamlined cylinder hull	+30	MCr3.15	-	-
Bridge Controls	-6	MCr0.15	-	-
Model/3 Computer	-0.3	MCr15.3	-1 EP	Model/3
Flight Avionics	-0.8	(MCr1.8)	-	Model/2
Medium Range Sensors	-0.9	(MCr1.8)	-	Model/3
Medium Range Communications	-0.6	(MCr1.5)	-	Model/3
6-G Acceleration	-5.1	MCr2.55	-1.8 EP	-
TL9 Fusion Power Plant	-6	MCr18	+4 EP	-
Fuel	-4	-	-	-
2 Small Craft Couches	-1	MCr0.05	-	-
1 Small Cabin	-2	MCr0.25	-	-
Fresher	-0.5	MCr0.002	-	-
1 Hardpoint	-	MCr0.1	-	-
Triple Turret	-	MCr1	-	-
Missile Magazine	-1	MCr0.1	-	-
Cargo	-1.8	-		
Totals	*+0*	*MCr40.652 (MCr32.522 with 20% standard design discount)*		

SLOW BOAT

Small Spacecraft

TL9, MCr27.842, 30 tons. The Slow Boat is more affordable than its faster cousin, and cargo space is better. These craft are often used by larger merchant ships. The vessel requires a crew of two, at least one of whom must have at least a Pilot skill rank of one or higher, and requires 5 months to build.

SLOW BOAT

Class: Smallcraft	**EP Output:** 3 (1.1 excess)
Tech Level: 9	**Agility:** 3 (+3 EP)
Size: Small (30 tons)	**Initiative:** +3 (+3 agility)
Streamlining: Streamlined	**AC:** 14 (+3 agility, +1 size)
Jump Range: None	**Repulsors:** None
Acceleration: 3-G	**Nuclear Dampers:** None
Fuel: 3 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 2	**AR:** 0
Staterooms: 0	**SI:** 80
Small Cabins: 1	**Main Computer:** Model/3
Bunks: 0	**Sensor Range:** Medium (Model/3)
Couches: 2	**Comm. Range:** Medium (Model/3)
Low Berths: 0	
Cargo Space: 7 tons	**Cost:** MCr24.842 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 200kph	Maximum = 375kph

Other Equipment: Fresher, missile magazine

Triple Turret: empty

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

TL9 Design Specifications

	Size	*Cost*	*EP*	*Notes*
30-ton streamlined cylinder hull	+30	MCr3.15	-	-
Bridge Controls	-6	MCr0.15	-	-
Model/3 Computer	-0.3	MCr15.3	-1 EP	Model/3
Flight Avionics	-0.8	(MCr1.8)	-	Model/2
Medium Range Sensors	-0.9	(MCr1.8)	-	Model/3
Medium Range Communications	-0.6	(MCr1.5)	-	Model/3
3-G Acceleration	-2.4	MCr1.2	-0.9 EP	-
TL9 Fusion Power Plant	-4.5	MCr13.5	+3 EP	-
Fuel	-3	-	-	-
2 Small Craft Couches	-1	MCr0.05	-	-
1 Small Cabin	-2	MCr0.25	-	-
Fresher	0.5	MCr0.002	-	-
1 Hardpoint	-	MCr0.1	-	-
Triple Turret	-	MCr1	-	-
Missile Magazine	-1	MCr0.1	-	-
Cargo	-7	-	-	-
Totals	*+0*	*MCr 34.802 (MCr 27.842 with 20% standard design discount)*		

PINNACE

Small Spacecraft

TL10, MCr48.402, 40 tons. A larger craft designed for high performance in atmosphere or in space, the Pinnace is fairly uncommon among small craft due to its high cost. Requires a crew of two.

PINNACE

Class: Smallcraft	**EP Output:** 4 (2 excess)
Tech Level: 10	**Agility:** 5 (+5 EP)
Size: Small (40 tons)	**Initiative:** +5 (+5 agility)
Streamlining: Streamlined	**AC:** 16 (+5 agility, +1 size)
Jump Range: None	**Repulsors:** None
Acceleration: 5-G	**Nuclear Dampers: None**
Fuel: 6 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 2	**AR:** 0
Staterooms: 0	**SI:** 82
Small Cabins: 1	**Main Computer:** Model/4
Bunks: 0	**Sensor Range:** Long (Model/4)
Couches: 2	**Comm. Range:** Medium (Model/3)
Low Berths: 0	
Cargo Space: 3.7 tons	**Cost:** MCr48.402 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 200kph	Maximum = 375kph

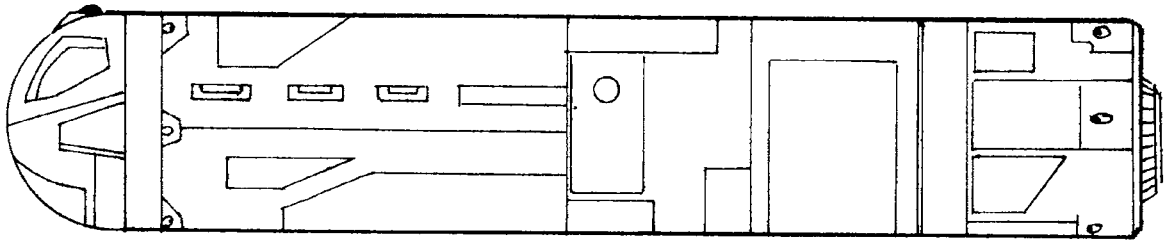
Other Equipment: Fresher, missile magazine

Triple Turret: empty

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

TL10 Design Specifications

	Size	*Cost*	*EP*	*Notes*
40-ton streamlined cylinder hull	+40	MCr4.2	-	-
Bridge Controls	-8	MCr0.2	-	-
Model/4 Computer	-0.4	MCr24.8	-2 EP	Model/4
Flight Avionics	-0.8	(MCr1.8)	-	Model/2
Long Range Sensors	-1.2	(MCr2.4)	-	Model/4
Medium Range Communications	-0.8	(MCr2)	-	Model/3
5-G Acceleration	-5.6	MCr2.8	-2 EP	-
TL9 Fusion Power Plant	-9	MCr27	+6 EP	-
Fuel	-6	-	-	-
2 Small Craft Couches	-1	MCr0.05	-	-
1 Small Cabin	-2	MCr0.25	-	-
Fresher	-0.5	MCr0.002	-	-
1 Hardpoint	-	MCr0.1	-	-
Triple Turret	-	MCr1	-	-
Missile Magazine	-1	MCr0.1	-	-
Cargo	-3.7	-	-	-
Totals	*+0*	*MCr 60.502 (MCr48.402 with 20% standard design discount)*		



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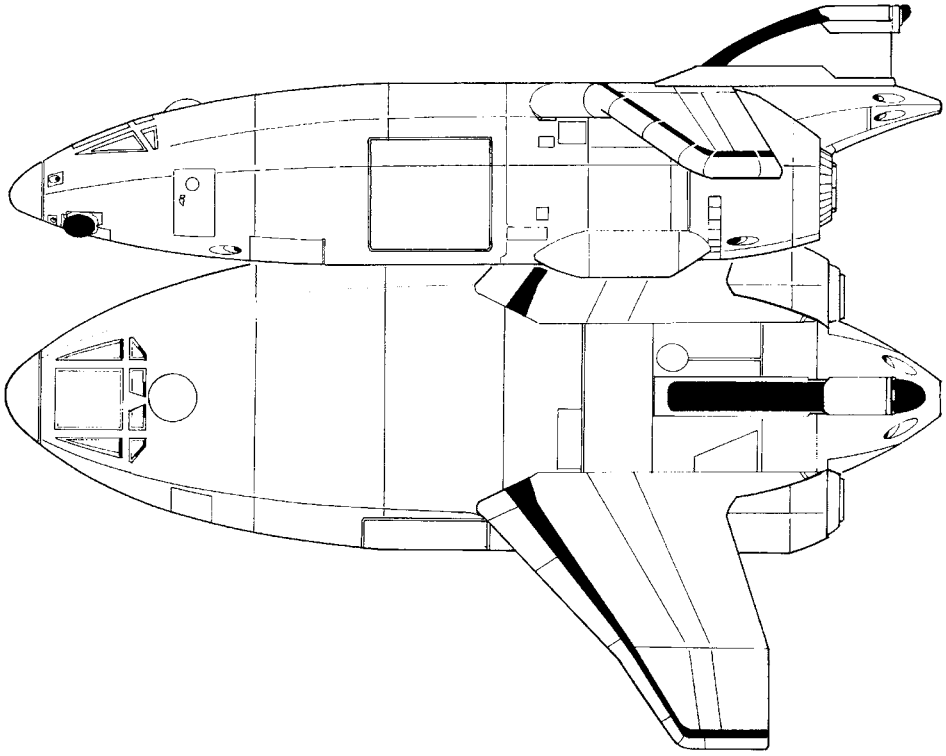

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SLOW PINNACE

Small Spacecraft

TL9, MCr28.882, 40 tons. The Slow Pinnace carries far more cargo than its faster cousin, and at a lower price. Performance in atmosphere is still good, and with the extra cargo capacity of a Slow Boat in a hull only 10 tons larger, the Slow Pinnace sees some use as a cargo lighter for merchant ships that cannot enter atmosphere. Requires a crew of two.

SLOW PINNACE

Class: Smallcraft	**EP Output:** 3 (1.2 excess)
Tech Level: 9	**Agility:** 3 (+3 EP)
Size: Small (40 tons)	**Initiative:** +3 (+3 agility)
Streamlining: Streamlined	**AC:** 14 (+3 agility, +1 size)
Jump Range: None	**Repulsors:** None
Acceleration: 2-G	**Nuclear Dampers:** None
Fuel: 3 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 2	**AR:** 0
Staterooms: 0	**SI:** 82
Small Cabins: 1	**Main Computer:** Model/3
Bunks: 0	**Sensor Range:** Medium (Model/3)
Couches: 2	**Comm. Range:** Medium (Model/3)
Low Berths: 0	
Cargo Space: 15.4 tons	**Cost:** MCr28.882 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 200kph	Maximum = 375kph

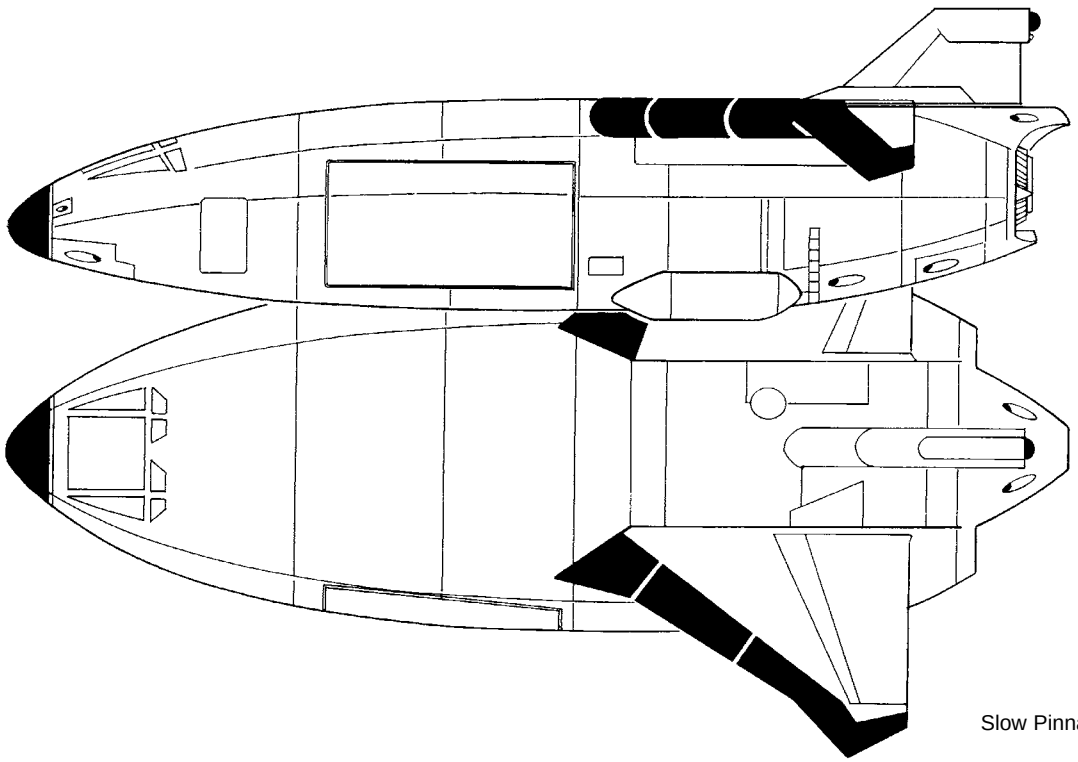
Other Equipment: Fresher, missile magazine

Triple Turret: empty

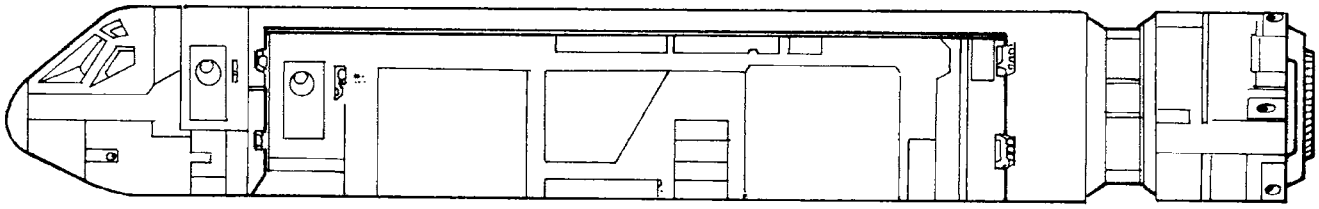
TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

TL9 Design Specifications

	Cost	*Size*	*EP*	*Notes*
40-ton streamlined cylinder hull	+40	MCr4.2	-	-
Bridge Controls	-8	MCr0.2	-	-
Model/3 Computer	-0.3	MCr15.3	-1 EP	Model/3
Flight Avionics	-0.8	(MCr1.8)	-	Model/2
Medium Range Sensors	-0.9	(MCr1.8)	-	Model/3
Medium Range Communications	-0.6	(MCr1.5)	-	Model/3
2-G Acceleration	-2	MCr1.4	-0.8 EP	-
TL9 Fusion Power Plant	-4.5	MCr13.5	+3 EP	-
Fuel	-3	-	-	-
2 Small Craft Couches	-1	MCr0.05	-	-
1 Small Cabin	-2	MCr0.25	-	-
Fresher	-0.5	MCr0.002	-	-
1 Hardpoint	-	MCr0.1	-	-
Triple Turret	-	MCr1	-	-
Missile Magazine	-1	MCr0.1	-	-
Cargo	15.4	-	-	-
Totals		*+0*	*MCr 36.102 (MCr 28.882 with 20% standard design discount)*	



Slow Pinnace, page 318



Modular Cutter, page 320

MODULAR CUTTER

Small Spacecraft

TL9, MCr15.16, 50 tons. The Modular Cutter is a highly versatile design used in many Port Authority, mercantile and military applications. The 30-ton module bay can carry a range of standard and custom modules (purchased separately) for cargo transfer, passenger or more specialist applications. Requires a crew of two.

MODULAR CUTTER

Class: Smallcraft	**EP Output:** 1 (no excess)
Tech Level: 9	**Agility:** 0
Size: Small (50 tons)	**Initiative:** +0
Streamlining: Streamlined	**AC:** 11 (+1 size)
Jump Range: None	**Repulsors:** None
Acceleration: 2-G	**Nuclear Dampers:** None
Fuel: 1 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 2	**AR:** 0
Staterooms: 0	**SI:** 92
Small Cabins: 1	**Main Computer:** Model/2
Bunks: 0	**Sensor Range:** Close (Model/1)
Couches: 3	**Comm. Range:** Close (Model/1)
Low Berths: 0	
Cargo Space: 0.5 tons	**Cost:** MCr15.16 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 200kph	Maximum = 375kph
Other Equipment:	

Triple Turret: empty

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

TL9 Design Specifications

	Size	*Cost*	*EP*	*Notes*
50-ton streamlined cylinder hull	+50	MCr5.25	-	-
Bridge Controls	-10	MCr0.25	-	-
Model/2 Computer	-0.2	MCr5.8	-	Model/2
Flight Avionics	-0.8	(MCr1.8)	-	Model/2
Close Range Sensors	-0.3	(MCr0.6)	-	Model/1
Close Range Communications	-0.2	(MCr0.5)	-	Model/1
2-G Acceleration	-2.5	MCr1.75	-1 EP	-
TL9 Fusion Power Plant	-1.5	MCr4.5	+1 EP	-
Fuel	-1	-	-	-
2 Small Craft Couches	-1.0	MCr0.05	-	-
1 Small Cabin	-2	MCr0.25	-	-
1 Hardpoint	-	MCr0.1	-	-
Triple Turret	-	MCr1	-	-
Cargo	-0.5	-	-	-
Module Options				
30 ton ATV Module (w/ATV)	-30	MCr1.8	-	
30 ton Fuel Module	-30	MCr1	-	
30 ton Open Module	-30	MCr2	-	
Totals	*+0*	*MCR 18.95 (MCr 15.16 with 20% standard design discount)*		

SHUTTLE

Small Spacecraft

TL10, MCr55.902, 95 tons. The Shuttle is a bulk cargo or passenger transfer craft. Reasonably fast, shuttles can undertake almost any task required of them and can be customized to meet an even wider range of needs. Requires a crew of two. Takes 7 months to build.

SHUTTLE

Class: Smallcraft	**EP Output:** 7 (2.15 excess)
Tech Level: 10	**Agility:** 2 (+2 EP)
Size: Small (95 tons)	**Initiative:** +2 (+2 agility)
Streamlining: Streamlined	**AC:** 13 (+2 agility, +1 size)
Jump Range: None	**Repulsors:** None
Acceleration: 3-G	**Nuclear Dampers:** None
Fuel: 7 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 2	**AR:** 0
Staterooms: 0	**SI:** 96
Small Cabins: 1	**Main Computer:** Model/4
Bunks: 0	**Sensor Range:** Long (Model/4)
Couches: 2	**Comm. Range:** Long (Model/4)
Low Berths: 0	
Cargo Space: 43.6 tons	**Cost:** MCr55.902 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 200kph	Maximum = 375kph

Other Equipment: Fresher, missile magazine

Triple Turret: empty

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

TL10 Design Specifications

	Size	*Cost*	*EP*	*Notes*
95-ton streamlined wedge hull	+95	MCr11.4	-	-
Bridge Controls	-19	MCr0.475	-	-
Model/4 Computer	-0.4	MCr21.2	-2 EP	Model/4
Flight Avionics	-0.4	(MCr0.9)	-	Model/1
Long Range Sensors	-1.2	(MCr2.4)	-	Model/4
Medium Range Communications	-0.8	(MCr2)	-	Model/4
3-G Acceleration	-7.6	MCr3.8	-2.85 EP	-
TL9 Fusion Power Plant	-10.5	MCr31.5	+7 EP	-
Fuel	-7	-	-	-
2 Small Craft Couches	-1	MCr0.05	-	-
1 Small Cabin	-2	MCr0.25	-	-
Fresher	-0.5	MCr0.002	-	-
1 Hardpoint	-	MCr0.1	-	-
Triple Turret	-	MCr1	-	-
Missile Magazine	-1	MCr0.1	-	-
Cargo	-43.6	-	-	-
Totals	*+0*	*MCR 69.877 (MCr 55.902 with 20% standard design discount)*		

FIGHTER

Small Spacecraft

TL9, MCr11.88, 15 tons. Fighters come in a range of sizes, from 15 or 20-ton light models up to 50-ton strike fighters. The 15-ton light fighter is the commonest design in use. Extremely fast and maneuverable, fighters are however very fragile and are primarily useful for screening and patrol work, and for policing merchant traffic. Even en masse, fighters are little threat to a major warship, but to an unruly Free Trader or a small commerce raider they may be an effective deterrent.

FIGHTER

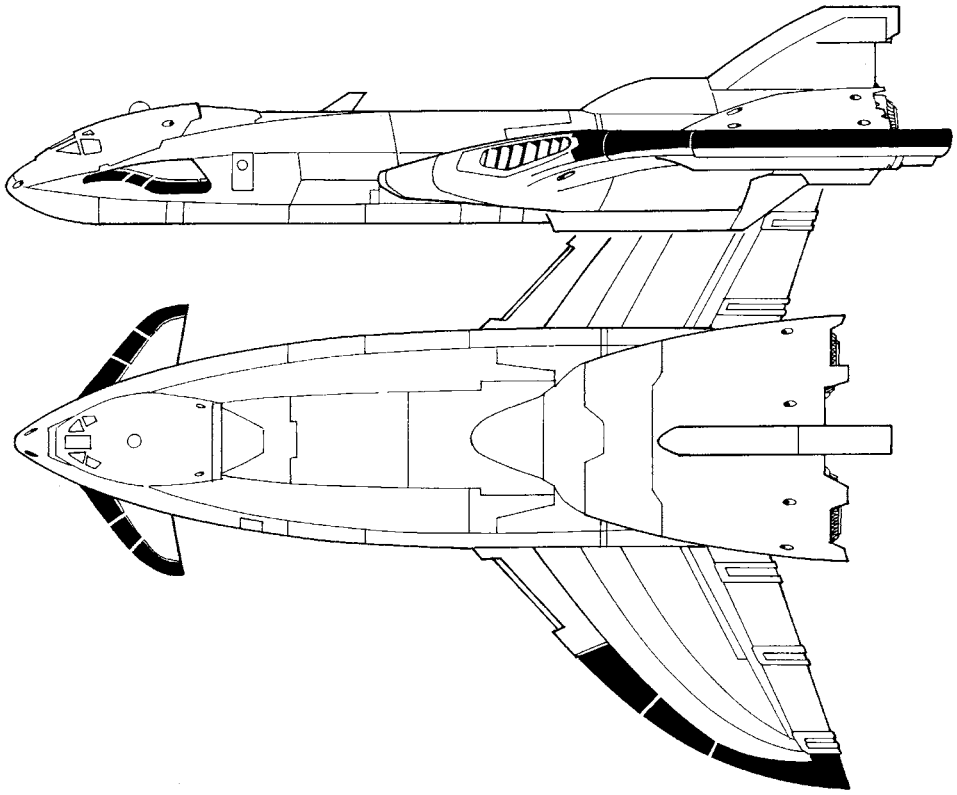
Class: Smallcraft	**EP Output:** 1.9 (1 excess)
Tech Level: 9	**Agility:** 6 (+6 EP)
Size: Small (15 tons)	**Initiative:** +6 (+6 agility)
Streamlining: Streamlined	**AC:** 17 (+6 agility, +1 size)
Jump Range: None	**Repulsors:** None
Acceleration: 6-G	**Nuclear Dampers:** None
Fuel: 1.9 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 1	**AR:** 0
Staterooms: 0	**SI:** 77
Small Cabins: 0	**Main Computer:** Model/1
Bunks: 0	**Sensor Range:** Close (Model/1)
Couches: 1	**Comm. Range:** Close (Model/1)
Low Berths: 0	
Cargo Space: 2.2 tons	**Cost:** MCr11.88 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 200kph	Maximum = 375kph
Other Equipment: None	

Triple Turret: empty

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

TL9 Design Specifications

	Size	*Cost*	*EP*	*Notes*
15-ton streamlined wedge hull	+15	MCr1.8	-	-
Bridge Controls	-4	MCr0.1	-	-
Model/1 Computer	-0.1	MCr2	-	Model/1
Flight Avionics	-0.4	(MCr0.9)	-	Model/1
Close Range Sensors	-0.3	(MCr0.6)	-	Model/1
Close Range Communications	-0.2	(MCr0.5)	-	Model/1
6-G Acceleration	-2.55	MCr1.275	-0.9 EP	-
TL9 Fusion Power Plant	-2.85	MCr8.55	+1.9 EP	-
Fuel	-1.9	-	-	-
1 Small Craft Couches	-0.5	MCr0.025	-	-
1 Hardpoint	-	MCr0.1	-	-
Triple Turret	-	MCr1	-	-
Cargo	-2.2	-	-	-
Totals	*+0*	*MCr 14.85 (MCr 11.88 with 20% standard design discount)*		



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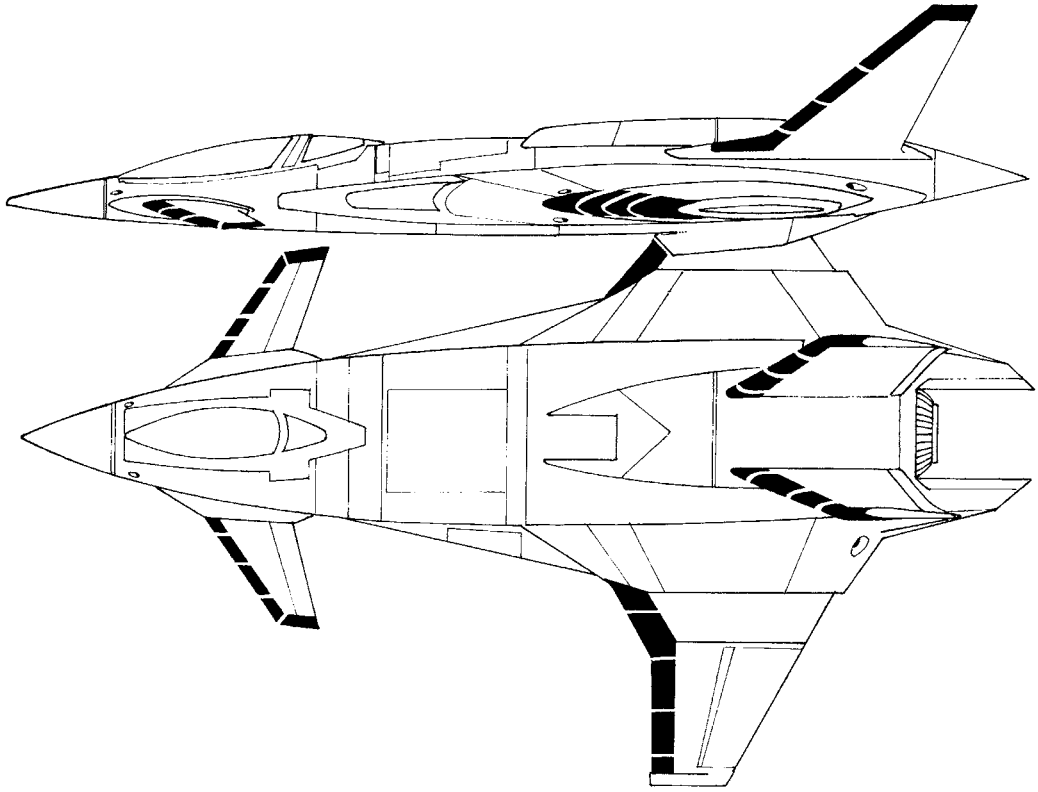
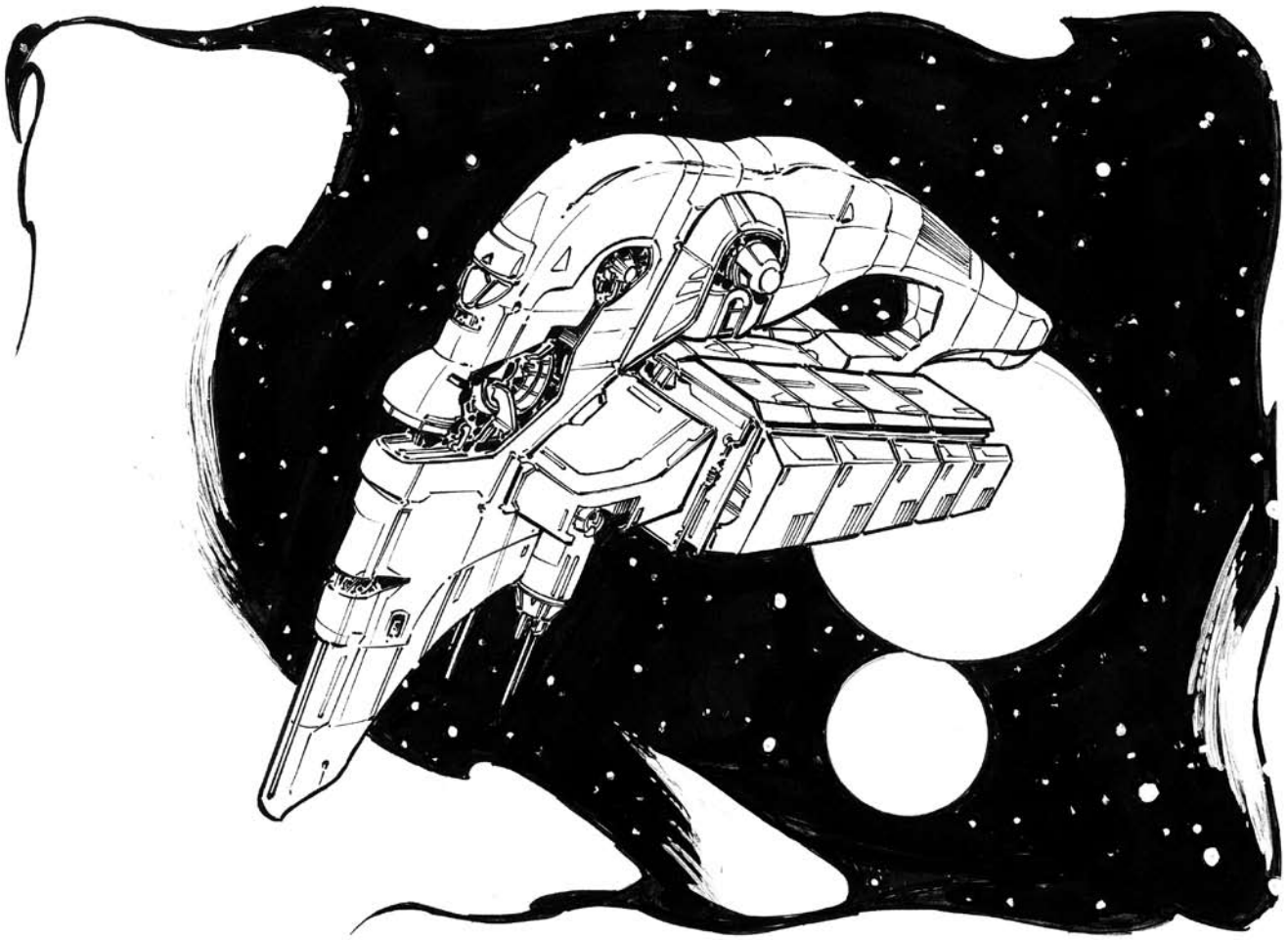


Fighter, page 322



STARSHIP DESIGNS

The following are all starship designs common in Charted Space. Crew requirements are minimal, and for maximum efficiency extra crew should be carried. Typically these personnel include extra engineers, a backup pilot (or a dedicated pilot to avoid the strain and distraction of having to pilot and astrogate a starship). Larger ships may have specialist command personnel, small craft pilots, technicians, cargo handlers, additional stewards etc, and any vessel mounting weapons will need gunners to operate them.

COMMON STARSHIPS AND SPACECRAFT

Ship	TL	Cost	Size	Acceleration	Jump	Cargo
Scout/Courier	11	MCr42.578	100 tons	2-G	2	20
Seeker	11	*	100 tons	1-G	2	35
Far Trader	11	MCr68.138	200 tons	2-G	2	66
Free Trader	9	MCr51.36	200 tons	1-G	1	96
Safari Ship	11	MCr67.884	200 tons	1-G	2	50
System Defense Boat	14	MCr201.16	200 tons	6-G	-	18.3
Yacht	9	MCr75.074	200 tons	1-G	1	47
Corsair	11	*	400 tons	3-G	2	159.9
Laboratory Ship	11	MCr191.662	400 tons	1-G	2	32.4
Patrol Cruiser	12	MCr227.76	400 tons	4-G	3	24.8
Subsidized Merchant	9	MCr96.426	400 tons	1-G	1	236.5
Subsidized Liner	12	MCr238.386	600 tons	1-G	3	202.4
Mercenary Cruiser	12	MCr412.675	800 tons	3-G	3	165.2

SCOUT/COURIER (TYPE S)

Medium-Size Starship

The Type S Scout/Courier is the most commonly seen ship in Charted Space. Small, cheap, and reasonably economical to operate, these ships have become a workhorse for both the government and military fleets; some are encountered in commercial use. Most Scout/Couriers are actually former Scout Service vessels either purchased as surplus from the government or are assigned for the private use of former Scouts currently on Detached Duty. In return for use of the ship the Scouts (and the ship itself) are subject to recall at any time for temporary or indefinite duty, as the Scout service requires.

The ship itself is built using the smallest available hull for a starship, 100-tons. The vessel carries a Maneuver drive capable of up to 2-G acceleration and a Jump-2 drive. The power plant provides just enough energy to power the maneuver drives or the Jump drive. If laser or energy weapons are installed, a larger power plant will be needed. Most ex-Scout vessels have had their powerful computer and sensor arrays removed and replaced with a standard Model/1bis computer. 4 staterooms are available for crew and passengers. Small cargoes may also be carried in the ship's compact 25-ton cargo hold. The vessel also carries a small vehicle bay, usually containing an air/raft.

The Scout/Courier requires a crew of one to operate; the pilot who must assume the duties of pilot and astrogator, and also oversees the highly automated drive section. A second crewmember is desirable. The Type S costs MCr42.578 new, and takes 5 months to build.

SCOUT/COURIER

Class: Starship, type S	**EP Output:** 4 (2 excess)
Tech Level: 11	**Agility:** 2 (+2 EP)
Size: Medium (100 tons)	**Initiative:** +2 (+2 agility)
Streamlining: Streamlined	**AC:** 12 (+2 agility)
Jump Range: 1 x Jump-2	**Repulsors:** 0
Acceleration: 2-G	**Nuclear Dampers:** 0
Fuel: 24 tons	**Meson Screens:** 0
Duration: 4 weeks	**Black Globes:** 0
Crew: 1	**AR:** 0
Staterooms: 4	**SI:** 100
Small Cabins: 0	**Main Computer:** Model/1bis
Bunks: 0	**Sensor Range:** Close (Model/1)
Couches: 0	**Comm. Range:** Close (Model/1)
Low Berths: 0	
Cargo Space: 20 tons	**Cost:** MCr42.578 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 825kph	Maximum = 1100kph

Other Equipment: Air/raft, fuel scoops.

Double Turret: empty

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

Design Specifications

Installed Components	*Tonnage*	*Cost*	*EP*	*Notes*
100-ton Hull (Wedge)	+100	MCr12	-	-
Bridge	-20	MCr0.5	-	-
Computer	-0.1	MCr4	-	Model/1bis
Flight Avionics	-0.4	(MCr0.9)	-	Model/1
Sensors	-0.3	(MCr0.6)	-	Model/1
Communications	-0.2	(MCr.0.5)	-	Model/1
Jump Drive 2	-3	MCr12	-2	-
Jump Fuel	-20	-	-	-
Maneuver Drive 2	-5	MCr3.5	-2	-
TL9 Power Plant	-6	MCr18	+4	-
Power Plant Fuel	-4	-	-	-
Fuel Scoops	-	MCr0.1	-	-
1 Hard Point	-	MCr0.1	-	-
Double Turret	-	MCr0.75	-	-
Air/Raft	-5	MCr0.273	-	-
Staterooms (4)	-16	MCr2	-	-
Cargo	-20	-	-	-
Totals	*+0*	*MCr53.223 (MCr42.578 with 20% standard design discount)*		

SEEKER (TYPE J)

Medium-Size Starship

The Type J Seeker is adapted from the standard Scout/Courier design to create a vessel suitable for lone prospectors or small teams. Ore sampling equipment is fitted, and the air-raft is usually replaced with a pressurized buggy for ground expeditions. The Seeker requires a crew of one to operate, the pilot who may assume the duties of both pilot and Astrogator. If built new, the ship would cost MCr34.498 and takes 9 months to build, but most are highly modified Scout/Couriers. Seekers do not fetch very high sale prices; around MCr20 depending on the state of the craft.

SEEKER

Class: Starship, type J	**EP Output:** 2 (0.5 excess)
Tech Level: 11	**Agility:** 1
Size: Medium (100 tons)	**Initiative:** +1
Streamlining: Streamlined	**AC:** 11 (+1 agility)
Jump Range: 1 x Jump-2	**Repulsors:** None
Acceleration: 1-G	**Nuclear Dampers:** None
Fuel: 22 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 1	**AR:** 0
Staterooms: 2	**SI:** 100
Small Cabins: 0	**Main Computer:** Model/1bis
Bunks: 0	**Sensor Range:** Close (Model/1)
Couches: 0	**Comm. Range:** Close (Model/1)
Low Berths: 0	
Cargo Space: 35 tons	**Cost:** see description
Atmospheric Speeds:	NoE = 275kph
Cruising = 825kph	Maximum = 1100kph
Other Equipment: Air/raft.	

Double Turret: Single Mining Laser; Attack Bonus +1 (+1 USP), Damage: 1d6, Range Increment: 15,000km.

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

Design Specifications

Installed Components	*Tonnage*	*Cost*	*EP*	*Notes*
100-ton Hull (Wedge)	+100	MCr12	-	-
Bridge	-20	MCr0.5	-	-
Computer	-0.1	MCr4	-	Model/1bis
Flight Avionics	-0.4	(MCr0.9)	-	Model/1
Sensors	-0.3	(MCr0.6)	-	Model/1
Communications	-0.2	(MCr.0.5)	-	Model/1
Jump Drive 2	-3	MCr12	-2	-
Jump Fuel	-20	-	-	-
Maneuver Drive 1	-2	MCr3	-1	-
TL9 Power Plant	-3	MCr9	+2	-
Power Plant Fuel	-2	-	-	-
1 Hard Point	-	MCr0.1	-	-
Double Turret	-	MCr0.75	-	-
Mining Laser	-1	MCr0.5	-0.5	-
Air/Raft	-5	MCr0.273	-	-
Staterooms (2)	-8	MCr1	-	-
Cargo	-35	-	-	-
Totals	*+0*	*MCr43.123 (MCr34.498 with 20% standard design discount)*		

FAR TRADER (TYPE A2)

Medium-Size Starship

The Jump-2 Far Trader sacrifices some cargo space for engines and fuel, meaning that it cannot really compete on a main. However, A2s can be encountered almost anywhere. They are particularly common in backwater regions where larger vessels are uneconomical. On the frontier, many Far Traders are armed. The Far Trader requires a crew of four: the pilot, astrogator and engineer to operate the ship along with a medic/steward to attend to the passengers. The ship cost MCr68.138 new, and takes 9 months to build.

SEEKER

Class: Starship, type A2	**EP Output:** 4
Tech Level: 11	**Agility:** 0
Size: Medium (200 tons)	**Initiative:** +0
Streamlining: Streamlined	**AC:** 10
Jump Range: 1 x Jump-2	**Repulsors:** None
Acceleration: 2-G	**Nuclear Dampers:** None
Fuel: 44 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 4	**AR:** 0
Staterooms: 10	**SI:** 115
Small Cabins: 0	**Main Computer:** Model/1bis
Bunks: 0	**Sensor Range:** Close (Model/1)
Couches: 0	**Comm. Range:** Close (Model/1)
Low Berths: 4	
Cargo Space: 66 tons	**Cost:** MCr68.138 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 825kph	Maximum = 1100kph
Other Equipment: Air/raft	

Double Turret: Empty.
Double Turret: Empty.

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

Design Specifications

Installed Components	*Tonnage*	*Cost*	*EP*	*Notes*
200-ton Hull (Wedge)	+200	MCr24	-	-
Bridge	-20	MCr1	-	-
Computer	-0.1	MCr4	-	Model/1bis
Flight Avionics	-0.4	(MCr0.9)	-	Model/1
Sensors	-0.3	(MCr0.6)	-	Model/1
Communications	-0.2	(MCr.0.5)	-	Model/1
Jump Drive 2	-6	MCr24	-4	-
Jump Fuel	-40	-	-	-
Maneuver Drive 2	-10	MCr7	-4	-
TL9 Power Plant	-6	MCr18	+4	-
Power Plant Fuel	-4	-	-	-
2 Hard Points	-	MCr0.2	-	-
2 Double Turrets	-	MCr1.5	-	-
Staterooms (10)	-40	MCr5	-	-
Low Berths (4)	-2	MCr0.2	-	-
Air/Raft	-5	MCr0.273	-	-
Cargo	-66	-	-	-
Totals	*+0*	*MCr85.173 (MCr68.138 with 20% standard design discount)*		

FREE TRADER (TYPE A)

Medium-Size Starship

Jump-1 Free Traders, of Type A and other designs, are very common starships. They ply the Jump-1 mains making a living from speculative trade and picking up the odd small shipment after the Corporate freighters have passed through. Many Free Traders are heavily modified as a result of their advancing age and non-standard refits. On the frontier, most vessels will be armed with at least a single laser. The Free Trader requires a crew of four: pilot, astrogator and engineer to operate the ship along with a medic/steward to attend to the passengers. The ship cost MCr51.36 new, and takes 9 months to build.

FREE TRADER

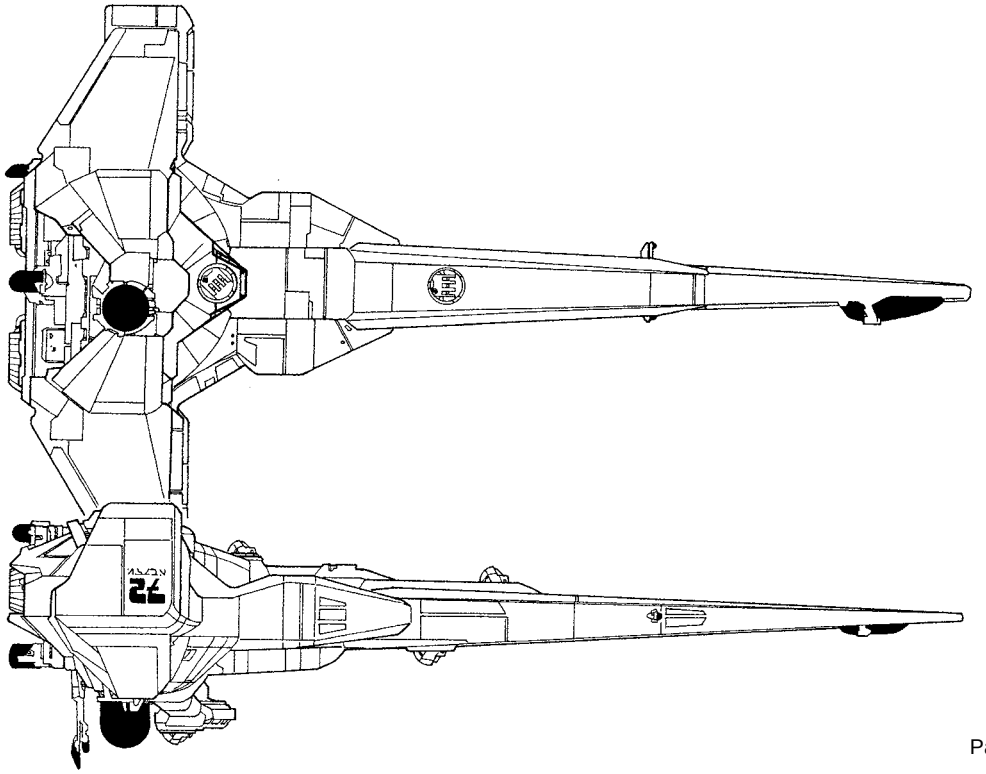
Class: Starship, type A	**EP Output:** 2
Tech Level: 9	**Agility:** 0
Size: Medium (200 tons)	**Initiative:** +0
Streamlining: Streamlined	**AC:** 10
Jump Range: 1 x Jump-1	**Repulsors:** None
Acceleration: 1-G	**Nuclear Dampers:** None
Fuel: 22 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 4	**AR:** 0
Staterooms: 10	**SI:** 115
Small Cabins: 0	**Main Computer:** Model/1
Bunks: 0	**Sensor Range:** Close (Model/1)
Couches: 0	**Comm. Range:** Close (Model/1)
Low Berths: 20	
Cargo Space: 96 tons	**Cost:** MCr51.36 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 825kph	Maximum = 1100kph
Other Equipment: None.	

No turrets or weapons installed.

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

Design Specifications

Installed Components	*Tonnage*	*Cost*	*EP*	*Notes*
200-ton Hull (Wedge)	+200	MCr24	-	-
Bridge	-20	MCr1	-	-
Computer	-0.1	MCr2	-	Model/1
Flight Avionics	-0.4	(MCr0.9)	-	Model/1
Sensors	-0.3	(MCr0.6)	-	Model/1
Communications	-0.2	(MCr.0.5)	-	Model/1
Jump Drive 1	-4	MCr16	-2	-
Jump Fuel	-20	-	-	-
Maneuver Drive 1	-4	MCr6	-2	-
TL9 Power Plant	-3	MCr9	+2	-
Power Plant Fuel	-2	-	-	-
2 Hard Points	-	MCr0.2	-	-
Staterooms (10)	-40	MCr5	-	-
Low Berths (20)	-10	MCr1	-	-
Cargo	-96	-	-	-
Totals	*+0*	*MCr64.2 (MCr51.36 with 20% standard design discount)*		



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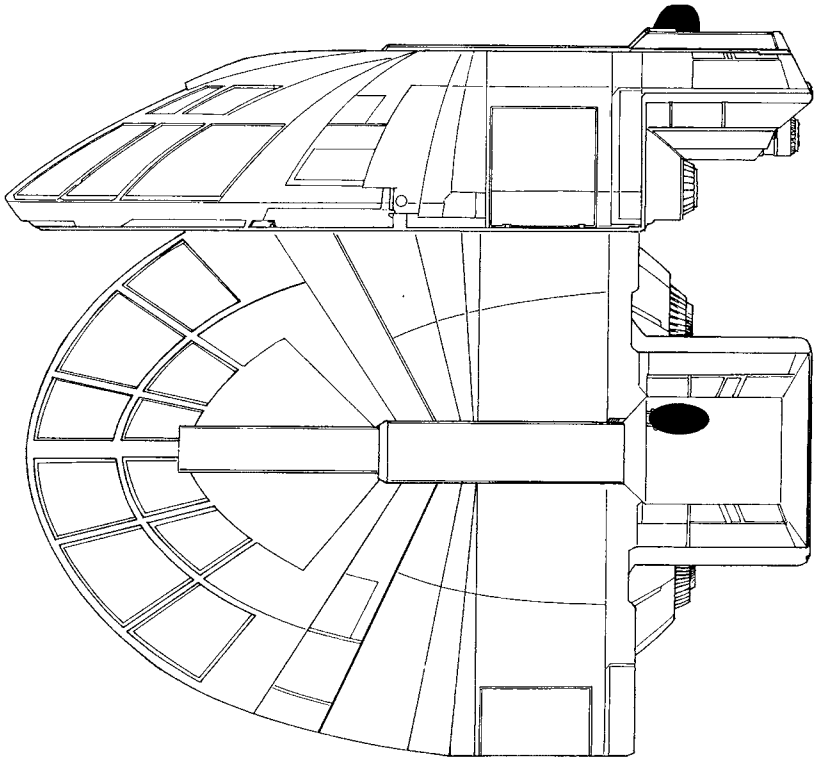

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SAFARI SHIP (TYPE K)

Medium-Size Starship

The Safari Ship is somewhat less common than other small vessels. Its most common function is as a “poor person’s yacht”; a small personal transport with a modest cargo capacity. However, this is not its designed function. Safari ships are intended to be used as a mobile base from which to conduct private exploration, surveying, hunting (of a photographic or lethal sort) and safari missions. Accommodation is fairly luxurious, reflecting the fact that many owners hire themselves and their ship to parties of wealthy people seeking a nice, safe adventure in the wilds. Cargo space can be configured to include pens for captured wildlife, and separate climate control exists for the cargo bay to keep catches alive. The Safari Ship requires a crew of three: pilot/astrogator and engineer to operate the ship along with a medic/steward to attend to the passengers. The ship costs MCr67.884 when new and takes 9 months to build.

SAFARI SHIP

Class: Starship, type K	**EP Output:** 4 (+2 excess)
Tech Level: 11	**Agility:** +1 (+1 EP)
Size: Medium (200 tons)	**Initiative:** +1 (+1 agility)
Streamlining: Streamlined	**AC:** 11 (+1 agility)
Jump Range: 1 x Jump-2	**Repulsors:** None
Acceleration: 1-G	**Nuclear Dampers:** None
Fuel: 44 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 3	**AR:** 0
Staterooms: 11	**SI:** 115
Small Cabins: 0	**Main Computer:** Model/1bis
Bunks: 0	**Sensor Range:** Close (Model/1)
Couches: 0	**Comm. Range:** Close (Model/1)
Low Berths: 0	
Cargo Space: 50 tons	**Cost:** MCr67.884 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 825kph	Maximum = 1100kph

Other Equipment: Air/raft, 20-ton launch

No turrets or weapons installed.

TAS Form 3.1 (Condensed) **Ship’s Data (Commercial)**

Design Specifications

Installed Components	*Tonnage*	*Cost*	*EP*	*Notes*
200-ton Hull (Flattened Sphere)	+200	MCr16	-	-
Bridge	-20	MCr1	-	-
Computer	-0.1	MCr4	-	Model/1bis
Flight Avionics	-0.4	(MCr0.9)	-	Model/1
Sensors	-0.3	(MCr0.6)	-	Model/1
Communications	-0.2	(MCr.0.5)	-	Model/1
Jump Drive 2	-6	MCr24	-4	-
Jump Fuel	-40	-	-	-
Maneuver Drive 1	-4	MCr6	-2	-
TL9 Power Plant	-6	MCr18	+4	-
Power Plant Fuel	-4	-	-	-
2 Hard Points	-	MCr0.2	-	-
Staterooms (11)	-44	MCr5.5	-	-
Air/Raft	-5	MCr0.273	-	-
20-ton Launch	-20	MCr9.842	-	-
Launch Hanger	-	MCr0.04	-	-
Cargo	-50	-	-	-
Totals	*+0*	*MC84.855 (MCr67.884 with 20% standard design discount)*		

SYSTEM DEFENSE BOAT (TYPE SDB)

Medium-Size Spaceship

A system defense boat, or SDB, is a ship that is used exclusively for planetary and star system defense, trading off the lack of jump drives for heavy armor, faster acceleration, and heavier weaponry in its place. There is no real 'standard' design for SDBs, as they are often of local manufacture or may be former starships pressed into local defense forces after having their jump drives removed. Most such conversions have additional armament and upgrades installed. Most SDBs are streamlined allowing them to also be used for orbital and air support for local ground troops.

If the need arises to move an SDB to another star system, it will usually be loaded onto a bulk freighter and shipped as large cargo, but this is very slow and inefficient and is not wise if the SDB is expected to go into action immediately upon arrival. In cases where rapid deployment at the destination is needed, Jump Pods can be built and strapped to the SDB, providing it with temporary jump capability. Upon arrival, the pods can be quickly and easily jettisoned, allowing the ship to move into action immediately. The pod would contain Jump drives large enough to Jump both the SDB and the pod itself, along with the requisite fuel needed to make the Jump.

A generic TL14 SDB like the one detailed here would cost MCr201.16 new, and take 11 months to build. It requires a crew of 6: Captain, Pilot, Engineer, 2 gunners and a missile technician who doubles as medic.

SYSTEM DEFENSE BOAT

Class: Spacecraft, type SDB	**EP Output:** 36 (12 excess)
Tech Level: 14	**Agility:** 6 (+6 EP)
Size: Medium (200 tons)	**Initiative:** +6 (+6 agility)
Streamlining: Airframe	**AC:** 30 (+6 agility, +14 armor)
Jump Range: None	**Repulsors:** None
Acceleration: 6-G	**Nuclear Dampers:** None
Fuel: 36 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 6	**AR:** 14
Staterooms: 4	**SI:** 115
Small Cabins: 0	**Main Computer:** Model/8
Bunks: 0	**Sensor Range:** System-wide (Mod/7)
Couches: 0	**Comm. Range:** System-wide (Mod/8)
Low Berths: 0	
Cargo Space: 18.3 tons	**Cost:** MCr201.16 (new)
Atmospheric Speeds:	NoE = 1475kph
Cruising = 4425kph	Maximum = 5900kph

Other Equipment: Missile Magazines (x3), 60 Missiles.

Triple Turret: Missile Racks (x3), Attack Bonus +2 (+2 USP), Damage 2d6.
Triple Turret: Beam Lasers (x3), Attack Bonus +3 (+3 USP), Damage 3d8.

TAS Form 3.1 (Condensed) Ship's Data (Commercial)

Design Specifications

Installed Components	*Tonnage*	*Cost*	*EP*	*Notes*
200-ton Hull	+200	MCr24	-	-
Airframe	-10	MCr2.4	-	-
Armor (AR14)	-15	MCr1.8	-	-
Bridge	-20	MCr1	-	-
Computer	-0.8	MCr87.2	-9	Model/8
Flight Avionics	-1.2	(MCr2.7)	-	Model/3
Sensors	-2.1	(MCr4.2)	-	Model/7
Communications	-1.6	(MCr4)	-	Model/8
Maneuver Drive 6	-34	MCr17	-12	-
TL13 Power Plant	-36	MCr108	+36	-
Power Plant Fuel	-36	-	-	-
2 Hard Points	-	MCr0.2	-	-
Triple Turret	-	MCr1	-	-
Missile Rack (x3)	-3	MCr2.25	-	-
Triple Turret	-	MCr1	-	-
Missile Magazine (x3)	-3	MCr0.3	-	-
60 Missiles	-	MCr0.3	-	-
Beam Laser (x3)	-3	MCr3	-3	-
Staterooms (4)	-16	MCr2	-	-
Cargo	-18.3	-	-	-
Totals	+0	MCr251.45 (MCr201.16 with 20% standard design discount)		

YACHT (TYPE Y)

Medium-Size Starship

A Yacht is not a commercially viable vessel. It serves as personal transport for a rich individual, and sometimes as their home. As status symbols, many yachts are finely decorated and contain expensive furnishings, paintings and so on. Many are armed. The Yacht requires a crew of three to operate, the pilot (who doubles as astrogator), an engineer and a medic/steward to attend to the passengers. The ship cost MCr75.074 new, and takes 11 months to build.

YACHT

Class: Starship, type Y	**EP Output:** 2
Tech Level: 9	**Agility:** 0
Size: Medium (200 tons)	**Initiative:** +0
Streamlining: Streamlined	**AC:** 10
Jump Range: 1 x Jump-1	**Repulsors:** None
Acceleration: 1-G	**Nuclear Dampers:** None
Fuel: 22 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 3	**AR:** 0
Staterooms: 14	**SI:** 115
Small Cabins: 0	**Main Computer:** Model/1
Bunks: 0	**Sensor Range:** Close (Model/1)
Couches: 0	**Comm. Range:** Close (Model/1)
Low Berths: 0	
Cargo Space: 47 tons	**Cost:** MCr75.074 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 825kph	Maximum = 1100kph
Other Equipment: Air/raft, tracked ATV, 30 ton ship's boat.	

No turrets or weapons installed.

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

Design Specifications

Installed Components	*Tonnage*	*Cost*	*EP*	*Notes*
200-ton Hull (Cone)	+200	MCr22	-	-
Bridge	-20	MCr1	-	-
Computer	-0.1	MCr2	-	Model/1
Flight Avionics	-0.4	(MCr0.9)	-	Model/1
Sensors	-0.3	(MCr0.6)	-	Model/1
Communications	-0.2	(MCr.0.5)	-	Model/1
Jump Drive 1	-4	MCr16	-2	-
Jump Fuel	-20	-	-	-
Maneuver Drive 1	-4	MCr6	-2	-
TL9 Power Plant	-3	MCr9	+2	-
Power Plant Fuel	-2	-	-	-
1 Hard Points	-	MCr0.1	-	-
Staterooms (14)	-56	MCr7	-	-
30-ton Ship's Boat	-30	MCr30.362	-	-
Ship's Boat Hanger	-	MCr0.06	-	-
ATV (Tracked)	-8	MCr0.047	-	-
Air/Raft	-5	MCr0.273	-	-
Cargo	-47	-	-	-
Totals	*+0*	*MCr93.842 (MCr75.074 with 20% standard design discount)*		

CORSAIR (TYPE P)

Medium-Size Starship

A corsair has one purpose - to attack merchant ships and take their cargo. Though the ship has good cargo capacity, it is not viable in normal commerce. Some Corsairs are constructed for use by mercenary units, as transport and support. Without a merc license it is almost impossible to find (legal) funding for a Corsair. The vessel is fast and well armed but not quite up to military standards - a warship of the same tonnage would defeat it in a straight fight. Of course, pirates never fight fair... The Corsair requires a crew of six to operate, the pilot, an astrogator, 3 engineers and a medic. The ship cost MCr156.44 new, and takes 14 months to build.

CORSAIR

Class: Starship, type P	**EP Output:** 15
Tech Level: 11	**Agility:** 0
Size: Medium (400 tons)	**Initiative:** +0
Streamlining: Partial	**AC:** 10
Jump Range: 1 x Jump-2	**Repulsors:** None
Acceleration: 3-G	**Nuclear Dampers:** None
Fuel: 95 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 6	**AR:** 0
Staterooms: 10	**SI:** 145
Small Cabins: 0	**Main Computer:** Model/2
Bunks: 0	**Sensor Range:** Short (Model/2)
Couches: 0	**Comm. Range:** Short (Model/2)
Low Berths: 20	
Cargo Space: 159.9 tons	**Cost:** see description
Atmospheric Speeds:	NoE = 75kph
Cruising = 200kph	Maximum = 300kph

Other Equipment: Missile Magazine, 20 Missiles.

Triple Turret: Beam Lasers (x1), Attack Bonus +1 (+1 USP), Damage 1d8.
Triple Turret: Beam Lasers (x1), Attack Bonus +1 (+1 USP), Damage 1d8.
Triple Turret: Beam Lasers (x1), Attack Bonus +1 (+1 USP), Damage 1d8.
Triple Turret: Missile Racks (x3), Attack Bonus +2 (+2 USP), Damage 2d6.

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

Design Specifications

Installed Components	*Tonnage*	*Cost*	*EP*	*Notes*
400-ton Hull (Cylinder)	+400	MCr40	-	-
Bridge	-20	MCr2	-	-
Computer	-0.2	MCr6.2	-	Model/2
Flight Avionics	-0.4	(MCr0.9)	-	Model/1
Sensors	-0.6	(MCr1.2)	-	Model/2
Communications	-0.4	(MCr1)	-	Model/2
Jump Drive 2	-12	MCr48	-8	-
Jump Fuel	-80	-	-	-
Maneuver Drive 3	-32	MCr16	-12	-
TL9 Power Plant	-22.5	MCr67.5	+15	-
Power Plant Fuel	-15	-	-	-
4 Hard Points	-	MCr0.4	-	-
4 Triple Turrets	-	MCr4	-	-
3 Missile Racks	-3	MCr2.25	-	-
1 Missile Magazine	-1	MCr0.1	-	-
20 Missiles	(-1)	MCr0.1	-	-
3 Beam Lasers	-3	MCr3	-3	-
Staterooms (10)	-40	MCr5	-	-
Low Berths (20)	-10	MCr1	-	-
Cargo	-159.9	-	-	-
Totals	*+0*	*MCr195.55 (MCr156.44 with 20% standard design discount)*		

LABORATORY SHIP (TYPE L)

Medium-Size Starship

Various types of laboratory ship exist; most are small, like the 400-ton design detailed here. The sole purpose of this vessel is scientific research; it cannot make its way in commerce, nor is it viable in combat. Lab ships are sometimes built to particular requirements, but are usually configurable to a user's immediate needs. The lab ship requires a crew of five; a pilot, astrogator, two engineers and a medic/steward to look after the research staff. There are 15 staterooms available for scientists, technicians and assistants, though some of these areas are usually turned into additional lab spaces. General lab equipment is assumed to be included with the ship's build cost, but very specialized equipment will have to be purchased separately.

The ship costs MCr 192.622 new, and takes 11 months to build.

LABORATORY SHIP

Class: Starship, type L	**EP Output:** 8 (4 excess)
Tech Level: 11	**Agility:** 1 (+1 EP)
Size: Medium (400 tons)	**Initiative:** +1 (+1 agility)
Streamlining: Partial	**AC:** 11 (+1 agility)
Jump Range: 1 x Jump-2	**Repulsors:** None
Acceleration: 1-G	**Nuclear Dampers:** None
Fuel: 88 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 5	**AR:** 0
Staterooms: 20	**SI:** 145
Small Cabins: 0	**Main Computer:** Model/2
Bunks: 0	**Sensor Range:** Short (Model/2)
Couches: 0	**Comm. Range:** Short (Model/2)
Low Berths: 0	
Cargo Space: 32.4 tons	**Cost:** MCr192.622 (new)
Atmospheric Speeds:	NoE = 75kph
Cruising = 200kph	Maximum = 300kph
Other Equipment: Air/raft, 40 ton pinnace, 12 laboratories.	

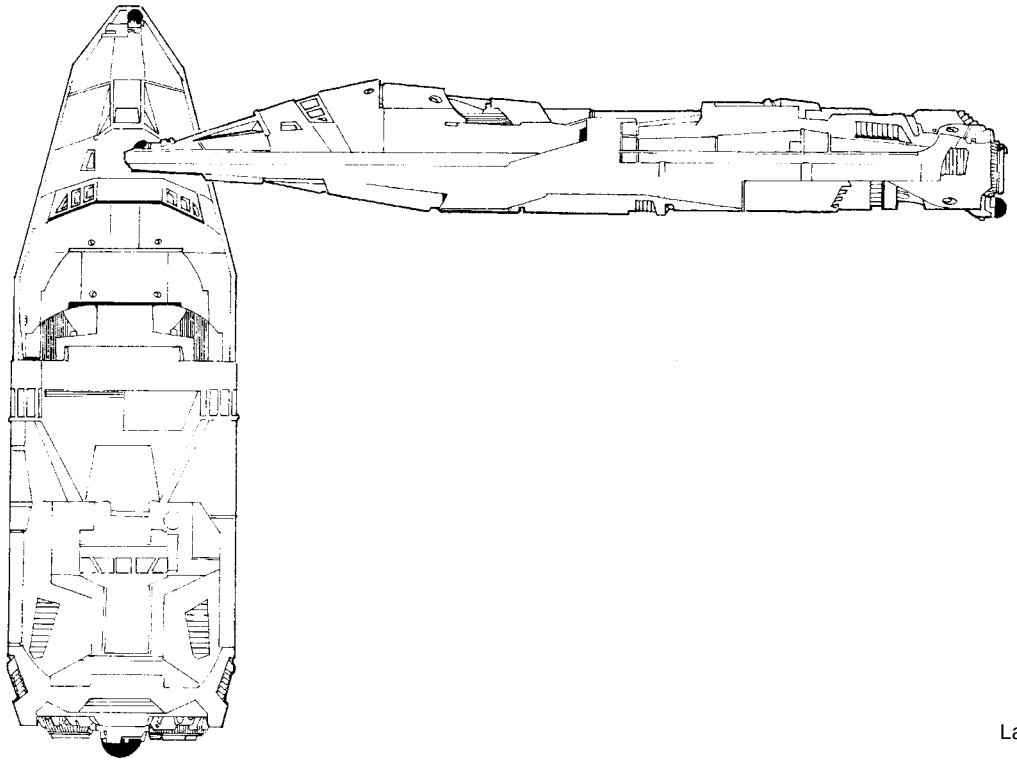
No turrets or weapons installed.

TAS Form 3.1 (Condensed)

Ship's Data (Commercial)

Design Specifications

Installed Components	*Tonnage*	*Cost*	*EP*	*Notes*
400-ton Hull (Cylinder)	+400	MCr40	-	-
Bridge	-20	MCr2	-	-
Computer	-0.2	MCr6.2	-	Model/2
Flight Avionics	-0.4	(MCr0.9)	-	Model/1
Sensors	-0.6	(MCr1.2)	-	Model/2
Communications	-0.4	(MCr1)	-	Model/2
Jump Drive 2	-12	MCr48	-8	-
Jump Fuel	-80	-	-	-
Maneuver Drive 1	-8	MCr12	-4	-
TL9 Power Plant	-12	MCr36	+8	-
Power Plant Fuel	-8	-	-	-
4 Hard Points	-	MCr0.4	-	-
Staterooms (20)	-80	MCr10	-	-
40-ton Pinnace	-40	MCr45.552	-	-
Pinnace Hanger	-	MCr0.08	-	-
Air/Raft	-10	MCr0.546	-	-
12 Laboratories	-96	MCr40	-	-
Cargo	-32.4	-	-	-
Totals	*+0*	*MCr240.778 (MCr192.622 with 20%standard design discount)*		



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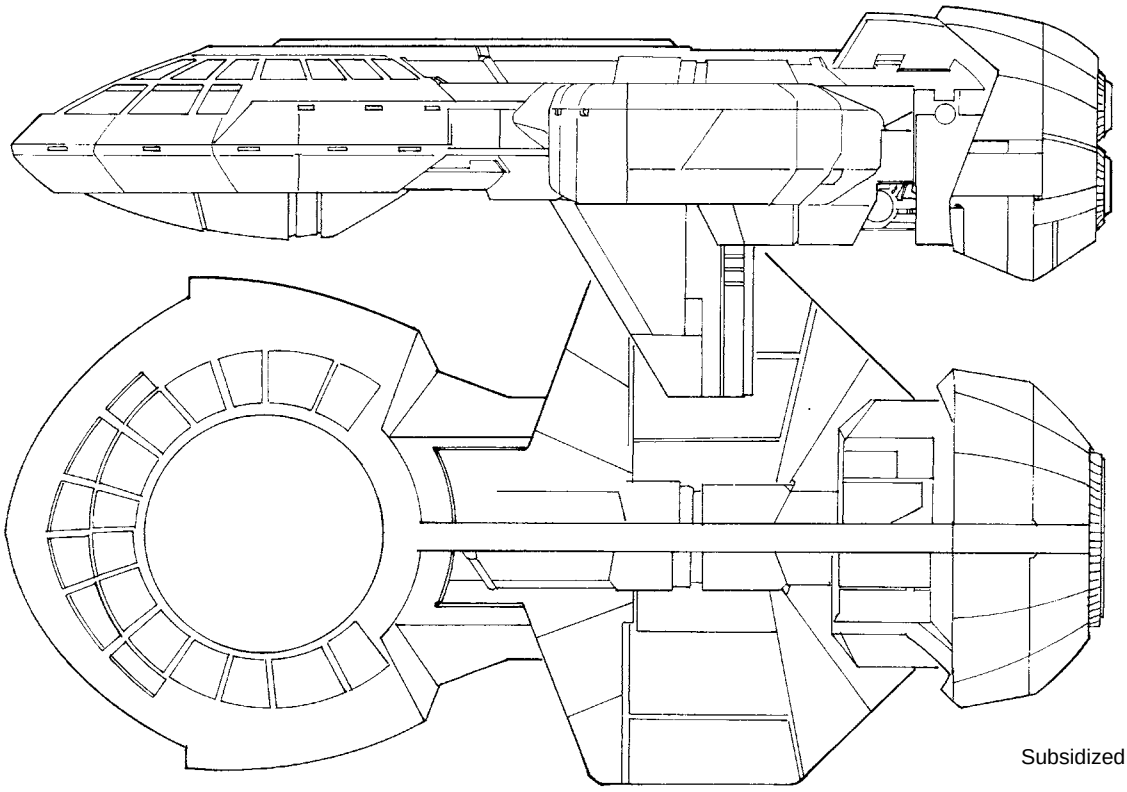

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PATROL CRUISER (TYPE T)

Medium-Size Starship

The Patrol Cruiser is a very common escort and patrol ship encountered throughout Charted Space. Many are owned by mercenaries or private escort firms, but most are in Navy hands. The ship requires a crew of 12: Captain, pilot, astrogator, three engineers, four gunners, a medic and a missile technician. Eight troops are usually also carried for boarding and customs duty. Although there are 20 stateroom-equivalents aboard, only four are single-occupancy (these are used by the captain, astrogator, chief engineer and commander of troops. The rest of the crew share staterooms in pairs, with all the troops barracked in a triple-sized "sardine can" stateroom. The other 9 stateroom-equivalents are used as an armory, sickbay, wardroom and common areas for the overcrowded crew. The ship costs MCr227.76 new and takes 14 months to build.

PATROL CRUISER

Class: Starship, type P	**EP Output:** 26 (4 excess)
Tech Level: 12	**Agility:** 1 (+1 EP)
Size: Medium (400 tons)	**Initiative:** +1 (+1 agility)
Streamlining: Partial	**AC:** 11 (+1 agility)
Jump Range: 1 x Jump-3	**Repulsors:** None
Acceleration: 4-G	**Nuclear Dampers:** None
Fuel: 140 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew:	**AR:** 0
Staterooms: 20	**SI:** 145
Small Cabins: 0	**Main Computer:** Model/3
Bunks: 0	**Sensor Range:** Medium (Model/3)
Couches: 0	**Comm. Range:** Medium (Model/3)
Low Berths: 20	
Cargo Space: 24.8 tons	**Cost:** MCr227.76 (new)
Atmospheric Speeds:	NoE = 75kph
Cruising = 200kph	Maximum = 300kph

Other Equipment: Missile Magazines (6), 120 Missiles.

Triple Turret: Missile Rack (x3), Attack Bonus +2 (+2 USP), Damage 2d6.
Triple Turret: Missile Rack (x3), Attack Bonus +2 (+2 USP), Damage 2d6.
Triple Turret: Beam Laser (x3), Attack Bonus +3 (+3 USP), Damage 3d8.
Triple Turret: Beam Laser (x3), Attack Bonus +3 (+3 USP), Damage 3d8.

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

Design Specifications

Installed Components	*Tonnage*	*Cost*	*EP*	*Notes*
400-ton Hull (Cylinder)	+400	MCr40	-	-
Bridge	-20	MCr2	-	-
Computer	-0.3	MCr12.6	-1	Model/3
Flight Avionics	-0.4	(MCr0.9)	-	Model/1
Sensors	-0.9	(MCr1.8)	-	Model/3
Communications	-0.6	(MCr1.5)	-	Model/3
Jump Drive 3	-16	MCr64	-12	-
Jump Fuel	-120	-	-	-
Maneuver Drive 4	-44	MCr22	-16	-
TL9 Power Plant	-39	MCr117	+26	-
Power Plant Fuel	-26	-	-	-
4 Hard Points	-	MCr0.4	-	-
4 Triple Turrets	-	MCr4	-	-
6 Beam Lasers	-6	MCr6	-6	-
6 Missile Racks	-6	MCr4.5	-	-
6 Missile Magazines	-6	MCr0.6	-	-
120 Missiles	(-6)	MCr0.6	-	-
Staterooms (20)	-80	MCr10	-	-
Low Berths (20)	-10	MCr1	-	-
Cargo	-24.8	-	-	-
Totals	+0	MCr284.7 (MCr227.76 with 20% standard design discount)		

SUBSIDIZED MERCHANT (TYPE R)

Medium-Size Starship

The "Subbie" is built on the "cargo van" principle. Designed as little more than a cargo bay with engines, Subbies are very common on Jump-1 trade routes. Most ply a fixed route subsidized by the worlds on it, ensuring regular mail and freighting services. Many Subbies are armed and configured to carry mail. The Subsidized Merchant requires a crew of five to operate; the pilot, engineer, and an astrogator along with a medic and steward to attend to the passengers. Since the vessel is larger and carries more passengers than the Type A or A2, the steward has a full-time job. The medic often assists or doubles as an assistant to relieve the load on the chief engineer. The ship cost MCr98.426 new, and takes 14 months to build.

SUBSIDIZED MERCHANT

Class: Starship, type R	**EP Output:** 4
Tech Level: 9	**Agility:** 0
Size: Medium (400 tons)	**Initiative:** +0
Streamlining: Partial	**AC:** 10
Jump Range: 1 x Jump-1	**Repulsors:** None
Acceleration: 1-G	**Nuclear Dampers:** None
Fuel: 44 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 5	**AR:** 0
Staterooms: 13	**SI:** 145
Small Cabins: 0	**Main Computer:** Model/1
Bunks: 0	**Sensor Range:** Close (Model/1)
Couches: 0	**Comm. Range:** Close (Model/1)
Low Berths: 9	
Cargo Space: 236.5 tons	**Cost:** MCr98.426 (new)
Atmospheric Speeds:	NoE = 75kph
Cruising = 200kph	Maximum = 300kph
Other Equipment: 20 ton launch.	

No turrets or weapons installed.

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

Design Specifications

Installed Components	*Tonnage*	*Cost*	*EP*	*Notes*
400-ton Hull (Cylinder)	+400	MCr40	-	-
Bridge	-20	MCr2	-	-
Computer	-0.1	MCr2	-	Model/1
Flight Avionics	-0.4	(MCr0.9)	-	Model/1
Sensors	-0.3	(MCr0.6)	-	Model/1
Communications	-0.2	(MCr.0.5)	-	Model/1
Jump Drive 1	-8	MCr32	-4	-
Jump Fuel	-40	-	-	-
Maneuver Drive 1	-8	MCr12	-4	-
TL9 Power Plant	-6	MCr18	+4	-
Power Plant Fuel	-4	-	-	-
2 Hard Points	-	MCr0.2	-	-
Staterooms (13)	-52	MCr6.5	-	-
Low Berths (9)	-4.5	MCr0.45	-	-
20-ton Launch	-20	MCr9.842	-	-
Launch Hanger	-	MCr0.04	-	-
Cargo	-236.5	-	-	-
Totals	*+0*	*MCr123.032 (MCr98.426 with 20%standard design discount)*		

SUBSIDIZED LINER (TYPE M)

Medium-Size Starship

The Subsidized Liner is almost always tied to a fixed route. Liners carry cargo as well as passengers. Three hardpoints are fitted for turrets, but except out on the frontiers or in troubled regions, liners usually carry no armament. The Subsidized Liner requires a crew of eight: the pilot and astrogator along with 2 engineers, a medic, and 3 stewards to attend to the passengers. The ship cost MCr238.386 new, and takes 22 months to build.

SUBSIDIZED LINER

Class: Starship, type M	**EP Output:** 18 (12 excess)
Tech Level: 12	**Agility:** 2 (+2 EP)
Size: Medium (600 tons)	**Initiative:** +2 (+2 agility)
Streamlining: Streamlined	**AC:** 12 (+2 agility)
Jump Range: 1 x Jump-3	**Repulsors:** None
Acceleration: 1-G	**Nuclear Dampers:** None
Fuel: 198 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 8	**AR:** 0
Staterooms: 21	**SI:** 175
Small Cabins: 0	**Main Computer:** Model/3
Bunks: 0	**Sensor Range:** Medium (Model/3)
Couches: 0	**Comm. Range:** Medium (Model/3)
Low Berths: 20	
Cargo Space: 202.4 tons	**Cost:** MCr238.386 (new)
Atmospheric Speeds:	NoE = 275kph
Cruising = 825kph	Maximum = 1100kph
Other Equipment: 20 ton launch.	

No turrets or weapons installed.

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

Design Specifications

Installed Components	*Tonnage*	*Cost*	*EP*	*Notes*
600-ton Hull (Cylinder)	+600	MCr63	-	-
Bridge	-20	MCr0.1	-	-
Computer	-0.3	MCr12.6	-1	Model/3
Flight Avionics	-0.8	(MCr1.8)	-	Model/2
Sensors	-0.9	(MCr1.8)	-	Model/3
Communications	-0.6	(MCr1.5)	-	Model/3
Jump Drive 3	-24	MCr96	-18	-
Jump Fuel	-180	-	-	-
Maneuver Drive 1	-12	MCr18	-6	-
TL9 Power Plant	-27	MCr81	+18	-
Power Plant Fuel	-18	-	-	-
3 Hard Points	-	MCr0.3	-	-
Staterooms (21)	-84	MCr10.5	-	-
Low Berths (20)	-10	MCr1	-	-
20-ton Launch	-20	MCr9.842	-	-
Launch Hanger	-	MCr0.04	-	-
Cargo	-202.4	-	-	-
Totals	*+0*	*MCr297.982 (MCr238.386 with 20% standard design discount)*		

MERCENARY CRUISER (TYPE MC)

Medium-Size Starship

Designed to fit the needs of mobile merc units, the Mercenary Cruiser can carry a platoon of ground troops or act as an escort-vessel-for-hire. The ship has a good Jump range and high acceleration for a non-Naval vessel. Almost all Mercenary Cruisers carry at least one weapons turret (up to 8 can be shipped) and most will have boat pilots for the cutters. This will raise the crew requirement beyond the minimum listed here. The Mercenary Cruiser requires a crew of eight: the pilot, astrogator, 5 engineers and a medic. The ship cost MCr412.675 new, and takes 25 months to build.

MERCENARY CRUISER

Class: Starship, type MC	**EP Output:** 30
Tech Level: 12	**Agility:** 0
Size: Medium (800 tons)	**Initiative:** +0
Streamlining: Partial\	**AC:** 10
Jump Range: 1 x Jump-3	**Repulsors:** None
Acceleration: 3-G	**Nuclear Dampers:** None
Fuel: 270 tons	**Meson Screens:** None
Duration: 4 weeks	**Black Globes:** None
Crew: 8	**AR:** 0
Staterooms: 25	**SI:** 205
Small Cabins: 0	**Main Computer:** Model/5
Bunks: 0	**Sensor Range:** Very Long (Mod/5)
Couches: 0	**Comm. Range:** Very Long (Mod/5)
Low Berths: 0	
Cargo Space: 165.2 tons	**Cost:** MCr412.675 (new)
Atmospheric Speeds:	NoE = 75kph
Cruising = 200kph	Maximum = 300kph

Other Equipment: Modular Cutter (x2).

Triple Turret: Empty.
Triple Turret: Empty.
Triple Turret: Empty.
Triple Turret: Empty.
Triple Turret: Empty.
Triple Turret: Empty.
Triple Turret: Empty.
Triple Turret: Empty.

TAS Form 3.1 (Condensed) **Ship's Data (Commercial)**

Design Specifications

Installed Components	*Tonnage*	*Cost*	*EP*	*Notes*
800-ton Hull (Sphere)	+800	MCr56	-	-
Bridge	-20	MCr4	-	-
Computer	-0.5	MCr36.5	-3	Model/5
Flight Avionics	-0.8	(MCr1.8)	-	Model/2
Sensors	-1.5	(MCr3)	-	Model/5
Communications	-1	(MCr2.5)	-	Model/5
Jump Drive 3	-32	MCr128	-24	-
Jump Fuel	-240	-	-	-
Maneuver Drive 3	-64	MCr32	-24	-
TL9 Power Plant	-45	MCr135	+30	-
Power Plant Fuel	-30	-	-	-
8 Hard Points	-	MCr0.8	-	-
8 Triple Turrets	-	MCr8	-	-
Staterooms (25)	-100	MCr12.5	-	-
Modular Cutter (2)	-100	MCr102.844	-	-
Cutter Hangers (2)	-	MCr0.02	-	-
Cargo	-165.2	-	-	-
Totals	*+0*	*MCr515.344 (MCr412.675 with 20% standard design discount)*		

APPENDIX I: GLOSSARY

2000 Worlds: A major power in Charted Space, the 2000 worlds is ruled by the K'Kree. It lies to Trailing of the Imperium.
Ability Check: A check of 1d20 + the appropriate ability modifier vs. a DC.
Ability Modifier: The bonus or penalty associated with a particular ability score.
Ablat: Ablative anti-laser armor.
AC: Armor Class.
Aca: Academic.
Ace: Ace Pilot.
ACR: An Advanced Combat Rifle
Advanced Combat Rifle: A sophisticated but conventional projectile weapon built at high tech level. ACRs are capable of automatic fire.
Air/Raft: A small gravitic (grav) vehicle often used as personal transport.
Agility: Agility refers to a vessel's ability to make violent maneuvers while remaining under control of the operator.
Aht: Army, high-tech.
Alt: Army, low-tech.
Amber Zone: A world where greater than usual caution is advised. Reasons for Amber Zoning vary from natural conditions to war, famine or plague.
Amt: Army, mid-tech.
Ancients: A mysterious species that once ruled Charted Space. All that remains of them are artifacts and the occasional ruin.
AP: Armor Piercing ammunition. Improves the odds of a round penetrating any armor protecting a target if a shot hits.
AR: Armor Rating.
Armed Merchant Cruiser: A civilian vessel fitted with armament for some purpose. AMCs are sometimes used as commerce guards. They are no match for a real warship, but may be able to beat off corsairs.
Armor Class: A number representing a creature's ability to avoid being hit in combat. An opponent's attack roll must equal or exceed the target creature's Armor Class to hit it.
Armor Rating: A number representing the number of damage dice that will be reduced if hit in combat.
Aslan: A major race of Charted Space, named by early explorers for a vaguely leonine appearance.
Aslan Hierate: A major power in Charted Space, the Hierate lies to Spinward of the Imperium.
Assault Rifle: A lightweight mid-tech weapon developed from the autorifle.
Assault Shotgun: A heavy shotgun capable of full-automatic fire.
Assault Transport: A troop transport vessel designed to deliver ground troops straight into planetary combat.
Attack of opportunity: A single extra melee attack per round that a combatant can make when an opponent within reach takes an action that provokes attacks of opportunity.
Attack roll: 1d20 + base attack bonus + Dexterity modifier + size modifier + range penalty. The attack hits if the result is at least as high as the target's Armor Class.
ATV: All-Terrain Vehicle: A rugged tracked or wheeled vehicle capable of traversing a variety of terrain.
Autopistol: Also automatic pistol, self-loading pistol or just pistol: a handgun fed by a removable magazine.
Autorifle: A mid-tech weapon capable of fully-automatic fire.
Auxiliary: A merchant ship in use by the Navy, normally to undertake routine transport operations.
Battlecruiser: A heavily armed and fast but lightly protected vessel. In some ways an alternative to a battleship, but very vulnerable to spinal weapon fire.
Battleship: A very powerful warship capable of standing in the line of battle and destroying opposing vessels.
Battle Dress: Heavy powered personal armor. The ultimate in personal protection.
Battle Rider: A powerful non-Jump-capable warship designed to be carried into action aboard a Tender.
Bayonet: A blade, knife or spike designed to be fitted on the barrel of a longarm, creating a spear-like weapon. Bayonets can be used in the hand as a fighting knife or as a tool.
Bbn: Barbarian.
Belter: An asteroid miner.
Bgh: Big Game Hunter.
Black Powder Weapon: A handgun, musket, shotgun or rifle in which the propellant is loose black powder. Unreliable and inaccurate.
Blade: Any blades weapon may be referred to as a "blade". A Blade specifically is a heavy machete or short-sword0like weapon, uses as a fighting or survival tool
Blinded: Unable to see. A blinded character suffers a 50% miss chance in combat, loses any Dexterity bonus to AC, moves at half speed, and suffers a -4 penalty on Search checks and on most Strength- and Dexterity-based skill checks. Any skill check that relies on vision automatically fails. Opponents of a blinded character gain a +2 bonus to

their attack rolls, since they are effectively invisible.
Blt: Belter.
Boat: A small craft. Also, a small defensive spacecraft (as in System Defense Boat).
Bombardment Ship: A vessel deigned to undertake planetary bombardment. This is typically a "cruiser" role.
Broadsword: A sword weapon designed for use in both hands.
Capital Ship: A major warship, for example a battleship, battlecriuser, fleet carrier or dreadnaught.
Carrier: A naval vessel whose main striking power lies in subordinate craft (typically fighters) carried aboard.
Centimeter: A metric measurement of distance or length; 10 millimeters or 1/100 of a meter.
CEV: Combat Environment suit.
Cha: Charisma.
Charisma: An ability. Charisma measures a character's force of personality, persuasiveness, personal magnetism, ability to lead, and physical attractiveness. It represents actual personal strength, not merely how others perceive one in a social setting.
Charted Space: The region of space inhabited by humans and thousands of other races, both major and minor. Charted space encompasses 128 sectors and more than 80,000 worlds.
Client State: An independent political unit (one or more worlds) that has the patronage of a larger power. The relationship is usually beneficial and is normally economic in nature, though political and defensive arrangements will normally exist.
Close Escort: A very small naval vessel optimized for the protection of other vessels.
Cloth: Ballistic cloth; a type of bullet-resistant armor.
cm: Centimeter.
Combat Armor: A sealed suit of heavy armor; the modern equivalent of plate armor. Very effective against weapons, and also provides protection against hostile environments.
Comm: A personal communicator. Many comms include other features like data and banking access facilities.
Commerce Raider: A legitimate warship attacking commercial traffic as part of military operations, and not for profit.
Con: Constitution.
Constitution: An ability. Constitution represents a character's health and stamina.
Contragravity, CG: The antigravity units used to life space vessels and grav vehicles.
Coreward: See Galactic Directions.
Corsair: A pirate vessel. Many Vargr consider piracy a respectable trade, and use the term "Corsair" to refer to themselves and their vessels.
Courier: A small, fast vessel designed for carrying messages.
Cr: Imperial Credit.
Cruiser: A major warship, capable of carrying a powerful spinal mount weapon. Cruisers undertake many tasks. Various types exist: strike, armored, light, heavy and battle to name but five. Each has a particular role. Also, the Imperial Navy sometimes designates some very small vessels as "cruisers". This refers to the long cruises they undertake while on patrol rather than their capabilities.
Cutlass: A heavy, curved sword weapon used in one hand. The traditional dress weapon of the Imperial Marine Corps.
Cutter: A 50-ton small craft with a detachable module bay.
Dazed: Unable to act normally. A dazed character can take no actions, but can defend against attacks normally.
Dazzled: Unable to see well because of over stimulation of the eyes. A dazzled creature suffers a -1 penalty on attack rolls until the effect ends.
DC: Difficulty Class.
Deafened: Unable to hear. A deafened character suffers a -4 penalty to initiative, automatically fails Listen checks, and has a 20% chance of spell failure when casting spells with verbal components.
Destroyer: A small to medium sized warship designed for independent and flotilla operations. Destroyers normally protect larger vessels, but may sometimes undertake operations in their own right.
Dewclaw: a retractable claw found under the thumbs of an Aslan.
Dex: Dexterity.
Dexterity: An ability. Dexterity measures hand-eye coordination, agility, reflexes, and balance.
Difficulty Class: The target number that a player must meet or beat for a check or saving throw to succeed.
Domain: A region of space containing 4 sectors, administered by an Archduke.
Downport: A starport situated on-planet, or the ground components of a port with both orbital and ground facilities.
Dreadnaught: The newest and most powerful battleships are termed Dreadnaughts.
Dromedary: A naval supply ship capable of delivering both fuel and dry stores.
Droyne: A major race of Charted Space, Droyne are found on many scattered worlds but have no major interstellar polities.
ECM: Electronic Counter-Measures.

Edu: Education.
Education: An ability. Education represents the accumulated general knowledge accumulated over the life of the character, either through formal or informal education.
Energy Points: A measurement of the amount of energy that must be supplied to an object for it to operate, or the amount of energy that is supplied by a given type of power plant.
Energy Weapon: A ranged weapon that uses energy rather than physical projectiles to cause harm. Examples include lasers, plasma and fusion guns.
Entangled: Entanglement impedes movement, but does not entirely prevent it unless the bonds are anchored to an immobile object or tethered by an opposing force. An entangled creature moves at half speed, cannot run or charge, and suffers a -2 penalty to attack rolls and a -4 penalty to its effective Dexterity score.
EP: Energy Points.
Escort: A small naval vessel designed for the protection of other vessels, patrol work and similar light tasks. Escorts cannot survive in battle with a major combat vessel.
Exhausted: Tired to the point of significant impairment. A fatigued character becomes exhausted by doing something else that would normally cause fatigue. An exhausted character moves at half normal speed and suffers an effective ability decrease of -6 to both Strength and Dexterity. After 1 hour of complete rest, an exhausted character becomes fatigued.
Far Trader: A small merchant ship capable of Jump-2 or more.
Fatigued: Tired to the point of impairment. A fatigued character can neither run nor charge and suffers an effective ability decrease of -2 to both Strength and Dexterity. After 8 hours of complete rest, fatigued characters are back to normal.
Feat: A quality or special ability of a character.
Fighter: A small, maneuverable naval craft intended primarily for patrol and screening work.
Flat-footed: Especially vulnerable to attacks at the beginning of a battle. Characters are flat-footed until their first turns in the initiative cycle. Flat-footed creatures cannot use their Dexterity bonuses to AC or make attacks of opportunity.
FGMP: Fusion Gun, Man Portable.
Foil: A light cut-and-thrust weapon, somewhat similar to a rapier. The Foil is the traditional weapon of the nobility.
Fortitude save: A type of saving throw, related to a character's ability to withstand damage thanks to his physical stamina.
Free Trader: Any small merchant ship. Also a specific design of ship – small, with limited Jump capability. Personnel making their living aboard such a ship may also call themselves Free Traders.
Freighter: A large cargo-only starship. "Bulk Freighters" are characterized by very large cargo holds, and transport things like ore, grain etc.
Freightliner: A large mercantile vessel that carries cargo and passengers.
Frightened: Fearful of a creature, situation, or object. Frightened creatures flee from the source of their fear as best they can. If unable to flee, they may fight, but suffer a -2 morale penalty to all their attack rolls, weapon damage rolls, and saving throws.
g: gram.
G: Gravity.
Galactic Directions: North and South do not work when referring to direction within the galaxy. Instead, the following conventions have achieved widespread acceptance when referring to astrographic directions. Toward the galactic core is coreward; away from it, in the direction of the rim, is rimward. In the direction that the galaxy is rotating is spinward, while the opposite direction is trailing.
Garden World: An Earthlike planet where humans can thrive unaided.
Gauss Weapon: A pistol, rifle or support weapon in which a projectile is accelerated to extreme velocities by an electromagnetic field.
Gas Giant: A huge, Jumpier-like planet.
Gram: A metric measurement of weight, 1/1000 of a kilogram. One pound (US) is equal to roughly 450 grams.
Grav Vehicle: A vehicle that uses contragravity lifters rather than wheels or tracks.
Gravitics: The science of manipulating gravity. Also the contragravity units of a vehicle may be referred to as "the gravitics".
Gravity: Use in reference to either the gravitational pull of a stellar body or the acceleration rate of a smallcraft or starship in normal space.
Gunship: A large craft, similar to an SDB, but carried aboard certain types of carrier or tender for offensive and escort operations.
Handcomp: A hand computer
Handgun: A revolver, autopistol, gauss pistol etc.
HE: High Explosive ammunition.
HEAP: High Explosive, Armor Piercing ammunition.
HEAP: High-Explosive Dual-Purpose (HE and fragmentation) ammunition.
HEV: Hostile Environment suit.

High-Energy Weapon: Particularly powerful energy weapons, such as Plasma and Fusion guns.
Highport: An orbital starport, or the orbital component of a starport with both orbital and ground facilities.
Hive Federation: A major interstellar power lying to rimward-trailing of the Imperium.
Hivers: A major race of Charted Space.
Humaniti: The current spelling of humanity, used when referring to humans in a general sense. The term refers to the human species and subspecies rather than the quality of being humane, which can be applied to any sentient species.
Iceball: A cold, normally airless world.
Imperial Credit: The mostly commonly used form of currency used in the Traveller universe.
Imperium: In the OUT, the main human interstellar civilization, the 3rd Imperium, is usually just referred to as the Imperium.
Int: intelligence.
Intelligence: An ability. Intelligence determines how well a character learns and reasons.
IR: Infrared.
Jack: A padded, resilient jerkin providing some protection against melee weapons.
k: Kilometer.
K'Kree: A major race of Charted Space. K'Kree are militant herbivores descended from herd animals.
kg: Kilogram.
KCr: Kilocredit. One thousand Imperial credits.
Kilogram: A metric measurement of weight; 1000 grams or approximately 2.2 pounds (US).
Kilometer: A metric measurement of distance or length; 1000 meters or approximately 0.62 miles (US).
Kph: Kilometers per hour.
LAG: A Light Assault Gun.
Launch: A 20-ton small craft used for passenger and cargo transfers, and as a lifeboat.
LI: Light Intensifying.
Lifeblood: A measure of the amount of lethal (impaling, cutting, etc) damage a character can take before dying.
Lighter: A large cargo transfer craft, normally or more than 100 tons displacement, may be termed a Lighter.
Liner: A large passenger vessel, which may sometimes carry a small amount of cargo in addition to its passengers.
LMG: A Light Machine Gun.
Logistics Ship: A transport vessel designed to carry dry stores for the support of ground or naval units.
Longarm: A firearm designed to be used in both hands.
m: Meter.
Mar: Marine.
mm: Millimeter.
Mainworld: The most important planet in a system, normally the source of the system name.
Major Race: A species that developed the Jump Drive independently; sometimes used to describe a powerful race that did not.
MCr: Megacredit. One million Imperial credits.
Mct: Merchant.
Megacorporation: A huge, Imperium-wide corporation. Megacorporations have their own private military forces and wield powerful political influence.
Merchant Ship: Any commercial starship.
Mesh: Metal or ceramic mesh woven into a tough garment, providing good protection against melee weapons.
Meson Gun: A powerful but short-ranged variant of the particle accelerator, often used as a main starship armament.
Meter: A metric measurement of distance or length; 100 centimeters or approximately 3 feet (US).
Millimeter: A metric measurement of distance or length; 1/1000 of a meter.
Minor Race: A race that did not develop the Jump drive independently but learned of it from outsiders (or has never achieved interstellar flight). Also, a race without any real power or influence.
Monitor: A large and powerful spacecraft designed for system defense.
Mry: Mercenary.
Musket: A low-tech smoothbore weapon muzzle-loaded with black powder and ball.
Nauseated: Experiencing stomach distress. Nauseated creatures are unable to attack, cast spells, concentrate on spells, or do anything else requiring attention. The only action such a character can take is a single move (or move-equivalent action) per turn.
Nav: Navy.
Nbl: Noble.
Noble: A member of the planetary or Imperial nobility.
Nonintelligent: Lacking an Intelligence score. Mind-affecting spells do not affect nonintelligent creatures.
OTU: An acronym for the Official Traveller Universe.
Panicked: A panicked creature must drop anything it holds and flee at top speed from the source of its fear, as well as any other dangers it encounters, along a random path. In addition, the creature suffers a -2 morale penalty on saving throws. If cornered, a panicked creature cowers and does not attack, typically using the total defense action in combat.

Paralyzed: Unable to move or act physically. Paralyzed characters have effective Dexterity and Strength scores of 0 and are helpless.
Particle Accelerator: A powerful energy weapon with a longer range than a meson gun, often used as a main starship armament.
Pinnace: An aerodynamic 40-ton small craft.
PGMP: Plasma Gun, Man Portable.
Portacomp: A powerful but portable computer unit.
Prf: Professional.
Prone: Lying on the ground. An attacker who is prone has a -4 penalty to melee attack rolls and cannot use a ranged weapon (except for a crossbow). Melee attacks against a prone defender have a +4 bonus, and ranged attacks against a prone character have a -4 penalty.
Pres: presence.
Presence: A special ability applied to Vargr only. Presence measures the status of a Vargr among their racial peer.
PSI: Psionic Strength.
Psionic Strength: The measure of a character's potential psionic ability. Normally unknown until tested at a Psionics Institute.
Q-Ship: An armed vessel disguised as a merchant or similar harmless craft.
RAM: Rocket Assisted, Multi-Purpose grenades.
Red Zone: A world to which access is prohibited for a variety of reasons. Examples include worlds under sanction, highly dangerous planets and prison worlds.
Reflec: Reflective anti-laser armor.
Reflex save: A type of saving throw, related to a character's ability to withstand damage thanks to his agility or quick reactions.
Revolver: A handgun fed from a revolving internal cylinder, typically containing six rounds.
Rifle: Any longarm with a rifled barrel is a "rifle". Specifically, a Rifle is a mid-tech bolt-action or semi-automatic weapon fed from an internal magazine, or loaded singly.
Rifle-Musket: A rifled black powder weapon; more accurate than a musket.
Rift: An area of space where stars are very sparse. Rifts can be major obstacles to navigation.
Rimward: see Galactic Directions.
Rockball: A planet that is little more than a ball of rock. Typically Rockballs have very thin, trace or no atmosphere, and no life. They may be hot or cold.
Rog: Rogue.
Save: Saving throw.
Saving throw: A roll made to avoid (at least partially) damage or harm.
Sct: Scout.
Scout/Courier: A small vessel designed for a variety of roles, including messenger and exploration craft.
Sector: A region of space 4 by 4 subsectors in size, normally forming an administrative region.
Ship's Boat: A small, fast 30t small craft used for personnel and cargo transfers.
Shotgun: A smoothbore weapon that normally fires pellets or flechettes. Various types exist but the standard is a pump-action weapon fed by a 6-round internal magazine.
Shuttle: Any cargo or passenger–carrying small craft can be termed a Shuttle, but the term us normally reserved for craft or around 100t.
SI: Structural Integrity.
Sidearm: A light weapon carried for self-defense. Typically a handgun but may also be a melee weapon.
Skill: an ability or area of knowledge or expertise which can be improved over time.
Slow Boat: A cheaper and less maneuverable version of the Ship's Boat.
Slow Pinnace: A cheaper and less maneuverable version of the Pinnace
Smallcraft: A small space-going that is not equipped with a Jump drive and is incapable of interstellar travel.
SMG: A Submachine Gun.
Soc: social standing.
Social standing: An ability. Social standing represents the status of a character in common society. A social standing score of 16 or higher is considered nobility.
Sophont: A sentient being.
Solomani: One of the races of Humaniti, originating on Terra. Also, a person from a culture strongly influenced by old Terran traditions.
Solomani Confederation: A powerful interstellar state lying to Rimward of the Imperium.
Solomani Hypothesis: The generally accepted idea that all Humaniti originated on Terra, and was transplanted throughout the universe by the Ancients, for reasons that remain unclear.
Spacecraft: Any vessel capable of interplanetary flight but not Jump. See also smallcraft.
Spaceport: A minor port that deals mainly with interplanetary rather than interstellar vessels.
Speeder: A fast version of the Air/raft.
Spinal Mount: A starship weapon mount running along the entire length of a ship, allowing for a very powerful weapon system to be installed.
Spinward: see Galactic Directions.

Subsector: A region of space 8 by 10 parsecs in size, normally forming an administrative region.
Subsidized Merchant: Any trade ship can obtain a subsidy and operate as a subsidized merchant, but the term normally refers to a specific type of vessel - a smallish starship carrying both cargo and passengers. "Subbies" normally ply a set route.
Stamina: Equivalent to Hit Points, Stamina is a measure of how much non-lethal damage a character can take before collapsing.
Starport: A port serving interstellar travel; also the main spaceport on a planet.
Starship: Any space-going vehicle of 100 tons displacement or greater, and equipped with a Jump drive.
Startown: The town, village or city adjacent to most starports. Startowns have a reputation for being somewhat rough and ready; not all of them deserve this.
Str: Strength.
Strength: Strength measures a character's muscle and physical power.
Stunned: A stunned creature can't take actions and loses any positive Dexterity modifier to AC. Each attacker gains a +2 bonus to attack rolls against that creature. In addition, stunned characters immediately drop anything they are holding.
Sword: Any bladed hilt weapon used in one hand; swords come in many specific types.
System: A star system includes one or more stars, orbited by other bodies including planets, asteroids and comets.
Take 10: To reduce the chances of failure on certain skill checks by assuming an average die roll result (10 on a 1d20 roll).
Take 20: To greatly reduce the chances of failure for certain skill checks by assuming that a character makes sufficient retries to obtain the maximum possible check result (as if a 20 were rolled on 1d20).
Talent: A specific Psionic ability.
Tanker: A naval vessel capable of skimming and refining fuel, and supplying it to other vessels.
TAS: Travellers' Aid Society.
Tender: A naval vessel designed to support the operations other vessels. Examples include Xboat Tenders, which support Jump-Capable express boats, and Battle Tenders, which transport Battle Riders into action.
Tfr: TAS Field Reporter.
TH: Thrust.
TL: Tech(nology) Level.
Ton: When used in reference to a smallcraft or starship, this refers to displacement tonnage or roughly 14 cubic meters of space. When referencing weight, this refers to metric tonnage (1000kg) unless otherwise noted.
Trailing: see Galactic Directions.
Traveller's Aid Society: An organization that supports and assists Travellers in the Imperium and some neighboring regions. TAS offers news, information and discounted accommodation to its members.
Travellers' Aide: A regular gazette published by QLI, providing information on specific aspects of Travelling and Charted Space. Travellers' Aide has been the subject of some legal questions on the part of TAS, but has retained its distinct identity.
Trv: Traveller.
USP: Universal Ship Profile.
UWP: Universal World Profile. A shorthand notation of the raw basic details of a world.
Vac Suit: A sealed suit designed to protect the wearer from hostile environments or vacuum.
Vargr: A major race of Charted Space, Vargr are descended from Terran canines.
Vargr Extents: A region of space lying to Coreward of the Imperium, divided between several Vargr states.
Vilani: One of the races of Humaniti, originating on Vland. Also, a person from a culture heavily influenced by Vilani traditions.
vl: Volume.
Volume: A unit of measure used when designing vehicles and starships under the T20 rules.
Will save: A type of saving throw, related to a character's ability to withstand damage thanks to his mental toughness.
Wis: wisdom.
Wisdom: An ability. Wisdom describes a character's willpower, common sense, perception, and intuition. While Intelligence represents one's ability to analyze information, Wisdom is more related to being in tune with and aware of one's surroundings.
Xboat: An express message boat. Xboats have Jump but no maneuver drives, and rely on tenders to support and retrieve them.
Zhodani: One of the races of Humaniti, whose culture embraces psionics.
Zhodani Consulate: A powerful interstellar state lying to Spinward-Coreward of the Imperium.

APPENDIX II: INDEX

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