

*Book 2*  
*Starships*

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***TRAVELLER***

*Science-Fiction Adventure in  
the Far Future*

Game Designers' Workshop



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the Far Future*

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TRAVELLER, Volume 2

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Although this game (as presented in Volumes 1, 2, and 3) envisions a referee or umpire to supervise play or to resolve questions, the publisher is prepared to answer questions or inquiries on *Traveller* provided a stamped, self addressed envelope accompanies the request.

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This volume of *Traveller* deals with the basic facts of interplanetary and interstellar travel, with the details of starships, their design, construction and operation, and with combat between spaceships.

## TRAVELLING BETWEEN WORLDS

Travellers travel. They move between worlds as well as on their surfaces. The distances such travel covers may be interplanetary or interstellar in scale.

**Interplanetary Travel:** Worlds orbiting the same star are accessible by interplanetary travel, including by scheduled liners and by ship's boats, pinnaces, cutters and even by lifeboats. Generally, however, interplanetary travel takes long periods of time. Since most stellar systems have only one major world, interplanetary travel is infrequently used.

### TYPICAL TRAVEL TIMES

10,000 miles .....	45 minutes
100,000 miles .....	2.3 hours
1 million miles.....	7.5 hours
10 million miles.....	23 hours
100 million miles.....	3.4 days
1 billion miles.....	9.6 days

The typical travel times list indicates the time required to travel a specified distance (assuming 1 G constant acceleration, turn-around at midpoint, and 1 G constant deceleration). Specific distance travel times can be calculated by the referee or by characters, using the travel formula shown, where  $T$  equals travel time,  $d$  equals the total distance travelled, and  $a$  equals the acceleration used. Constant acceleration, turn-around, and constant deceleration are assumed. It is suggested that the units used be 1000 miles, 10 minute periods, and 1 G (2000 miles per [10 minutes]<sup>2</sup>). These units are those used in the space combat section later in this booklet.

### TRAVEL FORMULA

$$T = 2\sqrt{d/a}$$

**Interstellar Travel:** Worlds orbiting different stars are reached by interstellar travel, which uses the jump drive. Once a starship moves to more than 100 planetary diameters from all worlds, it may activate its jump drive and move to another star system. Jump drives transfer ships from one star system to another in about one week per jump.

Interstellar distance is calculated on the basis of jumps, which range in size from one to six. Some worlds are inaccessible with the use of lesser size jumps, while, in other areas of the universe, large clusters of worlds are all situated within one jump of each other. Different ships are also equipped with jump drives of different capabilities, which determine the jump distance each ship is capable of. Actually making a jump takes about one week of elapsed time, which includes navigational and pilot support, and normal preparation as necessary. Transit time to a point at least 100 planetary diameters out adds a total of approximately 20 hours to the whole trip.

Commercial starships usually make two trips per month, spending one week in travel time and one week for transit to the jump point, landing and take-off and time in port. In port, five to six days are allowed for the acquisition of cargo and passengers, and for crew recreation.

Individuals who decide to travel to other worlds are confronted with the choice of the method and manner in which they wish to travel. Interplanetary travel is infre-

quent, but is possible using ship's boats, cutters, pinnaces, or other vessels. Because of the widely varying distances, a vessel must be chartered, at a price set by the referee or by the player-character who owns the vessel. Commercial travel by scheduled liner, when available, is provided at approximately 10% of the cost for similar interstellar travel.

Interstellar travel is more rigidly defined, being divided into levels of passage with specific features and costs.

*High Passage*— The best method of travel is called High Passage, and involves first class accommodations and cuisine. High passengers have the services of the ship's steward, entertainment and complete attention to their comfort. A baggage allowance of up to one ton is included in the price of passage. High passage costs CR 10,000.

*Middle Passage*— In order for starships to fill their staterooms with passengers, middle passage is offered on a standby basis, in the event that not enough high passages are sold. While middle passengers occupy staterooms normally similar to those occupied by high passengers, they do not receive the service or entertainment accorded the higher paying passengers. In addition, the quality of the cuisine is rather low. A baggage allowance of 100 kilograms is allowed. A middle passenger may be 'bumped' and his stateroom taken by a late arriving high passenger: the middle's ticket is returned, but no other compensation is made. (The middle could then buy a high passage and 'bump' another middle passenger, if it was felt that immediate transportation were necessary.) Middle passage costs CR 8,000.

*Working Passage*— A starship captain with a crew shortage may hire an individual to fill the vacant position, paying not money but passage in return. Working passage may not continue for more than three jumps, or the individual is considered to have been hired for standard salary. In order to be hired for working passage, the individual must have some expertise in the position for which he is hired. A baggage allowance of up to one ton is allowed.

*Low Passage*—Transportation while in cold sleep (suspended animation) is possible at relatively low cost to the starship, and thus to the passenger. The passenger is placed in a low passage berth before the ship takes off, and travels the entire journey in a state of suspended animation. He does not age, and requires very little life support. Unfortunately, the low passage system involves some intrinsic dangers to the passenger, and he runs some risk of not surviving the voyage. Throw 5+ for each passenger, when he is revived after the ship has landed. DMs: Attending medic of expertise of 2 or better, +1; low passenger with an endurance of 6 or less, -1. Failure to achieve the throw to revive results in death for the passenger.

Low passage costs CR 1000 and includes a baggage allowance of 10 kilograms. Refunds and civil or criminal liability if a low passenger fails to survive the trip are not allowed.

It is customary for the captain to contribute CR 10 out of each low passage towards a lottery in which each low passenger randomly guesses the number of low passengers who will survive the trip. If the winner does not himself survive, the captain receives the money. The lottery is administered by the ship's steward.

*The Travellers' Aid Society:* Individuals who have decided that they wish to pursue a life of travel and adventure may elect to join the Travellers' Aid Society, in order to take advantage of its facilities and passage dividends. The Society is fully described in Book 1.

Travel between the stars is also fraught with dangers, including those of hijacking, piracy, accident and misjump. These considerations are constantly on the minds of those travelling between the stars.

**Hijacking:** Starships can be easy prey for hijackers, especially because a starship can easily be used in distant parts of the universe without too many questions being asked. For this reason, most starship crews maintain a constant, but unobtrusive, guard at all times, and the ship's computer can run an anti-hijacking program which will scan personality profiles and deny access to control areas to potential hijackers. Passengers are required to check all weapons (except blades and daggers) into a locked compartment with access controlled by the ship's master and pilot. Such weapons are returned at the end of the voyage.

Nevertheless, there is a chance that a passenger will attempt a hijacking, to hold the ship for ransom, or to simply murder the crew and passengers in order to gain possession of the multi-million credit vessel. The referee should roll three dice, with a result of 18 exactly indicating that one or more passengers is making the attempt. This throw does not apply if all passengers are player characters.

When an attempt occurs, randomly determine the number of hijackers, their identities and their characteristics, and implement their attempt at some point during the voyage. He (or they) will gain complete control of the ship only after defeating all other individuals on the ship. If the anti-hijacking program is functioning, the hijackers will be able to enter the bridge (gaining access to the controls) only on a throw of 5 or less.

**Skipping:** Most starships are purchased against a mortgage or loan, and the monthly payments required against the multi-million credit debt are staggering. The owner or captain may decide to steal the ship himself instead of remaining under that load. Passengers have no way themselves of determining if a specific ship is in such a status. The referee should throw 12 exactly to determine that a commercial ship is of this type.

Ships which have skipped are subject to repossession attempts if they are detected by the authorities or by collection agencies. Such attempts may range from the formal service of papers through legal injunctions to armed boarding parties. A repossession attempt will occur under the following conditions: On each world landing, throw 12+ to avoid such an attempt, apply a DM of +1 per 5 hexes distance from the ship's home planet, to a maximum of +9. If the ship has called on the same world twice within the last two months, apply a DM of -2. This procedure also applies to ships owned by player characters who have skipped.

**Piracy:** A starship may be accosted by pirates while entering or leaving a system. Similar encounters may involve customs agents or military vessels, including blockades. The ship encounter table later in this book indicates the procedure.

Certain procedures, situations or mistakes may result in mishap or accident to a starship; these may well involve the passengers on such a ship.



**Contaminated Fuel:** The use of unrefined fuel, often forced by circumstance, and about as often the result of false economy by a captain, can cause drive failure. If unrefined fuel is used, there is a chance that the drive will fail while in flight (throw 11+ for failure to occur, throwing once per jump in which unrefined fuel is used. DM +1 for each jump made, until the drives are flushed, which takes about a week at any starport).

Unrefined fuel is often forced on a ship which must refuel without benefit of a starport. Unrefined fuel is available free to a ship by skimming a gas giant.

**Lack of Maintenance:** Ignoring annual maintenance requirements can result in drive failure. Throw once per jump made after annual maintenance has been skipped: a result of 12 indicates drive failure.

**Drive Failure:** When a drive fails, due to any reason, all three sections (maneuver, jump and power plant) are affected. They may be temporarily repaired by engineer crew members (throw 10+ to repair, once per day; allow DM of + level of engineering expertise on the throw). More comprehensive repairs are then made at the next starport by trained personnel.

**Misjump:** The most interesting event which can occur is the misjump, in which the jump drive malfunctions. At the instant of jump, a jump drive which is: a) within 100 diameters of a world or star, b) operating on unrefined fuel, or c) operating without annual maintenance may malfunction, resulting in a jump of random length and direction.

For all jumps (in any situations) throw 12+ for a misjump to occur. DM: +5 if within 100 planetary diameters of a world or star; +3 if using unrefined fuel (except military and scout ships); -1 if using refined fuel; +2 if operating beyond the required date for annual maintenance.

A misjump involves a considerable random jump. Throw one die to determine number of dice thrown (1 to 6). Throw that number of dice to determine the number of hexes long the jump is. Throw one die to determine in which of the six directions on the hex grid the jump is made (Book 3 covers star maps and the procedures governing their use).

The above circumstances also apply to the use of starships by owners and player characters as well as to starships which are carrying characters as passengers.

# Starship Economics

The operation of starships in interstellar commerce requires an understanding of the economics which govern trade between the stars. Prices and returns on effort and investment are controlled by the supply and demand which exists in the commercial system.

## STARSHIP PURCHASE

Bank financing is available to qualified individuals for the purchase of commercial starships. After a down payment of 20% of the cash price of the starship is made, the shipyard will begin construction of a specific vessel. Upon completion, the vessel is delivered to the buyer, with the bank paying off the purchase price to the shipyard. Because the bank now holds title to the ship, the price must be paid off in a series of monthly payments to it. Standard terms involve the payment of 1/240th of the cash price each month for 480 months. In effect, interest and bank financing cost a simple 120% of the final cost of the ship, and the total financed price equals 220% of the cash purchase price. The loan is paid off over a period of 40 years.

In addition, the bank will insist that the purchaser submit an economic plan detailing the projected activity which will guarantee that monthly payments are made. Unless a character has some form of guaranteed income (perhaps large royalties from some property he owns), these conditions will generally rule out purchases (at least financed purchases) of yachts, military vessels, or exploratory vessels.

**Subsidies:** The government may subsidize larger commercial vessels (built on type 600 hulls or larger), primarily to assure consistent service to specific worlds. These subsidized merchants are generally assigned a specific route connecting from 2 to 12 worlds of varying characteristics. The route will generally be determined before a subsidized merchant is purchased, to allow tailored design features as may be necessary. When a subsidized merchant is ordered, the character himself must make the 20% down payment, with the government assuming responsibility for the payments upon delivery, and taking 50% of the gross receipts of the ship while in service. The character is responsible for all expenses and costs of operation.

Subsidized merchants are also subject to mobilization (and use as auxiliaries) in the event of emergency or hostilities. At the end of 40 years, the vessel is completely paid off, and full title passes to the character himself, but the vessel remains subject to mobilization in case of government need.

## OPERATING EXPENSES

There are five basic expenses (in addition to the bank payment, if necessary) associated with starship operation:

**1. Fuel.** Starship fuel costs CR 500 per ton (refined) or CB 100 per ton (unrefined), at most starports. Fuel consumption is based on formulae related to the size of the starship power plant and the jump drive.

A power plant, to provide power for one trip (internal power, maneuver drive power, and other necessities) requires fuel in accordance with the formula: **10Pn**.

*Pn* is the power plant size rating, determined from the maximum drive potential table by cross-referencing power plant letter and hull size. The formula indicates amount of fuel in tons, and all such fuel is consumed in the process of a normal trip. A fully fuelled power plant will enable a starship an effectively unlimited number of

accelerations (at least 288) if necessary to use the maneuver drive during the trip (as when miniatures combat is used to resolve a ship to ship encounter).

A jump drive requires fuel to make one jump (regardless of jump number) based on the formula:  $0.1MJn$ , where  $M$  equals the mass displacement of the starship and  $Jn$  equals the jump number of the drive. Drive jump number is determined from the maximum drive potential table by correlating drive letter and hull size. Thus a vessel with a type A jump drive and a type 200 hull has a jump number of 1. It requires 20 tons of fuel ( $0.1 \times 200 \times 1 = 20$ ) for its jump drive. Jump fuel requirements are based on jump number rather than the size of the jump actually taken.

Fuel is also used by the maneuver drives of non-starships. When used in such vessels displacing under 100 tons (ship's boats, shuttles, pinnaces, etc) 10 kilograms (1/100th of a ton) of fuel is sufficient for 1G of acceleration for 10 minutes.

**2. Life Support.** Each stateroom on a starship, occupied or not, involves a constant overhead cost of CR 2000 per trip made. Each crew member occupies one stateroom; the remainder are available for high or middle passengers. Each low passage berth (cold sleep capsule) involves an overhead cost of CR 100 per trip.

There is a normal limit of one person per stateroom, travelling couples or groups usually taking adjoining staterooms. Military vessels or chartered ships may be used with a double occupancy system (two persons per stateroom) in some cases.

**3. Routine Maintenance.** Annually, a starship should be given a complete overhaul in order to insure that it is kept in good working order. Such maintenance costs 0.1% (1/1000th) of the cash price of the ship, and requires two weeks at a class A or B starport. The owner must make provision for payment of the maintenance fee when it comes due. Crew members generally take their vacation at this time, but must still be paid. Provision should also be made for the expected loss of revenue while the ship is out of service.

**4. Crew Salaries.** Crew members must be paid monthly. Non-player characters

#### CREW SALARIES

Pilot.....	CR 6000
Navigator.....	CR 5000
Engineer .....	CR 4000
Steward .....	CR 3000
Medic .....	CR 2000
Gunner.....	CR 1000

must be paid using the standard crew salary schedule (with suitable modifications for expertise or seniority, generally +10% for each level of expertise above level-1. Player characters may bargain for better pay rates, or they may elect to accept worse. In addition, player characters may participate with the owner-captain and accept shares in the proceeds of the ship's activities.

Characters who take working passage are not paid, receiving passage, room and board in lieu of salary (but, continuous working passage for more than 3 trips results in automatic hiring and receipt of salary).

The starship captain is usually the pilot or navigator. In some rare circumstances, the captain will hire a pilot or navigator, and himself serve as owner-aboard, drawing his pay from the profits.

Not all crew positions are required on all ships, and some ships will have more than one person performing the same function. For example, a large liner would have more than one steward.

**5. Berthing Costs.** Landing fees and handling costs at starports are a common practice, and such costs must be paid as they occur. The average cost is CR 100 to

land and remain for up to six days; thereafter, a CR 100 per day fee is imposed for each additional day spent in port. In some locations this fee will be higher, while at others local government subsidies will lower or eliminate it.

## REVENUE

Commercial starships generate revenue by carrying passengers, cargo and mail or private messages.

**Cargo.** Starship masters may inquire at a starport to determine the size and number of shipments awaiting transportation, and their destination. The referee should determine all worlds accessible to the starship (depending on jump number), and roll (for each such world) a number of dice equal to the population number of the destination. Each die represents one shipment, expressed in multiples of 5 tons. Thus, roll ten dice for the potential shipments to a population 10 world; should all dice show 6 (admittedly an unlikely event), there are 10 thirty ton (die roll 6 x 5 tons = 30) shipments awaiting transportation. A starship can carry as many shipments as will fit in the hold, but may not break-down the size of any specific shipment. Thus, a starship with a cargo hold capacity of 85 tons could accept two of the above shipments, but not a third as it would not fit.

Cargo is normally shipped at a rate of CR 1000 per ton. Starship owners may purchase goods locally and ship them at their own expense, speculating that they may later sell the items at sufficient increase to make a profit.

**Passengers.** After a starship has accepted cargo for a specific destination, passengers will present themselves desiring transport to that destination; the number and type of such individuals is dependent on the populations of the originating world and the announced destination. Consult the passenger table: roll the number of dice specified in the originating world column (3D-D, for example, indicates that three dice are rolled, and from that total, the result of another one die roll is subtracted. From the result of this roll, add or subtract the stated number given in the

PASSENGER TABLE						
Population	<i>Originating World</i>			<i>Destination</i>		
	High	Middle	Low	High	Middle	Low
0	—	—	—	—	—	—
1	—	—	—	—	—	—
2	D-D	D-D	3D-D	-1	-2	-4
3	3D-2D	2D-2D	3D-D	-1	-1	-3
4	3D-3D	3D-3D	4D-D	-1	-1	-2
5	3D-2D	3D-2D	4D-D	0	-1	-1
6	3D-2D	3D-2D	3D	0	0	-1
7	3D-2D	3D-2D	3D	0	0	0
8	2D-D	3D-2D	4D	+1	0	0
9	2D-D	2D-D	4D	+1	+1	0
10	2D-D	2D-D	4D	+1	+1	+2
11	2D	2D-D	5D	0	+1	+4
12	2D	2D	6D	0	0	0

destination column. Separate columns are presented for high passage, middle passage, and low passage. Treat worlds of population level greater than 12 as level 12.

Passengers will pay the standard fare for the class of transportation they choose: CR 10,000 for high passage, CR 8000 for middle passage, and CR 1000 for low passage. Passage is always sold on the basis of transport to the announced destination, rather than on the basis of jump distance.

Differences in starship jump drive capacity have no specific effect on passage prices. That is to say, a starship with a jump drive of 3 charges the same passage price as a starship with a jump drive of 1. The difference is that a jump-3 ship can reach a destination in one jump that would take the jump-1 ship three separate jumps (through two intermediate destinations) to reach. Higher jump numbers also may make otherwise inaccessible destinations within reach. But, for two ships of differing jump numbers going to the same destination in one jump, each would charge the same cargo or passage price.

**Mail.** Subsidized merchants may receive mail delivery contracts, usually as an adjunct to the established route to which it is assigned. Five tons of ship cargo capacity must be committed to postal duty on a full time basis, the ship must be armed, and a gunner must be a part of the crew. The starship is paid CR 25,000 (CR 5000 per ton of postal cargo area) for each trip made, regardless of the actual mail tonnage carried. Such tonnage may not exceed 5 tons per trip.

Other ships may be approached to deliver private messages, at times through the ship's owner or captain, and at times clandestinely through a crew member. This private mail is usually intended for delivery to a specific point (such as the Travelers' Aid Society building, or a tavern keeper), and is generally accompanied by a CR 20 to 120 honorarium. Throw 9+ for a private message to be awaiting transmittal, and then determine randomly which crew member is approached to carry it. Serving as a carrier for private messages also serves as an introduction to the recipient as a dependable, trustworthy person.

## INCIDENTALS

Goods taken on in orbit are delivered when delivered in orbit around the destination. Goods taken on a planetary surface are delivered when off-loaded on the planetary surface of the destination. Similar conditions apply to mail and passengers.

**Shuttles:** Where necessary, shuttles operate from planetary surface to orbit and return. The typical cost of shuttle service is 1/100 of the normal interstellar freight or passage cost. Thus, cargo is shipped to orbit by shuttle, or dropped to planetary surface from orbit by shuttle at a cost of CR 10 per ton.

# Starship Construction

Starships are constructed and sold by shipyards which share the field with major starports throughout the galaxy. Commercial vessels are available for purchase by private citizens, as are yachts, exploratory vessels, and even military ships. A variety of capabilities and armaments are also available to the purchaser, depending on needs, desires, and bank balance.

## STARSHIP DESIGN

Most starships are constructed from standard plans and specifications which use time-tested designs and combinations of features. Shipyards are unable to produce a starship unless they have a set of detailed plans and specifications; such plans and specifications are available for the construction of a limited number of standard design starships.

**Naval Architecture:** Should a person desire a starship which is not of standard design, he may approach a naval architect, there generally being a firm providing such a service wherever a shipyard exists. For a fee, the naval architect will produce the detailed plans and specifications necessary to construct a starship on a custom basis. This preparation usually takes about four weeks (two weeks for an additional overtime charge of 50%) at a cost of 1% of the final cash price of the ship.

In game terms, a player may purchase a standard design ship, or he may wish to design his own to more fully fit his needs, using these rules to determine what is possible and how much it will cost. When a character has settled on his own desires (generally using the starship design checklist), he must present that checklist to a naval architect who will then produce correct plans and specifications and deliver them upon payment of his fee. Such plans may then be turned over to a shipyard so that construction may begin.

**Shipyards:** Any class A starport has a shipyard capable of starship construction located adjacent to it. Any class A or B starport has a shipyard capable of constructing non-starships. In most circumstances, shipyards are quite willing to construct and sell ships at standard prices. In some locations (throw 11+ to occur) a local government will prohibit the construction of military or armed vessels.

**Construction Times:** Ship construction requires a relatively long period of time, based primarily on the hull size used. The rule section on hulls indicates the basic time required to construct a ship based on a certain size of hull (ranging from 10 to 36 months). Standard design ships take about one month less than the stated time.

**Costs and Payments:** When a ship is ordered, 20% of the base price is required as a down payment, and proper arrangements for bank financing or other payment of the remainder of the price must be made prior to delivery. Most shipyards will insist on full details of such plans before even beginning construction, and may insist on some form of guarantee of full payment if it is to be made in cash.

The actual cash price of a ship is computed from the sum of the costs of its components. Standard design ships are granted a 10% reduction in price because of their ease of construction and the familiarity of the yard with such work, and this reduction is contained in the price stated for each in the standard ship rules section.

## REQUIRED STARSHIP COMPONENTS

Most starships are constructed using one of the six basic standard hulls, and into this hull is then fitted the other required components, including drives and power plants, life support equipment, hardpoints for armaments, computers and other items. The total tonnage of the installed items in a ship cannot exceed the rated tonnage capacity of the hull used.

**The Hull:** Hulls are identified by their mass displacement, expressed in tons.

HULL TYPES				
Hull	Main	Engine	Price	Time
100	85	15	2	10
200	185	15	8	12
400	350	50	16	16
600	520	80	48	24
800	635	165	80	28
1000	835	165	100	30

Hulls of different mass displacements come in standard configurations which divide the tonnage into a (shielded) engineering section and a (pressurized) main compartment. All drives and power plants must be located in the engineering section, and only drives and power plants may be placed in that section. All other ship components, including fuel, cargo hold, living space, and computer must be located in the main compartment.

The hull types chart indicates the configurations of the six standard hulls, and states the proportion each has devoted to the engineering section and the main compartment, the price of the basic hull (expressed in millions of credits), and the construction time (expressed in months. Hulls in sizes (or engineering/main compartment proportions) not indicated in the chart must be produced on a custom basis. Such hulls may be ordered for construction at a shipyard at a base price of CR 100,000 per ton, with a minimum price of CR 20,000,000. Construction time for any custom hull is 36 months, regardless of tonnage. Custom hulls of up to 5000 tons mass displacement may be ordered. When consulting the maximum drive potential table, tonnage of custom hulls is rounded up to the next higher figure.

Different hulls have different requirements for drives and power plants. A drive of a certain size will be less efficient as the size of the hull increases. The maximum drive potential table lists the 24 possible drive and power plant types (lettered A through Z, omitting I and O) at the top and several levels of hull sizes along the left side. When drive or power plant letter is correlated with hull size, the number ob-

MAXIMUM DRIVE POTENTIAL																								
Hull	<i>Jump Drive, Maneuver Drive, or Power Plant Type</i>																							
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z
100	2	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
200	1	2	3	4	5	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
400	-	-	1	2	2	3	3	4	4	5	5	6	6	-	-	-	-	-	-	-	-	-	-	-
600	-	-	-	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	-	-	-	-
800	-	-	-	-	-	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6
1000	-	-	-	-	-	-	-	1	1	2	2	2	2	2	3	3	3	3	3	4	4	4	5	6
2000	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	2	3	4	5
3000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	2	3	4
4000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	2	3
5000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2

## DRIVES AND POWER PLANTS

Type	<i>Power Plants</i>		<i>Maneuver Drives</i>		<i>Jump Drives</i>	
	Mass	Price	Mass	Price	Mass	Price
A	4	8	1	4	10	10
B	7	16	3	8	15	20
C	10	24	5	12	20	30
D	13	32	7	16	25	40
E	16	40	9	20	30	50
F	19	48	11	24	35	60
G	22	56	13	28	40	70
H	25	64	15	32	45	80
J	28	72	17	36	50	90
K	31	80	19	40	55	100
L	34	88	21	44	60	110
M	37	96	23	48	65	120
N	40	104	25	52	70	130
P	43	112	27	56	75	140
Q	46	120	29	60	80	150
R	49	128	31	64	85	160
S	52	136	33	68	90	170
T	55	144	35	72	95	180
U	58	152	37	76	100	190
V	61	160	39	80	105	200
W	64	168	41	84	110	210
X	67	176	43	88	115	220
Y	70	184	45	92	120	230
Z	73	192	47	96	125	240

tained is termed maximum potential. For jump drives maximum potential is the ship's jump number (Jn); for maneuver drives, the maximum potential is the maximum acceleration (in Gs) that ship is capable of. For power plants, the maximum potential is the power plant size rating (Pn). For example, a type 200 hull equipped with a type A maneuver drive would be capable of 1 G acceleration; a type 800 hull equipped with a type H jump drive would be capable of jump-2.

**The Engineering Section:** Each starship is fitted with a power plant (to provide internal power and power for the maneuver drive), a maneuver drive (for interplanetary travel), and a jump drive (for interstellar jumps). Each is essential to the definition of a starship. The drives and power plants table lists the 24 different types of maneuver drives, jump drives, and power plants available, as well as their costs (in millions of credits) and their mass displacements (in tons). Only one of each may be installed in the engineering section, and the sum of the mass displacements of all three may not exceed the mass displacement of the engineering section of the hull.



## COMPUTER SOFTWARE LIST

<i>Title</i>	<i>Space</i>	<i>Price</i>	<i>Effect and DMs</i>
<b>Offensive Programs</b>			
Predict 1	1	2.	(+1)
Predict 2	2	4.	(+2)
Predict 3	1	6.	(+2)
Predict 4	3	8.	(+3)
Predict 5	2	10.	(+3)
Gunner Interact	1	1.	Adds gunner expertise for his turret.
Target	1	1.	Required for firing of turret weapons.
Selective 1	1	0.5	(-2) Allows gunner to select either main
Selective 2	2	0.8	(-1) compartment or engineering sec-
Selective 3	1	1.	(-) tion to receive hits inflicted.
Multi-Target 2	1	1.	Allows engagement of indicated number
Multi-Target 3	2	2.	of targets by a single ship, but not a single
Multi-Target 4	4	3.	turret to do so.
Launch	1	2.	Allows turrets to launch missiles, sand.
<b>Defensive Programs</b>			
Maneuver/Evade 1	1	1.	(-1/4 pilot expertise) Also performs the
Maneuver/Evade 2	2	2.	(-1/2 pilot expertise) routine functions of
Maneuver/Evade 3	3	3.	(-3/4 pilot expertise) a maneuver pro-
Maneuver/Evade 4	4	4.	(- pilot expertise) gram while in use
Maneuver/Evade 5	2	5.	(- pilot expertise)
Maneuver/Evade 6	3	6.	(-5)
Auto/Evade	1	0.5	(-2)
Return Fire	1	0.5	Automatic return fire if attacked.
Anti-Missile	2	1.	Allows laser anti-missile fire.
ECM	3	4.	May explode incoming missiles.
<b>Routine Programs</b>			
Maneuver	1	0.1	Required for use of maneuver drive.
Jump 1	1	0.1	Required for performance of jump 1.
Jump 2	2	0.3	Required for performance of jump 2.
Jump 3	2	0.4	Required for performance of jump 3.
Jump 4	2	0.5	Required for performance of jump 4.
Jump 5	2	0.6	Required for performance of jump 5.
Jump 6	2	0.7	Required for performance of jump 6.
Library	1	0.3	Contains encyclopedic information.
Navigation	1	0.4	Receives flight plans to control jumps.
Generate	2	0.8	Generates flight plans internally.
Anti-Hijack	1	0.1	Reacts to hijack situation.

Programs are more fully described in the text. Prices are in millions of credits. The basic software package provided with new ships consists of a credit of CR 2 million, applicable to any programs on the above list.

It is important to note, from the maximum drive potential table, that some drive and power plant types will not function in certain types of hulls (those situations indicated by a dash); the drives and power plants table also indicates that some drives will not fit into some hulls. It is also possible to fit a set of drives and power plant into a hull and then to have insufficient tonnage remaining for fuel, basic controls or life support. The completeness is intended to cover situations where custom hulls are produced. A jump capability of greater than 6 (or an acceleration of greater than 6 Gs) cannot be achieved with the 24 drive types listed in the table.

The installed power plant must be of a letter type at least equal to the drive letter of the installed maneuver drive (the power plant letter may be higher than the maneuver drive letter).

**The Main Compartment:** The starship's main compartment contains all other features of the ship, including the bridge, ship's computer, the staterooms, and the low passage berths, the cargo hold, fuel tanks, armament and other items.

**A. The Bridge:** All starships must allocate 20 tons displacement for basic controls, which include guidance radars, drive and power plant controls, communications equipment, and other devices required for proper control of the ship. Basic controls cost CR 500,000 per 100 tons of hull mass displacement.

The basic controls do not include the ship's computer, which is installed adjacent to the bridge and is available in a variety of configurations, ranging from the basic Model/1 to the sophisticated Model/7, each being listed in the computer models table.

COMPUTER MODELS				
<i>Model</i>	<i>Price</i>	<i>Mass</i>	<i>CPU</i>	<i>Storage</i>
1	2	1	2	4
1 bis	5	1	4	—
2	9	2	3	6
2 bis	12	2	6	—
3	18	3	5	9
4	30	4	8	15
5	45	5	12	25
6	55	5	15	35
7	60	5	20	50

Computer prices are given in millions of credits, and displacement required in tons. CPU refers to the computer's Central Processing Unit, indicating the capacity to process programs; storage refers to the additional capacity available to hold programs in readiness for processing. Programs themselves are classified by size, using a point indicator to specify how

much of the CPU or storage capacity is required for that program to fit into the computer. The number of programs (and the exact types of programs) which are on hand, in storage, or in the CPU is important in the operation of the starship, especially in combat.

Computer software (programs) must normally be acquired separately by purchase (or they may be written by a character who has computer expertise). Each computer model is originally furnished with a basic software package of commonly used programs. The computer software list indicates the features and prices of individual programs, as well as the contents of the basic software package.

Many starships are originally constructed with some tonnage in reserve to allow for retrofitting of a better model when assets and circumstances will allow.

Fire control equipment is also considered to be adjacent to the bridge. Each installed turret (see turrets, below) requires one ton of displacement committed for the installation of fire control equipment. Because turrets may well not be initially installed, space is often held in reserve to allow for later acquisition and installation.

**B. Staterooms:** Quarters for the crew and for high and middle passengers are provided in the form of staterooms, containing sleeping and living facilities. Each stateroom is sufficient for one person, and contains all important life support considerations. Staterooms are included in a starship at the cost of CR 500,000 each, and displace 4 tons each. In some starships (especially exploratory vessels, military ships, and privately owned starships), double occupancy is allowed in staterooms, but two persons is the limit that a stateroom will contain.

A non-military starship must have one stateroom for each member of the crew.

**C. Low Passage Berths:** Facilities for carrying passengers in cold sleep may be installed in a starship. One low passage berth will carry one low passenger, costs CR 50,000 to install, and displaces one-half ton. Low passage berths also serve well in emergencies, in that they can provide suspended animation facilities for characters when medical care, rescue, or assistance is not immediately available.

**D. Fuel:** The amount of fuel tank capacity to be built into a starship must be specified in the plans and specifications. No actual cost is involved, but such specification will determine the frequency of refuelling the ship must observe. Computation of the amount of fuel that a ship will require per trip is based on the size of the drives. Formulae for such computation are given in the section under ship operating expenses.

**E. Cargo Hold:** The displacement given over to cargo hold must be indicated in the starship plans and specifications. No extra cost is incurred in designating cargo capacity.

**F. Hardpoints and Turrets:** Hardpoints for the installation of weaponry on a temporary or permanent basis may be created when the ship is constructed. Starship hulls will accommodate one hardpoint for each 100 tons of hull displacement. One turret may be attached at one hardpoint. The designation of hardpoints costs CR 100,000 each, and they must be included in the ship plans and specifications.

Turrets are available to contain one, two, or three weapons, which may be of the same or of mixed types. Single weapons turrets cost CR 200,000; double weapons turrets cost CR 500,000. Triple weapons turrets cost CR 1,000,000. An installed turret requires one ton of displacement for the installation of fire control equipment necessary for its operation (such displacement must be available when the turret is installed, though it may be taken from reserve or surplus tonnage, or from cargo hold tonnage).

Each turret requires a gunner, in most cases assigned as a specific crew member, and requiring a stateroom, salary, and other crew requirements.

Hardpoints and turrets must be specified in ship plans and specifications, although turrets may be added to unused hardpoints later. In addition, turrets may be replaced by different sized turrets at a later time.

Weapons are never included in ship plans and specifications, and must be acquired and installed after delivery.

## OPTIONAL STARSHIP COMPONENTS

Ship owners may purchase optional items for installation on a starship; some must be included at construction, but allow variation to the standard plans and specifications controlling even standard designs, while others may be installed or fitted at any time, including after construction is completed.

**Computers:** Larger or smaller computer models may be installed or retrofitted to a starship, regardless of the model originally called for. In new construction, the different model is in lieu of the originally specified model; in retrofitting situations, the old model of computer can generally be traded in at 25% of original cost.

**Atmospheric Streamlining:** A starship may be streamlined when constructed, allowing it to enter atmospheres for landings. Such vessels are then not restricted to orbital unloading, and dependence on shuttles for cargo and passenger transfer. Such streamlining costs CR 1,000,000 per 100 tons of hull displacement, and must be included when the ship is constructed. Atmospheric streamlining is an option, and may be added to or deleted from standard designs.

**Ship's Vehicles:** A starship may have one or more subordinate vehicles specified

SHIP'S VEHICLES		
<i>Vehicle</i>	<i>Tons</i>	<i>Price</i>
ATV	10	3
Air/Raft	4	6
Life Boat	20	14
Ship's Boat	30	16
Pinnace	40	20
Cutter	50	28
Shuttle	95	33

as part of the ship's equipment, and tonnage may be devoted to the permanent stowage or hangarage of the vehicles. The several possible vehicles are indicated by the ship's vehicle table, which shows the tonnage required to be devoted to hangarage or stowage, and the price for the item in millions of credits.

Air/Rafts are anti-gravity floaters, capable of flying in atmosphere (they are not air-tight); ATVs are All Terrain Vehicles capable of overland travel, regardless of atmosphere or lack thereof. The remainder of vessels mentioned are space-going

ships described in the section on non-starships. All ship's vehicles have direct access through the hull to the outside, and may be used with a minimum of preparation.

**Turrets:** Turrets may be installed after construction at hardpoints specified on the ship's hull. Previously installed turrets may be removed and replaced by turrets of different sizes. Because they are options, they may be added to, or deleted from, the specifications of standard design ships.

Used turrets removed in the case of renovation or retrofitting may be sold for 25% of their original cost. Turrets are considered to be streamlined.

**Weaponry:** Weapons for installation in turrets may be procured and installed by a shipyard or by ship's personnel. Four types of weapons are commonly available: pulse laser, beam laser, missile launcher, and sandcaster.

**Pulse Lasers:** Pulse lasers fire short bursts of energy at specified targets. Each pulse laser costs CR 500,000.

**Beam Lasers:** Beam lasers fire continuous beams of energy at targets and are more effective in inflicting damage than are pulse lasers. Each beam laser costs CR 1,000,000.

**Missile Launchers:** Missile launch racks fire missiles at targets. Missiles themselves are expended when fired, and must be replaced by purchase (see expendables). The launch racks themselves cost CR 750,000, and allow selective launching of one of up to four specific types of missiles.

**Sandcasters:** Sandcasters dispense abrasive particles into the path of enemy targets, lessening the effectiveness of lasers, disrupting missile fire, and interfering with enemy ship flight. Firing involves the discharge of one canister of sand (see expendables) which must be replaced by purchase. Sandcasters cost CR 250,000 each.

## STARSHIP CREWS

The number of crew members required for a starship is based on the work which must be performed, and the degree of efficiency and safety required. On small ships (200 tons and under), each position is filled by one person, with some cross-training possible to allow another to fill in where necessary. On larger starships, each position may be duplicated two or three times to allow the standing of watches and the full attention of an active crew at all times.

The following basic crew positions exist:

**Pilot:** Each starship requires at least one pilot. In small ships, he may be the only crew member, filling all other necessary responsibilities as well.

**Navigator:** Each starship with a mass displacement of greater than 200 tons requires at least one navigator.

**Engineer:** The requirement for engineer is based on power plant and drive size. On any starship of mass displacement greater than 100 tons, one engineer is required for each 35 tons of mass displacement of drives and power plant actually installed in the hull. Of these individuals (if there is more than one), one is designated chief engineer (usually the oldest, or the one with the most expertise in engineering), and is accorded an additional 10% of salary for the post. A starship of type 100 hull or less does not require an engineer.

**Steward:** Stewards are necessary for the care of high passengers. In order for a starship to carry high passengers, it must have at least one steward for each 8 or fewer high passenger staterooms (not counting crew staterooms) on the starship. One of these stewards (if there is more than one) is designated the chief steward (or purser) on the basis of expertise, and draws a 10% higher salary.

**Medic:** Each starship of greater than 100 tons hull mass displacement requires a medic aboard. Starships carrying more than 120 passengers require one medic for each 120 passengers or fraction thereof.

**Gunner:** One gunner is required as a crew member for each turret mounted on the starship. In many cases, especially where trouble is not expected, the gunner position will be omitted.

One person may fill two crew positions, providing he has expertise to otherwise allow him to perform the work. However, because of the added burden placed upon him, he is unable to apply his expertise to the position (that is to say, he is not allowed expertise DMs in either position), and draws a salary equal to 75% of each job.

Other crew positions may be created depending on the facilities of the starship: for example, a starship with a cutter would have a position for cutter pilot (and possibly cutter gunner) in addition to the normal positions. Generally, specific jobs or tasks require crew members to perform them.

For starships of greater than 1000 tons hull mass displacement, the crew should also include a commanding officer (or captain), his executive officer, and at least three administrative personnel. As a general rule, extremely large starships should have at least 10 crew members for each 1000 tons of mass displacement.

## NON-STARSHIPS

Space-going vessels which do not have jump drive are classed as non-starships. Non-starships include some ship's vehicles, as well as interplanetary ships. The basic characteristics of non-starships are described below:

**Life Boat:** The life boat is an emergency device used to allow escape from danger, disaster, or calamity in space-going situations. Displacing 20 tons, it is capable of 1 G acceleration and can carry up to three conscious passengers. In addition, it contains five emergency low berths, each capable of holding four persons in cold sleep (all occupants of the same berth share the same survival throw upon revival: throw 6+ to survive with normal DMs as applicable). Thus a life boat can carry a total of 23 persons. Fuel tankage is 5 tons. Life boats are unarmed, and have a base price of CR 14,000,000.

**Ship's Boat:** Designed to carry up to 5 passengers, the ship's boat displaces 30 tons, and is capable of accelerations of up to 6 Gs. It has a cargo capacity of 12 tons and fuel tankage of 9 tons. Ship's boats are usually unarmed, but have provision for the attachment of one beam or pulse laser; no turret is used, but the installation consumes 2 tons of cargo capacity. The base price for the ship's boat is CR 16,000,000.

**Pinnacle:** The pinnacle is a larger version of the ship's boat, capable of 5 Gs acceleration, carrying up to 8 passengers and displacing 40 tons. It has a fuel tank capacity of 12 tons and an equal cargo capacity. Pinnacles are usually armed with one beam or pulse laser in a non-turret mount. In some cases (about 15%), a missile launch rack is installed instead. Base price is CR 20,000,000.

**Cutter:** The cutter displaces 50 tons, carries up to 12 passengers, and is capable of accelerations of up to 4 Gs. Cargo hold capacity and fuel tankage each equal 15 tons. Standard armament is one beam laser. The base price for a standard cutter is set at CR 28,000,000.

**Shuttle:** Access to planetary surfaces by ships incapable of landing themselves is made using shuttles which are present at a starport, or which are carried by the starship itself. Shuttles have a mass displacement of 95 tons, are capable of 3 Gs of acceleration, and can carry up to 30 passengers. They have a cargo hold capacity of 80 tons and a fuel capacity of 9 tons. Shuttles are unarmed, and are capable of cargo transfer in vacuum. Base price for a shuttle is CR 33,000,000.

The above are standard designs; other non-starships may be designed in accordance with the starship design rules, but leaving out the jump drive. Such vessels may not be converted to take a jump drive at a later time. Construction cost is calculated at 50% of the price for a similarly equipped starship.

All non-starships consume fuel at the rate of 10 kilograms (1/100th of a ton) for each G of acceleration for ten minutes, regardless of mass or cargo carried.

A non-starship described above can support its passengers for up to 30 days in space. Beyond that time, air, food and water begin to run out. The passenger capacity cannot be increased, due primarily to design constraints, and potential overload of life support equipment. At the end of 30 days, throw 9+ each day to prevent the recycling machinery from breaking down. If it does fail, it must be repaired on the same day (throw 9+ to repair; DM: +1 per level of mechanical expertise, once per day) or the air is exhausted and the passengers will suffocate.

## EXPENDABLES

Certain materials for starship (and non-starship) operation are not considered to be routine operating expenses, but nevertheless involve occasional purchases on an irregular basis. These include ammunition and repair parts.

**Missiles:** Missiles for missile launch racks are expended when they are fired; replacements must be obtained for reloading purposes when the situation warrants. Basically, a missile is of the homing type, costing about CR 5000 each. Such missiles are committed to a specific target when fired, and after launch, home towards that target until either the missile or the target is destroyed. Other types of missiles are possible (for example, jump capable message torpedoes, or bombs for attacks against planetary surfaces), but such require either specific alterations to ordinary torpedoes, or location of an arms supplier who deals in such items. Specific attributes of such non-standard missiles are the realm of the referee.

**Sand:** The abrasive particles used in the sandcaster are of a special composition, combining prismatic crystals and ablative particles, which allows interference with laser beams and pulses, as well as inflicting minor damage on ships which it touches. Ordinary sand or particles are not considered to be an adequate substitute. Sand must be procured from arms merchants, generally pre-packed in a sandcaster canister, weighing about 50 kilograms. Base price for a canister of sand is set at CR 400.

**Repair Parts:** Most items in a starship which malfunction can be temporarily repaired from the stock of emergency materials in the ship's Stores. Malfunctions usually occur in terms of a specific assembly (ship's computer, jump drive, etc), and the cost of the repair is based on the cost of the original assembly. After determining the cost of the assembly (from the component cost section of these rules), roll two dice: this indicates the cost of replacement of the item in 10% increments; DMs: -2 if the repair installation will be made by ship's crew rather than a shipyard. Because the repair cost can run to 120%, in some cases, complete replacement of the item is sometimes cheaper. In the case of minor malfunctions, DMs may be applied to the repair cost throw as considered appropriate. Repair part cost which is indicated to be 0% is considered to be inconsequential.

If the ship's crew undertakes the installation of a repair part, it should have appropriate expertise levels.

## STANDARD STARSHIP DESIGNS

The following list indicates the standard starship designs which most starports can produce using plans on file and available free of charge. The prices shown include the 10% price reduction for standard designs.

**Scout/Courier (Type S):** Using the type 100 hull, the scout/courier is equipped with 4 staterooms (which may accommodate double occupancy in non-passenger service), suitable for the crew of one (pilot) and additional crew members or passengers as the situation dictates. No low berths are installed. The ship has a jump drive-A, maneuver drive-A, and power plant-A, giving it a capability of 2 G acceleration and the ability to make jump-2. The hold contains an air/raft in a specially fitted compartment, and three tons of cargo hold space. One double turret is installed at the vessel's single hardpoint, but no weaponry is included. Computer Model/1, with basic software package is installed. The hull is streamlined for atmospheric landings. Fuel tankage for 40 tons is included. Base price is set at CR 32,490,000.

**Free Trader (Type A):** Using the type 200 hull, the free trader is equipped with ten staterooms (four for the crew: pilot, engineer, medic and steward; six for high and middle passengers) and twenty low passage berths. Jump drive-A, maneuver drive-A and power plant-A are all installed in the engineering section, giving the starship capability for acceleration of 1 G and jump-1. Fuel tankage for 30 tons and cargo hold for 82 tons is provided in the hull. Two hardpoints are specified in the hull, but do not have turrets or weaponry attached. Two tons of potential fire control space is held in reserve for later armament installation. Computer Model/1 with basic software package is installed. The hull is streamlined for atmospheric landings. Base price for the free trader is CR 37,080,000.

**Subsidized Merchant (Type R):** Using the type 400 hull, the type R subsidized merchant is equipped with 13 staterooms (five for the crew: pilot, navigator, medic, steward and engineer; eight for the high or middle passengers) and nine low passage berths. The ship is equipped with jump drive-C, maneuver drive-C and power plant-C, allowing 1 G acceleration and jump-1 interstellar flight. Cargo capacity is set at 200 tons, while fuel tankage will contain 50 tons. The hull is produced with two hardpoints, and is streamlined. A life boat is included as a ship's vehicle. Computer Model/1 is installed adjacent to the bridge. Base price for the type R is CR 100,035,000.

**Subsidized Merchant (Type M):** Using the type 600 hull, the type M subsidized merchant has 30 staterooms (nine for the crew: pilot, navigator, medic, three engineers and three stewards; 21 for the high and middle passengers) and eighty low passage berths. The ship has jump drive-J, maneuver drive-D and power plant-D, making it capable of jump 3, and 1 G acceleration. Computer model/3 is installed adjacent to the bridge. Cargo capacity is set at 124 tons, and fuel tankage will contain 190 tons. Three hardpoints are specified for the hull, and three tons are reserved for fire control purposes. The hull is not streamlined for atmospheric landings. Base price for the type M is CR 219,870,000.

**Yacht (Type Y):** Based on the type 200 hull, the yacht is equipped with 16 staterooms (four for the crew: pilot, engineer, medic and steward; eleven for the passengers). Note that two staterooms have been joined to make a suite for the owner-aboard. No low berths are installed. The yacht has jump drive-A, maneuver drive-A and power plant-A, allowing it 1 G of acceleration and jump-1. Computer Model/1 is installed adjacent to the bridge, and four tons of displacement are held in reserve for later use as the owner sees fit. Cargo capacity is 13 tons; fuel tankage is 39 tons, which includes one full refuelling load for the ship's boat. The hull is compartmented for the ship's boat, air/raft, and ATV which form the complement of ship's vehicles. The hull is not streamlined, and has one hardpoint, but no turret or weaponry is installed. Base price for the yacht is CR 59,490,000.

**Cruiser (Type C):** Based on the type 800 hull, the type C cruiser is a quasi-military vessel designed for private or semi-military operations. It is equipped with 25 staterooms (five for the senior crew: commanding officer, pilot, navigator, medic, and chief engineer; double occupancy for the remaining 40 crew members: 8 gunners, 4 engineers, 3 galley cooks, 2 pinnace pilots, 2 pinnace gunners, 1 admin clerk, 2 medic/orderlies, 1 forward observer, plus 17 spaces for research personnel, technicians, or troops). No low berths are installed. The ship has jump drive-M, maneuver drive-M and power plant-M, making it with capable of jump-3 and 3 G acceleration. Eighty tons of cargo space are allocated. Computer Model/5 is installed adjacent to the



bridge, and 8 tons are allocated to fire control equipment. The cruiser has 8 hard-points, each equipped with a triple turret, but weaponry is not initially installed. The hull is not streamlined. Fuel tankage amounts to 288 tons, including 48 tons available for refuelling the pinnaces. Hull compartmentalization contains two pinnaces, two ATVs and one Air/Raft. Base price for the type C cruiser is CR 419,670,000.

### **CUSTOM DESIGNED SHIPS**

Should one of the standard design starships not meet an individual's or a government's needs, a naval architect will assist in providing the plans and specifications for any specific vessel, directing them to the starship design checklist for details. In addition, the following notes apply:

1. Custom hulls with mass displacements not equaling one of the hull sizes shown on the maximum drive potential table are treated as the next larger size. The maximum size hull currently possible is the type 5000.

2. Only drive and power plants shown on the maximum drive potential table are available. Relationships between hulls and drives marked with a dash (-) cannot be used.

3. Non-starships may be constructed using the basic rules for starship construction, but omitting the jump drive. They may not later be converted to interstellar drive capability, but may be produced for 50% of the price of a comparable starship.

4. Turrets and weapons are easily left off original plans and specifications in order to reduce total cost.

5. The naval architect will insist on his 1% fee upon delivery of the plans and specifications.

## STARSHIP DESIGN CHECKLIST

*Use this checklist to insure that all steps in specification of starship components are made.*

1. Hull. Select Hull size.
2. Engineering. Select drives and power plant.
  - A. Jump Drive.
  - B. Maneuver Drive.
  - C. Power Plant.
3. Bridge. Select controls and computer.
  - A. Basic Controls. Requires 20 tons at CR .5 per 100 tons of hull.
  - B. Computer. Select from computer models table.
  - C. Fire Control Equipment. Allow 1 ton per turret.
4. Life Support. Select total crew and personnel.
  - A. Stateroom. Requires 4 tons, at CR .5 per stateroom.
  - B. Low Passage Berth. Requires .5 tons at CR .05 per berth.
5. Fuel. Compute fuel tankage necessary.
  - A. Maneuver Drive. Formula:  $10Pn$ .
  - B. Jump Drive. Formula:  $0.1MJn$
6. Weaponry. Determine weapons and mountings.
  - A. Hardpoints. Costs CR .1 each.
  - B. Turrets. Select turret sizes. One allowed per hardpoint.
    - 1) Single turret. Costs CR .2.
    - 2) Double turret. Costs CR .5.
    - 3) Triple turret. Costs CR 1.
  - C. Armaments. Select specific weapons for turrets.
    - 1) Pulse Laser. Costs CR .5.
    - 2) Beam Laser. Costs CR 1.
    - 3) Missile Rack. Costs CR .75.
    - 4) Sandcaster. Costs CR .25.
7. Ship's Vehicle. Select one or more vehicles, as desired.
  - A. Ship's Boat. Requires 30 tons, and costs CR 16.
  - B. Pinnacle. Requires 40 tons, and costs CR 20.
  - C. Cutter. Requires 50 tons, and costs CR 28.
  - D. Life Boat. Requires 20 tons, and costs CR 14.
  - E. Air/Raft. Requires 4 tons, and costs CR 6.
  - F. ATV. Requires 10 tons, and costs CR 3.
  - G. Other. Custom designed non starship, costs as necessary.
8. Optional Streamlining. Costs CR 1 per 100 tons of hull.
9. Cargo Capacity. Remaining tonnage is cargo capacity.
10. Naval Architect's fee. Add 1% to price.
11. Construction Time. Based on hull size used.

Note: Costs are given in millions of credits. Weights are in tons.

# Starship Combat

When starships encounter in space, they may be forced to do battle as a result of desire or of circumstance. In such situations, starship battles may be resolved using miniature spaceship combat in accordance with the following rules. These rules serve well in nearly all situations, from simple circumstances where a free trader attempts to outrun a pirate or revenue cutter, to the complex engagements between starship squadrons of rival systems or empires.

## BASIC PARAMETERS

*Traveller* starship combat uses the following scale for movement and combat resolution:

1. *Time*: Each game turn represents ten minutes elapsed time (six turns equal one hour).

2. *Space*: A playing surface is required, representing space as a two dimensional surface at the scale of 1:63360000, or, in more familiar terms, one inch equals one thousand miles. The term inches and thousands of miles are used interchangeably in these rules, and refer to distance. Planetary templates may be made as discs on this scale also.

3. *Thrust*: Ships maneuver using reaction drives, referred to as M-Drive or maneuver drive. Their thrust is measured in Gs (Gravities) expressed as a vector of both length and direction. While direction is entirely variable, the length of the arrow is represented at the scale 2 inches equal one G (Ten minutes acceleration at 1 G will produce a velocity change of 2 inches per turn).

4. *Units*: Starships and space vehicles are individually represented by spacecraft miniatures, or (if necessary) by counters or markers. Because spacecraft miniatures are almost certainly oversize when compared to the scale in use, each such craft should be marked with a spot or point to designate the exact true location of the ships in play.

## TURN SEQUENCE

Starship miniatures battles are resolved in a series of Game—Turns, each representing ten minutes elapsed time. Most battles, regardless of the number of ships or players participating, will involve only two sides. These two sides alternate player turns within a game turn. Thus, each ten minute game turn includes two player turns, one for each combatant side. Each player turn is further divided into several phases which allow specific activity to be performed in a regular, orderly manner.

For convenience, the two sides in the battle are referred to here as the intruder and the native. Other terms could (and should) serve equally as well when the situation warrants.

The sequence of the complete turn is given in the game turn sequence table. Activity must be performed only in the appropriate phases of the game turn or player turn; for example, spacecraft may not move during the laser fire phase, and ordnance may only be launched during the ordnance launch phase.

## GAME TURN SEQUENCE

### *Intruder Player Turn—*

A. **Intruder Movement.** The intruder moves his ships using the movement, gravity, and other applicable rules. Ordnance (missiles and sand) which he has launched in previous game turns is moved at the same time.

B. **Intruder Laser Fire.** The intruder may fire his ships' laser weaponry at enemy targets, subject to the combat, computer and other applicable rules. Only laser weaponry may fire in this phase.

C. **Native Laser Return Fire.** The native may return fire with his laser weaponry at enemy ships which fired on him, provided his return fire computer program is running during this phase, and in accordance with the computer program and combat rules. Anti-missile fire may be made in this phase if the appropriate computer program is running.

D. **Intruder Ordnance Launch.** The intruder may launch ordnance (missiles and/or sand) at enemy targets or on specific missions, subject to the applicable rules. Ordnance which has contacted enemy ships explodes in this phase. Lifeboats and ship's vehicles are launched in this phase.

E. **Intruder Computer Reprogramming.** The intruder may remove computer programs from his on-board computer, and input other programs in anticipation of their use in later turns.

### *Native Player Turn—*

A. **Native Movement.** The native moves his ships using the movement, gravity, and other applicable rules. Ordnance (missiles and sand) which he has launched in previous game turns is moved as the same time.

B. **Native Laser Fire.** The native may fire his ships' laser weaponry at enemy targets, subject to the combat, computer, and other applicable rules. Only laser weaponry may fire in this phase.

C. **Intruder Laser Return Fire.** The intruder may return fire with his laser weaponry at enemy ships which fired on him, provided he has a return fire computer program running during the phase. Anti-missile fire may be made in this phase if the appropriate computer program is running.

D. **Native Ordnance Launch.** The native may launch ordnance (missiles and/or sand) at enemy targets or on specific missions, subject to the applicable rules. Ordnance which has contacted enemy ships explodes in this phase. Lifeboats and ship's vehicles are launched in this phase.

E. **Native Computer Reprogramming.** The native may remove computer programs from his on-board computer, and input other programs in anticipation of their use in later turns.

### *Game Turn Interphase—*

The end of one game turn is marked. All non-player items such as planets or worlds move in accordance with the rules. Other miscellaneous activity may also be necessary. The game then proceeds to the movement and combat of the next game turn.

## PREPARATION FOR PLAY

Each ship involved in space combat must have a data card prepared for it. This card contains basic information about the ship, serving as a reference for the players during the course of the battle. As damage occurs, it is marked on the card to reduce the ship's abilities in later turns.

To prepare a data card, note the name of the ship on the top line of a blank 3 x 5 index card. Below the name, on succeeding lines along the left side of the card, write the six basic sections of the ship, followed by their capacities or values: 1. M-Drive (followed by the drive letter), 2. Power Plant (followed by the power plant letter), 3. J-Drive (followed by the drive letter), 4. Fuel (followed by the fuel tonnage), 5. Hold (followed by the hold tonnage), and 6. Bridge (followed by the pilot expertise).

Below this data, list all turrets (numbered consecutively starting with T-1). After each turret designation, indicate the armament with which each turret is equipped, using the letters B (beam laser), P (pulse laser), M (missile launcher), and S (sandcaster). A triple turret would have up to three letters indicating the weapons installed in it, while a single turret would only have one. After the letters for the weapons, indicate the expertise of the gunner manning the turret. Also indicate the number of missiles present in each launch rack.

To the right of the card, indicate the computer model, as well as the CPU and storage capacity. Below that, indicate the computer programs which are carried on board the ship. During the game, these programs will be entered into the computer, and will be cycled from storage to CPU and back, so leave room to mark them with pencil to indicate their status.

The data card example below shows how a typical Type S Scout would be represented, armed with typical weaponry.

### DATA CARD EXAMPLE

Suleiman (Type S)		
1. M-Drive (A, 2G)	Model/1	
2. J-Drive (A, Jump-2)	CPU = 2	
3. Power Plant (A)	Storage = 4	
4. Fuel (40)		
5. Hold (3 tons, plus Air/Raft)	1-Target	1-Auto/Evade
6. Bridge (Pilot-1)	1-Return Fire	2-Anti-Missile
	1-Launch	1-Jump-1
T-1 (B, M) Gunner-1	1-Predict-1	2-Jump-2
five missiles on board	1-Navigation	1-Library

Data cards must be created for all starships and non-starships. When creating cards for non-starships which were designed and built in accordance with the design rules, the above format applies. The J-Drive letter designation is simply left blank. When a data card is made for such standard non-starships as pinnaces, cutters, or shuttles, the standard format is used, and appropriate items are left blank. M-Drive is referred to by the vessel type (pinnacle, shuttle, etc). No computer is available, and no programs are carried. Weaponry is listed below, but without turret designations.

## MOVEMENT

Ships in miniature combat move using their maneuver drive (M-Drive); use of the J-Drive exits a ship into interstellar space, out of the area of play. Maneuver drive uses thrust to accelerate a ship in a specific direction for a specified distance. This direction and distance is expressed as an arrow (a line in one direction) called a vector. Vectors determine how far, and in what direction, a ship can travel.

Each ship has a vector, which expresses that ship's velocity as a line (arrow) of a specific direction. For example, a ship might have a vector of 6 inches at 90°, or of 4½ inches at 277°. It is possible to have a vector of 0 inches, whereupon the direction becomes irrelevant (in this case, the ship is stationary). Vectors are marked on the playing surface using string or soft wire. On some playing surfaces chalk can be used.

A ship's vector determines the direction and distance a ship will travel in the next turn, provided it is not changed by voluntary acceleration, or by gravitational effects. With a vector of 6 inches at 90°, a ship will travel 6 inches at 90° in its next movement phase. In clear space, without gravitational influence, and without voluntary acceleration by the ship, it could travel at 6 inches per turn (direction 90°) forever.

Acceleration involves altering a ship's vector by adding another to it; this new vector can come from thrust using the M-Drive, or from gravity. In either case, the method is the same. Vectors are added by placing them in a chain, head to tail, and drawing a new vector from the tail of the first to the head of the last.

For example, in figure A., to add two vectors (vector 1: 3 inches, 90°; vector 2: 1 inch, 90°) place the tail of vector 2 at the head of vector 1, and draw a line from the tail of the first to the head of the last. This becomes a new vector of 4 inches, 90°.



Figure A.

As a more complex example of vector addition (vector 1: 3 inches, 90°; vector 2: 3 inches 180°), in figure B., the tail of vector 2 is placed at the head of vector 1, and a new vector is drawn from the tail of vector 1 to the head of vector 2. In this case, the new length is approximately 4.2 inches, with a direction of 135°.

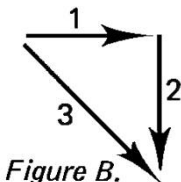


Figure B.

The important point to note, however, is that mathematics are not required for the solution of vector problems; a new vector is generated by simply laying all required vectors on the playing surface, and connecting them as shown above.

In a player's movement phase, he will indicate the acceleration (new vector) he wishes to apply, and note any gravitational influence vector he is required to apply, and then add them to his ship's present vector. His ship then moves in the direction of its new vector, for the length of the vector. The vector then remains on the playing surface for reference during the next applicable movement phase.

Ships are restricted in the amount of acceleration which they may make (and thus are restricted in the size of new vectors they may add to their current vector in one movement phase. Generally, a ship cannot accelerate more inches than the size rating of its M-Drive. Thus, a standard design Free Trader is capable of 1 G acceleration, and cannot add more than a two inch vector per turn. This does not count acceleration due to gravitational influence, and does not restrict repeated acceleration in succeeding turns. While a Free Trader can only accelerate 2 inches per turn, after 10 turns, it would have accumulated a vector 20 inches in length.

There is no restriction on the number of accelerations which may be made by a fuelled ship, but the total acceleration in a turn in inches, may not exceed the size rating of the M-Drive. Should the letter class of the M-Drive (or the power plant) be reduced by combat damage, it may not exceed the revised size rating. Unused acceleration may not be saved or conserved to allow excess acceleration in following turns.

## PLANETARY TEMPLATES

To express the effects of gravity in a scenario, a representative template may be created for any world once the diameter of the planet (in thousands of miles) is known. If desired, the planetary density (expressed as a fraction of Earth density) may be included in the computations. Additionally, the specifications for certain standard worlds, and for the planets of the Solar System are provided in tabular form.

The following steps are required for the computation of necessary data.

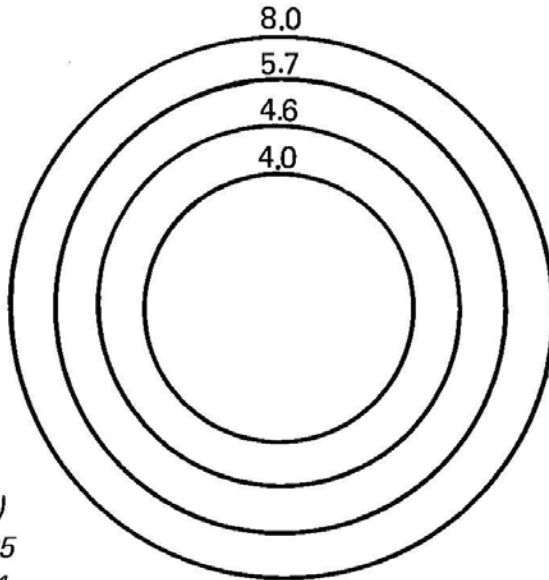
Step 1. Using the known values for D and K, compute the values for R, G, and M, as indicated in the planetary formulae chart, and record these values.

Step 2. Compute the values for L using formula 4, by substituting varying values for G, beginning at 0.25 and increasing in 0.25 increments until the value for G equals or exceeds the value for G found in step 1. Record these.

Step 3. Using a compass and ruler, inscribe concentric circles on a paper or cardboard template. From a central point, indicate the planetary surface by inscribing a circle of radius R. Then inscribe circles to mark expanding bands using as a radius the increasing values of L determined in step 2.

The units of measure for R, D, and L are inches (which represent thousands of miles);

<p style="text-align: center;"><b>PLANETARY FORMULAE</b></p> <ol style="list-style-type: none"><li>1. <math>R = D/2</math></li><li>2. <math>G = K (R/4)</math></li><li>3. <math>M = G^3</math></li><li>4. <math>L = 4 \sqrt{M/G}</math></li></ol>
---



*Earth  
(or Terra)  
E8679725  
D=8, R=4,  
G=1, M=1, K=1.*

G is stated in terms of Earth gravity (one inch per [ten minute turn]<sup>2</sup>); K refers to density in terms of Earth = 1.0; and M is stated in terms of Earth mass equals 1.0.

As an example of these computations, the following steps were taken to determine the values for a template for Earth:

Step 1. Earth has a diameter (D) of 8 and a density (I<) of 1.0. Thus, R = 4 (8/2=4). G = 1 (1.0x4/4= 1). M=1 (13 = 1).

Step 2. Because G at the planetary surface equals 1, it is necessary to determine L for strengths of G of 0.25, 0.50, and 0.75. At 0.25 G, L = 8.0 (4 x square root of 1/0.25 = 4 x square root of 4 = 4 x 2 = 8). At 0.50 G, L = 5.7 (4 x square root of 1/0.50 = 4 x square root of 2 = 4 x 1.414 = 5.7 approximately). At 0.75 G, L = 4.6 (4 x square root of 1/0.75 = 4 x square root of 1.33 = 4 x 1.15 = 4.6 approximately).

Step 3. The template is now drawn using a compass and ruler. A circle of radius (R) of 4 is drawn to indicate Earth's surface. A circle of with a radius of 4.6 inches is drawn to indicate the limit of 0.75 G influence. Similarly, circles with radii of 5.7 inches (for the limit of 0.50 G influence) and 8 inches (for the limit of 0.25 G influence) are drawn.

The resulting template is 16 inches in diameter (8 inch radius), and represents the Earth and its gravity well. The solid planet area should be shaded to indicate this fact, and the gravitational bands should be marked with their strengths. The template should be marked with its values for R, G, M, D, and K, as well as the planet's name, and any other interesting data.



*Some Notes of Interest:* In the scale presented for miniatures combat, no more than one planet or world of any important size will be on the average size playing surface. The moon (Luna) is 250,000 miles from Earth (Terra) and has a scale separation of 250 inches, or slightly more than 20 feet. However, a ship can reach such a point in 16 turns (slightly more than 2% hours) by using a constant acceleration of 1G. This means that the shifting of templates will be necessary as the battle progresses.

Similarly, in the scale given, the sun (Sol) would require a template 371 feet in diameter (in order to include its gravity well out to 0.25 G), and its physical surface line would inscribe a circle 70 feet in diameter.

*Asteroids and Planetoids:* Asteroid and planetoid belts are composed of many small worldlets, each with no significant gravity, and with no atmosphere or significant size. The average density of such a belt is about one asteroid per 4 square inches (approximate separation: 2 inches; 36 asteroids per square foot). Asteroids may be scattered on the playing surface, or they may be placed on a template for ease of shifting.

## STANDARD WORLDS

Name	D	R	M	0.25	0.50	0.75	1.00	1.25
One	1.00	0.50	0.002	—	—	—	—	—
Two	2.00	1.00	0.02	S	—	—	—	—
Three	3.00	1.50	0.05	1.83	—	—	—	—
Four	4.00	2.00	0.125	2.82	S	—	—	—
Five	5.00	2.50	0.24	3.95	2.77	—	—	—
Six	6.00	3.00	0.42	5.18	3.67	S	—	—
Seven	7.00	3.50	0.66	6.54	4.63	3.78	—	—
Eight	8.00	4.00	1.00	8.00	5.70	4.61	S	—
Nine	9.00	4.50	1.42	9.56	6.76	5.52	4.78	—
Ten	10.00	5.00	1.95	11.18	7.89	6.44	5.58	S

## THE SOLAR SYSTEM

Mercury	3.00	1.50	0.05	1.78	—	—	—	—
Venus	7.50	3.75	0.82	7.24	5.12	4.18	—	—
Earth	8.00	4.00	1.00	8.00	5.70	4.61	S	—
Mars	4.20	2.10	0.11	2.65	—	—	—	—
Jupiter	88.00	44.00	318.00	142.66	100.67	82.36	71.33	63.79*
Saturn	75.00	37.50	95.20	78.05	55.19	45.06	39.02	—
Uranus	29.00	14.50	14.50	30.46	21.54	17.58	15.23	—
Neptune	28.00	14.00	17.30	33.27	23.52	19.21	16.63	14.88
Pluto	3.60	1.80	0.004	—	—	—	—	—

\*Jupiter at closer distances: 1.50G = 58.24, 1.75G = 53.92, 2.00G = 50.43, 2.25G = 47.55, 2.50G = 45.11.

Note: D=Diameter, R=Radius, M=Mass. The columns marked 0.25 through 1.25 indicate the strength of gravity at the distance shown in the column. S indicates that that is the strength of gravity at the world's surface.

## GRAVITY

When the vector of a ship passes through the gravity bands of a world, the gravity may alter that vector. During the movement phase, lay out the vector of the ship to determine where it will move. If the exact midpoint of the vector lies in a gravity band, a gravity vector will be added to the course vector to create a new vector. The length of this gravity vector is equal (in inches) to the strength of the gravity band in Gs. Thus, a vector dictated by the 0.5 G band of a world is 1.0 inches long. The gravity vector is parallel to a line connecting the regular course midpoint to the planetary template center. It is added to the regular course vector (along with any ordinary course change vector) during a player's movement phase.

## LASER FIRE

In the laser fire phase of a player turn, the phasing player may fire his laser weaponry at enemy targets. The following procedure dictates the order of actions which must be taken by ships using laser fire. Several variables may affect this action.

**First**, the firing player selects the target at which the turrets of a single ship will fire. All lasers from one turret must fire on the same target; lasers from different turrets may fire on different targets if a multi-target program is running and will allow such activity. The firing player then continues to designate the targets for all of his ships.

**Second**, the firing player determines all applicable attack DMs and sums them to create one specific DM which he will use. Because of differences in ships, he may create one DM for each ship involved. Most attack DMs are the result of computer programs, but some may be forced by ship damage, faulty weaponry, or other disadvantages.

**Third**, the target player then determines all applicable defense DMs and sums them to create a single defense DM to be used against the enemy fire. Defense DMs result from such circumstances as obscuring sand or atmosphere, range, or defensive programs.

**Fourth**, two dice are thrown, and that result modified by both the attack and defense DMs. If the modified result equals or exceeds 8, a hit has been achieved. The dice throw is made once for each firing laser weapon. The total number of hits is noted.

**Fifth**, each hit received is located on the target ship. Using another two dice throw for each hit, the hit location table is consulted, and a specific effect is obtained and marked on the ship data card.

Laser fire is possible only for the phasing player, and hits are imposed on the target ship immediately. Return fire occurs in the following phase, and may be conducted only by ships which are capable of doing so after this phase.

**Shifting Fire:** Each firing ship must allocate its fire to a specific target before any ship has actually fired. Such allocation may be changed (shifted) if the target is destroyed before any weapons on the attacking ship have fired, but such a shift is subject to a DM of -6 in addition to all other applicable DMs.

## LASER FIRE DMs

### *Attack DMs*

Target Program .....	E
Predict Program .....	*
Pulse Laser .....	-1

### *Defense DMs*

Maneuver/Evade Program .....	*
Auto/Evade Program .....	-2
Range Greater than 150" .....	-2
Range Greater than 300" .....	-5
Per 1/2" of obscuring sand.....	-3

\* depends on exact program in use. E indicates that no DM is provided for that item.

## LASER RETURN FIRE

Laser return fire is conducted by those ships which have been targets for laser fire from enemy weaponry in the preceding laser fire phase. Both the target and return fire programs must be in the computer, but they cycle into the CPU only if actually used. Laser return fire may only be directed at an enemy ship which fired at this ship. Laser return fire may be made against multiple enemy ships only if the multi-target program is also present.

Anti-missile fire also takes place in the laser return fire phase. It is dependent on the anti-missile

fire program or the ECM program, or both. For anti-missile fire, no target program is necessary.

## ORDNANCE LAUNCH

During the ordnance launch phase, missiles or sand, or both may be launched, provided both launch and target programs are running. In addition, lifeboats or ship's vehicles may be launched (without programs being necessary) as desired.

During the ordnance launch phase, missiles or sand which contacted a target in the preceding movement phase now explode or take effect.

Ordnance must be specified as launched during the launch phase, and only one missile or sand canister may be launched from a launch rack or sandcaster. The launched item does not actually move until the following friendly movement phase. All ordnance which is launched has the launching ship's vector, which must be taken into account.

**Reloading:** Each launcher (sand or missile) has an inherent capacity for three missiles or canisters. This means that a triple turret with three missile launchers has a total of 9 missiles in immediate position. Such missiles are fully selectable by the gunner for type.

When a launcher's missiles or canisters are exhausted, it may be reloaded by the turret's gunner in one turn. Reloading three launchers would take three turns. A gunner engaged in reloading is unable to fire other weaponry in the turret.

**Missile Detonation:** Ordnance which impacts a target in a movement phase, and which then survives anti-missile fire, detonates in the ordnance launch phase. This detonation has a variable effect based on the range at detonation. For each missile, throw one die to determine the number of hits inflicted; determine each resulting hit type separately. When consulting the hit type table, apply a DM of -4.

## COMPUTER PROGRAMMING

The computer installed on board a ship controls all activity for the ship, and is especially used to enhance weapons fire and defensive activity. It also transmits con-

trol impulses for maneuver and jump drives, and conducts the routine operation of all ship systems. What the computer actually does is based on the programs actually installed and operating at any one time. .

Computers are specified in terms of their capacity to process and store programs. All programs in the computer's CPU are processed simultaneously, while programs in storage are available on a revolving basis to replace those in the CPU as needed.

For example, a model/1 computer has a CPU capacity of two, and an additional storage capacity of four. The computer might have in it six programs, (each of size or space 1): return fire, predict 1, gunner interact, auto/evade, maneuver, and target. Of these six, only two (the capacity limit of the CPU) can function at any one time (in one phase). In the laser return fire Phase, both target and return fire programs would be required, and only those programs could be used with this capacity CPU to effect laser return fire. During a laser fire phase, again, only two programs could be used: target is required, but the player could select between predict 1 or gunner interact for the program to be processed, depending on which would allow the greater benefit.

During the computer reprogramming phase, specific programs may be removed from the computer and others inserted. To continue the example above, both jump-1 and navigation would be required for the performance of an interstellar jump. Both programs would be fed into the computer during the reprogramming phase, but only after sufficient space had been cleared (perhaps by removing the maneuver and auto/evade programs).

Computer programs are presented in the Computer software list. They are classified as defensive, offensive and routine programs.

Defensive programs are used to protect a starship against enemy action.

**Maneuver/Evade:** The six maneuver/evade programs automatically produce minor movement for a ship, thus reducing the chances of the ship being hit by laser fire. Each has a DM based on pilot expertise to introduce this action. In addition, these programs allow the use of the maneuver drive as required, in lieu of the normal maneuver program.

**Auto/Evade:** This program is similar to maneuver/evade, but only introduces a defensive DM against laser fire of -2.

**ECM:** The electronic countermeasures program jams and confuses the homing heads of incoming missiles, forcing them to explode prematurely in many cases. During the laser return fire phase, all missiles in contact with the ship are destroyed without damage to the ship, on a throw of 7+.

Offensive programs are intended to allow the use of weapons mounted on a ship to damage or destroy enemy vessels.

**Target:** This program identifies the target and controls all turrets on board ship. Target is required for all laser fire and launches except for anti-missile fire.

**Predict:** These five programs predict the future position of a target, allowing the insertion of lead into laser fire and an advantageous DM. Predict applies only to laser fire.

**Gunner Interact:** This program interfaces the expertise of the gunner in a specific turret to the hit probability of those lasers hitting. The expertise of the gunner becomes a positive DM to hit when using laser fire.

**Selective:** These programs allow a gunner to select either main compartment or engineering section as the target to receive hits to be inflicted. Each of the three selective programs inserts DMs against the probability of hitting the more restricted target, but hits, if made, are assured of going on the selected portion of the target.

**Launch:** This program is required to allow missiles to be launched from launch racks or sand to be fired from sandcasters, or both. The target program is also required.

**Multi-Target:** These programs allow a ship to attack more than one target at one time. Each turret may still only fire at one specific target, but different turrets may fire at different targets. This program is required if more than one ship target is fired on in the same phase. The target program is also required. This program is not required for use with the anti-missile fire program.

**Return Fire:** This program allows laser weaponry to fire at enemy ships which have fired at it in the immediately previous fire phase. Use of this program also requires the target program, and DMs allowed by other programs (such as gunner interact) are allowed. If more than one enemy ship is fired on, the multi-target program is also required.

**Anti-missile:** This program allows any or all laser weaponry to fire at enemy missiles which have contacted the ship during the preceding movement phase. The target and multi-target programs are not required. Other programs do not effect the functioning of these programs (with DMs, etc).

**Double Fire:** This program allows a ship to draw excess power (if available) from the power plant, and thus increase the output of laser weaponry. When this program is functioning, a vessel with a power plant rated at least one letter higher than its M-Drive (and which has not yet taken damage to reduce the current letter rating to equal to or below the M-Drive letter) can fire a double beam or double pulse with laser weaponry. The normal dice throw to hit is made twice. Each time double fire is used, a throw must be made to determine if overload has occurred: For the first phase of such fire, throw 1+ to survive overload; for the second phase, throw 2+ to survive, etc. If the throw is not achieved, a hit is received on the ships power plant.

Routine programs are used to operate systems other than weaponry, and without regard to violent interaction.

**Maneuver:** This program is required to allow the use of Maneuver drive. In combat it is often replaced by the Maneuver/Evade program.

**Jump:** The jump programs are each required to allow the ship to perform a jump through interstellar space. The specific program for the jump distance required must be used.

**Library:** Much of the detailed information concerning the universe is contained in the purely informational library program. Crew and passengers often refer to this program before disembarking on a world. The referee will often find this a handy method of imparting commonly known information to the players. The note should be made that the library program is not all inclusive, and may be incorrect in some facts.

**Generate:** The navigator or pilot can input specific co-ordinates into the computer concerning a destination, and the generate program will create a flight plan to take the ship there. In cases where a generate program is not available, starports have single-use flight plans (in self-erasing cassettes) available for all worlds within jump range, and for which space lanes exist ( see Book 3).

**Navigation:** Flight plans must be fed into the navigation program, which then interfaces with the jump program to actually take a ship to its destination. To actually make a jump, both the jump and navigate programs must be functioning in the computer (the generate program need only run long enough to actually create the flight plan).

**Anti-Hijack:** This program constantly monitors conditions within the starship, and automatically locks the access doors to the bridge and controls when a hijack situation occurs. Because this system is not foolproof, would-be hijackers may gain access in spite of the program on a throw of 5 or less.

Player-characters can, and should, seek out new and different computer programs to assist them in the use and performance of their spacecraft. Generally, the writing of programs will conform to the outline given for computer skill in Book 1.

Certain types of standard craft (notably pinnaces, lifeboats, and the like) do not have standard computers. These craft may, in a game-turn, maneuver (accelerate or decelerate), or fire weaponry. They may not do both in the same turn. Return fire and anti-missile fire is not possible. A gunner on such craft may apply half of his gunnery expertise to a laser or launcher on the vessel.

## DETECTION

Starships can detect other ships at a range of approximately a half million miles (500 inches). Military vessels and scouts have detection ranges out to two million miles (2000 inches).

Ships which are maintaining complete silence cannot be detected at distances of greater than 100,000 miles; ships in orbit around a world and also maintaining complete silence cannot be detected at distances greater than 10,000 miles. Planetary masses and stars will completely conceal a ship from detection.

## DAMAGE DEFINITIONS

The following instructions detail the manner in which damage affects ships.

**Drives and Power Plants:** Each hit achieved on a drive or power plant reduces its letter classification by one. Thus C becomes B, X becomes W, etc. The potential of the drive or power plant is then computed based on its temporary new letter.

A power plant which is reduced to a level of the maximum drive potential table where its capabilities are marked with a dash cannot function. A drive reduced to less than A is destroyed, and must be replaced rather than repaired.

**Turrets:** Each turret hit incapacitates a turret, preventing it and its weaponry from functioning. In cases where multiple hits occur on a ship with more than one turret, dice randomly to determine which turret or turrets are hit.

**Hull:** A hull hit decompresses the ship's hull interior. Further hull hits have no effect.

**Hold:** A hold hit allows potential damage to items in the hold, including ship's vehicles and lifeboats, as well as cargo. Dice to determine randomly which items are damaged. Such damage may be repairable under the expendables rule.

**Fuel:** Each fuel hit punctures a fuel tank, and releases about 20 tons of fuel. When sufficient fuel hits have been inflicted to account for 60% of fuel tankage, the

vessel may not make a jump; when all fuel is accounted for, the vessel may not use its maneuver drive.

**Computer:** Each hit on the computer increases its chance of malfunctioning. The basic throw for a computer to operate in any situation is 1+, indicating extreme reliability. Each hit on the computer serves as a DM of -1 on the throw to operate. Thus, after three hits are inflicted on the computer, a DM of -3 is applied to the throw of 1+ to operate. The throw to operate is made each time the computer is used (in combat, this is generally once per phase). A computer which does not make its throw to operate malfunctions for the remainder of the phase. A new throw is made at the beginning of the next phase. A computer which has received 12 hits is permanently malfunctioning.

Persons with computer expertise may apply their skill level as a DM on the throw to operate.

A computer which is not operating effectively paralyzes a starship.

**Small Craft Passenger Section:** A hit on a small craft passenger section results in explosive decompression if decompression has not already occurred. Additional hits have no effect. Persons in vacc suits while in the passenger section are unaffected.

**Small Craft Weaponry:** A hit on the weaponry of a small craft destroys that weaponry. Additional hits have no effect.

**Small Craft Drive:** A hit on the drive of a small craft destroys the drive; the craft cannot maneuver or accelerate.

Hits as a result of laser fire, laser return fire or missile detonation are located on the target vessel through the use of the hit location table. Such damage as indicated above is then marked on the ship's data card.

Dice	Starship	Small Craft
2	Power Plant	Drive
3	Maneuver	Drive
4	Jump	Drive
5	Computer	Drive
6	Hull	Drive
7	Hull	Cabin
8	Hold	Cabin
9	Fuel	Cabin
10	Turret	Weaponry
11	Turret	Weaponry
12	Turret	Weaponry

## SPECIAL SITUATIONS

The following are descriptions of the manner in which several special situations may be handled when they arise. In addition to the specific instructions given, they also serve as a model for the creation of methods of handling other special situations.

**Decompression:** Starships (and non-starships) depressurize their interiors before combat whenever possible; the passengers and crew resorting to vacc suits for safety and comfort. This procedure minimizes the danger due to explosive decompression as a battle result. In some cases, selected areas may remain pressurized (perhaps the hold, for the safety of delicate cargo) while other areas are depressurized.

Any number of areas in the ship may be depressurized in the span of one turn (ten minutes). Repressurization requires two turns.

The following parts of the ship may be individually regulated: engineering section, hold, bridge, staterooms (individually), turrets (individually). The pilot controls depressurization from the bridge.

Hull hits result in explosive decompression if pressure has not already been lowered. Explosive decompression kills all persons in that section unless a vacc suit is available and put on immediately. Throw 9+ to put on an available vacc suit; DM + level of vacc suit expertise, and DM + dexterity of the individual.

**Atmospheric Braking:** Ships passing very close to the surface of a world with a standard or dense atmosphere may slow their speed through atmospheric braking. If any portion of a ship's vector passes within 1/4 inch of a world's surface, that vector is reduced by 1/4 inch in length.

**Abandon Ship:** Should circumstances warrant, a ship may be abandoned using ship's vehicles or other methods.

Military vessels (including exploratory vessels) can generally board the full passenger and crew complement of their ship's vehicles, and launch them during the ordnance phase of a turn, provided those individuals perform no other activity during the turn. If individuals are in vacc suits, each boards on a throw of 6+, boarding in the next turn if unsuccessful.

Non-military vessels require 1 to 6 turns (throw one die to determine the number of turns) to fully load all ship's vehicles. Crew members in the vehicles may elect to abandon ship without waiting for stragglers.

Individuals in vacc suits may abandon ship during the ordnance launch phase providing no other activity is performed during the player turn. Such persons may then be picked up by other ships or vehicles.

Individuals in vacc suits who are not picked up may attempt to land on a planet. The following notes apply:

1. A vacc suit can support its occupant for up to 100 ten-minute turns; an additional air/recycling tank will provide another 100 turns.

2. A vacc suit is capable of a total of 3 inches of acceleration.

3. A foamed atmospheric reentry ablation shield (part of the vacc suit kit) can protect the individual while entering atmosphere, provided his vector, while entering atmosphere, does not exceed 2 inches.

4. Generally, accident or mishap can occur during the process. Throw 6+ to survive provided all else is performed properly.

**Wilderness Refuelling:** Unrefined fuel may be obtained by skimming the atmosphere of a gas giant if unavailable elsewhere. Most star systems have at least one gas giant; the presence of a gas giant can be predicted from a distance of Jump-1, or determined from the ship's library. Throw 10+ for a system to not have a gas giant present.

**Planetary Defense Fires:** Many planets have extensive defenses based on laser weaponry, either in orbit or emplaced on the planetary surface. Such weaponry functions in the same manner as ship's guns, generally as beam lasers, and generally in triple turret mounts. Orbital emplacements are treated as starships; planetary surface emplacements must receive turret hits to affect them.

Ships can fire on such defenses from space. Persons located on the surface and in contact with a ship can serve as forward observers to assist in accurate fire.

**Damage Control:** Damage inflicted on starships in combat can be repaired or controlled by crew members during the battle. Especially in the case of player-characters, expertise or skill in specific fields may be used to remove or repair damage. Usually, a throw of 9+ will repair one hit of damage, with skill serving as a posi-



tive DM. One repair attempt may be made per ten minute turn. Drive damage which has completely destroyed a drive or power plant cannot be repaired.

**The Ship's Locker:** Most vessels carry a complete survival locker, capable of supplying at least the crew of the ship with cold weather clothing, communicators, basic rations for at least several days, and medical equipment. Weapons other than knives are not generally stocked on non-military vessels, but characters owning their own ships may elect to provide shotguns, rifles, or other guns if they desire. They may also specify other items they consider valuable or necessary for survival situations.

**Strategic Movement:** Gross movement between the stars (the actual jumps performed by the jump drive) is executed on the star-maps generated in Book 3.

## STARSHIP ENCOUNTERS

When a ship enters a star system, there is a chance that any one of a variety of ships will be encountered. The ship encounter table is used to determine the specific type of vessel which is met. This result may, and should, be superseded by the referee in specific situations, especially if a newly entered system is in military or civil turmoil, or involves other circumstances.

Throw two dice; apply a DM based on the starport of the primary world of the system (A +6, B +4, C +2, D +1, E -2, X -4). The result indicates the ship type encountered. If necessary, exact specifications for the ship should be generated. Both Patrol and Pirate Ships will generally be Type S Scout/Couriers (throw 6-) or Type C Cruisers (throw 8+), with the chance that they are Armed Type Y Yachts (throw 7).

Free Traders, if friendly, may serve as a source of information about other circumstances in the system; Subsidized Merchants may also provide such information. Patrols may be simple border pickets, or may be a form of pirate, exacting tolls or penalties.

## COMMENTS

This system of starship combat is designed to be used in conjunction with Traveller characters, but may also be easily adapted to simple space combat when and if desired.

**Dimensions:** These rules envision play on a flat surface, such as a floor or tabletop; the use of a third dimension (height, altitude or elevation) is not required.

In small encounters (three or fewer ships, or groups of ships) the third dimension is not required as three points define a plane. Even with larger numbers of ships, a third dimension adds an element of complication not essential to the game.

For those who still desire three dimensional interaction, it is suggested that altitude above or below the playing surface plane be noted in inches, and trigonometry and/or electronic calculators be used to compute distances and altitude changes.

SHIP ENCOUNTERS	
Die	Ship Encountered
8 or less	No encounter
9	Free Trader
10	Free Trader
11	Free Trader
12	Pirate
13	Subsidized Merchant
14	Patrol
15	Subsidized Merchant
16	Yacht
17	Yacht
18	Patrol

**Optional Acceleration Effects:** The vector movement system used in this game assumes, for simplicity, that all acceleration is instantaneous, and occurs at the beginning of the movement phase of the turn. For those who wish a greater degree of realism, note that, if acceleration occurs evenly during the movement phase, initial movement (i.e., during the turn acceleration is applied) will only be half that of the added vector ( $D = \frac{1}{2}at^2$  for constant  $a$ ). Full effect of the new vector will be felt only on succeeding turns. This also applies to the force of gravity.

**Non-Miniatures Battles:** In the course of normal Traveller adventures, starship travel should be subject to the encounters and potential battles called for by this rules section.

Generally, when a ship enters a star system, the encounter table should be consulted. If a ship is present, the encounter should be resolved, whether by communicator, boarding, warning shots, or simple combat.

Ship encounters may be made an easily included part of adventures by abbreviating the movement requirements. In essence, when an encounter occurs, shots (if they occur) are traded without regard to range initially. When one vessel elects to flee, the referee then states that a certain number of shots may be made before the ship is out of range.

For greater detail, it is also possible to plot the progress of a space battle on paper, without regard to miniatures. Such activity gives a permanent record of the activity, and allows the imposition of appropriate scales as necessary.

# Drugs

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A variety of pharmacological means are commonly (or uncommonly) available to travellers for medicinal (and other) purposes. Each drug has its own advantages and disadvantages, which users would be well served to be aware of.

Drugs, for uniformity and ease of use, are usually available in consistent, one-dose pill form. The six classes of drug described below are generally well known in the civilized universe. Psi-drugs are described in the section dealing with psionics. Other drugs are possible, but their use and availability must be prescribed by the referee.

**Slow Drug** is named because it makes the universe (from the viewpoint of the user) appear to move more slowly. This effect is achieved by accelerating the user's metabolism. In effect, the user lives at a much faster rate, approximately twice as fast as normal.

When taken, slow drug takes effect after three firing round (45 seconds), and continuing to function for 40 (real time) firing rounds. At the end of its effect, the user receives 1D in wounds or hits. A person using slow drug, because he is living at twice the normal rate, is allowed two combat rounds to each one available to normal individuals. The person can fire a weapon twice, or make two combat swings or blows, or move twice as far as normally.

A medical slow drug is also available, being used to hasten recovery from wounds or illness. One dose causes unconsciousness, and the passage of 30 days equivalent time in one day. During this period, ordinary healing takes place. No wounds or hits are received from the use of medical slow drug. Be certain to note the passage of time at the increased rate during period of drug use.

**Fast Drug** is named because it makes the universe (to its user) appear to move much more quickly; the drug slows down personal metabolism at a ration of approximately 60 to 1. Users are extremely vulnerable because they are living at such a slow rate; but physical aging is also slowed, and the need for consumable supplies is reduced, thus allowing conservation of air and food.

Fast drug takes effect immediately upon ingestion; one dose lasts for 60 days, making that time appear to be only one day. An antidote exists which cancels the effect remaining when taken.

**Combat Drug** is taken by fighters (usually military personnel) prior to combat. It increases personal strength and endurance each by two. The effect begins 2 combat rounds after taking, and lasts for 30 combat rounds. When the effect wears off, the user receives 1D in wounds.

**Medical Drug** is a general term describing the set of drugs used by medical personnel in the treatment of illness or injury. Generally, medical drug must be administered by a person with medical expertise, and the drug serves as medical treatment. Medical drug is used in conjunction with fast drug in most cases.

**Anagathics** are drugs which counteract the aging process. A regimen of regular monthly doses enables an individual to ignore the aging die throws and their potential for debilitation.

Because of the rarity and demand for anagathics, they are quite expensive, and are often unavailable at any price.

**Truth Drug** is used to compel individuals to answer interrogation truthfully. One dose is sufficient to assure truthful answers for approximately 2 minutes, after which the user experiences one hour of unconsciousness, and 2D in wounds.

The drug table indicates the name, gross effect, base price, technological index (see book 3) of the type of world on which it is generally available in pill form, and a throw for availability.

Availability indicates the chance that, after determined search, a band of adventurers will find an individual with some of the drug available for sale. A DM of +1 for each additional level of technological index on a world is allowed. DMs might be allowed for trained medical personnel, or admin or bribery expertise.

**Synergy:** If more than one drug is taken (except medical drug), the combination may have an adverse effect, called synergy. In addition to all other effects of drugs, throw one die for each drug taken, and multiply the results together. This indicates the number of hits or wounds received as a result of synergy. Such hits are inflicted at the end of the period of drug use.

## DRUGS

<i>Type</i>	<i>Effect</i>	<i>Price</i>	<i>Tech</i>	<i>Availability</i>
Slow	2:1 Slower	CR 500	8	9+
Medical Slow	30:1 Slower	CR 100	7	7+
Slow Antidote	counteracts slow drug	CR 600	10	10+
Fast	60:1 Faster	CR 200	9	8+
Fast Antidote	counteracts fast drug	CR 900	12	9+
Anagathics	voids aging throws	CR 20000	15	10+
Truth	two minutes of truth	CR 5000	8	7+
Combat	+2 Stren, Endur	CR 750	9	6+
Medical	aids recovery	CR 100	6	9+
Psi-Booster	see psionics	CR 1000	see psionics	
Psi-Double	see psionics	CR 4000	see psionics	
Psi-Special	see psionics	CR 10000	see psionics	

**Legality:** Worlds may have legal restrictions regarding the possession and use of drugs. Book 3 fully describes worlds; there is a chance that local law will prohibit or regulate drug possession and use based on the law level of the world. Throw two dice: if the result is equal to or greater than the law level of the world, there is generally no problem. If the result is less than the law level, then using, possessing or attempting to purchase drugs is considered to be illegal.

# Experience

As characters travel through the universe, they already know their basic physical and mental parameters: their basic education and physical development have already occurred, and further improvement can happen only by dedicated endeavor. The experience which is gained as the individual character travels and adventures is, in a very real sense, an increased ability to play the role which he has assumed.

## SELF-IMPROVEMENT

Limited personal development and experience is possible in the sense of increasing abilities and skills. Such potential for increases is possible in four specific areas, only one of which may be attempted at one time: education, weapon expertise, other skills, and physical fitness.

In each field, the character devotes himself to a four-year program of self-improvement, dedicating his endeavors in something like obsession, to the general end of self-improvement. Because persons do not always have the will to continue with such a program, there is the chance that the program will be planned, but never actually carried out. After the general field has been chosen, the character must make a dedication die roll. Throw 8+; no DMs apply except when throwing to enter a physical fitness program, in which case +2 if intelligence is 8 or less, +4 if intelligence is 5 or less. Failure to achieve this throw indicates that the self-improvement program is not carried out, and a new one may not be attempted for at least one year. Success in the throw indicates that the program is undertaken.

*Education:* A character with an education characteristic lower than his intelligence characteristic may improve his education level through the use of correspondence courses and tutoring. In general such courses (or tutors) have a base price of CR 50 per week. Generally one session per week is taken, though 2 per week are possible. After 50 sessions are completed (about one year), the character's education level is increased by one. In the four-year period, it is possible to increase the education characteristic a maximum of 6 levels.

Education increases gained are permanent. A character may not work in this area unless his education characteristic is lower (at the start of the program) than his intelligence.

In addition, any character may, once in his life, take a sabbatical (for 4 years) for the purpose of specifically gaining a skill through education. Such activity is the equivalent of a technical school or college education, and allows the acquisition of one specific non-weapon skill with a level 2. Cost of this education is CR 70,000.

*Weapon Expertise:* The skill which a character has in his weaponry indicates his native trained ability; by dedicating himself (through training and practice) to specific weapons, the character may hone his skill on a temporary basis. Consider that highly skilled marksmen achieve their best work when at the peak of their training. One gun and one blade weapon may be chosen; skill level in each is increased by 1 for the duration of the program. If a weapon is chosen in which the character has a skill level of  $\frac{1}{2}$ , his skill level is increased, for that weapon, to 1 on a permanent basis.

At the end of this program, skill increases are lost unless the program is extended or continued formally for another four years. After a second four-year program, the improved skill level becomes permanent. This permanent level may then

itself be temporarily improved by further programs of training. Any weapons may be chosen for this type of program, and one or both weapons may be dropped for new ones in the succeeding program.

For example, Johnson has skills of foil- $\frac{1}{2}$  and revolver-3, and chooses to practice in these weapons. After successfully making his throw of 8+ for dedication to purpose, his skill levels for these weapons become foil-1 and revolver-4. At the end of the four-year program, his skills would revert to foil-1 and revolver-3 if he does not continue his program of training. Johnson successfully makes his dedication throw of 8+ again, and continues in these two weapons. His skill level becomes foil-2 and revolver-4. At the end of that 4 year program, he elects to abandon this self-improvement for another program, and his weapons skills revert to foil-1 and (because he has spent a second four-year program on revolver) revolver-4.

*Skill Improvement:* In a fashion similar to that of weapon expertise, a character may temporarily improve his skill in another field by dedicating himself to it for a program of 4 years duration. Only two skills may be chosen, and the individual must already have a level of at least 1 in each skill. Skill level reverts to the original level at the end of the program. If the program is continued for a second four-year period, the new skill level becomes permanent at the end of that period.

*Physical Fitness:* Because many individuals find a regimen of physical conditioning unrewarding intellectually, a dedication throw of 8+ is required (DMs of +2 for intelligence of 8 or less, or +4 for intelligence of 5 or less. If the throw is attained, the character increases his three physical characteristics (strength, endurance, and dexterity) each by 1. This increase remains in effect for the duration of the physical fitness program. Physical characteristics may never be increased to more than 15.

The pursuit of a program envisions that the required materials will be available on a regular basis. Weapons training requires the weapons specified; tutoring requires a tutor. If the required materials are not available, the program is suspended temporarily, but the benefits are not lost if the suspension is of less than 3 months duration.

## **ALTERNATIVES**

The above is the only ordinary method of self-improvement available to characters. Highly scientific or esoteric methods of improving personal skills and characteristics are logically available, provided the individuals search hard enough for them. Such methods could include RNA intelligence or education implants, surgical alteration, military or mercenary training, and other systems. Alternatives to the above methods must be administered by the referee.

# Trade and Commerce

Although most commercial starships routinely carry cargos as common carriers, charging a flat rate per ton for the service, many also engage in speculation by buying goods at low prices, transporting them in spare cargo space, and then selling them for higher prices in markets anxious for them.

A reasonably comprehensive listing of trade goods and speculation items is presented in the trade and speculation table. Some of the goods have base prices which will provide a return insufficient to pay even the overhead necessary for them; nonetheless, it could prove more profitable to transport such goods than to ship empty hold space.

All listed trade goods have a specified base price which indicates the absolute value of the goods on a constant scale. The actual value table indicates the price such goods may be purchased for, by showing a percentage modification to the base price. Upon arriving at a potential market, the selling price may also be determined as a percentage of the base price (not actual purchase price).

## PROCEDURE

A trader with cargo space available and free capital with which to speculate may seek out suitable goods to buy and sell. The referee throws two dice, noting their results consecutively, to create a number between 11 and 66. A DM of +1 is imposed on the first die if the world's population is 9 or greater; a DM of -1 is imposed if the world's population is 5 or less. A modified throw of less than 1 is 1, greater than 6 is 6. This throw indicates a search by the characters has determined that this type of trade good is the best item available for the purpose. A throw may be made once per week.

The quantity of goods available is then determined. Throw the number of dice

### ACTUAL VALUE TABLE

Die	Percentage
2	40%
3	50%
4	70%
5	80%
6	90%
7	100%
8	110%
9	120%
10	130%
11	150%
12	170%
13	200%
14	300%
15	400%

and multiply as shown (3Dx5 indicates the result of a three dice throw multiplied by 5). This is the quantity of goods available in the lot, expressed in tons except in the case of items 51 through 56, which are expressed per each item. Goods are available up to the quantity encountered. A lot may be split or partial purchases may be made if the characters desire. Such partial purchases do entail a handling fee of 1% if made.

The price of goods is determined by consulting the actual value table; a two dice throw determines the percentage of the base price to be paid for the goods. This value multiplied by the quantity of goods in the lot gives the net cost of the items to the characters.

The actual value table is subject to DMs from three sources: character's skills, brokers' services, and world characteristics.

**Broker's DMs:** Four types of brokers are available to assist in the sale of goods once delivered to a world. Each must be paid his fee even if the seller decides not to sell his goods. Broker's fees are related to their general worth; 5% of sale price for each +1 to the resale die throw. Thus, a +4 broker receives a 20% commission for determining the best resale price around. A broker DM may never be higher than +4. Only one broker may assist with a sale.

**Character Skills:** If characters are skilled in bribery or admin, they may apply these as DMs for the sale of goods. In any given transaction, such DMs may be used by only one person.

**World Types:** The trade and speculation table indicates purchase and resale DMs based on world types. Book 3 indicates the meaning of various world characteristics for other aspects of the game. They are used here to define six world types of interest: agricultural and nonagricultural, industrial and nonindustrial, rich and poor worlds. A world may meet the criteria for more than one label. Those meeting criteria for more than one label are subject to the DMs for each such label when using the trade goods table.

**Agricultural Worlds:** Any world with atmosphere 4 - 9, hydrographic percentage 4 - 8, and population 5 - 7 is an agricultural world.

**Non-Agricultural Worlds:** Any world with an atmosphere 3 or less, hydrographic percentage 3 or less, and population 6 or greater is a non-agricultural world.

**Industrial Worlds:** A world with an atmosphere 0, 1, 2, 4, 7, or 9, and a population of 9 or more is an industrial world.

**Non-Industrial Worlds:** Any world with a population of 6 or less is a non-industrial world.

**Rich Worlds:** Any world with a government type of 4 - 9, an atmosphere of 6 or 8, and a population of 6 - 8 is a rich world.

**Poor World:** Any world with an atmosphere of 2 - 5, and a hydrographic percentage of 3 or less is a poor world.

The trade goods table lists many types of goods, often of general classes which may be of interest to characters for various uses. The goods labels are abstractions, such that a cargo of firearms could potentially be any form from muzzle-loading replicas to laser carbines. Should characters wish to divert some part of the cargo to personal use (through payment or pilferage), the exact type of cargo must be determined by the referee.

When determining the contents of a cargo, the players and referee must be certain to correlate the established price of goods with the cost per ton. For example, the base price of a shotgun is CR 150, while a ton of firearms as trade goods has a base price of CR 30,000. A strict weight extension of the shotgun (3.75 kg per shotgun) would indicate 266 shotguns. Extension should be instead based on price, with weight as a limiting factor. Thus one ton of shotguns would contain 200 guns, at CR 150 each. The extra weight would be considered packing and crates. Similar calculations should be made to keep prices in line on other trade goods.

Some goods (those results 51 - 56, and 66 on the table) are sold individually instead of by the ton. Quantity is expressed in single units; tonnage weight and base prices must be determined by the players or referee in accordance with established prices and equipment.



## TRADE AND SPECULATION TABLE

Die	Trade Good	Base Price	Purchase DMs	Resale DMs	Quantity
11	Textiles	3000	A-7, NA-5, NI-3	A-6, NA+1, R+3	3Dx5
12	Polymers	7000	I-2, R-3, P+2	I-2, R+3	4Dx5
13	Liquor	10000	A-4	A-3, I+1, R+2	1Dx5
14	Wood	1000	A-6	A-6, I+1, R+2	2Dx10
15	Crystals	20000	NA-3, I+4	NA-3, I+3, R+3	1D
16	Radioactives	1000000	I+7, NI-3, R+5	I+6, NI-3, R-4	1D
21	Steel	500	I-2, R-1, P+1	I-2, R-1, P+3	4Dx10
22	Copper	2000	I-3, R-2, P+1	I-3, R-1	2Dx10
23	Aluminum	1000	I-3, R-2, P+1	I-3, NI+4, R-1	5Dx10
24	Tin	9000	I-3, R-2, P+1	I-3, R-1	3Dx10
25	Silver	70000	I+5, R-1, P+2	I+5, R-1	1Dx5
26	Special Alloys	200000	I-3, NI+5, R-2	I-3, NI+4, R-1	1D
31	Petrochemicals	10000	NA-4, I+1, NI-5	NA4, I+3, NI-5	6Dx5
32	Grain	300	A-2, NA+1, I+2	A-2,	8Dx5
33	Meat	1500	A-2, NA+2, I+3	A-2, I+2, P+1	4Dx5
34	Spices	6000	A-2, NA+3, I+2	A-2, R+2, P+3	1Dx5
35	Fruit	1000	A-3, NA+1, I+2	A-2, I+3, P+2	2Dx5
36	Pharmaceuticals	100000	NA-3, I+4, P+3	NA-3, I+5, R+4	1·D
41	Gems	1000000	I+4, NI-8, P-3	I+4, NI-2, R+8	1D
42	Firearms	30000	I-3, R-2, P+3	I-2, R-1, P+3	2D
43	Ammunition	30000	I-3, R-2, P+3	I-2, R-1, P+3	2D
44	Blades	10000	I-3, R-2, P+3	I-2, R-1, P+3	2D
45	Tools	10000	I-3, R-2, P+3	I-2, R-1, P+3	2D
46	Body Armor	50000	I-1, R-3, P+3	I-2, R+1, P+4	2D
51	Aircraft	1000000	I-4, R-3	NI+2, P+1	1D
52	Air/Raft	6000000	I-3, R-2	NI+2, P+1	1D
53	Computers	10000000	I-2, R-2	NI+2, P+1, A-3	1D
54	ATV	3000000	I-2, R-2	NI+2, P+1, A+1	1D
55	AFV	7000000	I-5, R-2, P+4	NA-2, A+2, R+1	1D
56	Farm Machinery	150000	I-5, R-2	A+5, NA-8, P+1	1D
61	Electronics Parts	100000	I-4, R-3	NI+2, P+1	1Dx5
62	Mechanical Parts	75000	I-5, R-3	NI+3, A+2	1Dx5
63	Cybernetic Parts	250000	I-4, R-1	NI+4, A+1, NA+2	1Dx5
64	Computer Parts	150000	I-5, R-3	NI+3, A+1, NA+2	1Dx5
65	Machine Tools	750000	I-5, R-4	NI+3, A+1, NA+2	1Dx5
66	Vacc Suits	400000	NA-5, I-3, R-1	NA-1, NI+2, P+1	1Dx5

Use this table to determine goods and prices for goods available for interstellar speculation. Die indicates the result of two consecutive die throws. Base price is the unaltered value of the goods. Purchase DMs alter this value based on the world of purchase. Resale DMs alter this value based on the world of resale. Quantity is the amount of goods in the lot which is available. Items 11 through 46 and 61 through 66 are expressed in tons. Items 51 through 56 are expressed per each single item.

Abbreviations: A = Agricultural World, NA = Nonagricultural World, I = Industrial World, NI = Nonindustrial World, R = Rich World, P = Poor World.

