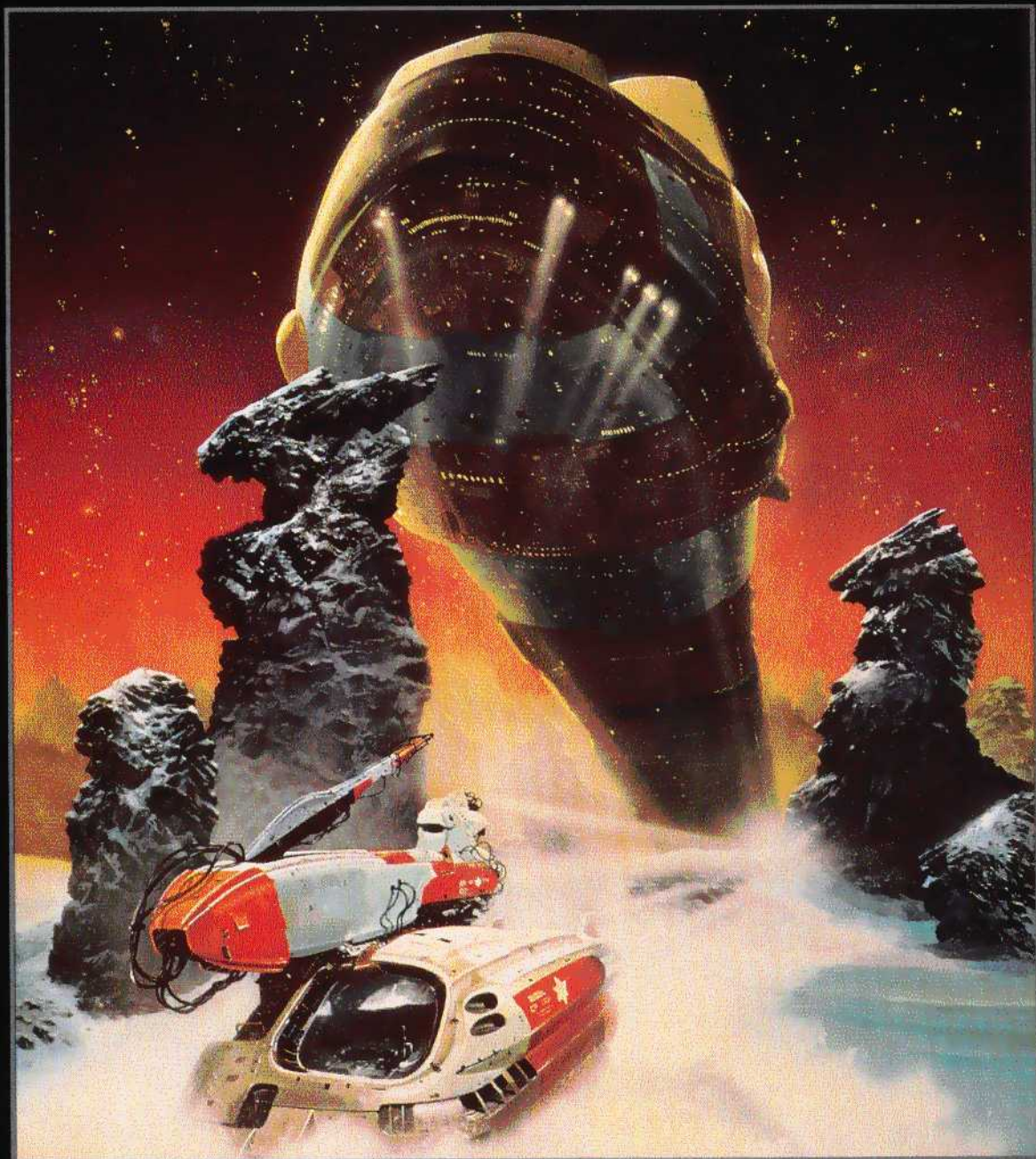


T4

# STARSHIPS™

MARC MILLER'S TRAVELLER®





## **Science-Fiction Adventure in the Far Future**

Learn the working of the Imperial Calendar on page 5.

Check out the luxurious interior of a Royal Class Liner on page 27.

Get the complete stat on a Corsair before you have to face one, on page 51.

Meet the brilliant Dr. Seldera and other personalities of note on page 57.

Design your own interstellar vessel from the ground up, starting on page 70.

Find out how various maneuver drives propel a starship on page 71.

Shop for futuristic space combat weapons for your starship on page 98.

## **The Future is Around The Corner**

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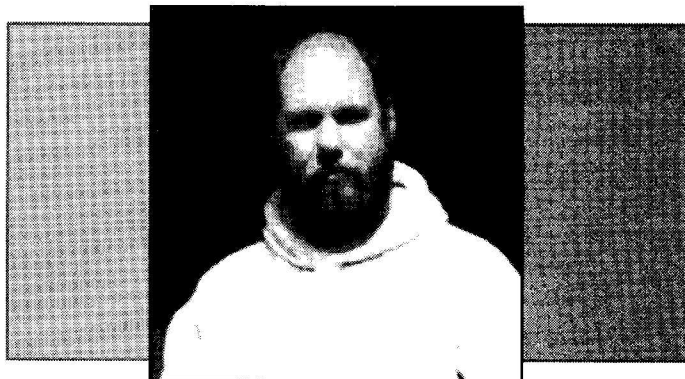
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*Knights of the Black Earth*, a science fiction novel set in the Star of the Guardians universe, co-author with Margaret Weis, Penguin USA/ROC, April 1995.  
*Robot Blues*, the second science fiction novel set in the Knights of the Black Earth universe, co-author with Margaret Weis, Penguin USA/ROC, 1996.  
*Theros Ironfeld*, a Dragonlance® Warriors series novel, TSR, Inc., 1996.  
*Doom Brigade*, a War of Chaos series novel, co-author with Margaret Weis, TSR, Inc., 1996.

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"First Dragon Army Bridge Building Company" in The Dragons of Krynn short story collection, TSR 1994.  
"War Diary of Lord Ariaken" to be published by TSR.  
"Island of the Brutes" in The History of Dragonlance collection, TSR 1995.  
"Fire One!" in Dragons of War short story collection, TSR, 1996.  
"Free Trader Beowulf" in the Journal of the Travellers Aid Society, Imperium Games, 1996.

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*Men at Arms*, 15 and 25mm Medieval Miniatures Rule Book, Editor and Publisher, 1993

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*Star Trek*® Collectible Trading Card Game from Fleer Skybox, design assistant to Jeff Grubb.  
*Wing Commander*® Collectible Trading Card Game from Mag Force 7, Co-designer and Producer with Jeff Grubb.  
*Star of the Guardians* Collectible Trading Card Game from Mag Force 7, Designer and Producer, 1995.  
*Supremacy*®, Board Game from Supremacy Games, Military Consultant, 1988.



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# INTRODUCTION

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The Third Imperium, much like any other organization of space-faring planets, relies on movement between planets to further its ends. Starships have served to move individuals, cargos, ideas, and passions across huge expanses of the known galaxy. To the seasoned traveller, the worlds and ports visited are merely transient places - sites for business, education, training, or battle. The true traveller calls the starship home.

This book describes the starships most commonly found in the new Third Imperium, as well as their use. Some of these ships are not new. Many have been in service for generations. They are, however, the backbone of Imperial society. Without them, there would be no trade, commerce, travel or off-world news.

All noteworthy starships traveling the Imperial space are presented here, along with detailed deck plans. Many events happen on starships, so it is important to know where things are happening, where different sections and equipment are, and how to get there. Each ship's capabilities are outlined in what is called a Universal Ship Profile. This standard notation describes each vessel and makes it possible to use the ship in the **Traveller** game and its basic ship-combat system.

This book also features the Standard Ship Design System. Although there is an immense amount of variety in the ships already detailed, there is always a need for a different ship than is available. Both civilian and military leaders commission the building of starships. Many times, the simpler module building system employed by most shipyards is not enough. The inherent wastage in ship designs from the lack of optimization can be critical in the design of a specific-to-type ship. The Standard Ship Design System provides naval architects the opportunity to create ships that use standardized parts, but do not have as much inherent waste as modular ships.

As Emperor Cleon I once said, "The Empire is nothing without the services of both civilian and military craft. To their crews, we give great thanks. Now, onward into space!"

## The Imperial Calendar

Counting time is an essential part of any activity. Naturally enough, many different ways of counting time have been established throughout the regions of space explored by man and by the races that man has encountered. The major time-counting for use in the Imperium is known as the Imperial Calendar.

Imperial time-keeping is based on the time units of the Terran Confederation. During the Rule of Man, the basic units of the Terran day (24 hours) and the Terran year (365 days) were imposed on First Imperium territories by the Terran conquerors. During the Long Night, the day and year remained in place in what little interstellar trade was available, and by the time the Third Imperium was established, these particular spans for day and year was easily accepted.

The time periods were simplified: The day was made exactly 24 hours, and the year exactly 365 days.

**Base Point:** Imperial dates count from the year of the founding of the Third Imperium: the year 0. Dates before that are negative, dates after that are positive (with the sign usually suppressed).

**Date Format:** Within each year, the Imperial dating system uses a modified Julian system which consecutively numbers the days of the year from 001 to 365. Weeks of seven days and months of 28 days are used to indicate periods of time, but they are not named and are not used to indicate dates. The first day of the year is 001; the 100th day is 100.

A complete day and year is given in a date group: a three-digit day and a three- or four-digit year, separated by a hyphen.

**Imperial Format: ddd-yyyy (ddd =day; yyyy=year)**

Each year begins with a special day called Holiday: day 001. According to the Imperial calendar, Holiday is not a part of any week, but stands alone as a special day.

Because the Imperial year does not vary in length, it is possible to reuse the calendar from year to year, and days always fall on the same date (008 is always a Sevenday).

The adoption of the standard calendar produced a requirement for names for the days of the week. The decision was made to scrap the traditional Anglic day names and instead a series of numbered day names were established: Oneday, Twoday, Threeday, Fourday, Fiveday, Sixday, and Sevenday. The commonly accepted abbreviations are used extensively for these day names (1day, 2day, 3day, 4day, 5day, 6day, and 7day).

The Imperial calendar shown here is the standard one distributed throughout the Imperium. It can be used to determine dates for any year, plan for upcoming events, or as a record to denote the passage of time. It is a useful reference for noting dates for required ship maintenance, when starship payments are due, when birthdays will fall, and other time-keeping tasks.

The typical starship voyage spends one week in jumpspace between star systems. Most commercial ships spend the next week in their destination star system: traveling to the destination world, unloading cargo, finding new cargo and passengers, then traveling away to the jump point again. All of these activities can be tracked with the Imperial calendar.

# THE IMPERIAL CALENDAR

Holiday	Oneday	Twoday	Threeday	Fourday	Fiveday	Sixday	Sevenday	Oneday	Twoday	Threeday	Fourday	Fiveday	Sixday	Sevenday
001	002	003	004	005	006	007	008	009	010	011	012	013	014	015
	016	017	018	019	020	021	022	023	024	025	026	027	028	029
	030	031	032	033	034	035	036	037	038	039	040	041	042	043
	044	045	046	047	048	049	050	051	052	053	054	055	056	057
	058	059	060	061	062	063	064	065	066	067	068	069	070	071
	072	073	074	075	076	077	078	079	080	081	082	083	084	085
	086	087	088	089	090	091	092	093	094	095	096	097	098	099
	100	101	102	103	104	105	106	107	108	109	110	111	112	113
	114	115	116	117	118	119	120	121	122	123	124	125	126	127
	128	129	130	131	132	133	134	135	136	137	138	139	140	141
	142	143	144	145	146	147	148	149	150	151	152	153	154	155
	156	157	158	159	160	161	162	163	164	165	166	167	168	169
	170	171	172	173	174	175	176	177	178	179	180	181	182	183
	184	185	186	187	188	189	190	191	192	193	194	195	196	197
	198	199	200	201	202	203	204	205	206	207	208	209	210	211
	212	213	214	215	216	217	218	219	220	221	222	223	224	225
	226	227	228	229	230	231	232	233	234	235	236	237	238	239
	240	241	242	243	244	245	246	247	248	249	250	251	252	253
	254	255	256	257	258	259	260	261	262	263	264	265	266	267
	268	269	270	271	272	273	274	275	276	277	278	279	280	281
	282	283	284	285	286	287	288	289	290	291	292	293	294	295
	296	297	298	299	300	301	302	303	304	305	306	307	308	309
	310	311	312	313	314	315	316	317	318	319	320	321	322	323
	324	325	326	327	328	329	330	331	332	333	334	335	336	337
	338	339	340	341	342	343	344	345	346	347	348	349	350	351
	352	353	354	355	356	357	358	359	360	361	362	363	364	365

The Imperial standard work week begins on Oneday and ends on Fiveday. Sixday and Sevenday are normally days off, although merchants wishing to take advantage of most people being off do adjust work schedules.

The Empire observes several standard holidays throughout the year. Apart from Holiday (Day 001), four other days are recognized as Imperial-wide holidays, all of which fall on a Oneday. The Emperor's Birthday is celebrated on Oneday 051. Empire day, celebrating the achievements of the Imperial Military, is Oneday 114. Standard Religious Holiday, for all religions to observe their most holy day, has been standardized to fall on Oneday 184. Finally, Harvest Revel is held on Oneday 282 to give thanks for the many blessings of the Imperial Throne. Differing Regions and planets have other holidays added on, but these are the Imperial decreed holidays that are observed regardless of location.

## RESCUE BALL

Tons: 5  
Crew: 0  
Cargo: 0

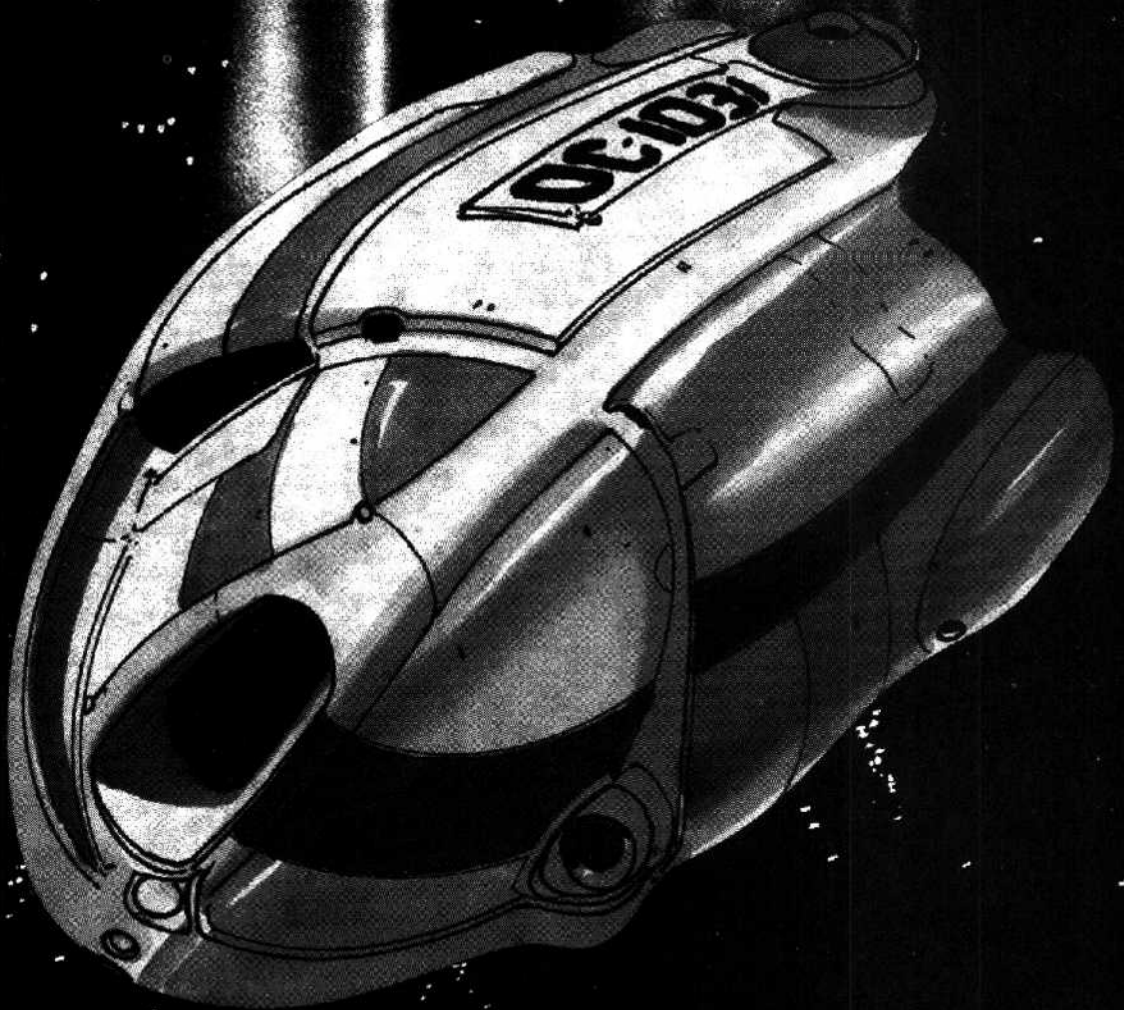
Volume: 70  
Passengers High/Medium: 0  
Controls: Minimal

Cost in Mcr: 12  
Passengers Low: 4 Emerg  
Tech Level: 10

6 Size Rating  
0 Fire Control Rating

0 Jump Rating  
1 G Rating  
1 Power Plant Rating  
1 Fuel Rating  
0A 1P 0J Sensor Rating  
0 Armor 1 Structure

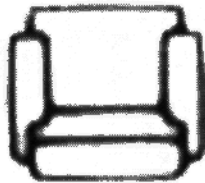
The rescue ball was first installed on ships before the rise of the Third Imperium. Their use is not standard, but all passenger carrying vessels licensed in the Imperium contain enough rescue balls to carry passengers and crew. They are equipped solely to boost survivors from a crippled ship and into space to await pickup by rescue ships. Four passengers or crew can use the Rescue Ball, but are immediately put into cryogenic suspension.





# RESCUE BALL

2 meters



**Maneuver  
Drive**

**Engine**

**Maneuver  
Drive**

## LAUNCH

Tons: 20  
Crew: 2  
Cargo: 6

Volume: 280  
Passengers High/Medium: 6  
Controls: Civilian Standard

Cost in Mcr: 14  
Passengers Low: 0  
Tech Level: 8

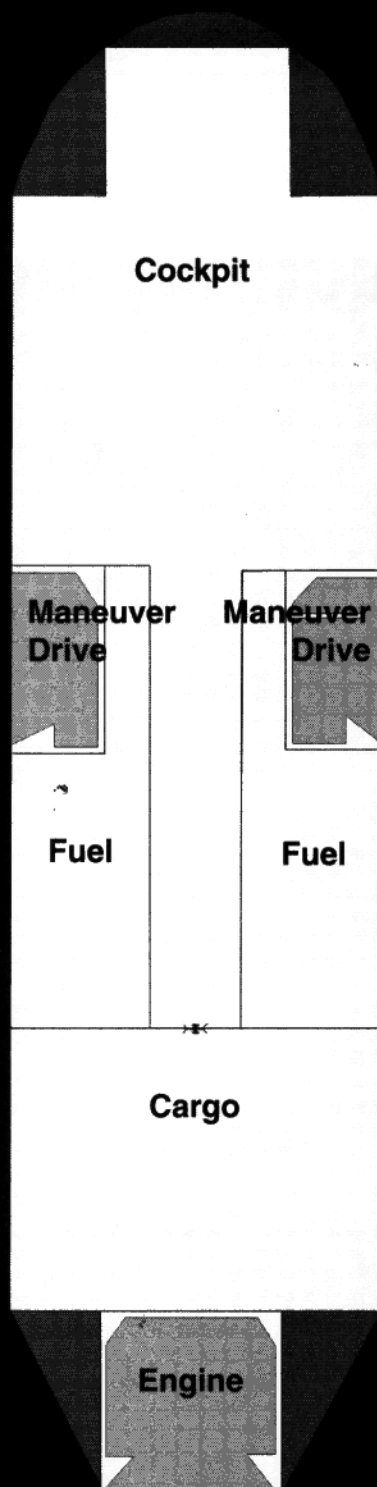
7 Size Rating  
0 Fire Control Rating

0 Jump Rating  
1 G Rating  
1 Power Plant Rating  
5 Fuel Rating/ Scoop/ Refine  
0A 2P 0J Sensor Rating  
0 Armor 1 Structure

Using a 20-ton hull, the launch is capable of 1-G acceleration, carries 1 ton of fuel tankage, and has a crew of two. It is used to handle small transport tasks not suited for larger vessels.



LAUNCH



1m



## SHIP'S BOAT

Tons: 30

Crew: 2

Cargo: 6

7 Size Rating

0 Fire Control Rating

Volume: 420

Passengers High/Medium: 6

Controls: Civilian Standard

Cost in Mcr: 16

Passengers Low: 0

Tech Level: 9

0 Jump Rating

6 G Rating/ Maneuver Drive

6 Power Plant Rating

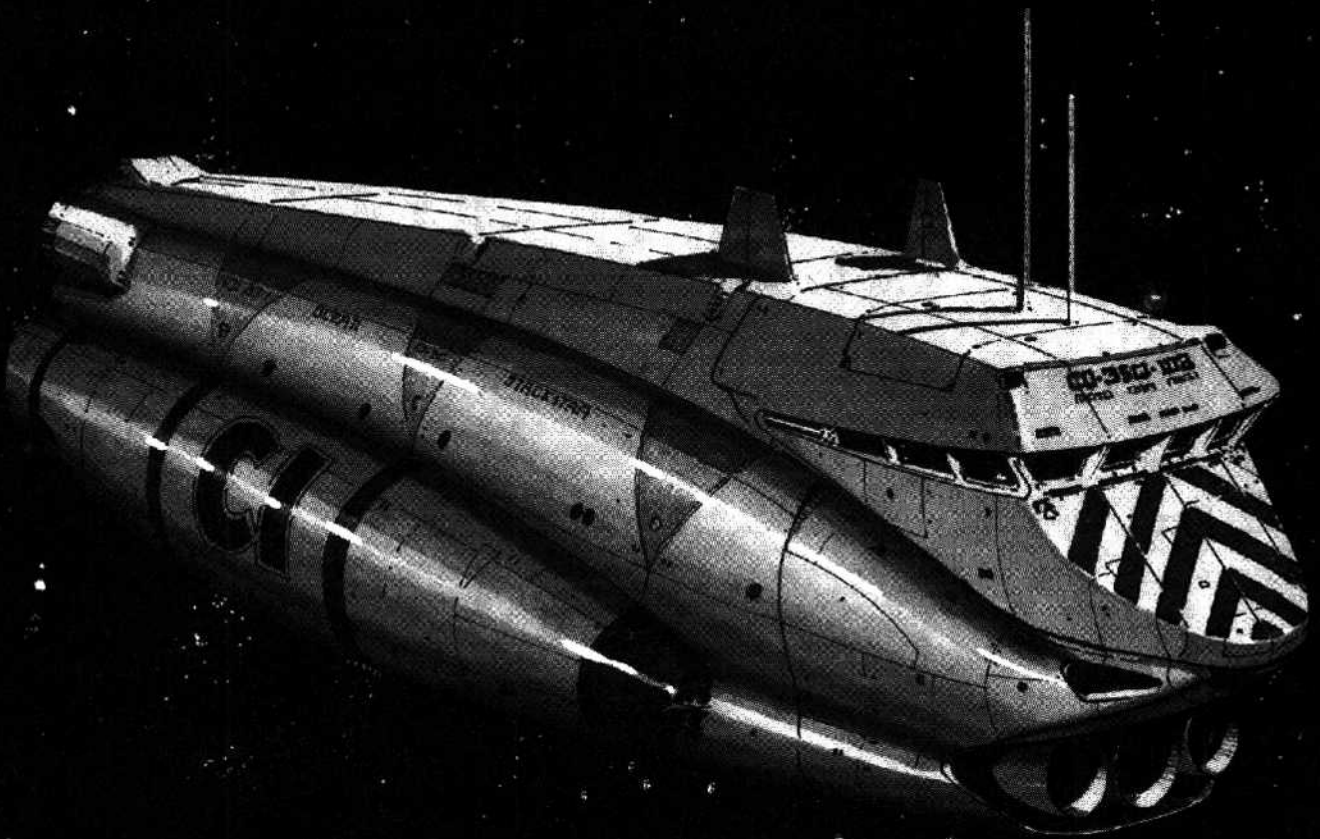
6.5 Fuel Rating/ Scoop/ Refine

0A 2P 0J Sensor Rating

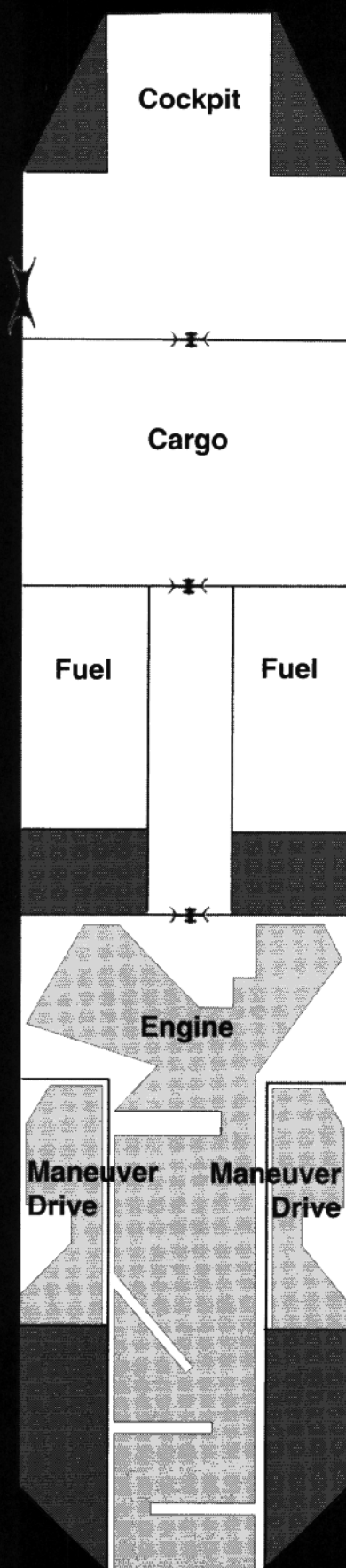
0 Armor

6 Structure

Using a 30-ton hull, the ship's boat is capable of 6-G acceleration, carries 1.8 tons of fuel tankage, and has a crew of two. It is used mainly to move small cargo from planet surfaces into space and back again. It can be used as a small fighting ship when needed.



# SHIPS BOAT



1m

## SLOW BOAT

Tons: 30

Crew: 2

Cargo: 10

7 Size Rating

0 Fire Control Rating

Volume: 420

Passengers High/Medium: 10

Controls: Civilian Standard

Cost in Mcr: 15

Passengers Low: 0

Tech Level: 9

0 Jump Rating

3 G Rating

4 Power Plant Rating

6 Fuel Rating/ Scoop/ Refine

0A 2P 0J Sensor Rating

0 Armor

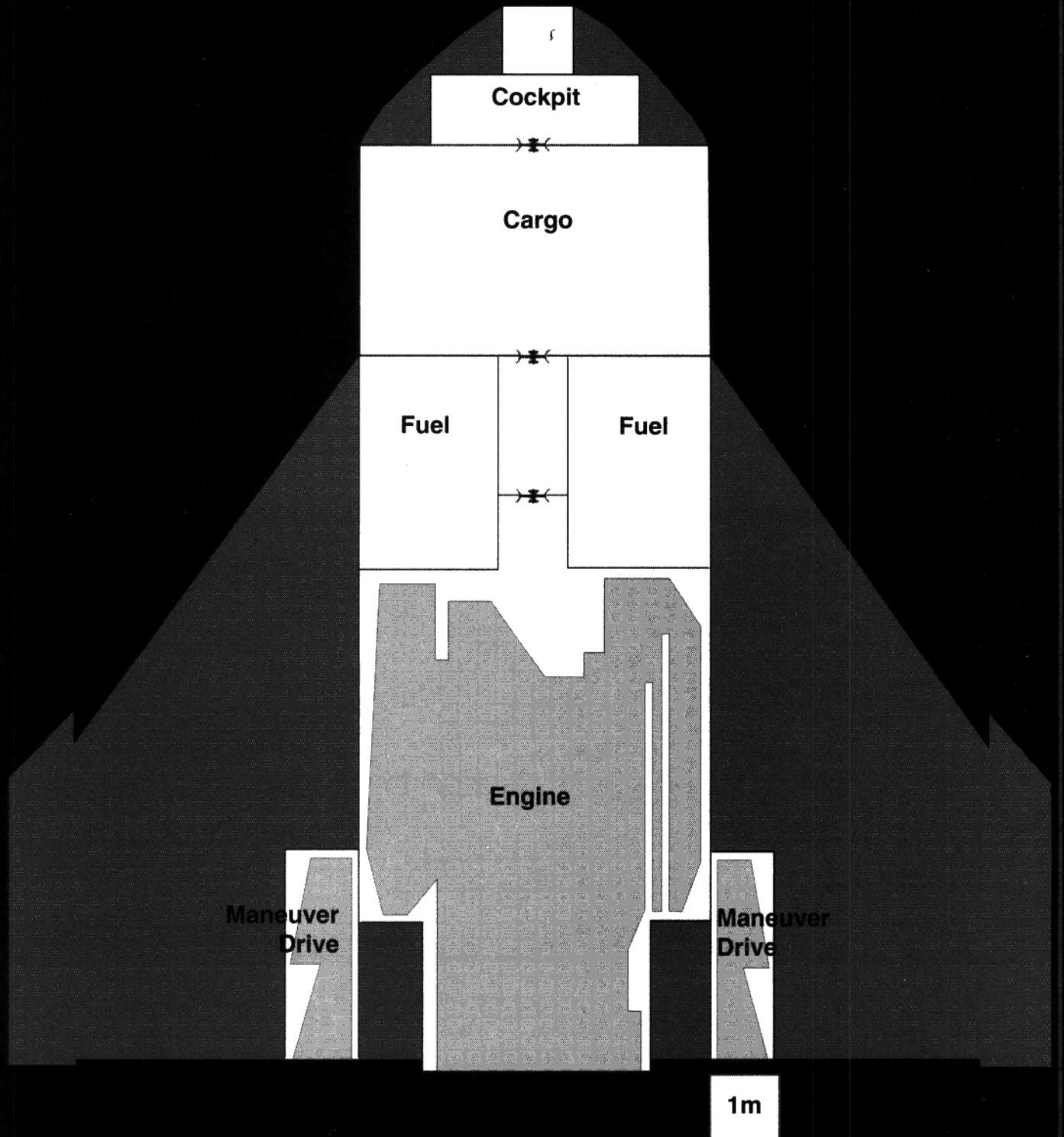
3 Structure

Using a 30-ton hull, the slow boat is capable of 3G acceleration, carries 1 ton of fuel tankage, and has a crew of two. It is used to move small cargo from ship to ship at or around a space platform.





# SLOW BOAT



## PINNACE

Tons: 40  
Crew: 2  
Cargo: 12

Volume: 560  
Passengers High/Medium: 8  
Controls: Civilian Standard

Cost in Mcr: 20  
Passengers Low: 0  
Tech Level: 9

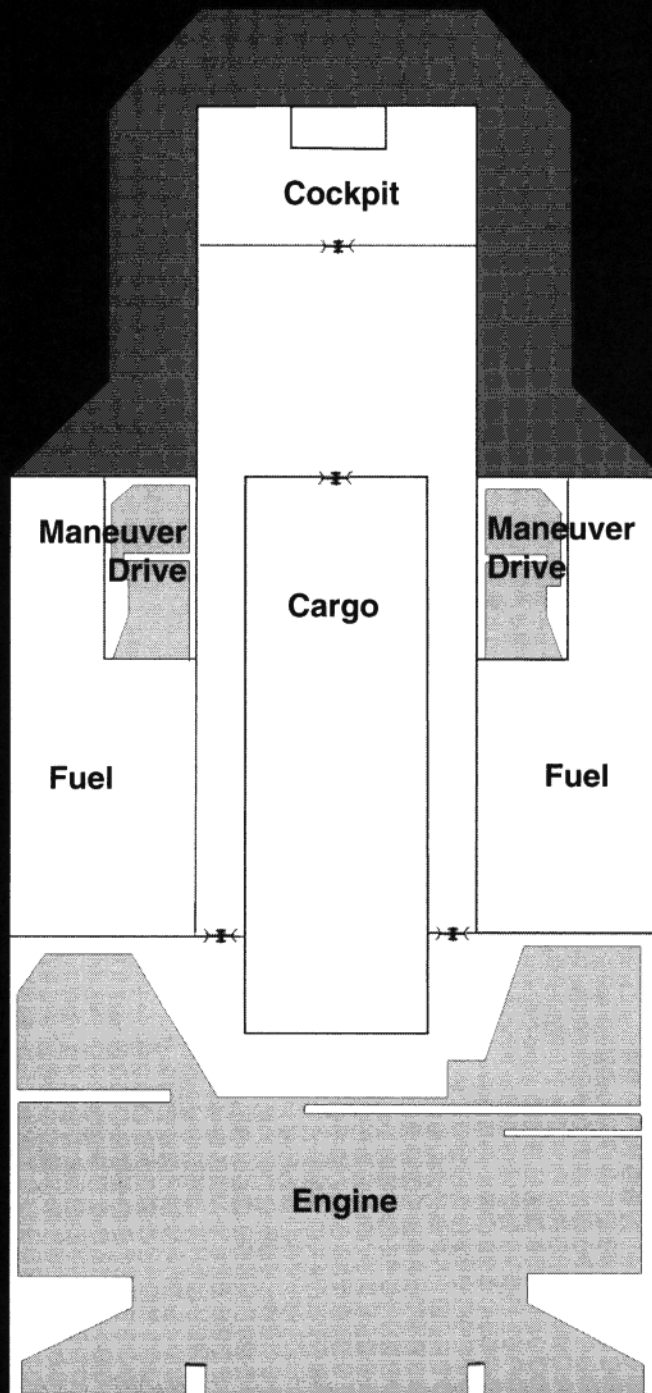
7 Size Rating  
0 Fire Control Rating

0 Jump Rating  
5 G Rating  
5 Power Plant Rating  
8.4 Fuel Rating/ Scoop/ Refine  
0A 2P 0J Sensor Rating  
0 Armor                      6 Structure

Using a 40-ton hull, the pinnacle is capable of 5G acceleration, carries 2 tons of fuel, and has a crew of two. It is used to move passengers and large cargos between facilities and ships.



# PINNACE



1m



## SLOW PINNACE

Tons: 50  
Crew: 5  
Cargo: 12.6

7 Size Rating  
0 Fire Control Rating  
L Battery 1 - 1, 0, 0, 0

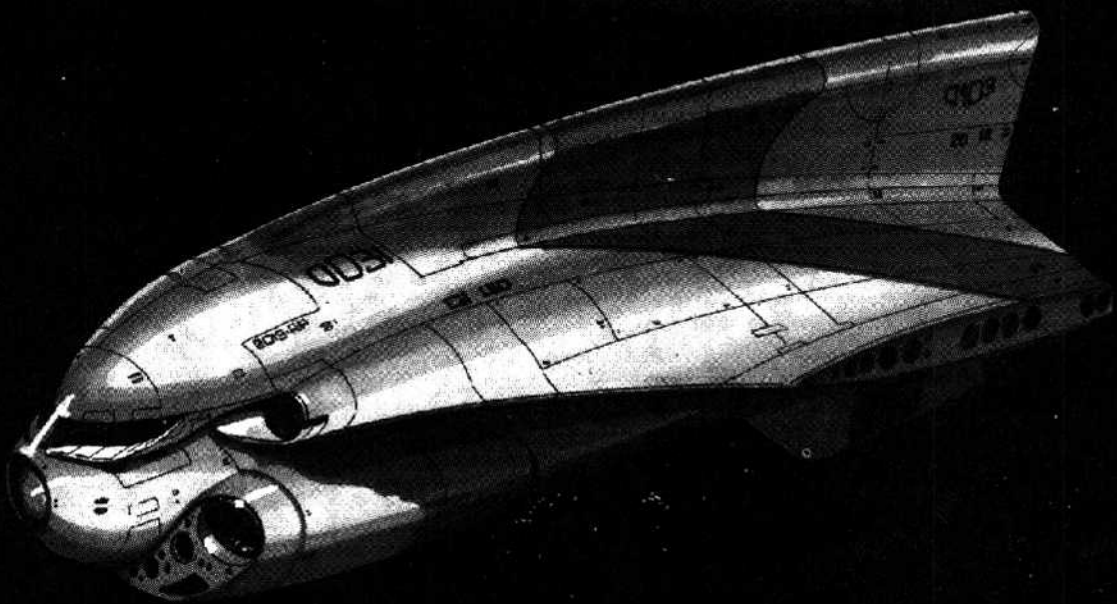
Volume: 700  
Passengers High/Medium: 5  
Controls: Civilian Standard

Cost in Mcr: 46.2  
Passengers Low: 0  
Tech Level: 11

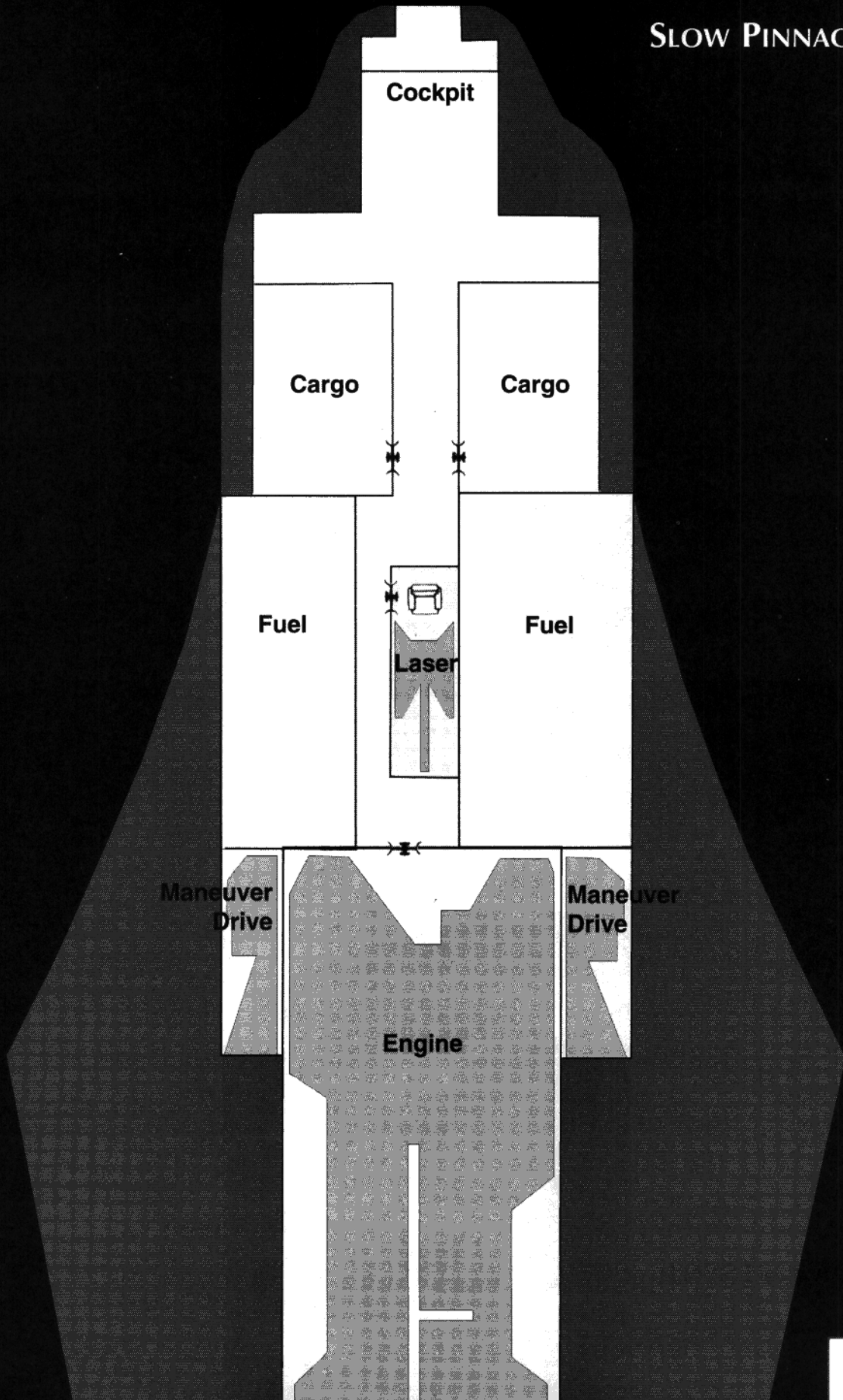
0 Jump Rating  
2 G Rating / HEPlaR  
2 Power Plant Rating  
15 Fuel Rating  
0A 2P 0J Sensor Rating  
0 Armor                      3 Structure

Chief Naval Architect: Peter Miller

The Slow Pinnacle is an armed version of the Pinnacle and is used mainly by armed or military vessels. VIPs are usually shuttled in Slow Pinnaces because it is armed and has enough capacity to handle most sensitive cargoes. The design uses HEPlaR engines mainly due to its original pre-Imperial design criteria. Newer versions, however, are using Thruster Plates for use with long range ships.



# SLOW PINNACE



## MODULAR CUTTER

Tons: 50  
Crew: 2  
Cargo: 15

7 Size Rating  
0 Fire Control Rating

Volume: 700  
Passengers High/Medium: 12  
Controls: Civilian Standard

Cost in Mcr: 28  
Passengers Low: 0  
Tech Level: 9

0 Jump Rating  
4 G Rating/ Maneuver Drive  
4 Power Plant Rating  
13.5 Fuel Rating/ Scoop/ Refine  
0A 2P 0J Sensor Rating  
0 Armor                      6 Structure

Chief Naval Architect: Lewis Roberts

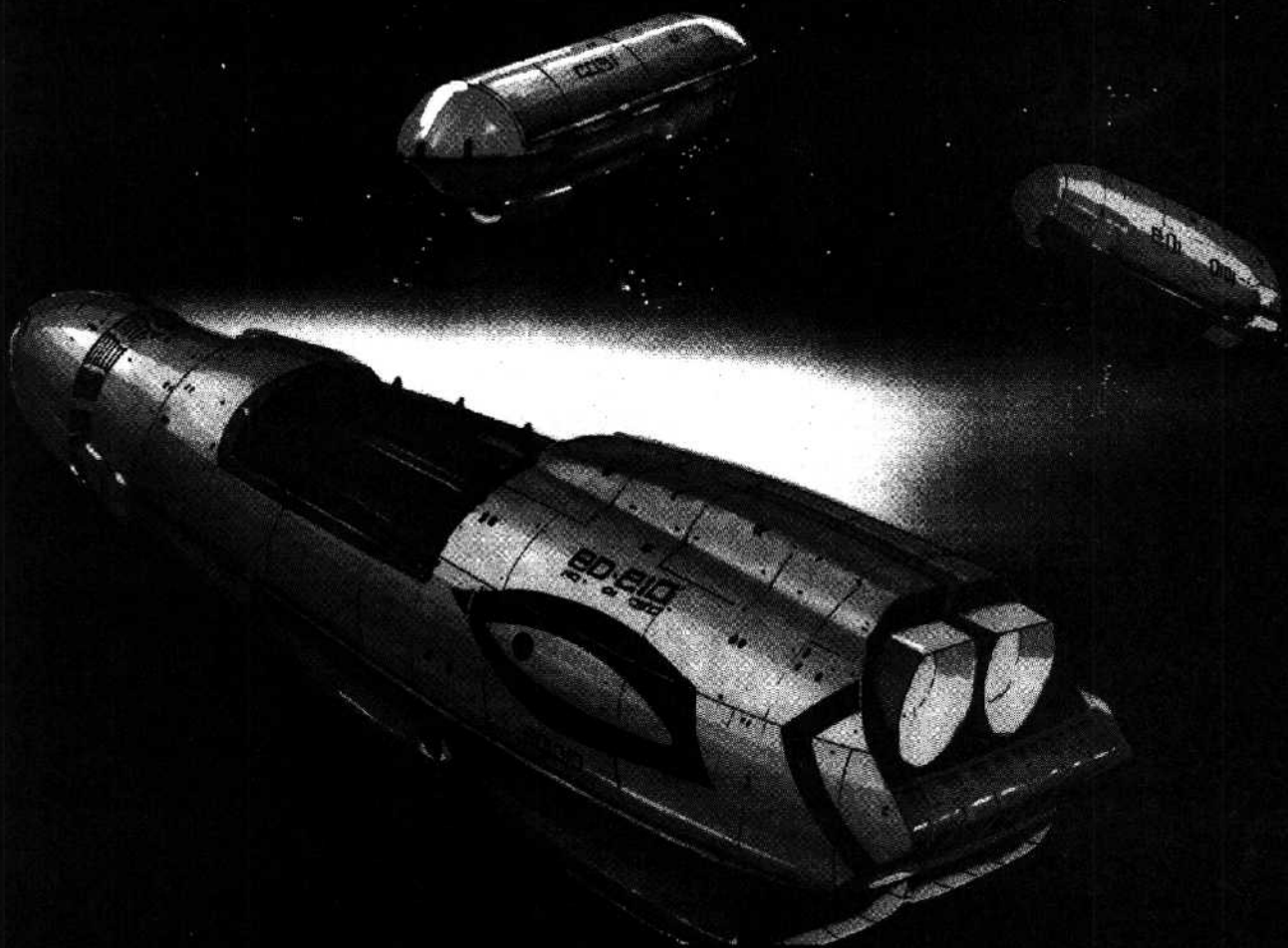
Using a 50-ton hull, the cutter is capable of 4G, carries 2 tons of fuel, and has a crew of two. It has 30 tons committed to special detachable modules; the craft has 2.5 tons excess space available for weaponry or ancillary items.

Three interchangeable modules are routinely available for the modular cutter:

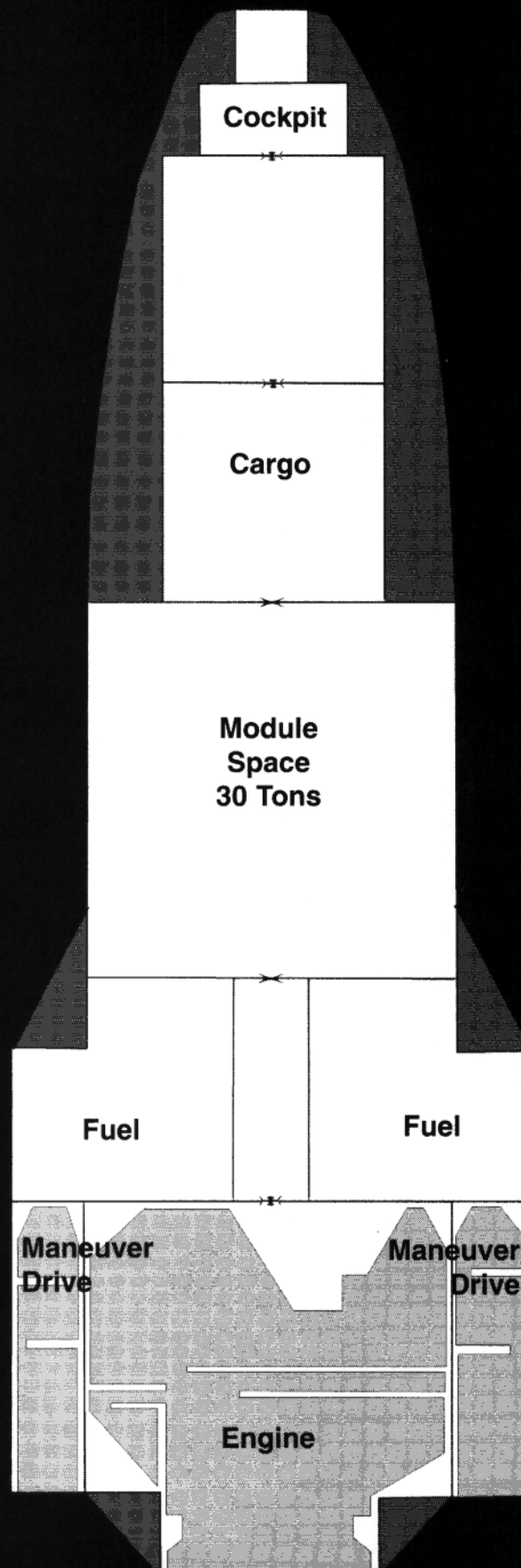
The **ATV module** (which includes an operational ATV) is 30 tons. It can land (and retrieve) an ATV on a world surface. The module can serve as an ATV storage location, if desired.

The **fuel module**, with 30 tons of fuel tankage, serves as a fuel skimming vehicle and storage tank.

The **open module** is a customizable frame with 30 tons of excess space, which can be allocated to passenger seating, fuel, cargo, cabin, or staterooms.



# MODULAR CUTTER



1m



## SHUTTLE

Tons: 100

Crew: 2

Cargo: 71

8 Size Rating

0 Fire Control Rating

Volume: 1400

Passengers High/Medium: 10

Controls: Civilian Standard

Cost in Mcr: 18

Passengers Low: 0

Tech Level: 8

0 Jump Rating

3 G Rating

4 Power Plant Rating

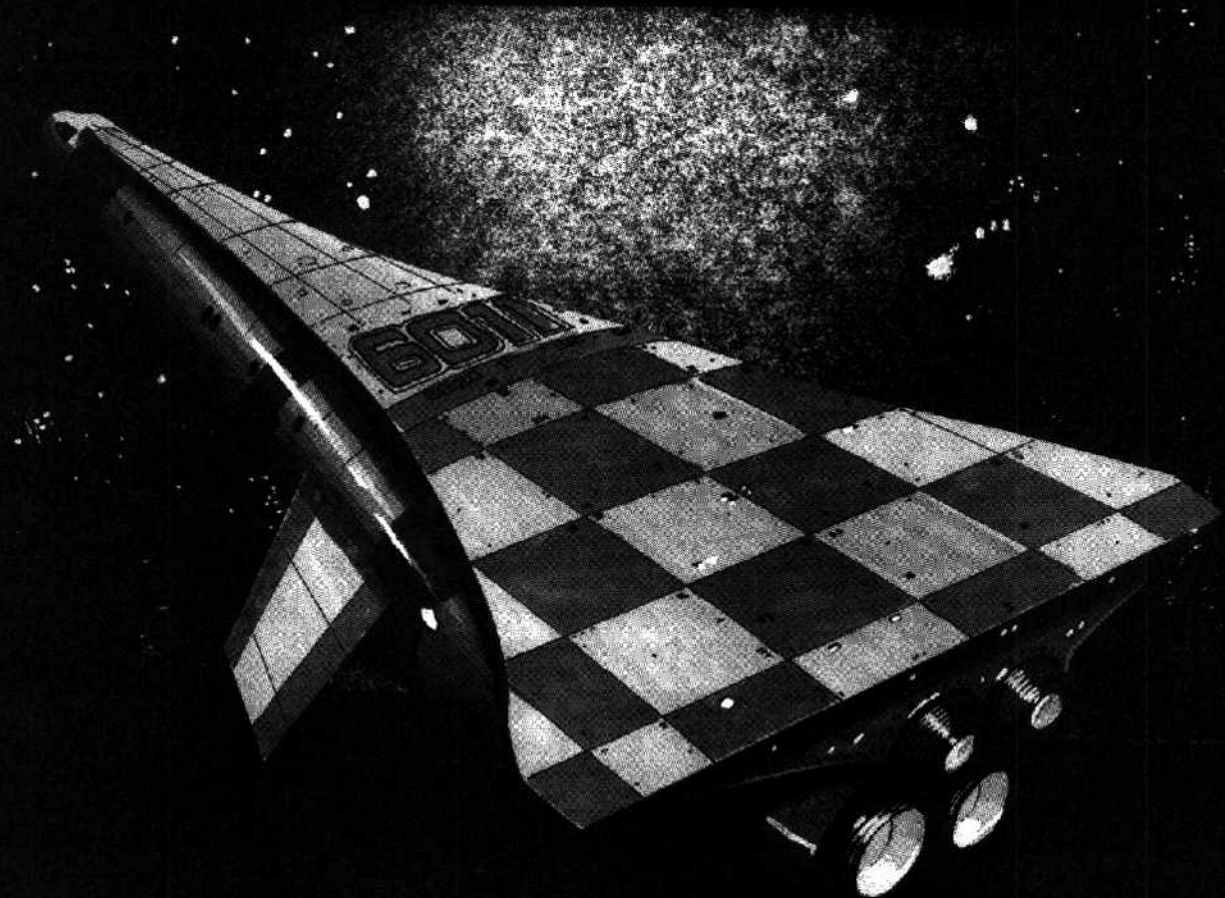
15 Fuel Rating/ Scoop/ Refine

0A 2P 0J Sensor Rating

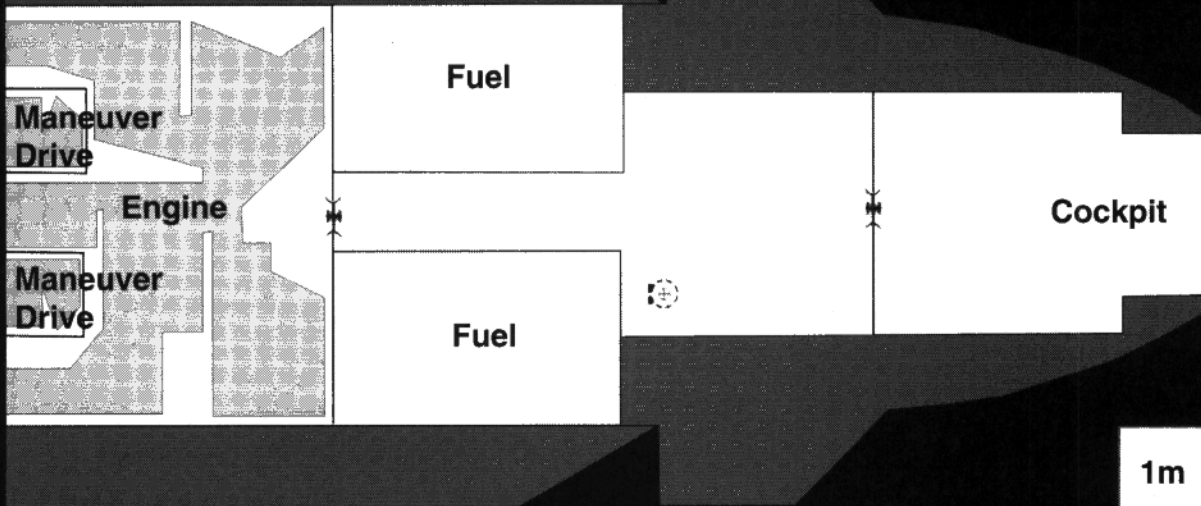
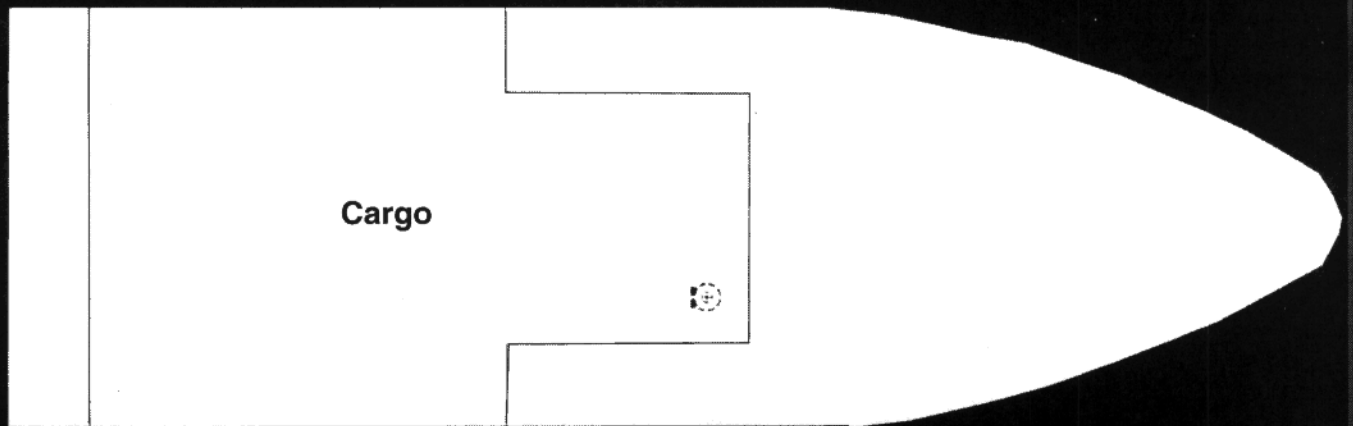
0 Armor

8 Structure

Using a 100-ton hull, the shuttle is capable of 3G acceleration, carries 2.85 tons of fuel, and has a crew of two. It is the prime mover of material from space to a planet's surface and vice versa. Before TL12, the shuttle was the smallest effective space-worthy vessel.



# SHUTTLE



## GIG

Tons: 20

Crew: 3

Cargo: 1

7 Size Rating

0 Fire Control Rating

L Battery 1 - 1, 0, 0, 0

Volume: 280

Passengers High/Medium: 0

Controls: Civilian Standard

Cost in Mcr: 22

Passengers Low: 1 Emerg

Tech Level: 12

0 Jump Rating

3 G Rating/ Thruster (T Plates)

5 Power Plant Rating

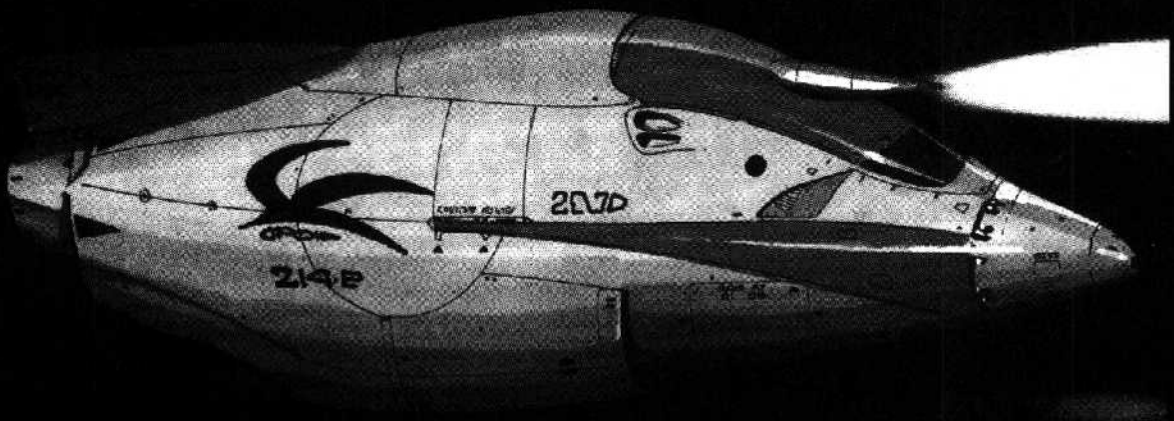
0.5 Fuel Rating/ Scoop/ Refine

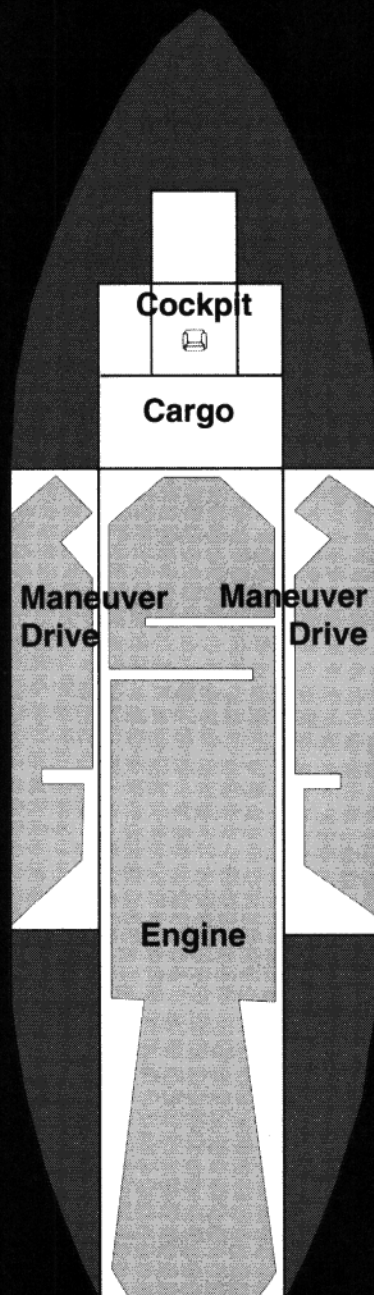
1A 3P 0J Sensor Rating

2 Armor

6 Structure

The 20-ton Gig is a small, armed, light craft designed to be carried by other larger ships. It can take the place of small craft when an armed and slightly armored boat is more practical. The gig has proven to be especially useful in mail deliveries and important small-cargo transfers.





1m



## SCOUT/ COURIER

Tons: 100  
Crew: 1  
Cargo: 12.9

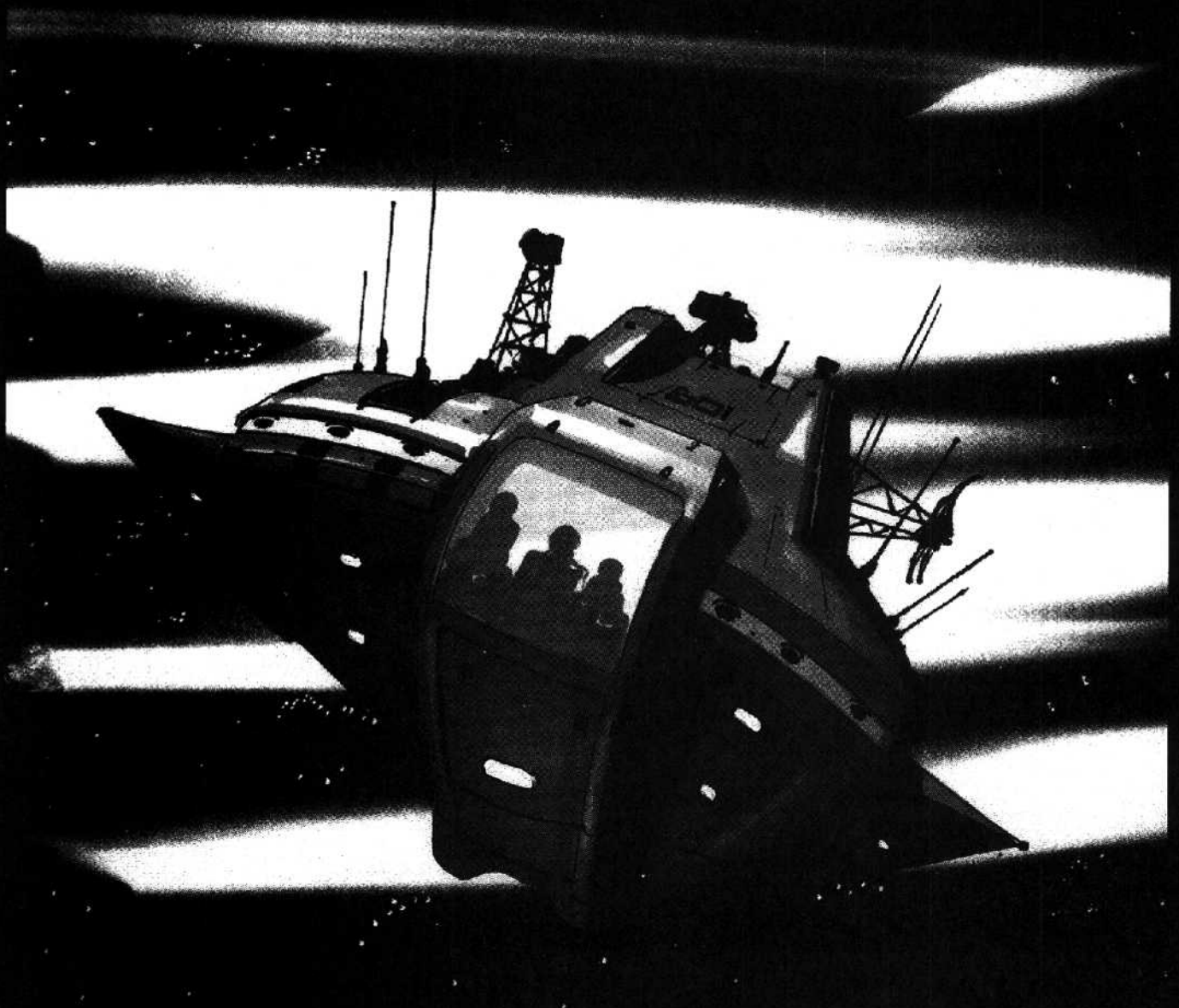
Volume: 1400  
Passengers High/Medium: 3  
Controls: Military Standard

Cost in Mcr: 21.75  
Passengers Low: 0  
Tech Level: 12

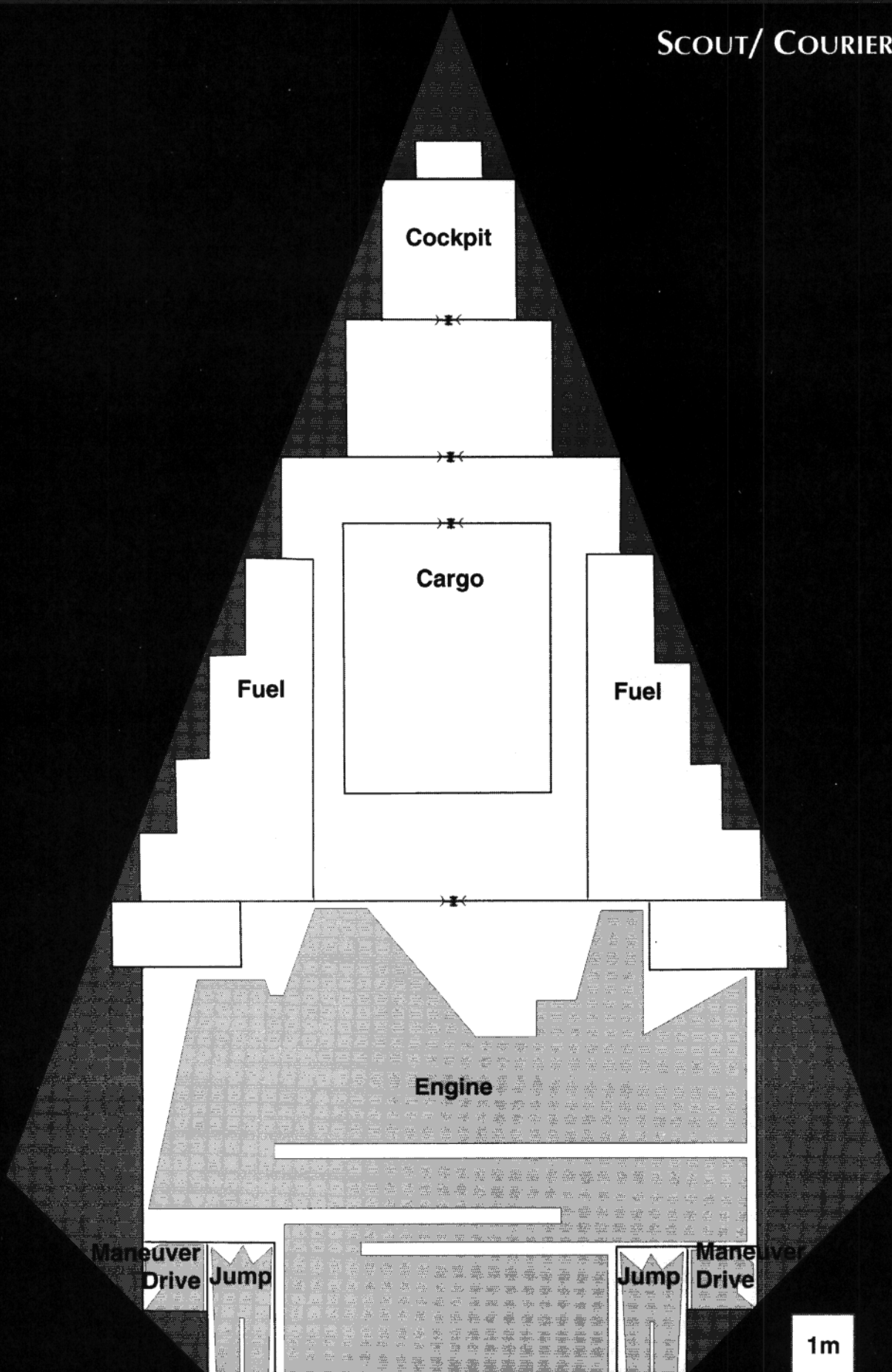
8 Size Rating  
0 Fire Control Rating

2 Jump Rating  
2 G Rating  
3 Power Plant Rating  
20.7 Fuel Rating/ Scoop/ Refine  
2A 3P 0J Sensor Rating  
10 Armor 6 Structure

Using a 100-ton hull, the scout/courier is intended for exploration, survey, and courier duties, with many in service throughout known space. It is used when a ship of long-range duration and high sensor capabilities is needed. The ship is fast, and capable of operating for months without returning to a base or home planet.



# SCOUT/ COURIER



## LUXURY LINER

Tons: 5,000

Crew: 185

Cargo: 12

9 Size Rating

3 Fire Control Rating

L Battery - 8, 4, 2, 1

Volume: 70,000

Passengers High/Medium: 514

Controls: Civ Std/ Bridge

Cost in Mcr: 1392.6

Passengers: Low 0

Tech Level: 11

2 Jump Rating

1 G Rating

3 Power Plant Rating

1000 Fuel Rating

05(24) Sand Caster Rating

4A 4P 0J Sensor Rating

0 Armor

22 Structure

Shuttle.

Chief Naval Architect: Lewis Roberts

The Royal Class of liners is designed with luxury in mind. It is how the nobles and the super rich of the new Imperium travel the stars. The Royal is outfitted with every conceivable luxury: a Grand Ballroom with one of the finest Sylean-style chamber orchestras (42 piece) in the sector; a high rollers casino, where the wealthy can try to become even wealthier; sports center with a small swimming pool and variable gravity weight lifting equipment; the finest original holo-movies, shown each night in the Grand Salon; twenty of the finest chefs from the Imperium create masterpieces of culinary delight each and every night; an excellent sickbay with expert physicians in case of medical emergency. In addition, the entire staff is highly trained and taught how to deal with the rich and famous with the utmost of discretion.

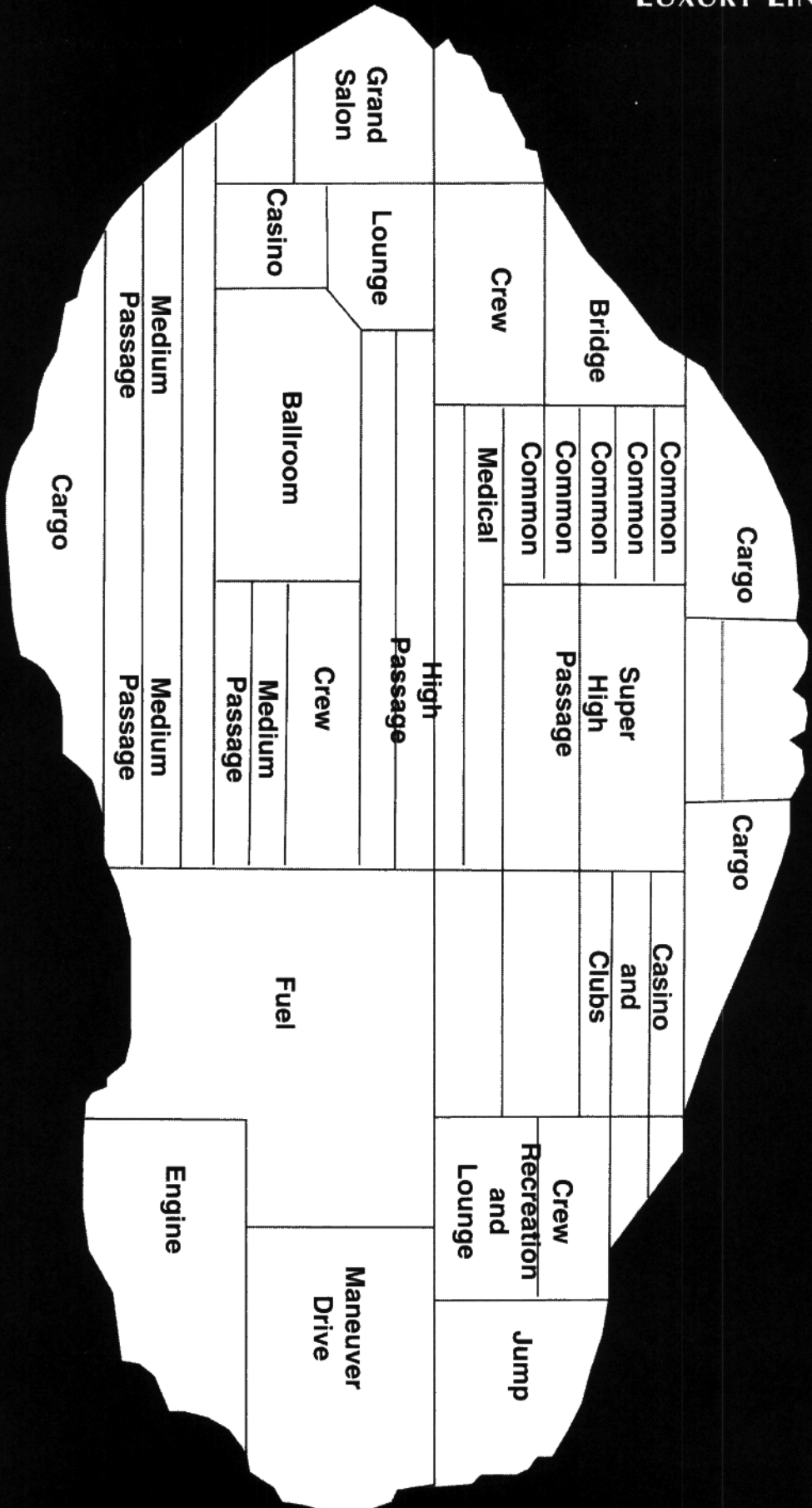
- The Royal class has 414 standard high passage rooms, plus 100 luxury suites that have twice the space, and passengers are even more pampered than the other guests.

- The ship carries a shuttle craft to load and unload passengers. Each ship is named for members of the Imperial Family, and several of the Emperor's nieces have traveled on a Royal liner, and have raved about their stay. More members of the Imperial family are expected to take a cruise soon.

- Each Royal ship is equipped with a state-of-art defense grid, and all members of the staff are cross-trained in security matters, so as to be able assure passengers' safety.



# LUXURY LINER





## FREE TRADER

Tons: 200  
Crew: 4  
Cargo: 75.9

8 Size Rating  
0 Fire Control Rating  
2xL Batteries - 2, 0, 0, 0

Volume : 2800  
Passengers High/Medium: 6  
Controls: Civilian Standard

Cost in Mcr: 30.75  
Passengers Low: 20  
Tech Level: 12

1 Jump Rating  
1 G Rating /Thruster  
20.7 Power Plant Rating  
50 Fuel Rating/ Scoop/ Refine  
1A 3P 0J Sensor Rating  
0 Armor                      6 Structure

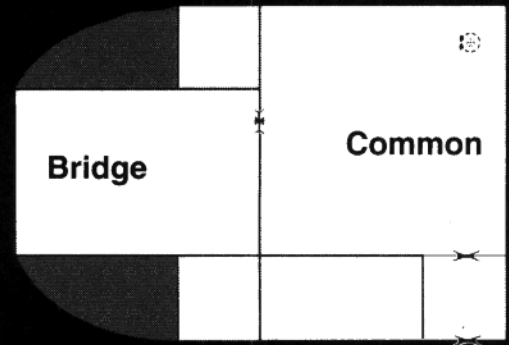
Chief Naval Architect: Joe Walsh

Using a 200-ton hull, the free-trader is an elementary interstellar merchant ship, carrying cargo and passengers. It is the primary trade and passenger mover in the Imperium. Other civilizations have similar designs for the same purpose. It has the capability of entering atmospheres, making it good for service to planets without orbital platforms or stations.

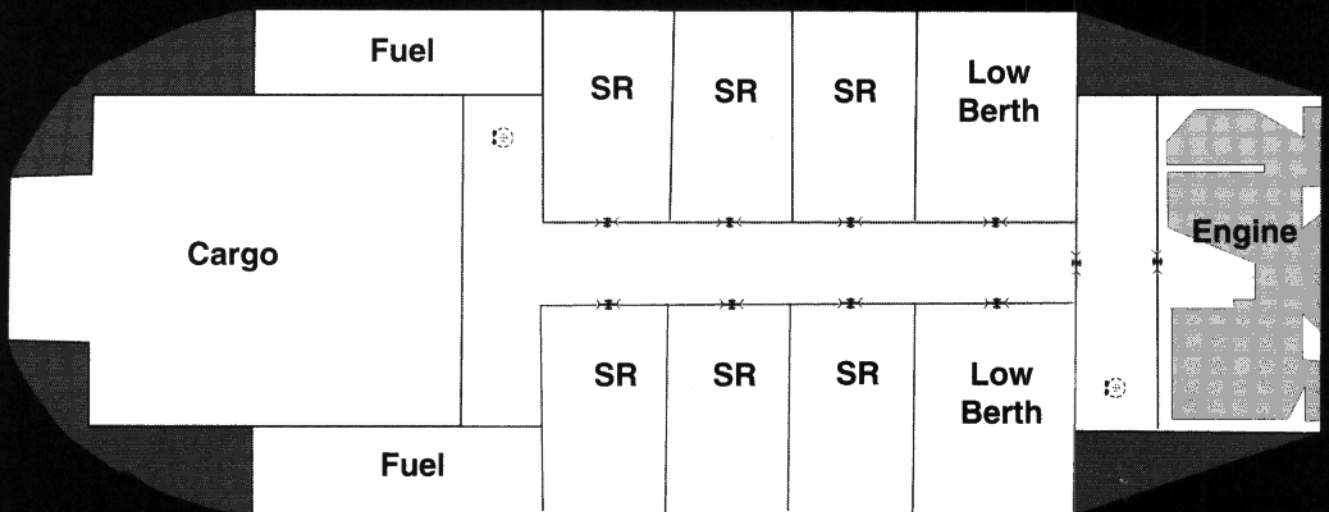


# FREE TRADER

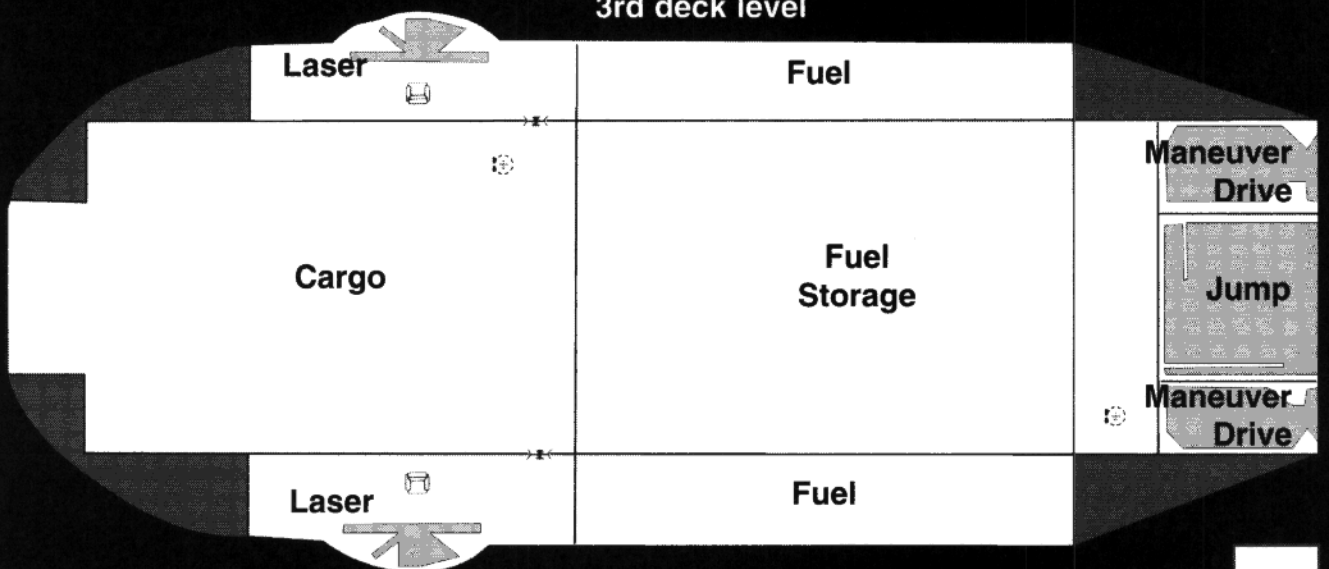
1st deck level



2nd deck level



3rd deck level



2m

## FAR TRADER

Tons: 200  
Crew: 5  
Cargo: 34

Volume: 2800  
Passengers High/Medium: 7  
Controls: Civilian with Bridge

Cost in Mcr: 84.6  
Passengers Low: 4  
Tech Level: 11

8 Size Rating  
0 Fire Control Rating  
2xL Batteries - 2, 0, 0, 0

2 Jump Rating  
1 G Rating / HEPlaR  
5 Power Plant Rating  
50 Fuel Rating  
0A 2P 0J Sensor Rating  
0 Armor                      6 Structure

Chief Naval Architect: Joe Walsh

The Far Trader is a popular design used by longer ranged shipping companies and commercially aggressive ship captains. The maintenance cost is kept low for the standard haul, ensuring the design's profitability well into the future. The two laser batteries ensure that pirates will have a second thought before attempting to board a Free Trader.

Far Traders have enjoyed more success since the founding of the Imperium, because of the demand for goods and materials from outside of Imperial space.



# FAR TRADER

4th deck level

Cargo

Common

Fuel

3rd deck level

Low Berth

Laser

Laser

Common

Engine

Jump

Jump

Maneuver  
Drive

Maneuver  
Drive

1st deck level

Bridge

2nd deck level

2m

SR

SR

SR

SR

SR

SR

SR



## SECURE TRADER

Tons: 200  
Crew: 10  
Cargo: 44

8 Size Rating  
4 Fire Control Rating  
2xL Batteries - 3, 2, 0, 0

Volume: 2800  
Passengers High/Medium: 7  
Controls: Civilian with Bridge

Cost in Mcr: 88.1  
Passengers Low: 0  
Tech Level: 12

2 Jump Rating  
2 G Rating / HEPlaR  
2 Power Plant Rating  
41 Fuel Rating  
2A 3P 0J Sensor Rating  
40 Armor                      12 Structure

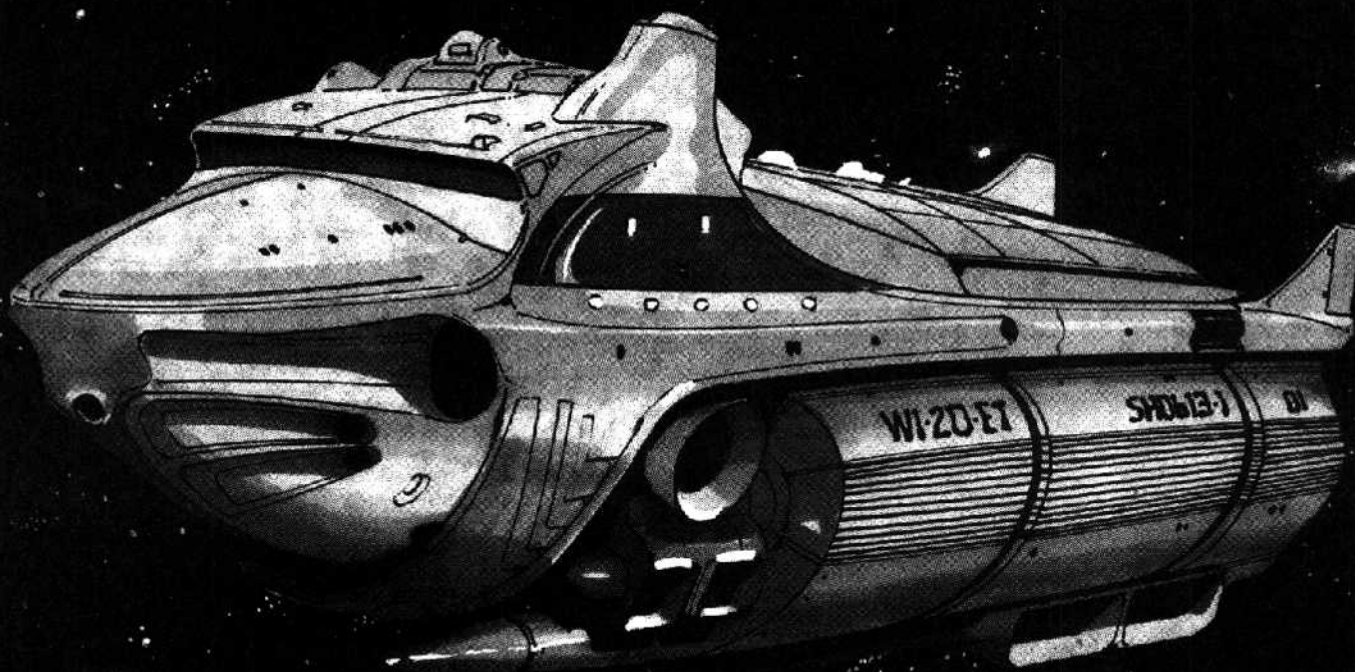
Chief Naval Architect: Joe Walsh

The Secure Trader is designed to transport goods and individuals to and from hostile areas, as well as transporting goods and individuals that have a high probability of attracting hostile attention. Since a much higher price can be commanded for such transportation, this Trader is capable of making a profit for its owner in spite of the higher price in comparison with the more commonly used Far Trader.

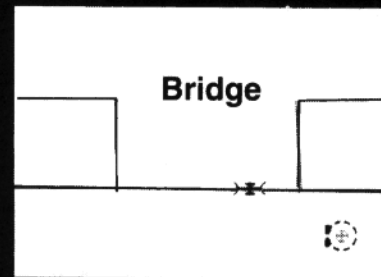
The main causes of the high price of this ship are the weaponry and the hull, both of which exceed the standards for trading vessels. However, they also allow the Secure Trader to survive in situations that would destroy a standard Far Trader.

While the small staterooms have been designed with the crewmembers in mind (excepting the Captain), travellers experienced with this sort of ship have found it sometimes necessary to have the crew double-up in large staterooms because a passenger's social sensibilities require that his or her retinue use the smaller accommodations. With eight large staterooms and nine small staterooms available, it is possible to set up many different lodging arrangements to please even the most discriminating passenger. In addition, if no high passengers are available at a given port, the Captain can always sell middle passage and leave the high passage staterooms for the crew.

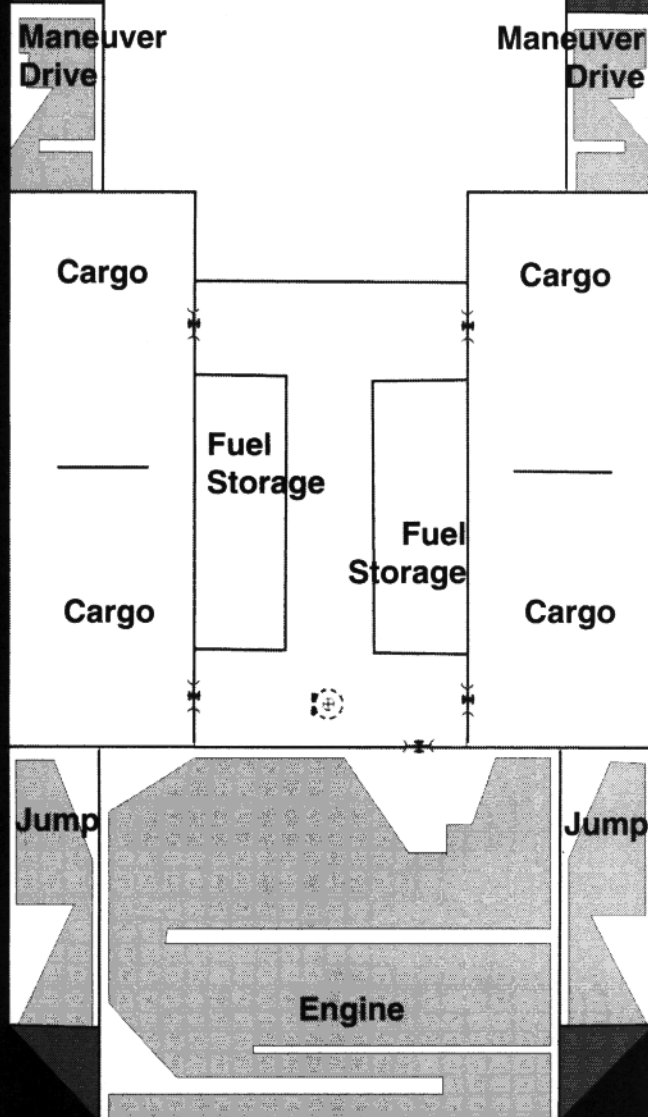
Not every Traveller will desire a Secure Trader, but for those who have a true sense of adventure, it can bring rewards rarely seen by the timid captains of standard trading vessels.



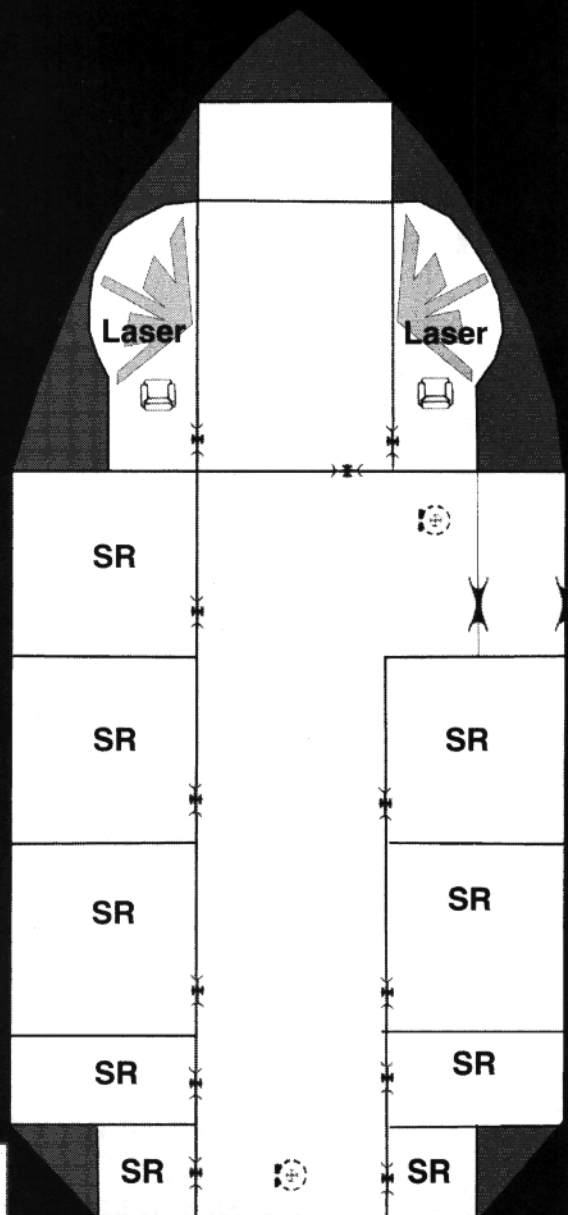
# SECURE TRADER



1st deck level



3rd deck level



2nd deck level

2m

## SUBSIDIZED MERCHANT

Tons: 400  
Crew: 5  
Cargo: 207.9

Volume: 5600  
Passengers High/Medium: 10  
Controls: Civilian Standard

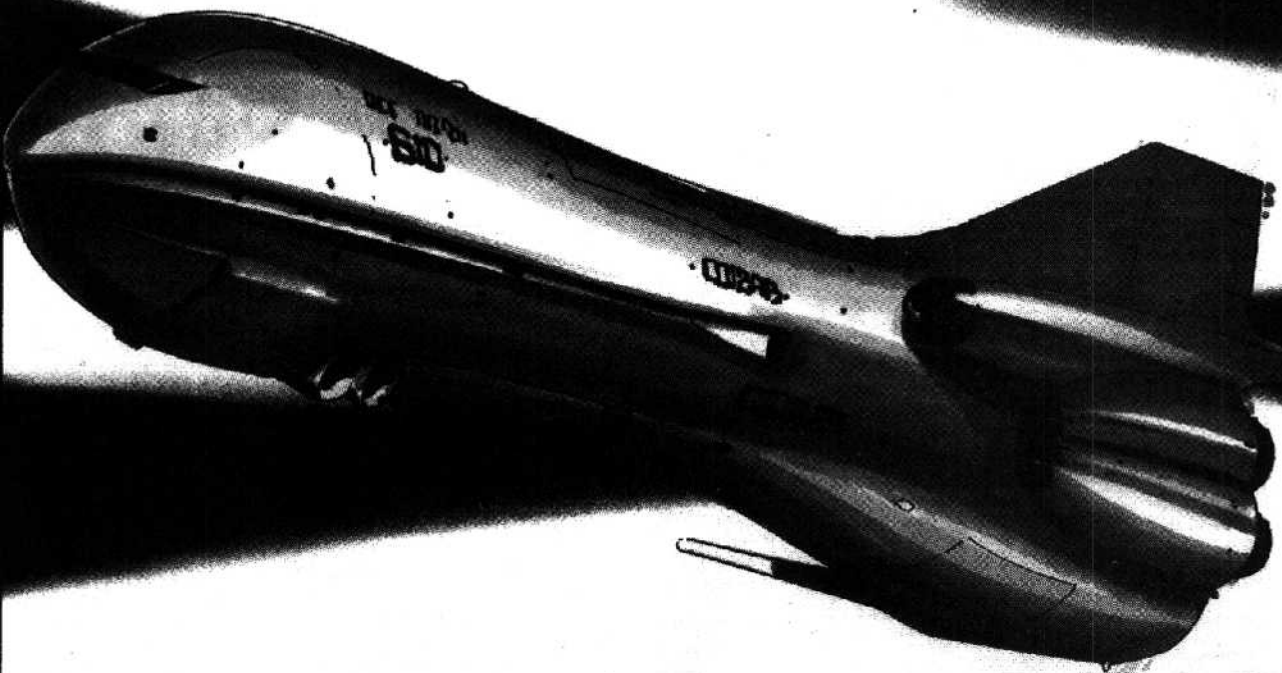
Cost in Mcr: 49.728  
Passengers Low: 10  
Tech Level: 12

8 Size Rating  
0 Fire Control Rating

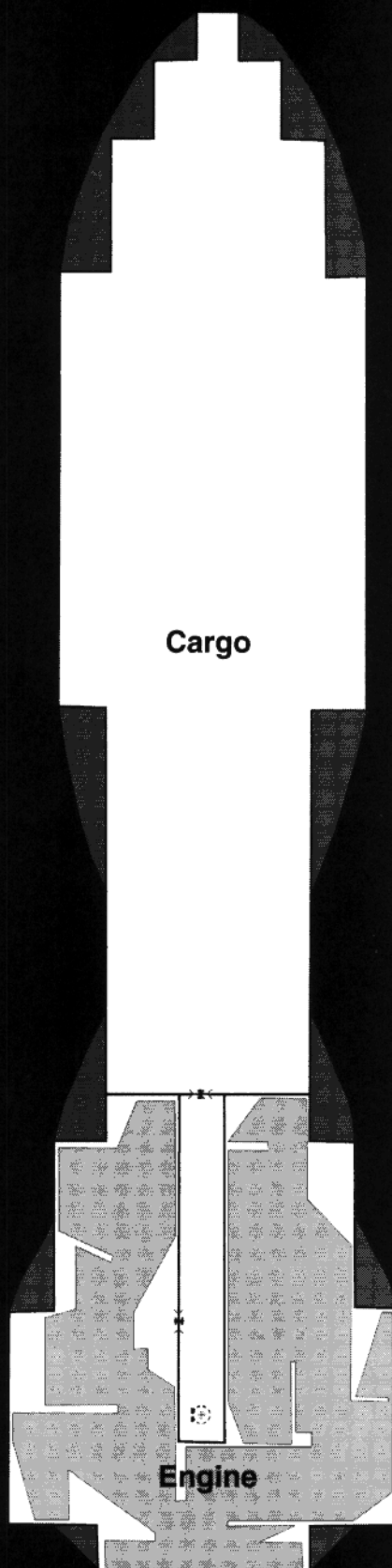
1 Jump Rating  
1 G Rating/ Thruster  
1 Power Plant Rating  
51.3 Fuel Rating/ Scoop/ Refine  
1A 3P 0J Sensor Rating  
0 Armor 8 Structure

Chief Naval Architect: Joe Walsh

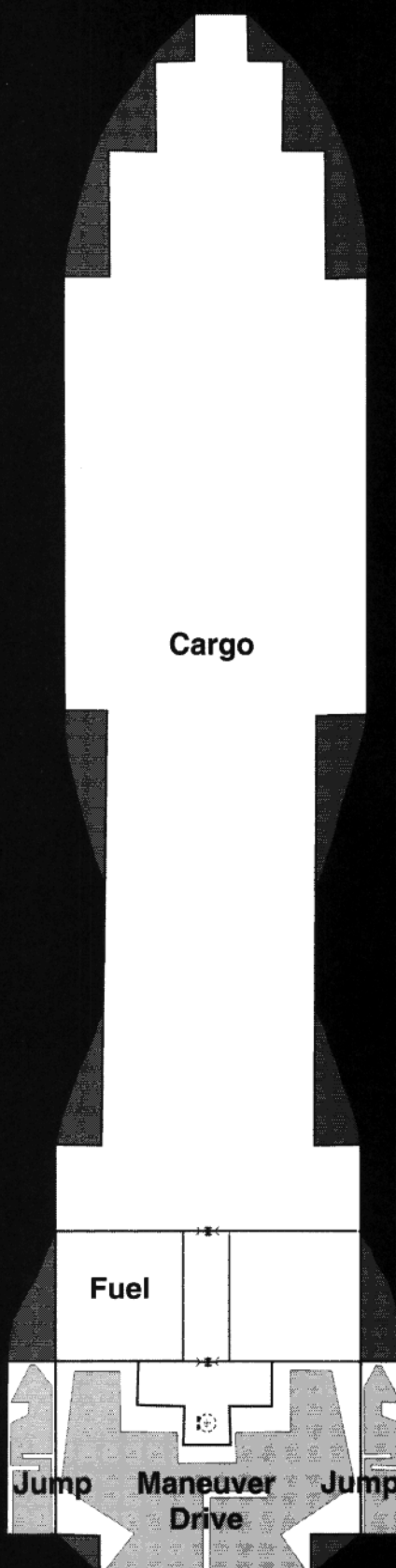
Using a 400-ton hull, the subsidized merchant is a trading vessel intended to meet the commercial needs of clusters of worlds. The ship has an impressive amount of cargo and passenger capacity, but its short range takes it out of far-space operations. It has the capability of entering atmospheres, making it good for service to planets without orbital platforms or stations.



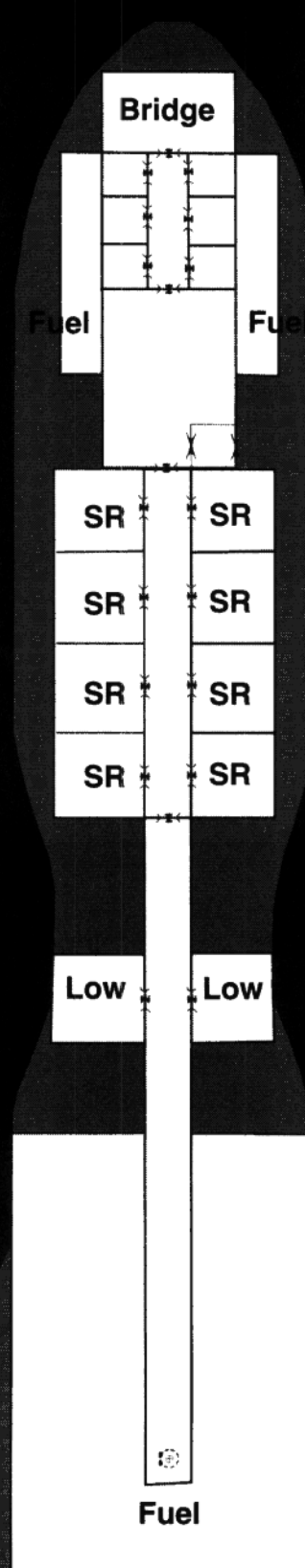
# SUBSIDIZED MERCHANT



3rd deck level



2nd deck level



1st deck level

2m



## SUBSIDIZED LINER

Tons: 600  
Crew: 9  
Cargo: 129

Volume: 8400  
Passengers High/Medium: 21  
Controls: Civilian Standard

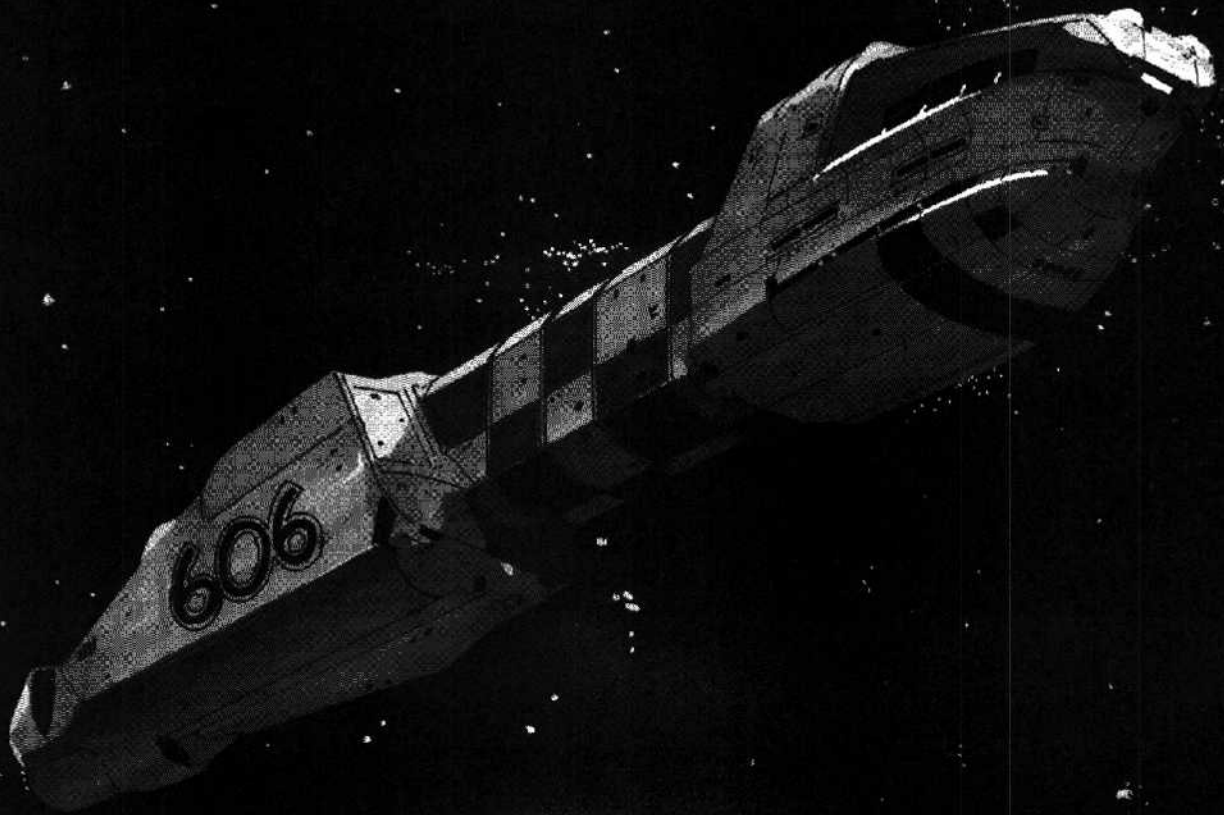
Cost in Mcr: 236.97  
Passengers Low: 20  
Tech Level: 12

8 Size Rating  
0 Fire Control Rating

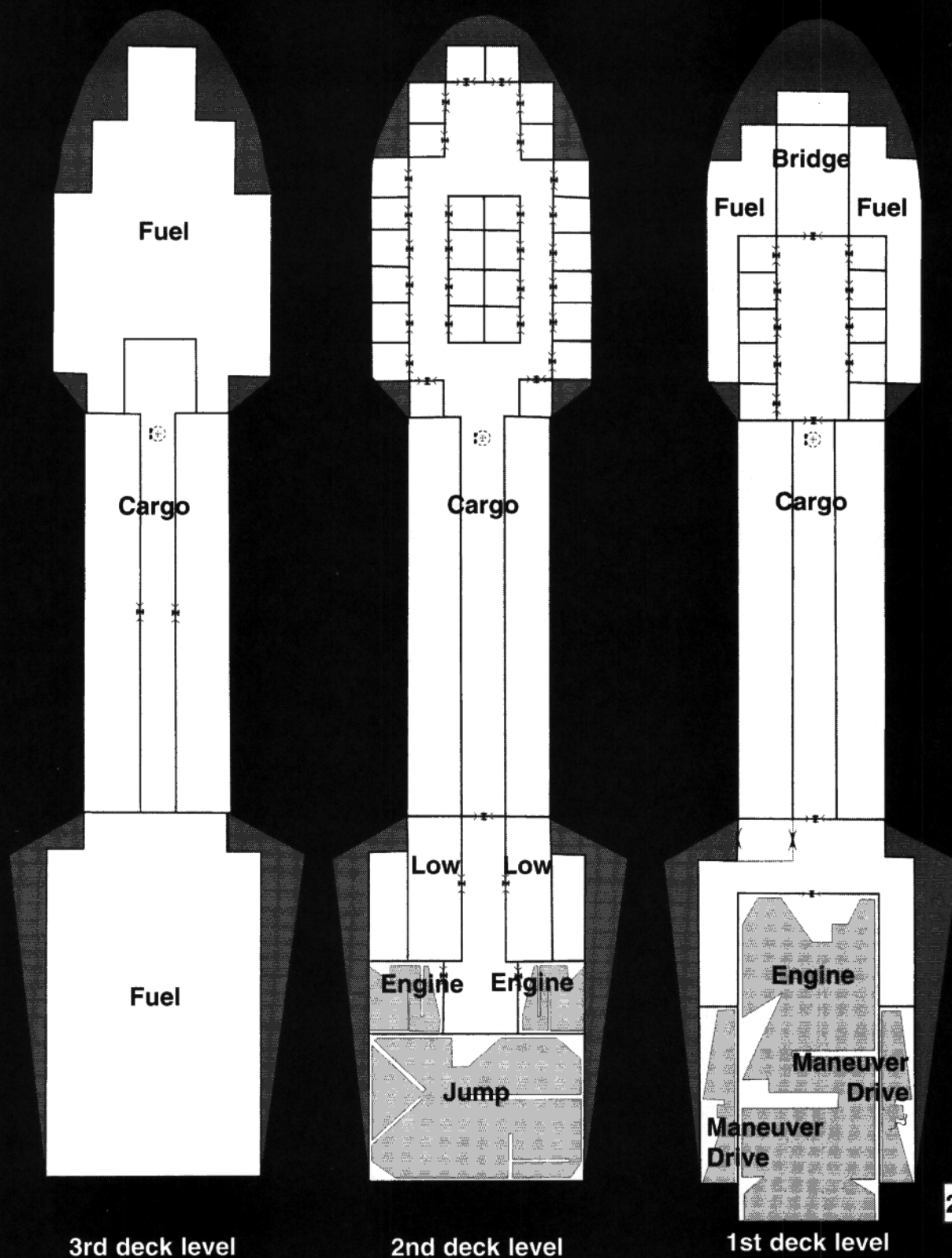
3 Jump Rating  
1 G Rating  
3 Power Plant Rating  
210 Fuel Rating  
0A 2P 0J Sensor Rating  
0 Armor            10 Structure

### Launch

The Subsidized Liner is the government's current answer to the problem of not having enough passenger service between Imperial planets. The large ship has a good passenger capacity, and is able to maintain a high quality of service within normal shipping lanes. The ship is capable of longer range, and several have been used in extra-Imperial runs, but these have been relatively few and far between.



# SUBSIDIZED LINER



## YACHT

Tons: 200  
Crew: 4  
Cargo: 19.9

Volume: 2800  
Passengers High/Medium: 10  
Controls: Civilian Standard

Cost in Mcr: 33.252  
Passengers Low: 0  
Tech Level: 12

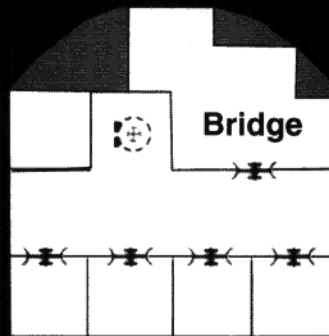
8 Size Rating  
0 Fire Control Rating

1 Jump Rating  
1 G Rating/ Thruster  
1 Power Plant Rating  
20.8 Fuel Rating/ Scoop/ Refine  
2A 3P 0J Sensor Rating  
20 Armor 11 Structure

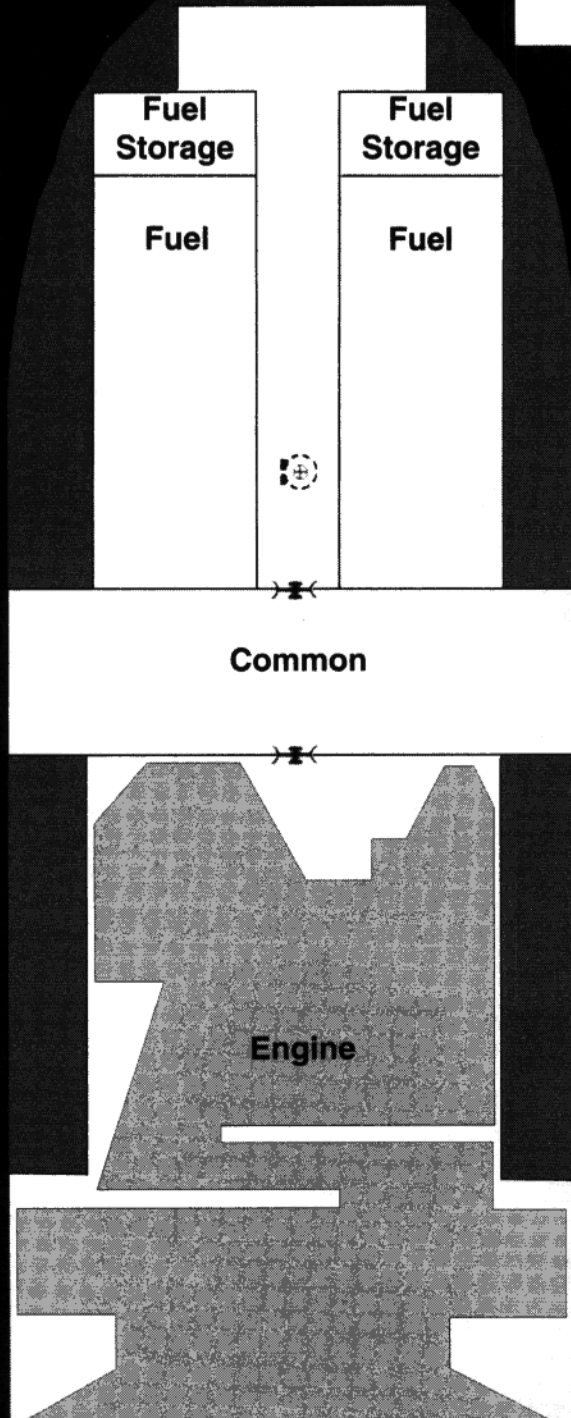
Built on a 200-ton hull, the yacht is a noble's plaything, used to entertain friends and undertake political or commercial missions. There are three ship's vehicles: an air raft, a 30-ton ship's boat, and an ATV. The ship's boat is fitted to ferry the ATV from orbit to surface and back. The yacht is not streamlined, and relies on its ship's boat for inner-atmosphere cargo and passenger transfers.



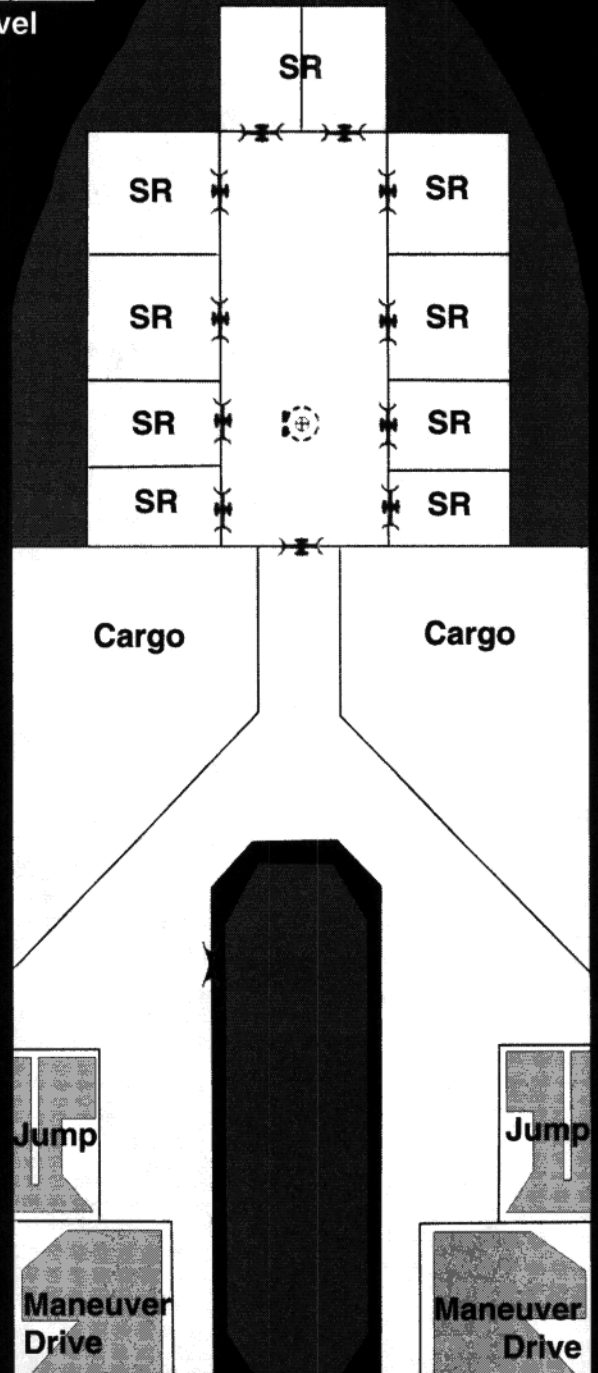
# YACHT



1st deck level



3rd deck level



2nd deck level

2m



## PATROL CRUISER

Tons: 200

Crew: 10

Cargo: 0

8 Size Rating

2 Fire Control Rating

2 x L Battery - 3,3,2,0

2 x M Battery - Barbette 5

Volume: 5600

Passengers High/Medium: 8 Troops

Controls: Military Standard

Cost in Mcr: 236.04

Passengers Low: 0

Tech Level: 12

3 Jump Rating

4 G Rating

7 Power Plant Rating

162.2 Fuel Rating/ Scoop/ Refine

8 Sand Caster Rating

10A 4P 4J Sensor Rating

40 Armor

14 Structure

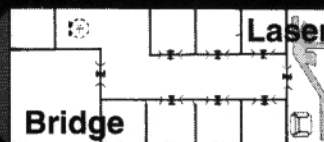
GCarrier and Ship's Boat

Using a custom 200-ton hull, the patrol cruiser is a military vessel used for customs inspections, piracy suppression, and normal safety patrols. There are two ship's vehicles: a GCarrier and a 30-ton ship's boat. The ship is streamlined to chase offenders wherever they go, regardless of atmosphere.

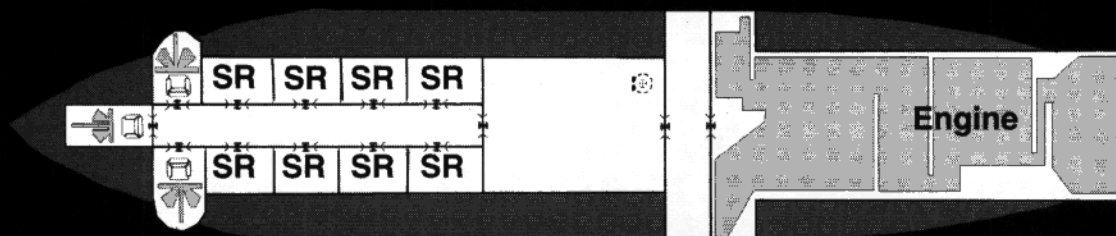


# PATROL CRUISER

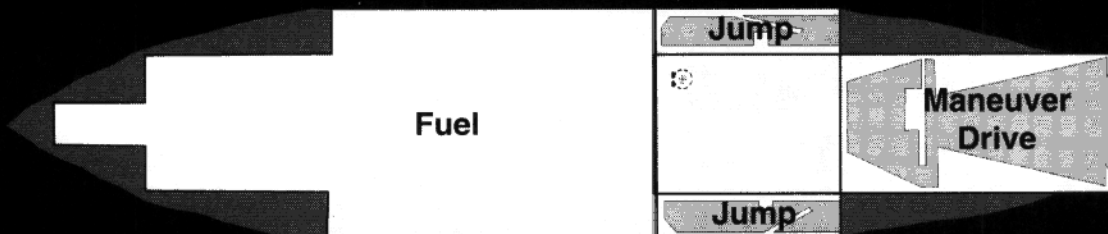
1st deck level



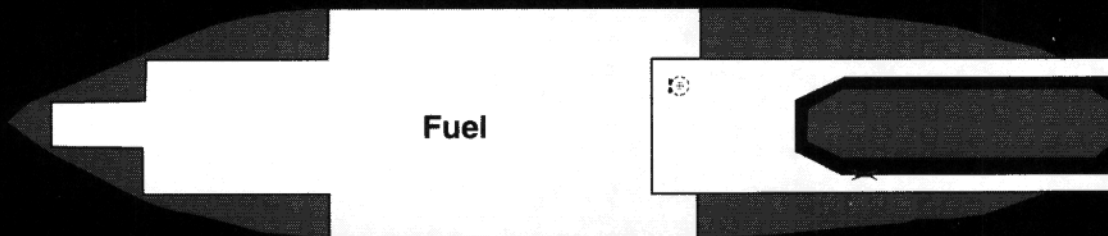
2nd deck level



3rd deck level



4th deck level



2m



## MERCENARY CRUISER

Tons: 800  
Crew: 30  
Cargo: 23.6

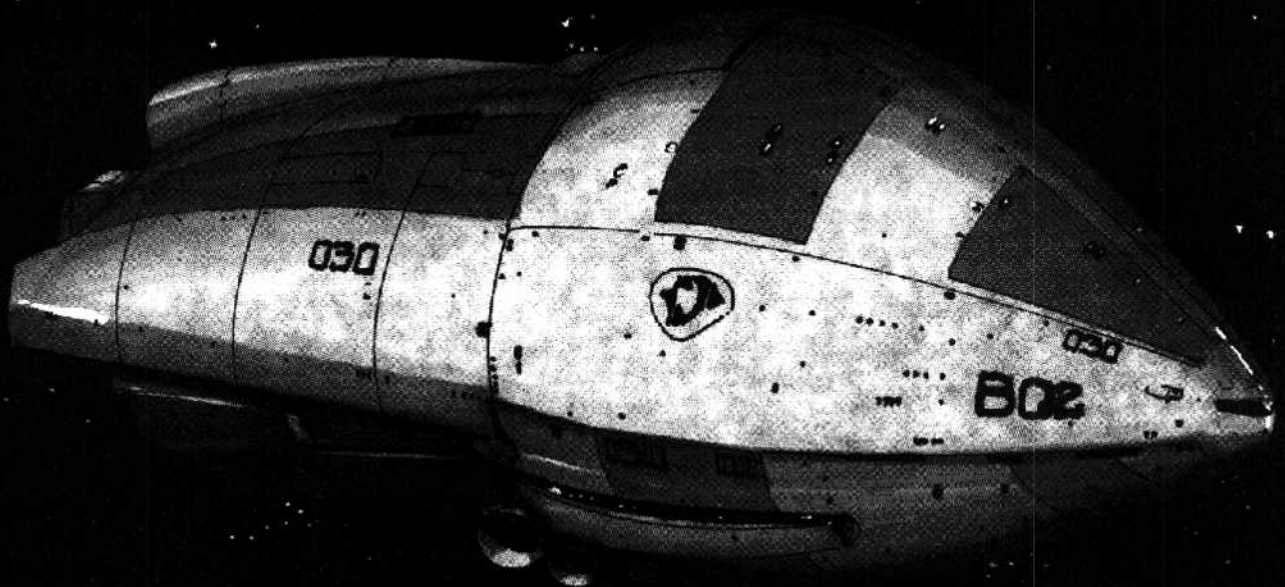
Volume: 11200  
Passengers High/Medium: 40  
Controls: Military with Bridge

Cost in Mcr: 285.352  
Passengers Low: 4  
Tech Level: 12

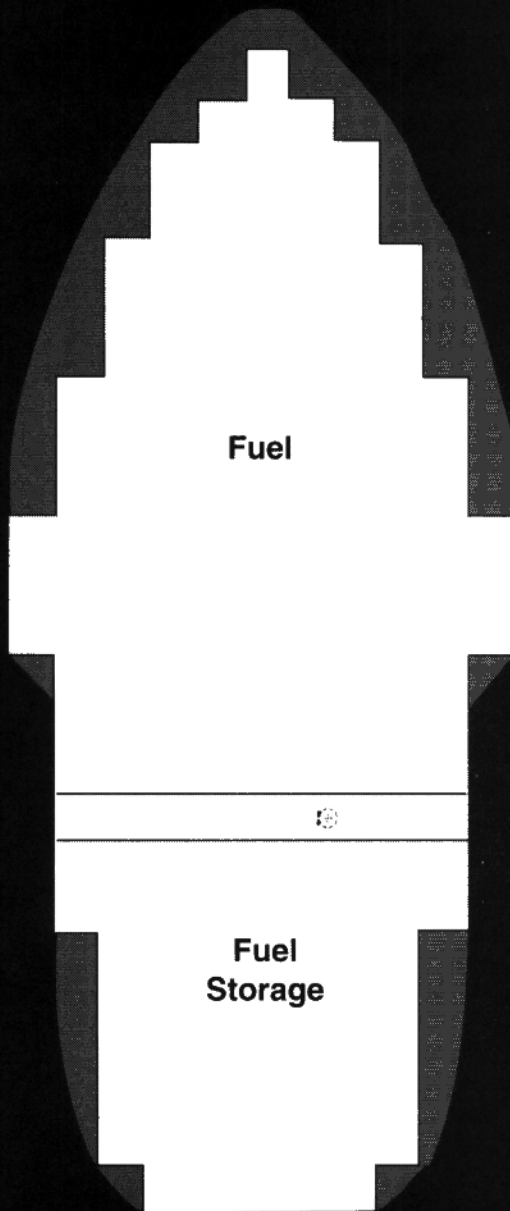
8 Size Rating  
2 Fire Control Rating  
2 x L Battery - 3,3,2,0  
2 x M Battery - Barbette 5

3 Jump Rating  
2 G Rating/ Thruster  
3 Power Plant Rating  
303.2 Fuel Rating/ Refine  
2 Sand Caster Rating  
1 Damper Rating  
10A 4P 10J Sensor Rating  
60 Armor 14 Structure

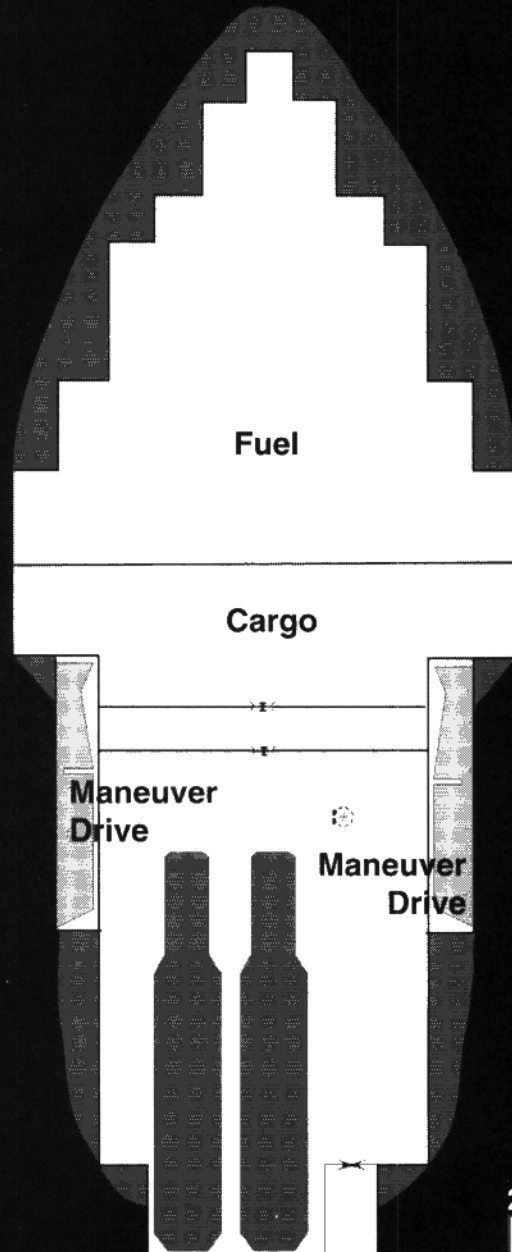
Using an 800-ton hull, the mercenary cruiser is built to carry small troop units for corporate or government operations. There are five ship's vehicles: two modular cutters (one open passenger and cargo module and one fuel module), two ATVs (in ATV modules), and one air raft. The hull is unstreamlined.



# MERCENARY CRUISER (A)



4th deck Level

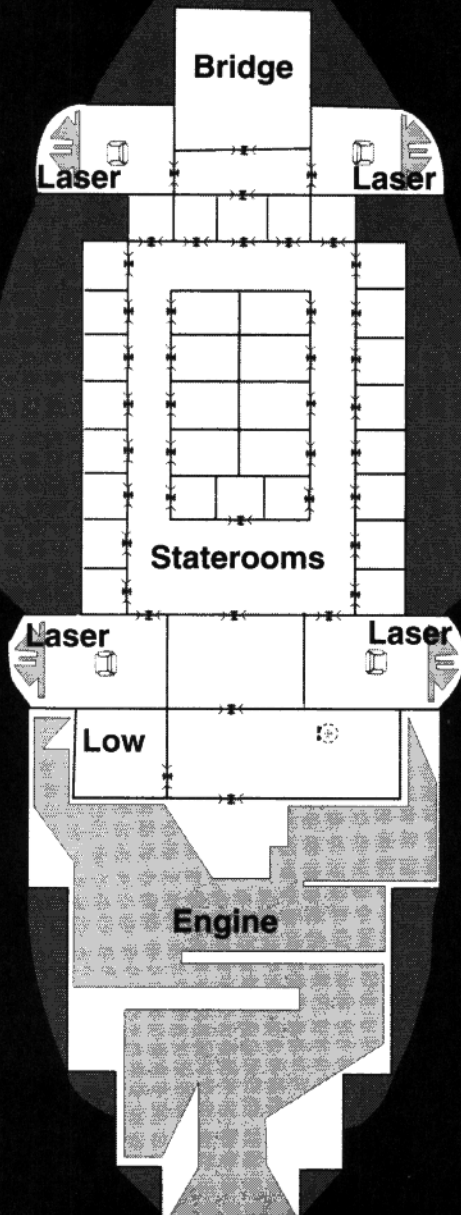


3rd deck Level

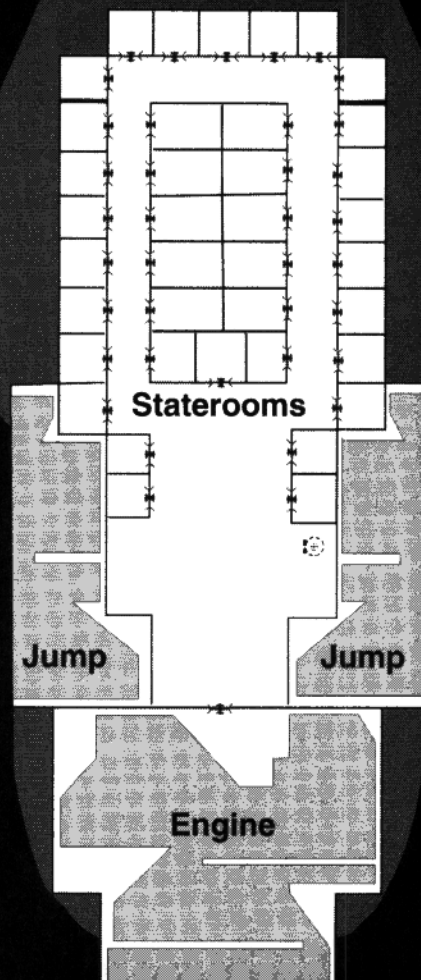
2m



# MERCENARY CRUISER (B)



2nd deck Level



1st deck Level

2m

# PERSONALITIES

The individuals described here are not the typical persons found in space-faring employment. They are the best at what they do. The government, and even the Royal Family, have taken note of these individuals from time to time. Their exploits, traits and positions are such that they are recognized in what they do. Should a traveller encounter one of these characters, it would not be unlikely at all to have heard of, or even know, some of the personal history behind them.

## **Marine Captain Melissa Von Sarnoff**

B7374A, Age 26, ATV-2, Brawling-2, Perception-1, Rifle-3.

Captain Von Sarnoff was born in Sylea 20 years before the start of the Third Imperium. She is the daughter of a Noble family and has been very successful in her military career. She attended the Sylean Military Academy along with her three brothers, and father, Captain Robert Von Sarnoff. She was outstanding in her class in many skills, with close combat, and riflery being her two best subjects. She stood out of her class not only because of her hard work but because of her utter fearlessness.

Von Sarnoff's father trained her from birth to be the best at everything and in many ways she is. but Von Sarnoff does have a weakness—a lack of trust in the abilities of those under her command. While at the top of her class, her superiors noted that she is a loner and preferred to do things herself unless instructed to enlist the aid of her peers.

After finishing her training, she was stationed at Fleet Headquarters on Sylea and served under Major Radley. She has not seen a lot of combat because of her tender age but was instrumental in stopping a terrorist plot to kidnap a Third Imperium Emissary: a band of youths had plotted to infiltrate an Imperium ship with false identifications and posing as a political youth group. Captain Von Sarnoff noticed a discrepancy in the fake ID's, and then infiltrated the band and capture them. She received the Third Imperium Medal of Valor Second Class for her actions and was sent to the northern continent of Sylea for special forces training. Her training now complete, Captain Von Sarnoff is the first noblewoman to hold a position in the Marine Special Forces, and commands an anti-terrorist/anti-hijacking force deployed from the main orbital starport of Sylea.

## **Military Navy Captain Elizabeth Knowles**

7649A3, Age 46, ATV-1, Brawling-1, Leadership 4, Physics-3, Pilot 3, Rifle-1, Ship's Boat 2. Tactic-3, Vac Suit-2.

Captain Knowles started her career as a Gunner's Mate aboard the Sylean Federation ship *Intrepid*. She saw action during the Morgensen Raid, and was instrumental in saving several members of her weapon's bay when it was hit by fire. She was awarded the Sylean Federation Bronze Cluster for Bravery in Combat. She was offered a commission to Ensign, and immediately took the chance.

Officer training left its mark on the young woman as the other classmates did not accept "lower deck scum" becoming an officer. She worked hard and passed, but made no friends among her class. She decided to take an educational sabbatical and attend school before taking active assignment. Her successes in the field of Relativistic Physics kept her in school to the completion of a Master's Degree from the Norminustrum Institute on Sylea before returning to active duty.

She was a Lieutenant Commander at the Sylean Naval Depot when Emperor Cleon I founded the Third Imperium. The quick change of power greatly affected the old military hierarchy, giving Knowles the chance to show her capabilities. She was given command of a destroyer. She never saw action against a

political foe, but her ship was twice awarded the Emperor's Citation for actions against Pirates in the Sylea Sector.

Captain Knowles now commands a squadron of three destroyers and one light cruiser, charged with the internal security of Sylean shipping lanes. She is a good tactician and a very able leader. Her knowledge of jump and maneuver technology gives her an added advantage in the great unknown of space combat. She has never lost.

## **Freighter Captain Errol S. Barrett**

5619F7, Age 36, Computer-2, Navigation-1, Pilot-2, Short Blade-2, SMG-2, Vac Suit-2

Captain Barrett was born on the outskirts of the Capital. He enlisted in the Navy in order to escape the political side of Sylean life. He was stationed as a Marine Liaison on Ceres III when the Navy discovered that Errol Barrett was a strategic genius.

On a routine exercise Barrett was put in charge of a platoon of Marines and given a map of simulated territory. Within seconds, Barrett formulated the perfect plan to infiltrate the territory that astonished his superiors. The map was designed to test the creativity of the troops, and no one had actually devised a completely working solution to the terrain barriers except for Barrett. At the age of twenty-four, Barrett was working for Naval intelligence on newly mapped areas of the Sylean Federation.

Barrett soon succumbed to the pressure of the Navy pressing on him to solve battle scenarios, which were then entered into a computer and saved against possible attacks. He began to think of himself as a pawn of the Sylean Federation, and subsequently botched a mission, on purpose.

After confessing to what had happened, Barrett was assigned duty aboard a civilian subsidized transport vessel and has been there ever since. The rise of the Third Imperium has gained him the ownership of the freighter. He is content with his job, but the new Imperium keeps a tab on his whereabouts in case he needs to be called in to consult on a mission. Captain Barrett would rather be left alone but the Imperium has threatened to court-martial him for his previous actions if he does not cooperate.

"From core of Capital City,  
To the rim of Solomani.  
All decks blazing gallant,  
Brave seven seas starry."

—First verse of *Star Intrepid*, traditional Navy voyage song.

"Cowardice, like alcoholism, is a lifelong affliction."

—Captain Melissa Von Sarnoff

## LABORATORY SHIP

Tons: 400  
Crew: 15  
Cargo: 11.9

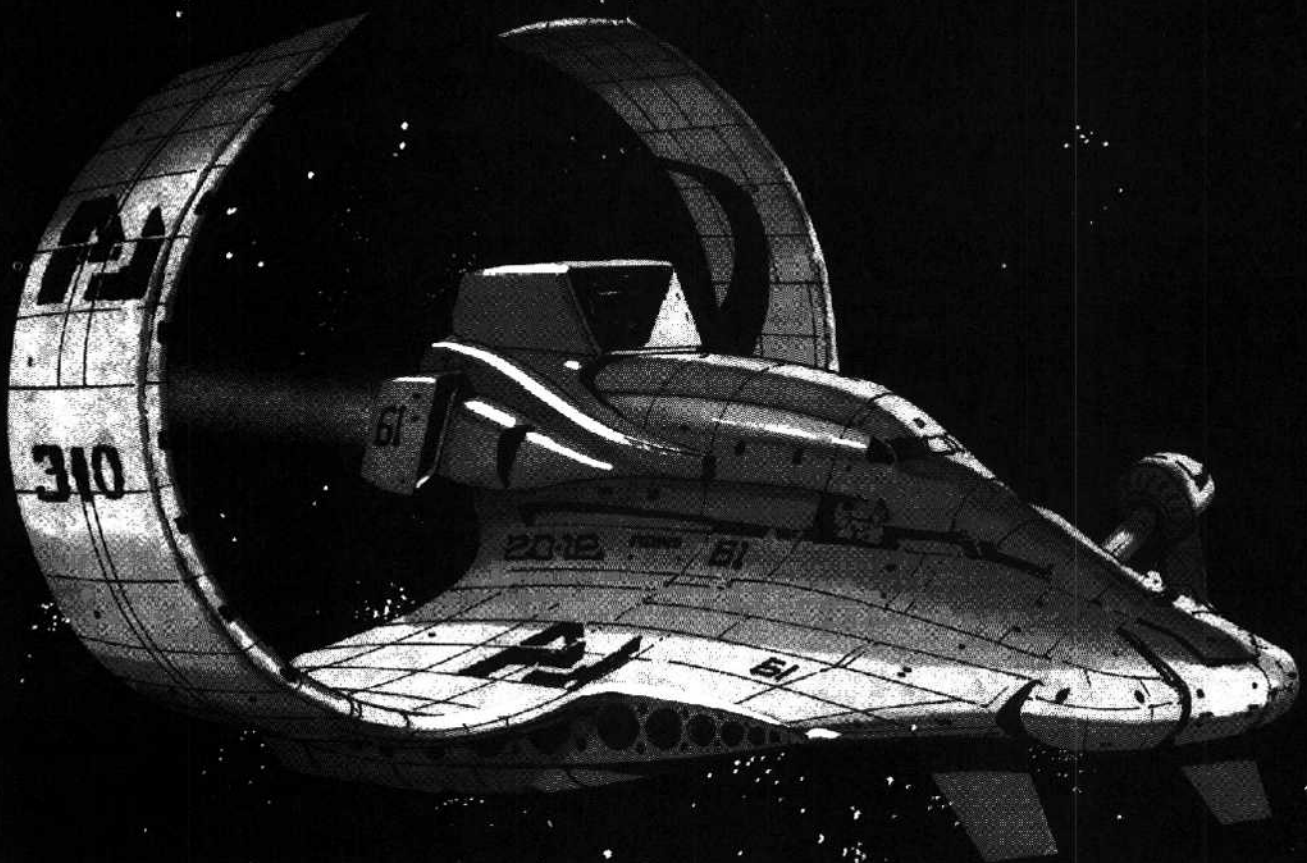
Volume: 5600  
Passengers High/Medium: 20  
Controls: Military with Bridge

Cost in Mcr: 145.209  
Passengers Low: 10  
Tech Level: 12

8 Size Rating  
0 Fire Control Rating

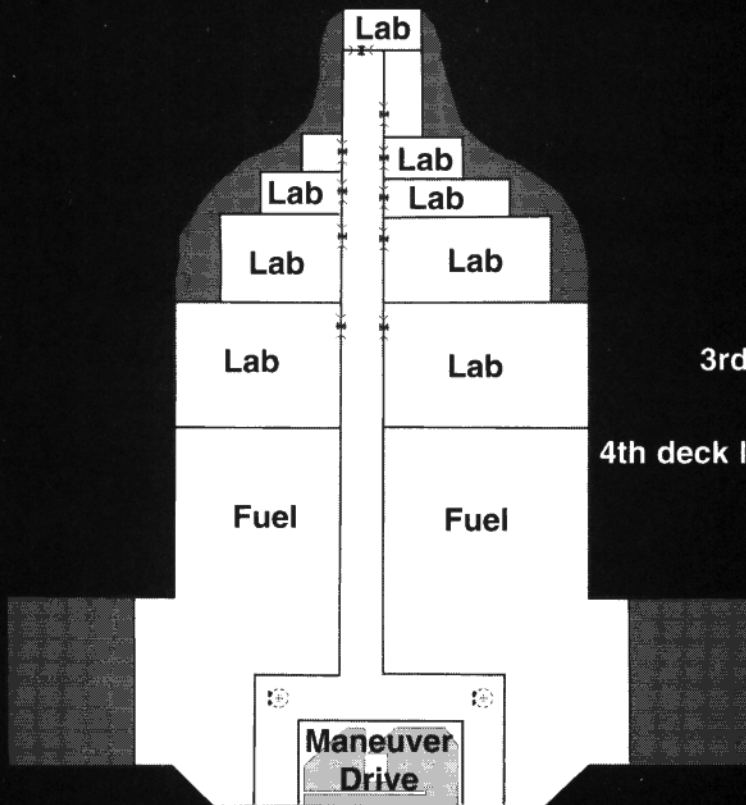
2 Jump Rating  
1 G Rating/ Thruster  
1 Power Plant Rating  
82 Fuel Rating  
10A 4P 10J Sensor Rating  
0 Armor 1 Structure

Using a 400-ton hull, the laboratory ship is a mobile base for scientific analysis and investigation. It contains labs for 20 scientists, and there are three ship's vehicles: two air rafts and one 40-ton pinnacle, used mainly for research in space, or moving any cargo or passenger. Laboratory space on board equals 85 tons. The ship is unstreamlined, and often customized to best serve its scientific mission.



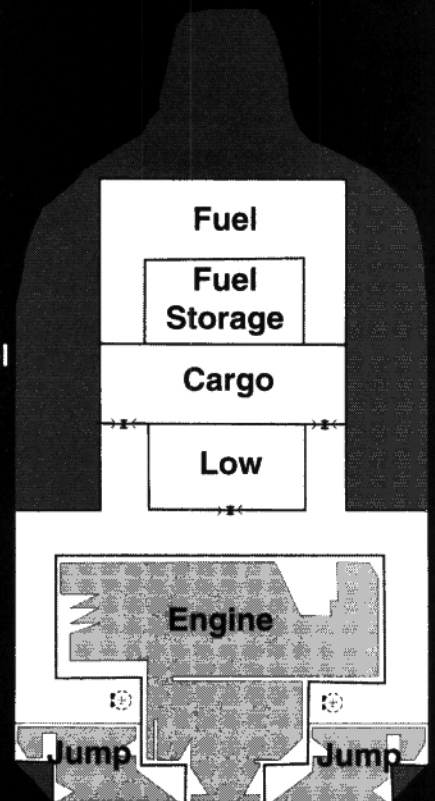


# LABORATORY SHIP

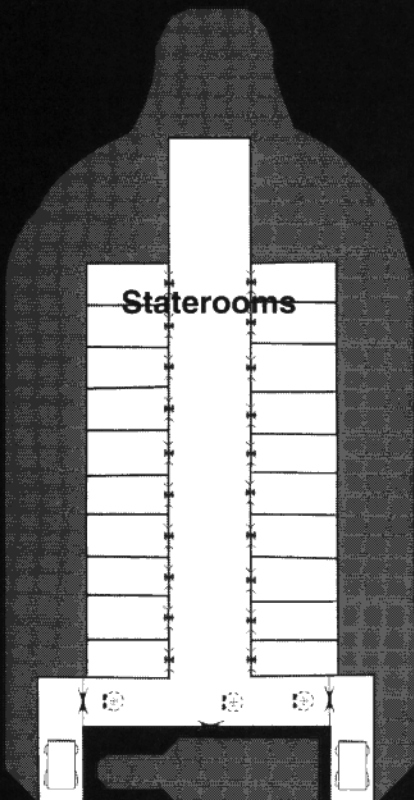


3rd deck level

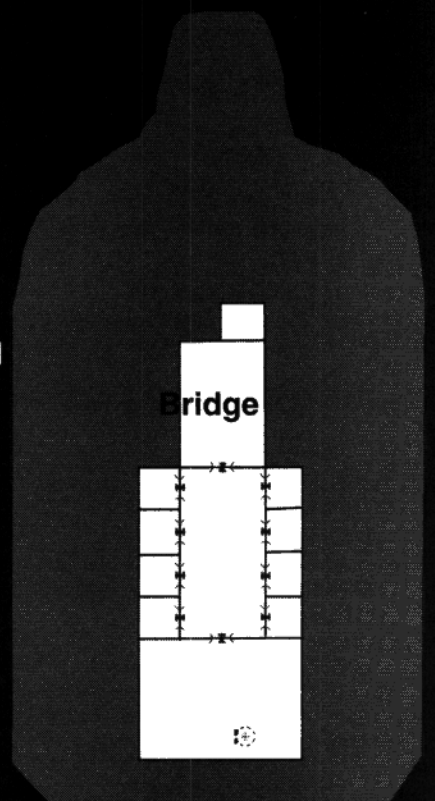
4th deck level



1st deck level



2nd deck level



2m



## SAFARI SHIP

Tons: 200

Crew: 5

Cargo: 4.9

8 Size Rating

0 Fire Control Rating

L Battery - 2,0,0,0

Volume: 2800

Passengers High/Medium: 6

Controls: Civilian Standard

Cost in Mcr: 36.558

Passengers Low: 0

Tech Level: 12

2 Jump Rating

1 G Rating/ Thruster

1 Power Plant Rating

40.9 Fuel Rating/ Scoop/ Refine

2A 3P 10J Sensor Rating

0 Armor

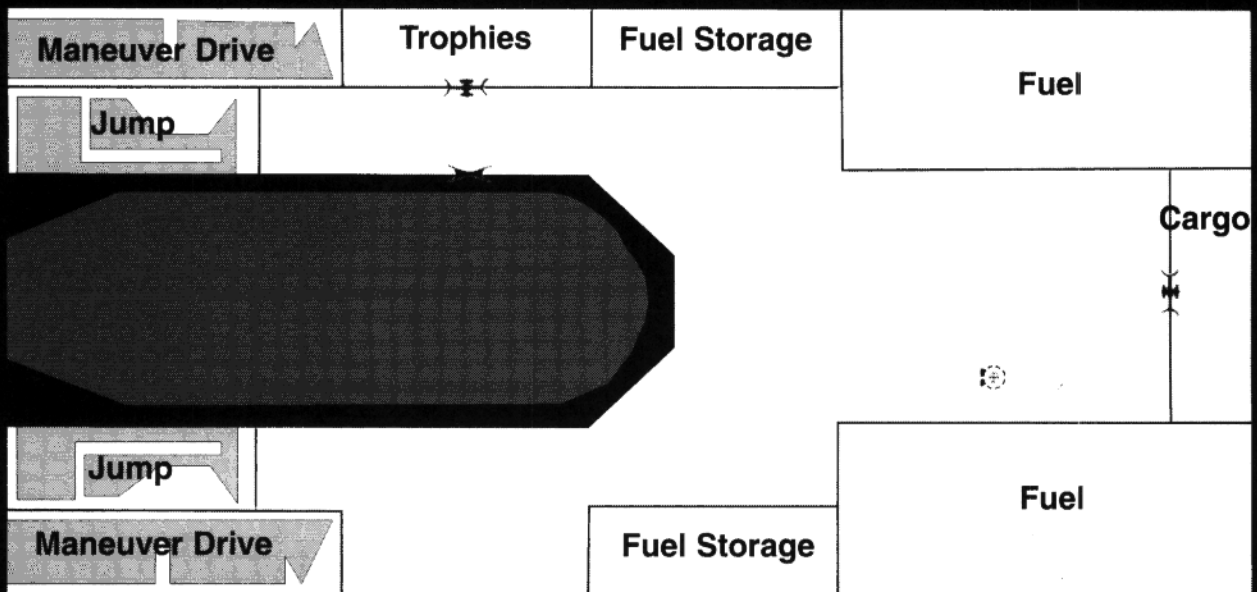
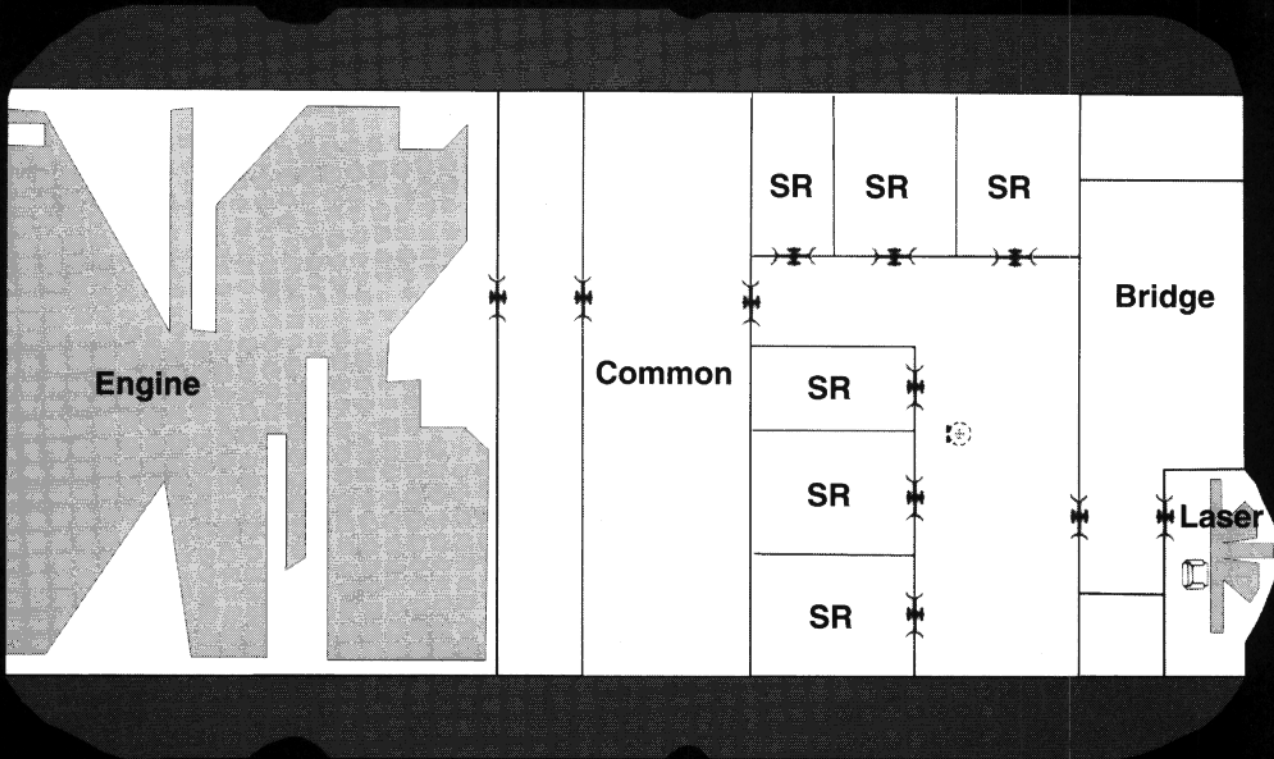
9 Structure

The safari ship is an excursion vessel intended for trophy-taking (real or photographic) expeditions to other worlds. There are two ship's vehicles: an air raft and a 20-ton launch. Two 7-ton capture tanks hold specimens, and a 7-ton trophy lounge serves as a hunter's recreation area. The hull is streamlined.



# SAFARI SHIP

## 2nd deck level



## 1st deck level

2m

## CORSAIR

Tons: 400  
Crew: 10  
Cargo: 109

Volume: 5600  
Passengers High/Medium: 0  
Controls: Civ Adv/bridge/fib

Cost in Mcr: 216.5  
Passengers Low: 20  
Tech Level: 11

8 Size Rating  
3 Fire Control Rating  
3 x L Battery 3, 0, 0, 0

2 Jump Rating  
3 G Rating  
3 Power Plant Rating  
118 Fuel Rating  
10A 4P 4J Sensor Rating Masking  
40 Armor 16 Structure

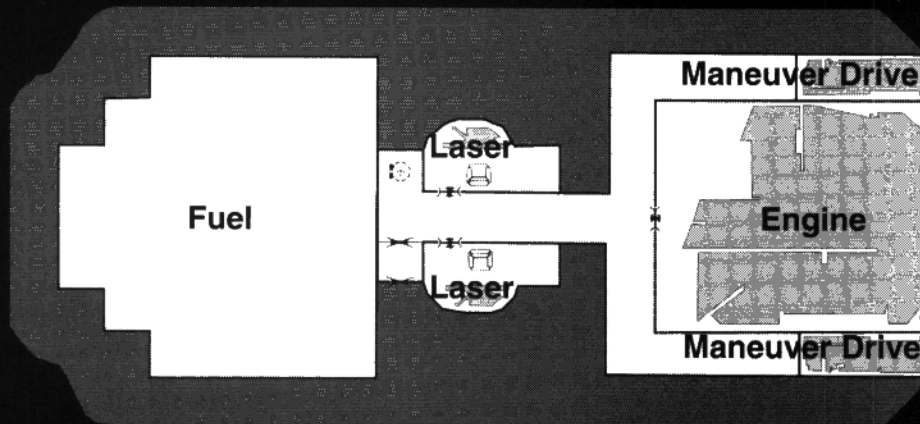
Chief Naval Architect: Joe Walsh

The Corsair, an armed raiding ship, is mostly used by pirates. Notable features of the corsair are large cargo doors and variable identification features. The large clamshell doors can open to reveal the entire cargo bay. The ship has several centrally controlled identification features which can be used to disguise the ship: radio emissions alter frequency and content, and the ship's transponders can be altered to identify the vessel as having any of a variety of missions and identities.

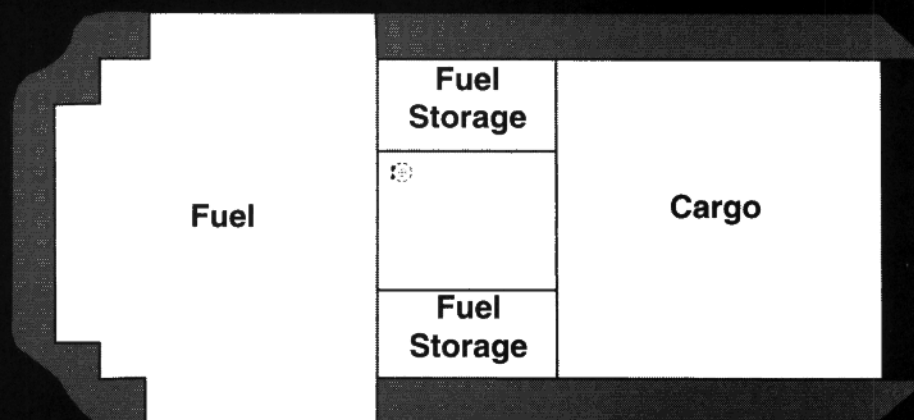
Based on a 400-ton, wedge-shaped, unstreamlined hull, the ship has 10 Large Staterooms for use as crew quarters, while the 20 low berths are available for emergency use, or to hold captives. The Corsair is not normally available on the open market, as the ship is a non-commercial type.



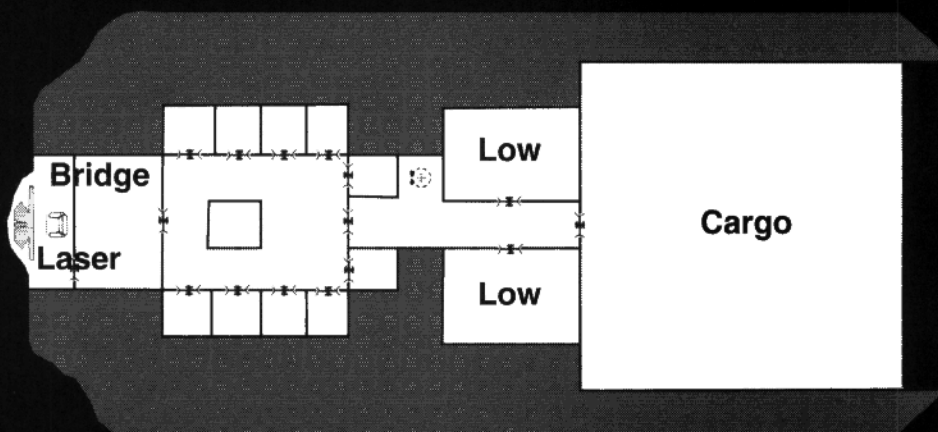
1st deck level



2nd deck level



3rd deck level



2m



## LARGE ARMED FREIGHTER

Tons: 3,000  
Crew: 43  
Cargo: 1,600

9 Size Rating  
4 Fire Control Rating  
10 x L Battery - 2, 0, 0, 0

Volume: 42,000  
Passengers High/Medium: 0  
Controls: Civ Std /bridge/fib

Cost in Mcr: 574  
Passengers Low: 0  
Tech Level: 12

2 Jump Rating  
2 G Rating  
2 Power Plant Rating  
615 Fuel Rating  
10 (300) Sand Caster Rating  
2A 3P 0J Sensor Rating  
10 Armor            23 Structure

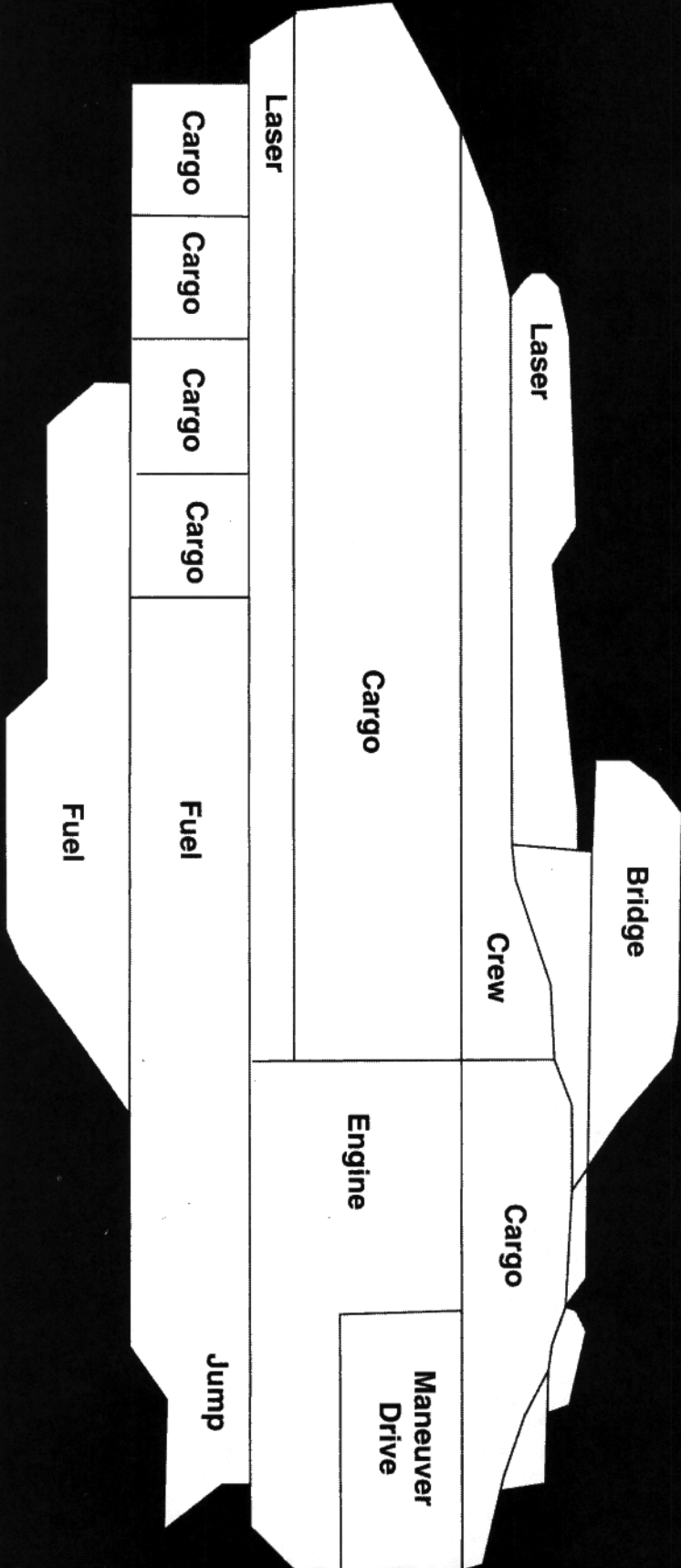
Carries Ship's Boat, Launch

Chief Naval Architect: Liam McCauley

The Large Armed Freighter is a relatively new entry into the long-haul, large-cargo shipping industry. It is perilously expensive, but the armor and multiple weapons batteries have made it a favorite auxiliary ship for use in military fleet replenishment. Civilian use has been light, with those doing so seeing service out beyond the boundaries of the Imperium. Their large cargo holds make them ideal for supporting mining and other raw resource operations on distant worlds.



LARGE ARMED FREIGHTER



## MILITARY LANDING SHIP INFANTRY

Tons: 800

Crew: 32

Cargo: 4

8 Size Rating

3 Fire Control Rating

L Battery - 4, 2, 1, 0

4 x Msl Battery 20 (13)

Volume: 11,200

Passengers High/Medium: 124

Controls: Mil Std /bridge /fib

Cost in Mcr: 415

Passengers Low: 0

Tech Level: 11

2 Jump Rating

2 G Rating HEPLaR/ Thruster Plates

2 Power Plant Rating

240 Fuel Rating/ Scoop/ Refine

10A 4P 4J Sensor Rating

70 Armor

14 Structure

2 x ship's boats.

High Passengers are actually onboard Marines

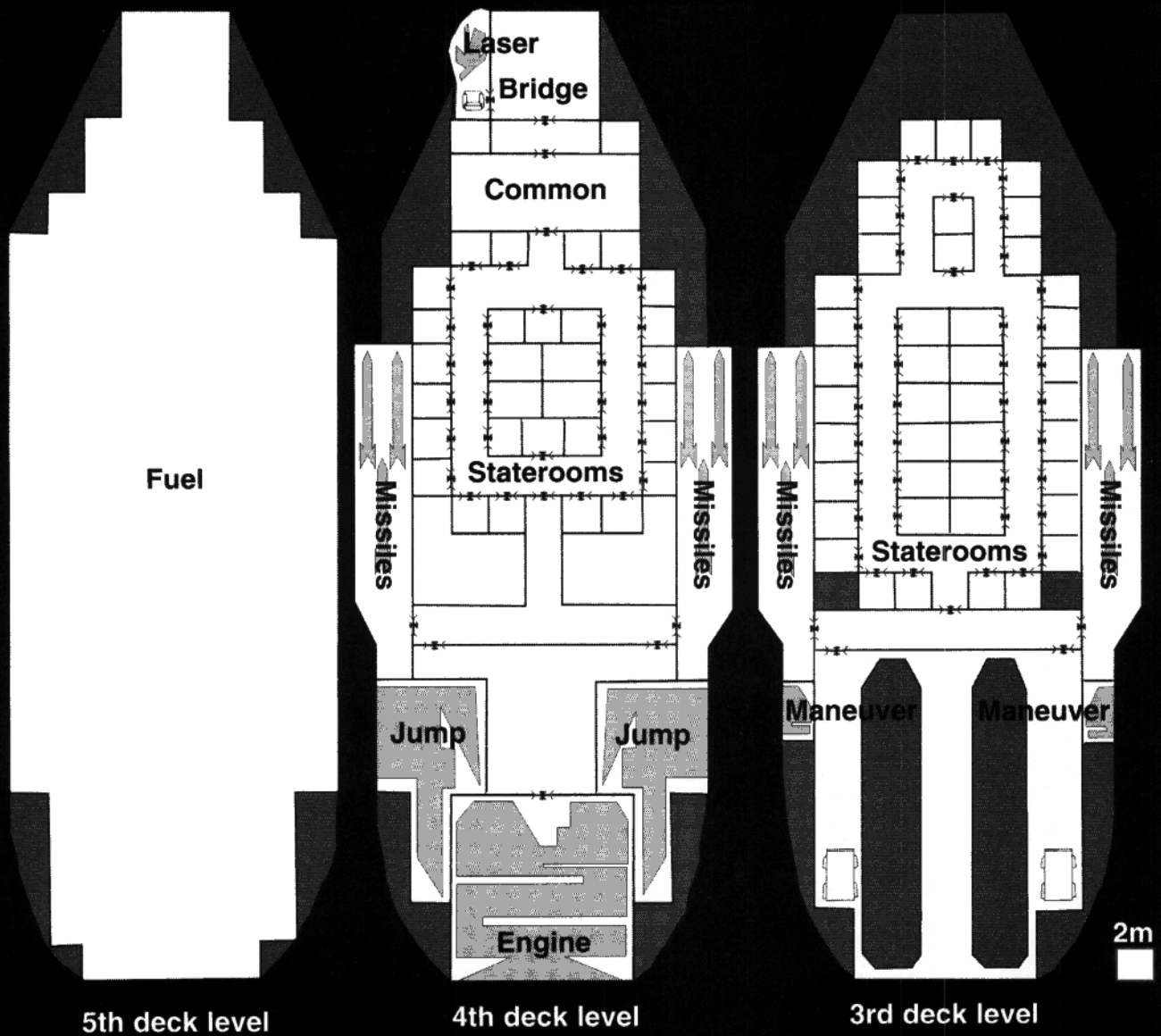
Chief Naval Architect: George Herbert

The Landing Ship Infantry and the Mercenary Cruiser evolved out of a single prototype in response to an Imperial Naval specification for a vessel able to land a marine company against hostile defenders in a moderate threat environment. The military version did not opt for the modular cutter design, but instead went for higher troop-carrying capacity.

These ships have a significant amount of redundancy and toughness, as they carry large numbers of troops and operate far from home much of the time. The hull armor is significantly tougher than the average warship its size, and the main power plant is broken down into three 250-MW standard fusion units and an emergency, "Get-Home" fission reactor of 25 MW rating. A second full life support system is fitted should the primary go offline due to failure or damage. Electronic and Mechanical Shops and a Sick Bay are fitted to provide repair and medical facilities on board. Unlike other designs for similar ships, both small craft are in internal bays not external, allowing for repair access. The ships were designed shortly after the introduction of thruster plates by cautious engineers, and as a result ended up with a dual sublight propulsion system. Both thrusters (1-G rated) and HEPLAR (1-G) are fitted, and if both are operating properly the ship can make 2Gs. It has unlimited endurance at 1-G on thrusters, or up to 11 G-hours of HEPLaR thrust.

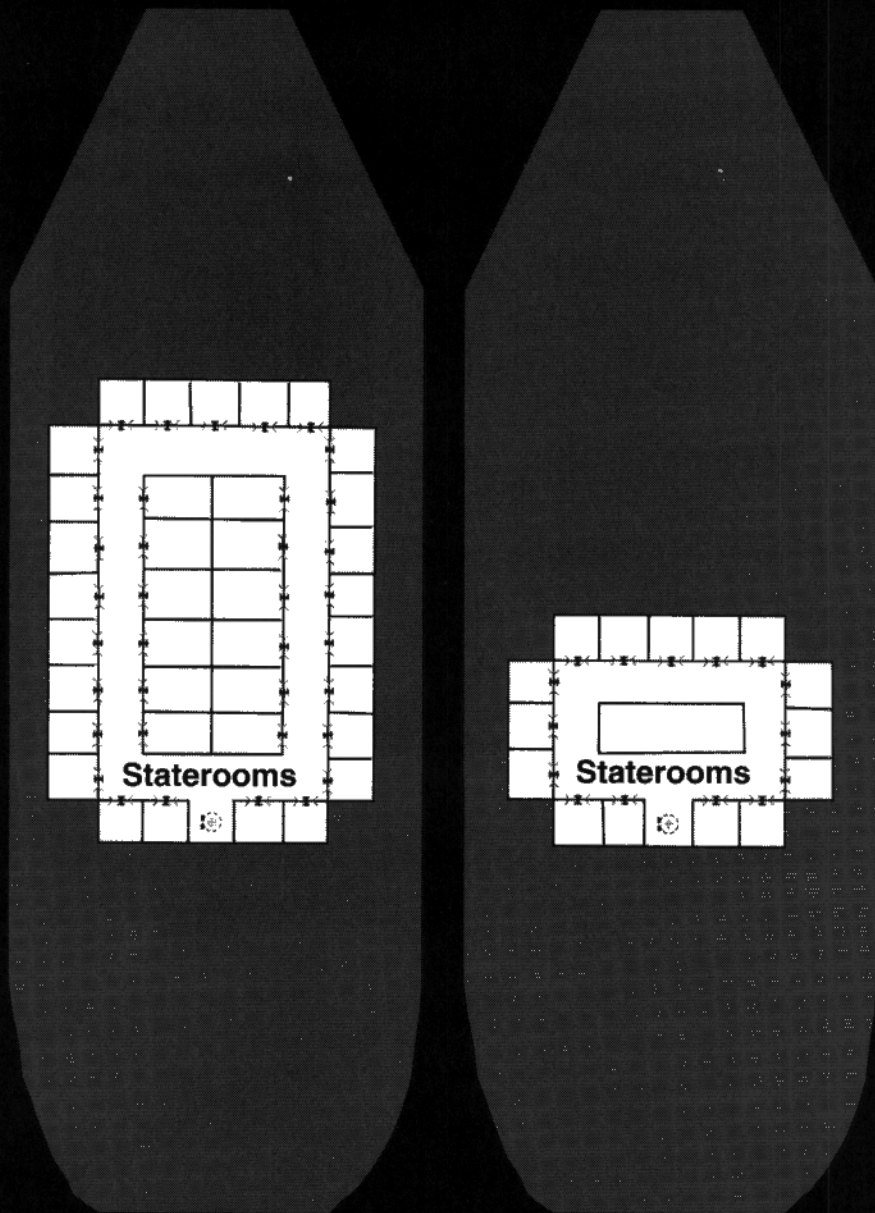


# MILITARY LANDING SHIP INFANTRY (A)





# MILITARY LANDING SHIP INFANTRY (B)



2nd deck level

1st deck level

# MORE PERSONALITIES

## **Naval Commander (Doctor) Mark C. Seldera**

865896, Age 35, Admin-1, Computer-1, Medical-6, Research-4, Writing-2.

Commander Seldera was born off-world on a merchant liner to transiting parents. He always had a love of space travel, but eventually received his medical training at the Vlorshiek Academy at his parents' insistence. He is politically conservative, and only cares about his rank and station in life. He made his mark on the medical world by single-handedly curing an outbreak of disease on Sylea. He is the Imperium's foremost authority on human virus and has written many academic books on this subject.

The one drawback to Commander Seldera's research is his motive, which is pure personal gain. He has secretly discovered and contained two viruses that could wipe out an enemy force, but have yet to be tested in real combat. The Imperium does not like to deal with Seldera because of his political affiliations and his arrogance. They suspect his experimentation of the viruses that he has discovered but cannot catch him in the act. His naval rank does nothing to curb his personal tendencies, either.

The Imperium is keeping a very close eye on Seldera to make sure that he does not sell his talents to the highest bidder. He is, therefore, stationed on a Naval Station where he can be monitored. His contacts are also under close scrutiny and have not shown to be subversive as of yet. Dr. Seldera is outlandish in his actions because he knows that the Imperium needs him should war ever break out. He has his run of the base and is not very well liked by his peers. Seldera hopes to one day make enough money to retire a wealthy man from the military and disappear from the watchful eye of the Imperium.

## **Mercenary Captain Otto K Slinger**

486755, Age 38, Gunnery-1, Intrusion-3, Jack-of-all-Trades-2, Leadership-2, Mechanics-1, SMG-3, Rifle-3, Streetwise-5.

Captain Slinger was born in the backwaters of the Sylean Federation. His troubles began at a young age when he learned that he had a talent for breaking Federation codes and stealing arms. He then joined a subversive group and sold the arms to small military factions. Otto has no political interests and cares only for himself and his only living relative, his uncle. Otto was given to the Federation by his friends and he has not forgiven them since.

Slinger escaped from Federation prison six months before the rise of the Third Imperium. He started his own mercenary group that found political favor with the new reign when he inadvertently saved the life of a third cousin to Emperor Cleon I during a botched raid on a rival mercenary band.

The Empire does not condone Captain Slinger's operations, but certainly does not hinder them. In fact, special loans were granted for the purchase of a Cruiser for the group. To date, Captain Slinger has gone on five successful missions and one failed mission where he lost eighty percent of his command.

Otto has a lot of friends and connections, especially in the underworld of Sylea. He can find out just about any kind of information one might require, but there is a price. Slinger is not a greedy person but knows the value of a dollar and what it means to ask a favor of his friends. If the cause seems to be just, then his prices are reasonable and he is happy to help. His favorite kind of mission is one where he can anger an established government or monarchy outside of the Imperium.

Captain Slinger desperately wants to take revenge on the few who turned him in to the old Sylean Federation. His actions are suspected to be severely hostile.

## **Commander Colin A. Hughes, Squadron Commander YC2234, the Eagle Claws.**

5619F7, Age 50, Carousing-4, Computer-2, Navigation-1, Pilot-4, Short Blade-2, SMG-2, Vac Suit-2.

Commander Hughes was born into the Sylean Federation to a military family. He was trained at the Sylean Military Academy and is a decorated officer. He has seen a lot of combat and has served under some of the very best Admirals in Sylean history. Hughes is widely known and respected throughout the Third Imperium, and has many connections.

He is known as a tough Commander and expects nothing but the best from his Squadron. He is known for never taking risks and will not enter a combat situation without knowing all of the facts; his judgment is impeccable and is never doubted. He has the respect of his pilots but not necessarily their friendship. He has no time or space for weakness and will not tolerate anyone who cannot cut it in his Squadron. He has the highest record for successful missions in the navy.

Young pilots strive to make the cut for his command but few ever make it. Those who do can expect no special treatment from Hughes. His reputation precedes him throughout the military and is often consulted for his expertise in the area of space combat.

Hughes has settled very nicely into his routine and is very traditional when it comes to his unit. He is not getting any younger and will eventually be forced into retirement.

## **Space Station Administrator John Ferguson**

948499, Age 40, Admin-5, Computer-1, Gambling-3, Vac Suit-1.

Ferguson is a bureaucrat who loves his job. He started at the bottom of the ladder and has worked very hard to get the job that he has today.

John Ferguson has many responsibilities, including the monitoring and safekeeping of the space station. He is in charge of keeping the log books updated and making sure they are accurate, he also takes care of all of the supplies and demands of the station. It is a high pressure job but he tackles even the smallest of problems with zeal.

His biggest challenge is in keeping a close communication with the people who are actually on the station and do the day to day upkeep that he oversees. Sometimes there is a clash of personalities with highly ranked Captains and Commanders. Ferguson does everything by the book and will not usually make exceptions, only in times of crisis will he bend the rules. He is an efficient man and does not waste time or money if he can help it. Some Space Station personnel like to get away with things like ordering unnecessary supplies. Ferguson sees this as taking advantage of the Imperium and will not stand for it. He takes pride in his work and hopes that he will be recognized for his effort. He has won awards for his efficient run of the station but believes he deserves more than praise and a pat on the back.

He was recently promoted as second administrator on Sylea Down, and now is second to the senior military officer, Admiral J. Beddard, on Sylea Orbital. Many foresee Ferguson becoming a senior bureaucrat under Emperor Cleon I's reign.

## MILITARY FRONTIER CRUISER

Tons: 2,000

Crew: 50

Cargo: 35

9 Size Rating

4 Fire Control Rating

PA Battery - 9, 7, 6, 5

4 x Msl Battery 20 (20)

10 x L Battery - 2, 2, 0, 0

Volume: 28,000

Passengers High/Medium: 48

Controls: Mil Std /bridge /fib

Cost in Mcr: 1056.5

Passengers Low: 0

Tech Level: 12

2 Jump Rating

4 G Rating Thruster Plates

6 Power Plant Rating

632 Fuel Rating /S /R

5 (150) Sand Caster Rating

16A 5P 16J Sensor Rating

30 Armor

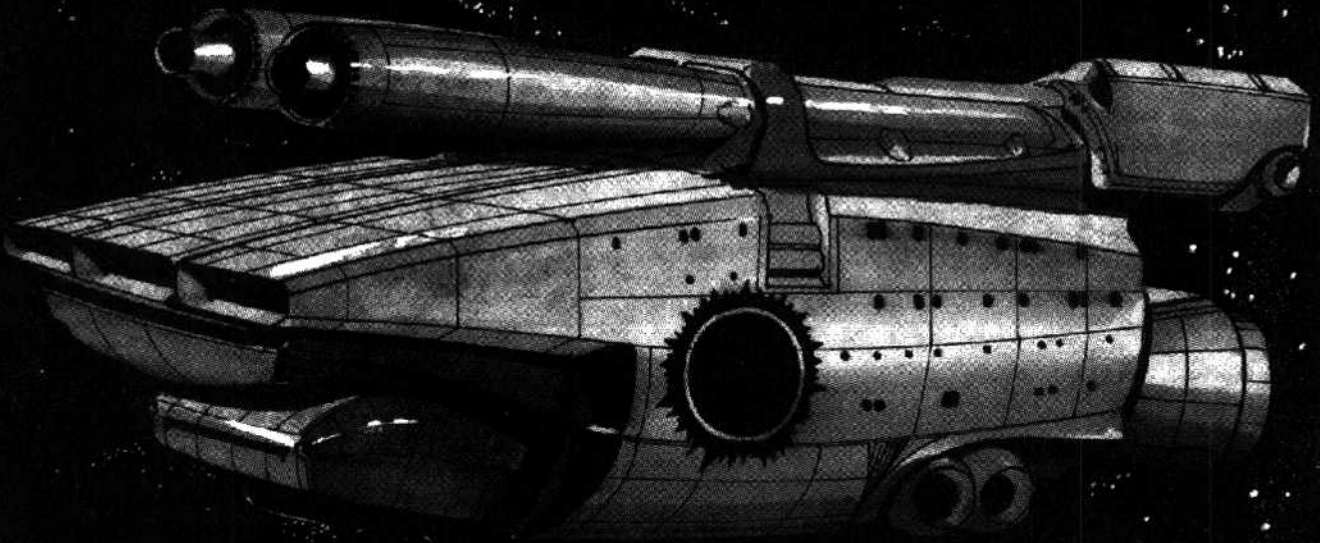
25 Structure

Launch, Ship's Boat

High Passengers are actually onboard Marines

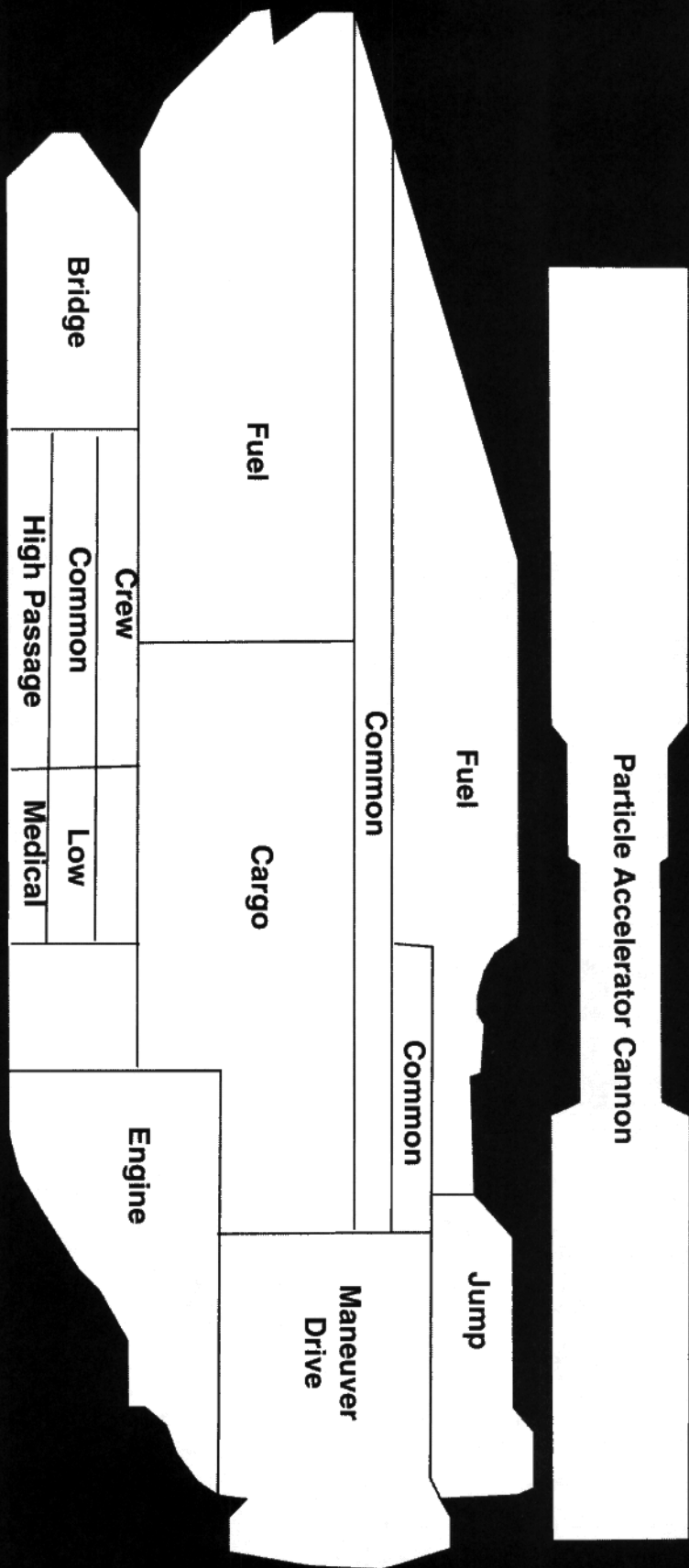
Chief Naval Architect: Liam McCauley

The Military Frontier Cruiser is designed to "show the flag" and discourage piracy. As a representative of Imperial might, it can patrol systems where a front-line cruiser would be uneconomical or overly ostentatious. This ship is usually more than capable of holding off a corsair or two with its particle accelerator and missile barbettes, whilst defending with sandcasters and laser turrets. It is not designed to fight larger craft, so no meson screen is fitted.





MILITARY FRONTIER CRUISER





## MILITARY DESTROYER

Tons: 1,000

Crew: 50

Cargo: 15

9 Size Rating

4 Fire Control Rating

4 x L Battery - 3, 3, 3, 2

4 x Msl Battery 20 (20)

10 x L Battery - 2, 2, 0, 0

Volume: 14,000

Passengers High/Medium: 6

Controls: Mil Std /bridge /fib

Cost in Mcr: 413.1

Passengers Low: 0

Tech Level: 12

3 Jump Rating

3 G Rating Thruster Plates

6 Power Plant Rating

233 Fuel Rating /S /R

5 (150) Sand Caster Rating

10A 4P 10J Sensor Rating

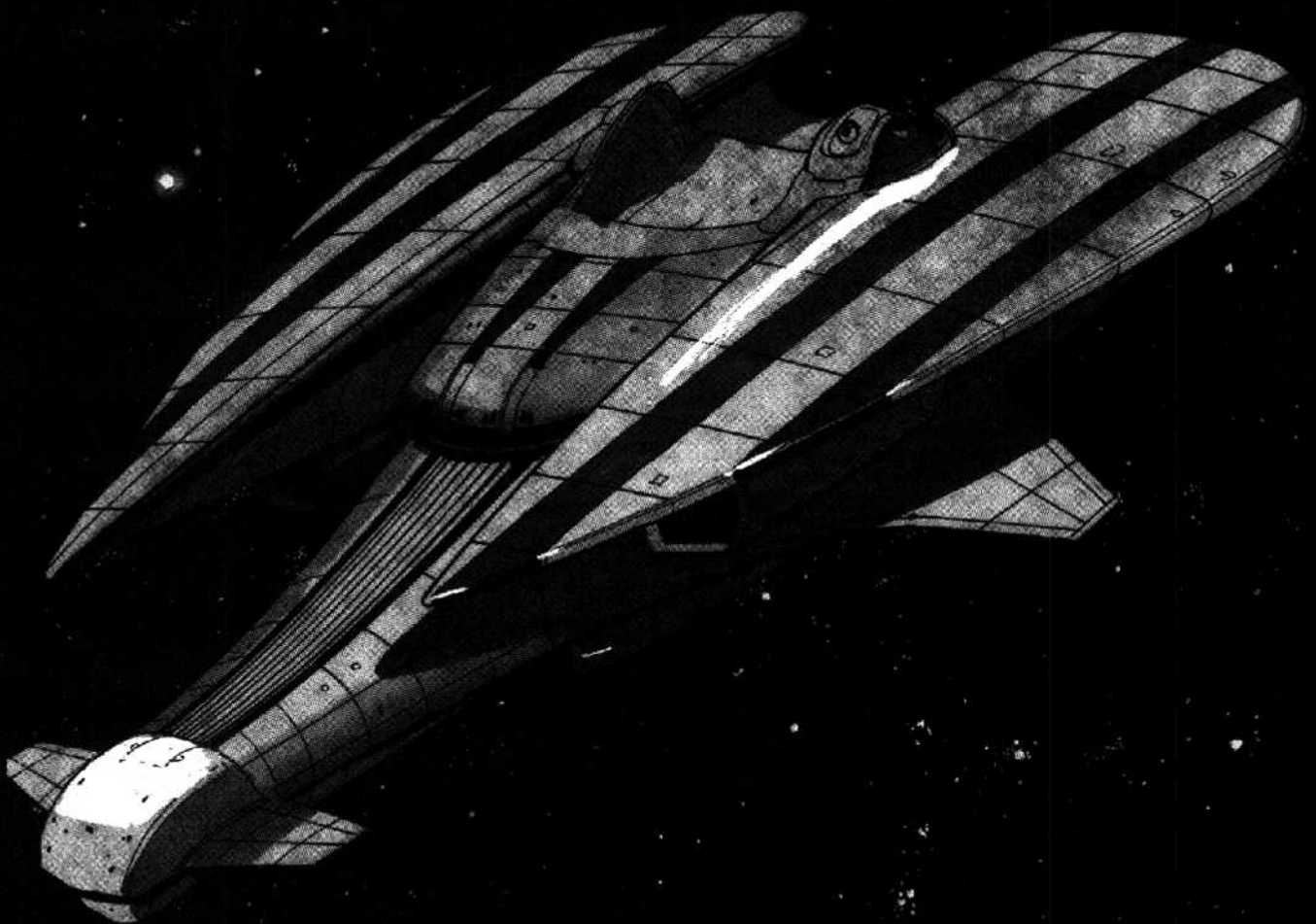
10 Armor

18 Structure

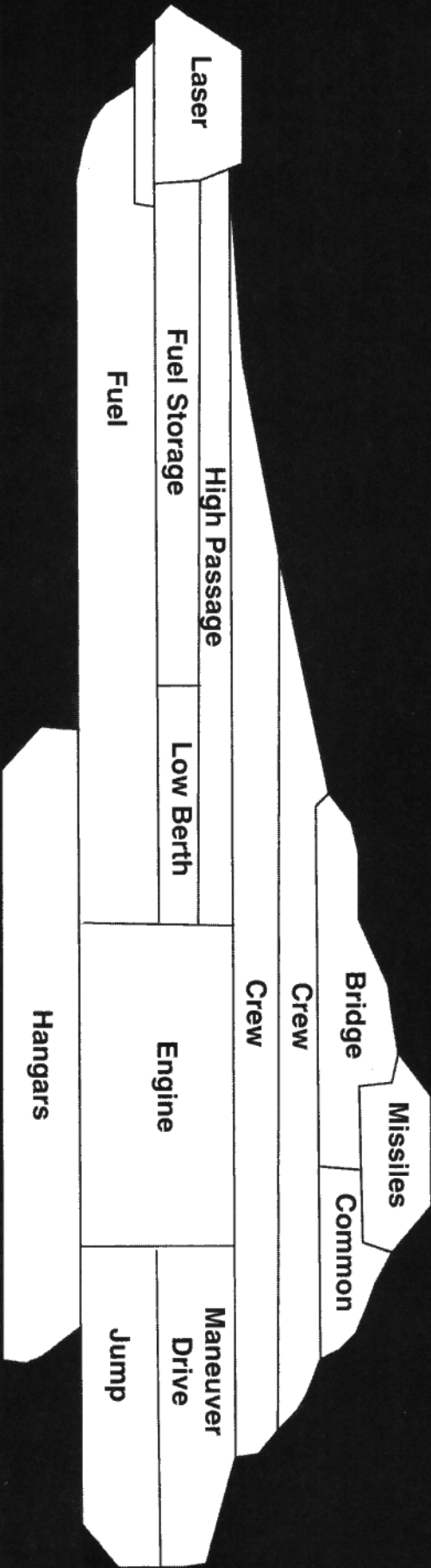
Ship's Boat

High Passengers are actually onboard Marines

The Destroyer is the mainstay of the Imperial Fleet. It is a very versatile, well-rounded ship with good offensive capabilities. Destroyer Squadrons are deployed throughout Imperial space, and are always escorts to the much larger Auxiliary Carriers. Their onboard Marines are used for internal security of the ship, as well as search and seizure raids or boarding parties. The ship is capable of atmospheric entry and landing, but is rarely called upon to do so. The hangar bay for the Ship's Boat is configured to be able to handle 20 tons of fighter (either one medium or two light fighters), should the need arise. The Destroyer is the most versatile of all of the ships in the Fleet, and is used for any job which does not require a fleet to handle.



MILITARY DESTROYER



## LIGHT FIGHTER

Tons:10

Crew: 1

Cargo: 1

7 Size Rating

1 Fire Control Rating

L Battery - 2,0,0,0

Volume: 140

Passengers High/Medium: 0

Controls: Military Standard

Cost in Mcr: 18

Passengers Low: 0

Tech Level: 12

0 Jump Rating

6 G Rating

6 Power Plant Rating

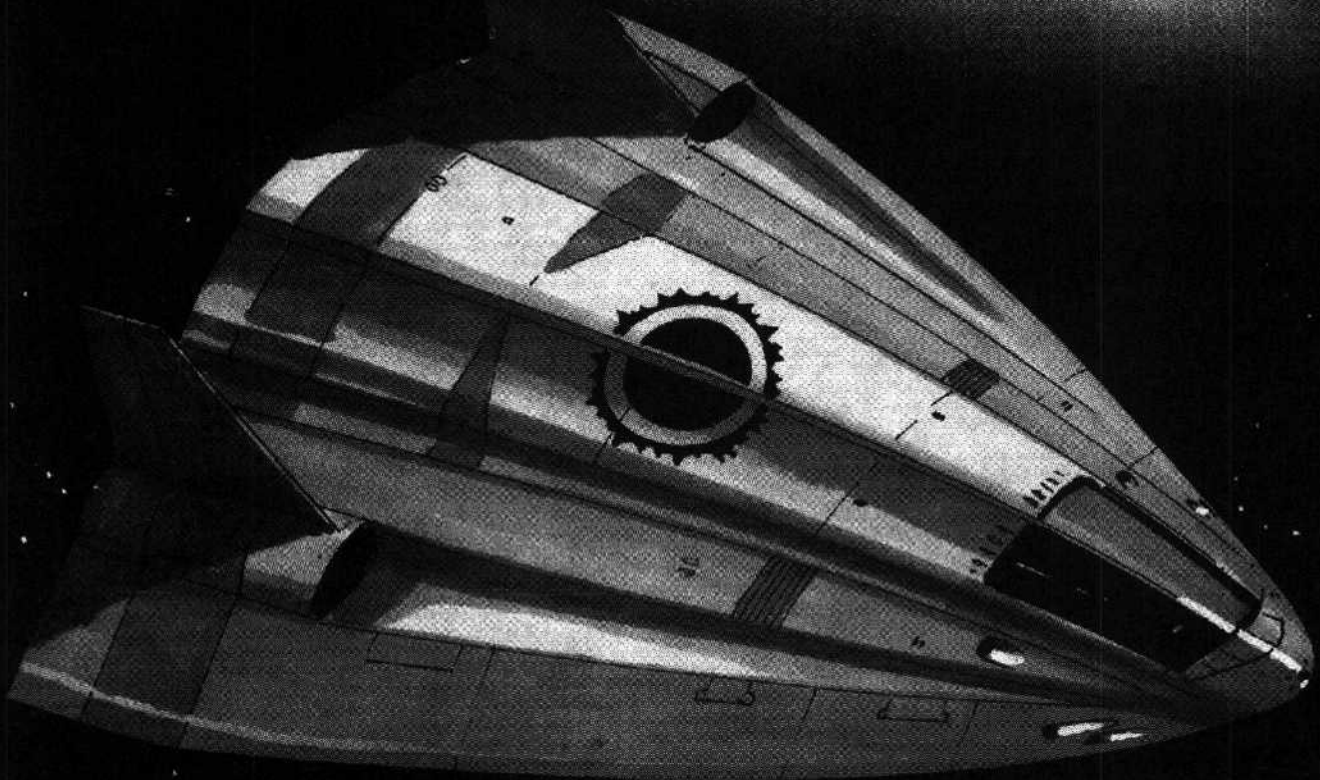
10 Fuel Rating/ Scoop/ Refine

5A 2P 2J Sensor Rating

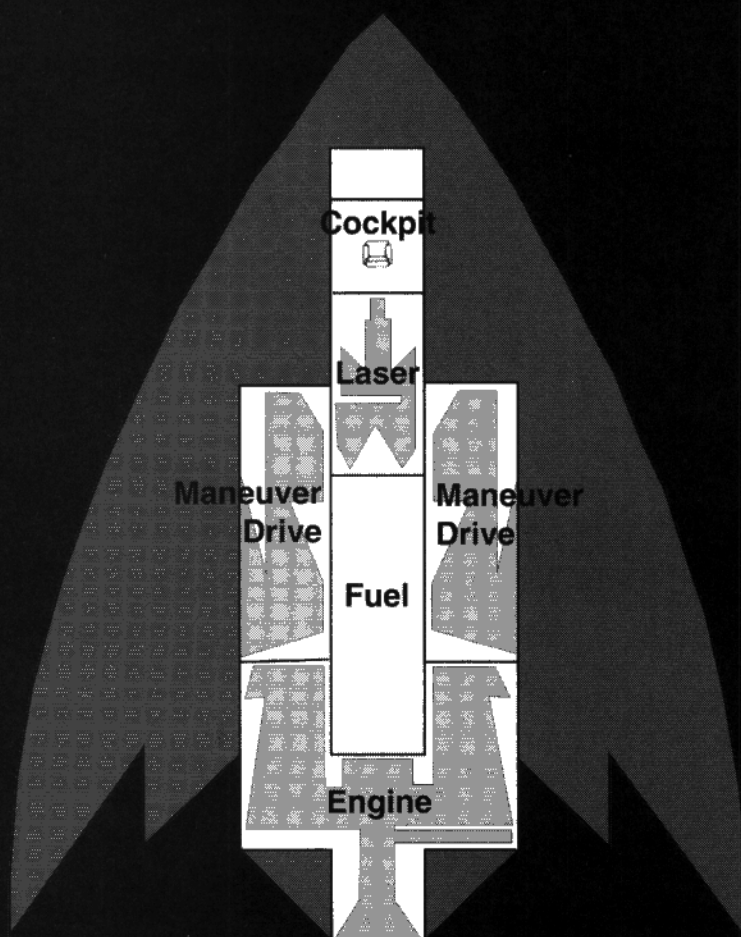
8 Armor

2 Structure

The Light Fighter was introduced using the new Imperial Technology as a brand new class of fighting ship. It is the smallest high-G fighting ship in the Imperial inventory, and can do devastating damage to lightly armed or unarmed vessels. The Imperial Fleet has jumped at the new technology, and is fielding many light fighters. The vessels are used primarily for combat missions against inferior enemies, although its airframed hull makes it capable of operations against atmospheric fighters.



# LIGHT FIGHTER





## MEDIUM FIGHTER

Tons: 15

Crew: 1

Cargo: 1

7 Size Rating

1 Fire Control Rating

3 x L Battery 1 - 2,0,0,0

Volume: 210

Passengers High/Medium: 0

Controls: Military Standard

Cost in Mcr: 24

Passengers Low: 0

Tech Level: 12

0 Jump Rating

5 G Rating

7 Power Plant Rating

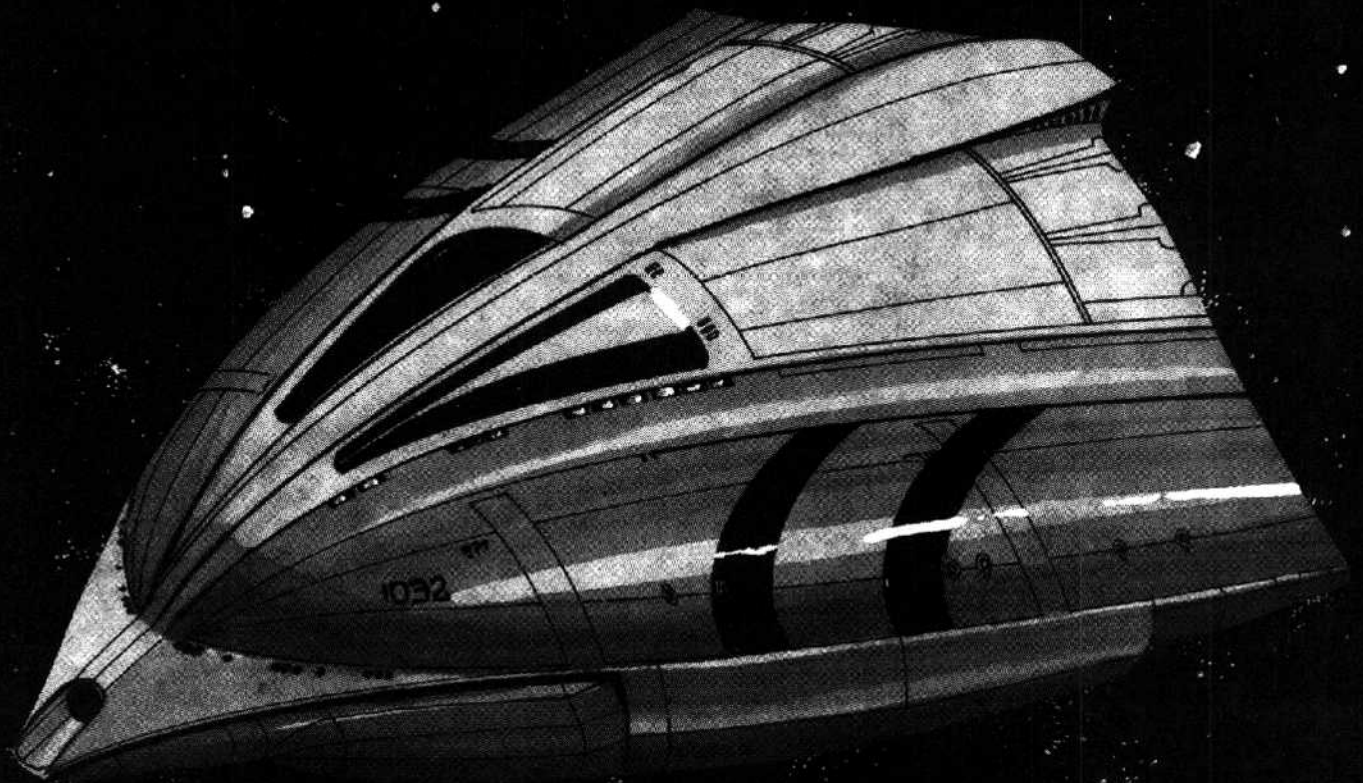
12 Fuel Rating

5A 2P 2J Sensor Rating

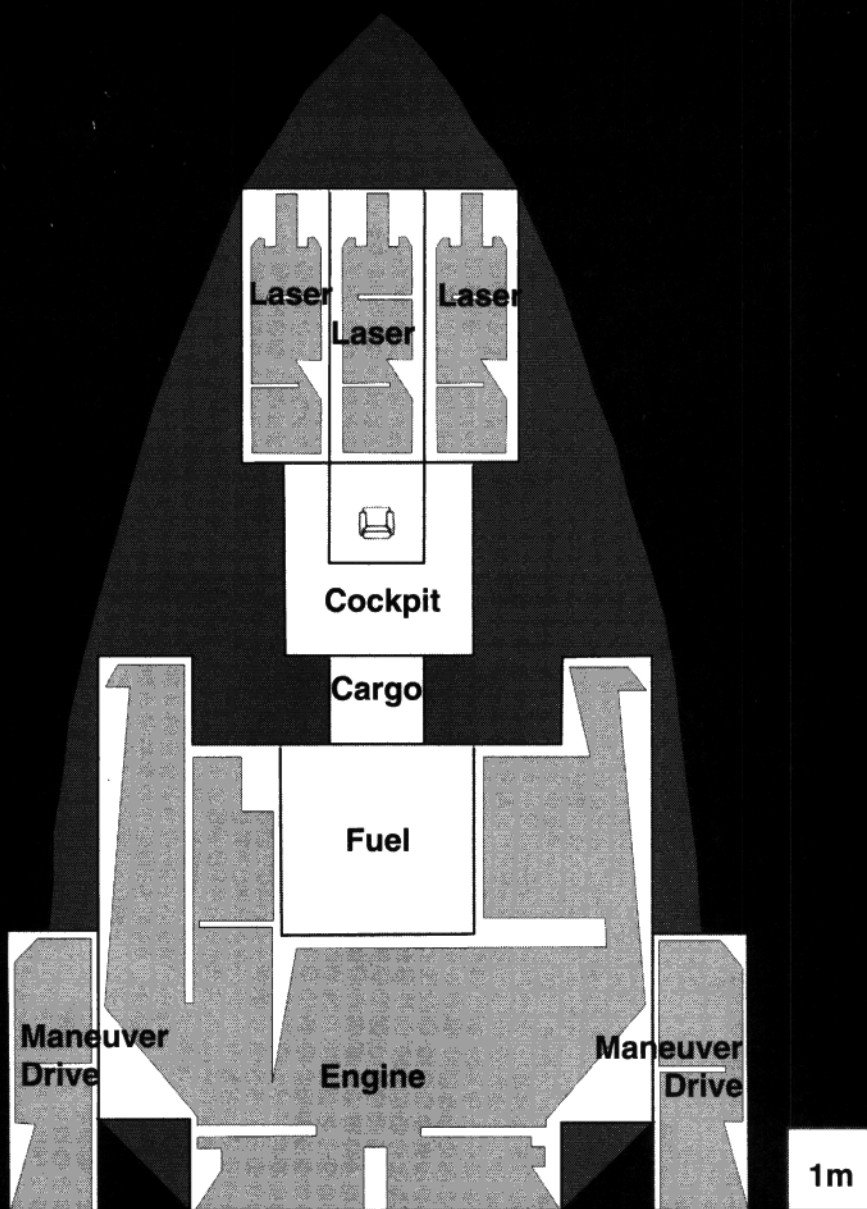
8 Armor

2 Structure

The Medium Fighter has been in service almost as long as the light fighter. Its design stemmed from the need to have a massively damaging weapon system with a single crewmember. It is ideal for taking control of local space, and is a very intimidating sight to raiding pirates or running smugglers. It, too, is capable of atmospheric flight, but its lower G rating make it less effective than a suitably armed atmospheric fighter. The Medium Fighter relies on a combination of maneuverability and heavy firepower to achieve its missions.



# MEDIUM FIGHTER



## HEAVY FIGHTER

Tons: 30

Crew: 2

Cargo: 1

7 Size Rating

2 Fire Control Rating

1 x L Battery 1 - 4, 2, 0, 0

3 x L Battery 2 - 2, 0, 0, 0

Volume: 420

Passengers High/Medium: 1

Controls: Military Standard

Cost in Mcr: 34

Passengers Low: 0

Tech Level: 12

0 Jump Rating

4 G Rating

7 Power Plant Rating

14 Fuel Rating

5A 2P 2J Sensor Rating

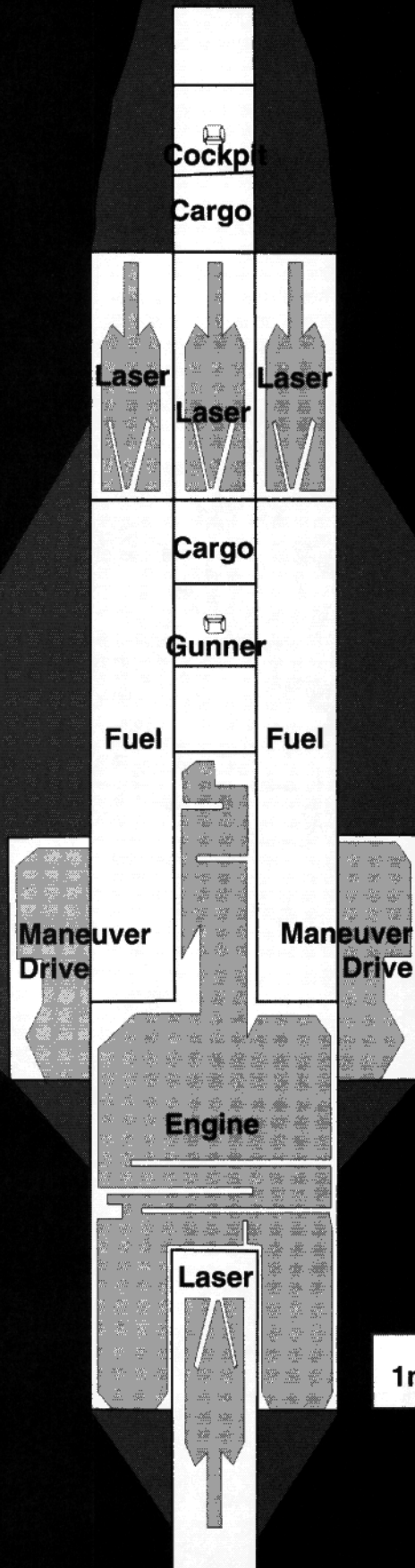
12 Armor

2 Structure

The Heavy Fighter is the punch behind the Imperial Fleet's new Space Control arm. The fighter was introduced only recently, due to a need to take on Capital Ships with fast fighters, yet still be capable of defending itself from small enemy ships or atmospheric fighters. The addition of an extra crewmember allows the pilot to concentrate on a target while the rear gunner keeps would-be attackers at bay.



# HEAVY FIGHTER





## MISSILE BOMBER

Tons: 30  
Crew: 4  
Cargo: 4

Volume: 420  
Passengers High/Medium: 1  
Controls: Military Standard

Cost in Mcr: 38  
Passengers Low: 0  
Tech Level: 12

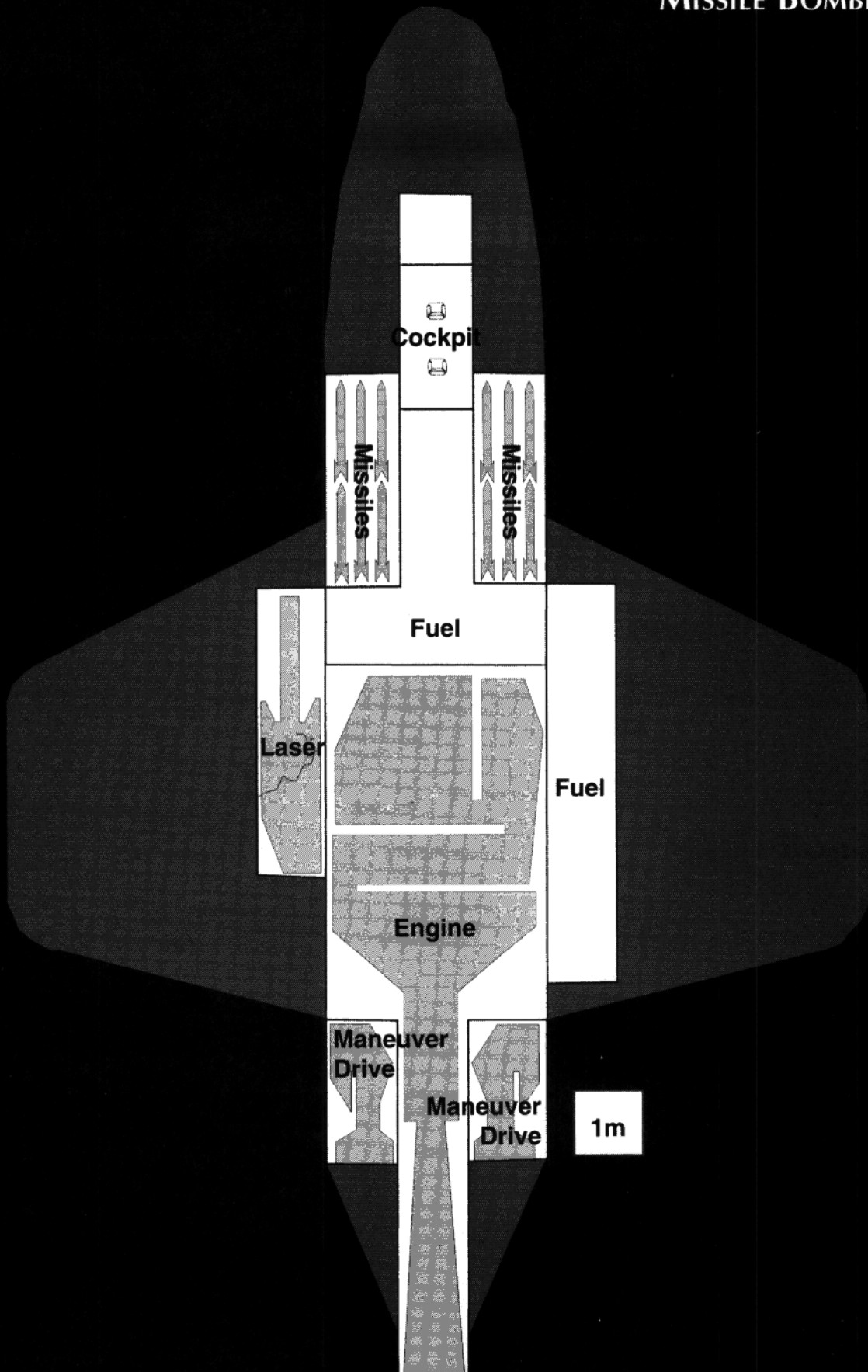
7 Size Rating  
1 Fire Control Rating  
1 x L Battery - 2, 0, 0, 0  
2 x Msl Battery - 5 (30)

0 Jump Rating  
3 G Rating  
7 Power Plant Rating  
18 Fuel Rating  
5A 2P 2J Sensor Rating  
12 Armor                  6 Structure

The Missile Bomber is, in fact, a modified Heavy Fighter, but with most of the laser fire control and laser turrets removed. The bomber is the mainstay of the Fleet's long-range strike capability, and can hit targets at long distance in either space or in atmosphere, delivering nuclear or conventional warhead missiles in a cheap package. The laser turret is used for defense, but there have been noted occasions where gunners have actually scored Capital Ship hits that made a difference. The missile bomber has an extra capability of carrying small cargoes and a passenger. Emperor Cleon I has been seen arriving at the Imperial Naval Depot in one, reportedly claiming that even a Cruiser could not keep him as safe.



# MISSILE BOMBER



# THE STANDARD SHIP DESIGN SYSTEM

Certain situations in **Traveller** call for a different ship design than those provided. The Standard Ship Design System (SSD System) is a simple way of customizing and designing starships for **Traveller**. Ships designed with the SSD System are starships assembled at the shipyard from standardized components.

The standardized components make starships constructed using this system cheaper than custom-designed ships. Starships designed under the SSD System receive a 10% discount over the equivalent custom-built ship. The design tables show the undiscounted list price of the components. When the ship design is completed, multiply all the final cost by 90% to reflect the discount for the mostly standardized, modular construction.

## THE DESIGN SEQUENCE

The goal of the design sequence is to fill in the Universal Ship Profile (USP) of the new ship. This will provide all of the necessary details of the ship, from its cargo capacity to its fighting weaponry and defenses.

Starship designing is a process of following the sequence below. Use the starships worksheet for the design. When the USP is completed, the ship has been completely designed.

The chosen hull will determine the total volume (in displacement tons) of the vessel. All systems must fit in the volume of the ship hull. The surface area of the ship is also critical to determining the type and number of external fittings on the ship. The surface area of added equipment and fixtures cannot exceed the total available surface area of the ship.

1. Select Mission
2. Select Hull
3. Calculate Volume and Surface Area Available
4. Select Jump Drive
5. Select Maneuver Drive
6. Select Offensive Weapons
7. Select Defensive Weapons
8. Select Controls and Electronics
9. Select Life Support
10. Select Miscellaneous Features
11. Select Power Plant
12. Calculate Passenger Capacity and Crew Requirements
13. Add Bridge and Workstations
14. Calculate Cost
15. Complete the USP

### Step 1 Select Mission

Select the Tech Level and mission for the ship. This will determine how the ship will be equipped. For example, a long-range military ship will require a bigger hull and greater jump drives, not to mention weapons, whereas an intrasystem cargo vessel may only require a short jump drive, lots of cargo space, and no weapons. The ship's mission will dictate the requirements for weapons, defenses, passengers, and cargos. The Tech Level of the ship sets the maximum tech level of any components in the ship. The ship may have inferior technology aboard if the designer so chooses.

### Step 2 Select Hull

The mission determines the size of the ship's hull, which in turn determines the amount of equipment, weapons, passenger and cargo space available. There are nine different types of hull configuration available for starships. Each provides a different amount of surface area and internal displacement available for use, and have different associated costs. Some are better at entering atmosphere, while others are superior at maximizing volume. The different hull types are:

Open Frame Hull  
Needle Hull  
Wedge Hull  
Cylinder Hull  
Box Hull  
Sphere Hull  
Dome/Disk Hull  
Close Structure Hull  
Slab Hull

### Step 3 Calculate Volume and Surface Area Available

Select the size in displacement tons (1 ton is equivalent to 14 cubic meters), configuration, and any streamlining. Not all types of streamlining are available for all configurations. The "Price Mods" entry on the hull size tables will indicate the options available, or "n/a" for no option. Also choose the maximum acceleration (in Gs of acceleration) the ship is capable of and the armor level. Find the hull displacement on the appropriate configuration chart.

Under Volume Factor, find the column for the tech level, and find the row for the displacement. Multiply the number there by the maximum Gs to determine the amount of hull volume (in m<sup>3</sup>) that is dedicated to the internal structure of the ship.

Multiply that same Volume Factor by the armor level desired for the volume taken up by the armor. If an "Airframe" hull is desired, multiply the result by 1.3.

The Material Type table shows the material of the hull at each tech level. Find the row for the tech level. Multiply the structure volume just calculated by the density number in the Material Type table for how much the structure masses. Likewise, multiply the structure volume by the cost number in the Material Type table to find out the cost. Do the same with the armor volume to find the armor mass and price. The amount of streamlining affects the price of the armor. At the top of the Hull Size table are price modifiers for different streamlining. Multiply the armor price just calculated by the price modifier for streamlining.

The ship requires a certain number of airlocks. The Airlocks portion of the table shows how many are needed, and the total mass, volume, power and price they take up. For hulls less than 50 displacement tons, airlocks are optional.

Record the mass, volume, and price for both the structure and armor. Also note the total volume and area available. Note that Airframe (AF) streamlining also increases the surface area available — multiply the listed number by 1.3.

### Step 4 Select Jump Drive

Decide the Jump capacity for the ship (limited by tech level).

On the Jump Drive Size table, find the ship's size, then go across to the column under the required jump number. This is the volume the jump drive requires. Also listed is the price and mass. Calculate the surface area the drive requires by dividing its volume by 3.

At the end of the row is a column that lists how much fuel is needed for a jump of one parsec. Multiply that by the jump rating of the ship to determine how much fuel needed for a full jump. If more than one jump is needed, include more fuel.

Record mass, volume, area and cost, as well as the Crew Factor.

## Step 5 Select Maneuver Drives

Decide how many Gs of acceleration the ship requires. You should have decided this under Hulls, since it affects the hull structure.

Decide type of drive to use, consistent with the tech level.

Multiply the hull size, in displacement tons ( $T_d$ ), by 10xGs to determine the thrust required. Find the value in the thrust column where the thrust is greater than or equal to what is needed. That row is the drive that will give the desired performance.

Note the fuel requirement per hour. Multiply by the number of hours of sustained travel at full acceleration to get the volume required for fuel. Merchant vessels can get by with 40-60 divided by their maximum acceleration. Warships require more. Remember that Thruster Plates do not require fuel.

Note the power requirements of the drive. If the number is in parentheses—like (10)—then that is how much excess power the drive produces that is available to other systems.

Note the Crew Factor the drive requires. This is used later to determine the crew requirements for the ship.

Record how much volume the drive and fuel require, and how much is still available. Also record the surface area taken up by the exhaust ports.

### ContraGravity (Tech Level 9+)

ContraGravity drives are not real maneuver drives, and aren't useful outside of a gravity well. Their primary use is gravity vehicles. They are included here so that ships below tech level 11 (thruster plates) can hover and maneuver in an atmosphere. By 10 diameters out from a planet, the ContraGravity drive is virtually worthless, only producing 1% of the thrust it would on the surface. Note that the accelerations listed can only be achieved in a 1G gravity well. Ships that use ContraGravity still need another form of maneuver drive to get out to jump distance. Normally, only enough CG is installed to counter the mass of the ship (use 10x displacement tons as a rule of thumb).

### Fusion Drive (Tech Level 9)

A fusion rocket is not much more than a fusion reactor with a steady stream of hydrogen going in one end and a hole in the other. Super-heated hydrogen plasma expelled at tremendous velocities forms the reaction mass. Because of the nature of the drive, the exhaust is extremely dangerous. It cannot be used within planetary atmospheres, and ships which intend to land must have some form of auxiliary drive, such as ContraGravity.

Other ships passing through the hydrogen wake will generally do so quickly enough that they won't suffer any ill effects, unless extremely close (~200km, referee's discretion). In that case, each crewperson must make a Formidable Endurance roll to avoid incapacitation by radiation (Difficult if wearing radiation-protective clothing), and each system on the ship suffers minor damage. All crew will require blood and bone-marrow therapy over the next several months to avoid long-term health problems. If the ship has sufficient sick-bay space, this can be done on board. Otherwise, it must be done at a local hospital.

Because of this effect, many systems have restrictions on using fusion drive within the local traffic area (10 planetary diameters). Restrictions range from strict control on when and where the drive may be aimed for course changes, to requiring the drive

to be "run-rich," increasing the fuel flow tenfold to dilute the effects somewhat. This also reduces the drive's thrust.

Note that the fusion drive does not require power, it generates excess power for use by other ship's systems.

### High Efficiency Plasma

#### Recombustion (HEPlaR) Drive (Tech Level 10)

HEPlaR consists of a heat exchanger and recombustion chamber added to any power plant. Hydrogen is injected into the recombustion chamber, where the power plant heats the hydrogen to a plasma state, causing a small fraction of the hydrogen to undergo damper-mediated fusion. The plasma is then released as a high velocity stream of reaction mass, providing thrust.

Note the power required from the HEPlaR Drives table and make sure it's included in your power requirements when you select a power plant. The prices and volumes may seem like a bargain compared to the other drives, but remember, you still need a power plant!

### Thruster Plates (Tech Level 12+)

Another effect of the tech level 12 mastery of gravitics (the science of gravity) is the invention of thruster plates. Earlier contra-grav technology only negates the effects of a gravitational field: thruster plates actually use the field itself for propulsion, by 'grabbing on' to the curvature of space and running along it much like an ant on the slope of a sugar-bowl. Rather than wasting valuable mass by hurling it out the rear of the ship, as lower-tech rockets do, gravity drives use the stellar system itself as their reaction mass (much as a train pushes against its track, and the planet below, rather than by expelling exhaust). A small change in a star's momentum translates to a huge velocity change for the much smaller spacecraft.

Unlike the ant of the earlier example, however, the slope of the "bowl" has a different effect on gravitic-drive ships. They depend on the slope for propulsion. Beyond a certain point, quantum-gravitic effects drastically reduce the efficiency of a gravitic-drive ship by a factor of a hundred or more, and thus they cannot maneuver effectively in deep-space unless they have an auxiliary drive, though they can remain there while, for example, computing jump parameters. The cutoff parameter turns out to be around 2,000 solar radii. Beyond this point, thruster plates are virtually worthless for anything beyond stationkeeping, and some alternate form of propulsion is needed. Thus, the Drenid Deep Space Research Facility in Sylea system is still resupplied using an automated freighter driven by a fusion rocket.

Another disadvantage of thruster plates is their gravitic and visual signature: gravity-wave sensors can easily detect the peculiar emissions characteristic of the system. Normal telescopic sensors are approximately as useful: the 'thruster plates' themselves give off exotic particles, which very quickly decay as they leave the thruster field. The bright blue glow emanating from the rear of many new Imperial vessel is, perhaps, more distinctive than the subtle space-warp.

## Step 6 Select Offensive Weapons

Select any weapons that the ship will carry. They must be placed in either turrets, bays or spinal mounts. Record their volume, mass, area, power, price and Crew Factor

Group any chosen turrets into batteries. All weapons in a single battery must be identical. Record their volume, mass, area, power, price and Crew Factor

For each battery, install a Master Fire Director to control it. Record their volume, mass, area, power, price and Crew Factor. Single turrets, while considered a battery of 1, don't require a Master Fire Director (MFD). However, in combat they only get a



Fire Control rating of 1 without an MFD. All bays and spinal mounts count as separate batteries, and have MFDs built in.

Particle Accelerators weapons use powerful electrical and/or magnetic fields to accelerate ions or charged subatomic particles to near-relativistic speeds, and to focus these particles into a concentrated beam that retains its power density over long distances. Because neutral (uncharged) particles can't be affected by electrical or magnetic fields, they're charged while they are accelerated. Unfortunately, charged particle accelerator weapon (CPAW) are useless in space combat — all the like-charged particles repel each other and the beam quickly loses focus and falls apart. By having a device at the end of the barrel to neutralize the particles again (either by adding an electron to a positive ion, or stripping the extra electron from a negative ion), you convert the weapon to a neutral particle accelerator weapon (NPAW). These weapons are much more useful for combat in space, where the CPAW is ideal for targets within an atmosphere.

Meson Guns are an extremely advanced form of particle accelerator, becoming available by Tech Level 11. Instead of simply firing subatomic particles at the target, the particles are made to collide, resulting in another kind of particle, the meson. Since mesons don't interact with normal matter, they pass right through armor or anything else. However, they have a very short life span, and when they decay, they produce radiation and damaging particles. By accelerating the original particles to carefully-calculated relativistic speeds, one can precisely control the decay so that it occurs within the target.

For all weapon charts, there are four range bands listed. Each entry has a range (in tenths of a light second), a penetration value for lasers only, and a damage value (R: P/PP - DD). For the Basic Ship Combat System, only the range and the damage values are needed for the USP values of the weapons.

Note that lasers below TL13 are turnable, and all use gravitic focusing to increase their range; TL13+ lasers are straight x-ray lasers. Those marked with an \* don't use gravitic focusing (for more powerful lasers at short range, but with reduced long range performance). Those without an \* use gravitic focusing to ensure lethality is preserved at longer ranges, but limited by the larger size of the focal array required for the gravitic mechanism.

### Turret Weapons

Turrets can be

- Empty (reserving space for later)
- Laser, or
- Missile

The rate of fire of any turret can be increased up to ROF 100 by increasing the power usage by the same factor. This will increase combat performance by increasing the final rating of the weapon.

### Empty Sockets

These can be installed in a ship to reserve space for weapons to be added later, by the purchaser of the ship. They require no power or crew, and cost nothing, but some power should be reserved for whatever weapon is expected.

### Bay Weapons

Bays may be installed as desired, up to the surface area.

#### Laser Bays

Note that bays include a built-in MFD, but no workstation. Workstations for bays are allocated under step 13 as for MFDs. All of these weapons are grav-focussed. Also note that the weapons do not fill the entire bay; the bay size was chosen to allow the proper surface area for the focal arrays.

The rate of fire of any bay can be increased up to ROF 100 by increasing the power usage by the same factor.

### Missile Bays

The Launchers column specifies how many individual launchers are contained within the bay. The column Reloads per Launcher shows how many ready missiles are available per launcher.

### Spinal Mount Weapons

The Spinal Mount tables list the length of the weapon; the ship must be at least this long.

## Step 7 Select Defensive Weapons

Choose from the available defenses:

- **Nuclear Dampers** – Simply choose the one with the defensive factor you want.
- **Meson Screens** – Choose the protective value you want, then find it on the Meson Screens table under your ship's size category.
- **Sandcasters** – Sandcasters are just like turret weapons, in that they can be aggregated into batteries. Choose how many batteries you want, and how many sandcaster turrets should be in each. Install the sandcasters, and one Master Fire Director per battery.
- **Tractor/Repulsors** – Choose what strength you want, then find the system on the chart.
- **Black Globes**

For each chosen system, record the mass, volume, price, power, antenna area and crew requirements.

## Step 8 Select Controls and Electronics

Control systems include control consoles from which the crew of a ship controls its systems, and the interior circuitry linking the ship's electrical and mechanical systems to those controls. Installed computers must be from the same tech level as the controls, and avionics and navigation aids may not be installed from a tech level higher than that of the controls.

This step provides systems for Basic Controls (the interior circuitry linking the consoles to the electrical and mechanical systems) and Electronics Packages (communications, sensors, computers, avionics and navigation aids). The consoles used by the crew will be installed as part of step 13, since the number needed will depend on the number of crew members.

There are three different levels of automation available. Low automation means there is no interconnection between different ship's systems. While this provides the most security (even if one system is broken into, you can't go anywhere else, and failures stay isolated), it also requires the most crew for the ship. Standard automation provides basic communications links between different systems, allowing data to be passed back and forth, but limits how much influence one system has on another. High automation means everything is highly interconnected, processors are shared, and any system can control any other. Naturally, this allows the smallest crews, but makes the ship the most vulnerable — damage to one system, or hackers breaking in, can spread to other systems. Theoretically a hostile individual could take complete control of the ship.

Military ships, with their need for damage resistance and security, usually use Standard automation, as do exploration vessels and merchant ships venturing into risky territory. Civilian ships and merchants plying safe, well-known space go with High automation to maximize cargo space and minimize crew costs. Finally, ships designed in the "New Era" milieu, set in Imperial Year 1200 after the fall of the Imperium use Low automation out of fear of computer viruses.

Find the hull size of the ship on the table, find the tech level of controls required, and copy the mass, volume, power, price and crew information to the worksheet.

The basic controls listed are for a low level of automation (no interconnection between different ship's systems). For Standard automation, increase the values listed by 5%. For High automation, increase them by 15%.

### **Electronic Packages (Comm/Sensor)**

Choose an electronics package. If additional systems are required beyond what is in the pre-defined packages, add those items individually.

#### *Minimum Capability*

This is the minimum required for safe operations. It contains a short-range radio for communicating with Traffic Control and other ships nearby in orbit, avionics necessary for landings, a short-range radar for landing, a passive sensor package, and three computers. There's no way to communicate with somebody out of orbit, no private link, and no redundancy for battle-damage.

- 1x 3,000km Radio
- 1x 3,000km Radar (tech level8-9) or Active EMS (tech level10+)
- 1x 30,000km High Resolution Thermal (tech level8-9) or Passive EMS (tech level10+) fixed array
- 3x tech level-x Standard computers
- tech level-x Flight Avionics

#### *Standard Civilian*

This is the most common package for small private and merchant vessels. It has a longer-range radio for broadcast communications in "immediate area" (1/10th of a light second), a maser communicator for tight-beam private communications, radar, passive sensor package, and avionics. There is no redundancy for battle-damage.

- 1x 30,000km Radio
- 1x 30,000km MaserComm
- 1x 30,000km Radar (tech level8-9) or Active EMS (tech level10+)
- 1x 60,000km HRT (tech level8-9) or PEMS (tech level10+) fixed array
- 3x tech level-x Standard computers
- tech level-x Flight Avionics

#### *Advanced Civilian*

This package increases the ranges for communicators and sensors

- 1x 300,000km Radio
- 1x 1,000AU MaserComm (except at tech level8: only 300,000km range)
- 1x 60,000km Radar (tech level8-9) or 1x120,000km AEMS (tech level10+)
- 1x 120,000km HRT (tech level8-9) or PEMS (tech level10+) fixed array
- 3x tech level-x Standard computers
- tech level-x Flight Avionics

#### *Exploration/Survey*

This package is for scout vessels and others needing to perform detailed sensor sweeps. It has a long-range radio, two tight-beam communicators for links with small craft, and a bevy of sensors.

- 1x 300,000km Radio
- 3x 1,000AU MaserComm (at tech level8, only 300,000km)
- 2x 60,000km Radar (tech level8-9) or 2x 300,000km AEMS (tech level10+)
- 2x 120,000km HRT (tech level8-9) or PEMS (tech level10+) fixed array
- 1x Densitometer (tech level11+ only)
- 1x tech level-x Neural Activity Sensor (tech level13+ only)

- 1x Neutrino Sensor (tech level10+ only)
- 3x tech level-x Standard computers
- tech level-x Avionics

#### *Military*

This package is used for military vessels, and includes redundant combat-range sensors, hardened computers, and ECM

- 2x 300,000km Radio
- 2x 1,000AU MaserComm (300,000km at tech level8)
- 1x 300,000km LaserComm (for controlling missiles)
- 2x 60,000km Radar (tech level8-9) or 300,000km AEMS (tech level10+) (Note: power requirements only allow one of these to be powered up at a time.)
- 1x 120,000km PEMS folding array. (Note: This system can't be used while maneuvering.)
- 1x 60,000km Radar Jammer (tech level8-9) or 300,000km AEMS Jammer (tech level10+)
- 3x tech level-x Fiber Optic computers
- tech level-x Avionics

### **Electromagnetic Masking (Tech Level 10+)**

Electromagnetic Masking is an advanced form of stealth design, and includes radiators to dissipate enormous IR signatures as well as more advanced electromagnetic absorbing material. EMM packages may be installed only to replace stealth.

## **Step 9 Select Life Support**

Find the hull size on the Life Support table and note the requirements.

### **Artificial Gravity/Inertial Compensators**

Find the hull size on the AG/IC table, and note the requirements.

## **Step 10 Select Miscellaneous Features**

### **Small Craft & Launch Facilities**

Reserve space for small craft; also record their crew information here since they'll need to be quartered aboard. A spacious facility allows all maintenance and repairs on small craft; minimal facility increases task difficulty for repairs by one level; docking rings will fit small craft with no extra space, so on-site repair is not possible. Maintenance (Mx) crew factor is the mass of the carried craft divided by 500.

### **Cargo**

Any available space remaining may be designated as cargo. Simply record the volume. Cargo requires no additional power. Cargo hatches are required: one large cargo hatch per  $350\text{m}^3$  of cargo, or one small hatch if the total cargo space is under  $100\text{m}^3$ .

### **Fuel Scoops**

A ship may be outfitted with special "scoops" and internal equipment to allow it to skim the free raw materials of liquid hydrogen (LHyd) from oceans or gas giant atmospheres. They do not take up any volume, or add mass to the ship. They do take up surface area. For every 5% of surface area dedicated to fuel scoops, the ship can scoop fuel equal to 20% of its total maximum fuel volume in an hour. Cost is MCr0.000075 per cubic meter of hull.

### **Purification**

While fusion reactors and jump drives run on hydrogen, fuel skimmed from an ocean is water, and fuel from a gas giant is contaminated with a variety of other substances. Fusion reactors tolerate this moderately well; jump drives are a little more finicky, and are more likely to misjump if burning unrefined fuel. A fuel purification plant removes those impurities to produce pure liquid

hydrogen. If the ship requires fuel purification, select a table from the list below for installation in the ship. The purification rate listed is the amount of fuel that can be processed in 6 hours.

## Step 11 Select Power Plant

Determine how much power is needed. Each step to this point has a power requirement. Total all of the power requirements.

Using the appropriate chart from the Fission/Fusion Plant tables, pick enough power plants to generate at least as much power as you've used so far. Note that using multiple power plants gains you redundancy.

Set aside enough space for the fuel the plant needs.

Record everything and proceed to the next step.

## Step 12 Select Passenger, Capacity and Crew Requirements

The crew factors noted in all of the above steps are for minimal automated ships. If no crew factor is listed for a system or feature, then it does not require crew.

Automation can assist in reducing the number of crewmembers needed to run a ship. The first level of automation is the collection of relevant data at a single console for a working system. Thus, a weapons bay, for example, would need fewer crew to man than an unautomated system. The second level of automation is the linking of whole systems together across the ship. Fewer crew are needed to run the ship, but the ship becomes more vulnerable to accidental damage, hostile action (from weapons fire or enemy hackers.)

Total up all the crew categories currently listed on the worksheet.

These numbers are very "raw" – first they need to be modified according to the capabilities of the computers installed. Look up the "Control Modifier" on the appropriate table, and multiply Engineering (En), Electronics (El) and Maintenance (Mx) by it. Other categories are unaffected. These are basic crew numbers.

An automation level was chosen in the controls & electronics step: Low (no interconnection between systems), Standard (some level of interconnection between systems), or High (everything very tightly integrated). The basic crew numbers are modified as follows:

The crew numbers for Engineering only consider power plant crew. First, modify the PP crew according to the automation level: divide by 1.3 (low), 4 (standard), or 10 (high)

Next, determine the maneuver drive and jump drive crew based on the mass of the drives as recorded on the worksheet. Divide the volume in  $m^3$  by 56 and multiply by the Control Modifier to get the basic crew, then divide by the drive automation factor: low=1, standard=2, or high=5. These crewmembers are also Engineering crew.

Maintenance crews are affected by automation as well. Divide the basic maintenance crew number by the drive automation factor also.

Meson gun and particle accelerator crews are also affected by automation. Divide the crew numbers listed in the tables by the weapon automation factor: low=1, standard=1.7, or high=2.8. Decide how many Ship's Troops are required.

Calculate Maneuvering Crew. If the ship only has a maneuver drive, only a pilot is required (Mn=1). If the ship has a jump drive, an astrogator is also needed (Mn=2).

For Command crew, add up all the crew factors and divide by 6, dropping any fractions.

Decide how many passengers are to be carried.

**High Passage**—The best method of travel is called high passage, with first class accommodations and cuisine. High passengers have the services of the ship's steward, entertainment, and complete attention to comfort.

**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 similar to those used by high passengers, they do not receive the service or entertainment accorded the higher-paying passengers. Also, the quality of the cuisine is below that of High Passage. A middle passenger may be "bumped" and the stateroom taken by a late arriving high passenger; the middle passenger's ticket is returned, but no other compensation is made.

**Low Passage**—Transportation while in cold sleep (suspended animation) is possible at relatively low cost 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. The passenger does not age, and requires very little life support. Unfortunately, the low passage system involves some intrinsic dangers to the passenger, and the passenger runs some risk of not surviving the voyage.

Assign stewards: one steward is needed for every 8 high passengers or command crew, and one per 100 middle passengers or remaining crew.

Assign medical crew: 1 is needed for every 20 low passengers, and one per 120 high or middle passenger, or crewmember.

Drop all fractions, except for categories that are less than one. Collect all those together, and add them up. If the result is greater than 1, there is an individual who has multiple jobs. Regardless of the results, any ship 100T<sub>d</sub> and below can be run by one person, and ships up to 200T<sub>d</sub> can be run by two persons.

Accommodations — choose appropriate accommodations from the list. High passengers require at least individual large staterooms, and middle passengers require at least individual small staterooms. Low passengers require a low berth. Crew can be assigned any kind of berth other than low berth, although it's customary for at least the captain, and on larger ships, his senior staff, to have individual staterooms. Emergency low berths can be installed (one for every four people) in case of emergencies.

## Step 13 Add Bridge and Workstations

If there are more than two command crewmembers, there must be a bridge on the ship. The bridge itself doesn't require extra room, it just requires larger workstations.

Command, Electronics, Maneuvering and any Master Fire Director gunners require either a bridge workstation (if there is a bridge), or a regular workstation (if not). Turret weapon crews have their workstations built into their weapon systems. Note that all bay and spinal weapons have an integral MFD, but still need the workstation.

The Engineering crew requires a regular workstation.

Note the only difference between a ship with or without a bridge is the volume. The only difference between tech levels is the price, and the automation factor in the automation table.

## Step 14 Calculate the Cost

The cost of the ship is determined by adding all of the costs of the various components together. This cost is discounted for the use of standardized components during assembly. Multiply the cost by 90% to calculate the final cost to the purchaser.

## Step 15: Complete the Universal Ship Profile

All of the information to create the Universal Ship Profile is now available. Fill in the ship design along with calculated values:

<b>Position in the USP</b>	USP Rating.
<b>Tons</b>	Enter the tonnage of the vessel, in standard displacement tons..
<b>Volume</b>	Enter the volume of the vessel in cubic meters. Volume equals tonnage multiplied by 14.
<b>Cost</b>	Total the cost of the ship in MCr, rounded to the nearest tenth, and enter it here.
<b>Crew</b>	Enter the total number of the crew (including stewards and medics).
<b>High/Medium Passengers</b>	Enter the total number of high or medium passengers carried.
<b>Low Passengers</b>	Enter the number of low berths.
<b>Cargo</b>	Enter the total volume of the ship's cargo holds, in displacement tons.
<b>Controls</b>	Enter a short description of the ship's controls: "Std" for standard control systems, or "Fib" for military-specification fiber-optic systems. If the ship has a bridge, place "/Bridge" after the system type.
<b>Tech Level</b>	Enter the controlling TL of the design (usually the TL of the ship's avionics).
<b>Size Rating</b>	Enter the value from the Hulls table of the hull chosen.
<b>Fire Control</b>	Listed in MFD table. For weapons without an MFD (single turrets), FC Rating is 0. List the highest rating available.
<b>Jump Drive</b>	Jump number.
<b>Maneuver Drive</b>	G-Rating.
<b>Power Plant</b>	2 * Total Output/Hull Displacement.
<b>Fuel Rating</b>	Enter the number of displacement tons of fuel carried on board. Add a /S if fuel scoops are installed. Add a /R if fuel refining is installed.
<b>Meson Screen Rating</b>	Enter the USP number from the meson screen table.
<b>Sand Caster Rating</b>	Enter the number of sandcasters, and in parentheses, the total number of canisters carried in ready storage.
<b>Damper Rating</b>	Enter the number of nuclear damper turrets installed.
<b>Active/Passive/Jam Sensors</b>	Enter the sensor's range for Active and Passive as the A and P USP values. All packages without jammers have a rating of 0 for jamming. Those packages listed as having jamming equipment use the Active USP value for their jamming USP value. Annotate the USP as having Stealth or EMM if the ship is equipped with either package.

## Weapons Batteries

For each distinct type of battery carried by the ship, make a battery entry consisting of the number of batteries of this type, a battery identifier (such as "Long-Range Laser" or "Missile Bay"), and the USP combat statistics.

Weapons values are listed by range in tenths of light seconds. For short range, take the damage value at 10 tenths of a light second, and convert the value with the USP Conversion Chart. For medium range, take the value at 20 tenths of a light second, long at 40 tenths of a light second, and extreme at 80 tenths of a light second. If the weapon does not have a damage value at 10, 20, 40, or 80 tenths of a light second, the USP value for that range is 0. If the value of the damage converts to 0 for short range, then use the best damage value between 1 and 9 tenths of a light second, and all other range USP values will be 0.

Once the weapon is converted to USP values, multiply the USP values by the number of weapons in the battery. Add a Rate of Fire modifier as follows: If the weapon has a Rate of Fire less than 100, no modifier. For ROF of 100, +1; for ROF of 200, +2; for ROF of 400, +3; for ROF of 800, +4. Note that the ROF bonus cannot be greater than the battery's current damage rating (i.e. a weapon that converts to 2-0-0-0, with a ROF of 800, only gets a +2 bonus at short range and no bonus beyond that: 4-0-0-0).

If the ship is equipped with missiles, note the number of missiles in the battery in ready storage, and in parentheses, the number of missiles that can be controlled in flight at any one time.

## Internal Structure

Ship displacement (in disp tons [T<sub>d</sub>]) times G-rating, then use the USD Conversion chart.

**Armor** Convert the armor value chosen using the USP Conversion chart below.

**Notes** Note additional information about the ship here, including the hull shape, streamlining, and details of any carried craft.



## SHIP DESIGN WORKSHEET

Component		Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Mx	En	Gn	El	Fl					
<b>Hull</b>	Config:	Size:	Streamlining:	Armor:	Max Gs:	G	Length:	m								
Internal Structure																
Armor																
Airlocks																
<b>Drives</b>	Jump Capacity: J	Mdrive Type:	Acceleration:	G	Reaction Fuel:	hrs										
Jump Drive																
Jump Fuel																
Maneuver Drive																
Maneuver Fuel																
ContraGravity																
<b>Weapons &amp; Defenses</b>																
Turret Weapons – list type of turret, and number/battery organization (i.e. 3x5 is three batteries of five each, total of 15 weapons)																
<b>Bay Weapons</b>																
<b>Spinal Mount</b>																
<b>Defenses</b>																
Master Fire Directors – one required per battery (weapon or sandcaster turrets)																
<b>Controls and Electronics</b>																
Basic Controls																
Electronics Package																
Stealth or EMM																
<b>Life Support</b>																
Basic or Standard Life Support																
G-Tank																
Artificial Gravity																
<b>Miscellaneous Features</b>																
<b>Power Plants</b>																
Power Plant Fuel																
<b>Passengers and Crew</b>																
Total crew so far				Hp	Mp	Lp	Cm	Mn	Md	St	Tr	Mx	En	Gn	El	Fl
times Control modifier																
times Automation modifier																
Add maneuvering crew and Ship's Troops																
Add all crew so far, divide by 6 for command crew																
Choose passengers																
Assign stewards and medical																
Total crew & passengers (dropping fractions)																
Large Staterooms																
Small Staterooms																
Bunks																
Standard Low Berths																
Emergency Low Berths																

## SAMPLE UNIVERSAL SHIP PROFILE

### Type and Name of Ship

Tons	Volume	Cost in MCr
Crew	Passengers High/Medium	Passengers Low
Cargo	Controls	Tech Level
## Size Rating		## Jump Rating
## Fire Control Rating		## G Rating / Maneuver Drive
## Battery 1 - ##, ##, ##, ##		## Power Plant Rating
## Battery 2 - ##, ##, ##, ##		## Fuel Rating / Scoop / Refine
## Battery 3 - ##, ##, ##, ##		## Meson Screen Rating
## Battery 4 - ##, ##, ##, ##		## Sand Caster Rating
## Battery 5 - ##, ##, ##, ##		## Damper Rating
## Battery 6 - ##, ##, ##, ##		## A ## P ## J (Mask) Sensor Rating
## Battery 7 - ##, ##, ##, ##		
## Battery 8 - ##, ##, ##, ##		## Armor      ## Structure

## MATERIAL TYPE AND TECH LEVEL

Material Type	Cost (MCr/m <sup>3</sup> )	Density (t/m <sup>3</sup> )
TL 8-9: Composite Laminate	0.008	8.0
TL 10-11: Crystallron	0.009	10.0
TL 12-13: Superdense	0.014	15.0
TL14-16: Bonded Superdense	0.028	15.0

## OPEN FRAME HULL

Price Modifiers: No SL 0.3; SL n/a; AF n/a					Volume Factor				Airlocks					
Size	Size	Length	Total	Surface	TL	TL	TL	TL	Qty	Mass	Volume	Area	Power	Price
(T <sub>d</sub> )	Code	(m)	(m <sup>3</sup> )	(m <sup>2</sup> )	8-9	10-11	12-13	14-16		(t)	(m <sup>3</sup> )	(m <sup>2</sup> )	(MW)	(MCr)
10	7	28.0	140	190	0.63	0.48	0.27	0.14	1	0.2	3	2	0.001	0.005
20	7	32.0	280	230	0.77	0.58	0.33	0.16	1	0.2	3	2	0.001	0.005
30	7	36.8	420	270	0.90	0.68	0.39	0.19	1	0.2	3	2	0.001	0.005
40	7	41.6	560	310	1.03	0.78	0.44	0.22	1	0.2	3	2	0.001	0.005
50	7	44.8	700	380	1.27	0.95	0.54	0.27	1	0.2	3	2	0.001	0.005
60	7	46.4	840	420	1.40	1.05	0.60	0.30	1	0.2	3	2	0.001	0.005
70	7	50.0	980	460	1.53	1.15	0.66	0.33	1	0.2	3	2	0.001	0.005
80	7	52.8	1,120	510	1.70	1.28	0.73	0.36	1	0.2	3	2	0.001	0.005
90	7	54.4	1,260	550	1.83	1.38	0.79	0.39	1	0.2	3	2	0.001	0.005
100	8	56.0	1,400	600	2.00	1.50	0.86	0.43	1	0.2	3	2	0.001	0.005
200	8	68.0	2,800	900	3.00	2.25	1.29	0.64	2	0.4	6	4	0.002	0.010
300	8	80.0	4,200	1,200	4.00	3.00	1.71	0.86	3	0.6	9	6	0.003	0.015
400	8	88.0	5,600	1,500	5.00	3.75	2.14	1.07	4	0.8	12	8	0.004	0.020
500	8	96.0	7,000	1,700	5.67	4.25	2.43	1.21	5	1.0	15	10	0.005	0.025
600	8	100.0	8,400	2,000	6.67	5.00	2.86	1.43	6	1.2	18	12	0.006	0.030
700	8	108.0	9,800	2,200	7.33	5.50	3.14	1.57	7	1.4	21	14	0.007	0.035
800	8	112.0	11,200	2,400	8.00	6.00	3.43	1.71	8	1.6	24	16	0.008	0.040
900	8	116.0	12,600	2,600	8.67	6.50	3.71	1.86	9	1.8	27	18	0.009	0.045
1,000	9	120.0	14,000	2,800	9.33	7.00	4.00	2.00	10	2.0	30	20	0.010	0.050
2,000	9	144.0	28,000	4,300	14.33	10.75	6.14	3.07	20	4.0	60	40	0.020	0.100
3,000	9	168.0	42,000	5,700	19.00	14.25	8.14	4.07	30	6.0	90	60	0.030	0.150
4,000	9	188.0	56,000	7,000	23.33	17.50	10.00	5.00	40	8.0	120	80	0.040	0.200
5,000	9	204.0	70,000	8,000	26.67	20.00	11.43	5.71	50	10.0	150	100	0.050	0.250

## NEEDLE HULL

Price Modifiers: No SL 0.7; SL 0.8; AF 1.2

Volume Factor

Airlocks

Size (T <sub>d</sub> )	Size Code	Length (m)	Total Volume (m <sup>3</sup> )	Surface Area (m <sup>2</sup> )	TL 8-9	TL 10-11	TL 12-13	TL 14-16	Qty	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)
10	7	21.0	140	247	0.41	0.31	0.18	0.09	1	0.2	3	2	0.001	0.005
20	7	24.0	280	299	0.50	0.37	0.21	0.11	1	0.2	3	2	0.001	0.005
30	7	27.6	420	351	0.59	0.44	0.25	0.13	1	0.2	3	2	0.001	0.005
40	7	31.2	560	403	0.67	0.50	0.29	0.14	1	0.2	3	2	0.001	0.005
50	7	33.6	700	494	0.82	0.62	0.35	0.18	1	0.2	3	2	0.001	0.005
60	7	34.8	840	546	0.91	0.68	0.39	0.20	1	0.2	3	2	0.001	0.005
70	7	37.5	980	598	1.00	0.75	0.43	0.21	1	0.2	3	2	0.001	0.005
80	7	39.6	1,120	663	1.11	0.83	0.47	0.24	1	0.2	3	2	0.001	0.005
90	7	40.8	1,260	715	1.19	0.89	0.51	0.26	1	0.2	3	2	0.001	0.005
100	8	42.0	1,400	780	1.30	0.98	0.56	0.28	1	0.2	3	2	0.001	0.005
200	8	51.0	2,800	1,170	1.95	1.46	0.84	0.42	2	0.4	6	4	0.002	0.010
300	8	60.0	4,200	1,560	2.60	1.95	1.11	0.56	3	0.6	9	6	0.003	0.015
400	8	66.0	5,600	1,950	3.25	2.44	1.39	0.70	4	0.8	12	8	0.004	0.020
500	8	72.0	7,000	2,210	3.68	2.76	1.58	0.79	5	1.0	15	10	0.005	0.025
600	8	75.0	8,400	2,600	4.33	3.25	1.86	0.93	6	1.2	18	12	0.006	0.030
700	8	81.0	9,800	2,860	4.77	3.58	2.04	1.02	7	1.4	21	14	0.007	0.035
800	8	84.0	11,200	3,120	5.20	3.90	2.23	1.11	8	1.6	24	16	0.008	0.040
900	8	87.0	12,600	3,380	5.63	4.23	2.41	1.21	9	1.8	27	18	0.009	0.045
1,000	9	90.0	14,000	3,640	6.07	4.55	2.60	1.30	10	2.0	30	20	0.010	0.050
2,000	9	108.0	28,000	5,590	9.32	6.99	3.99	2.00	20	4.0	60	40	0.020	0.100
3,000	9	126.0	42,000	7,410	12.35	9.26	5.29	2.65	30	6.0	90	60	0.030	0.150
4,000	9	141.0	56,000	9,100	15.17	11.38	6.50	3.25	40	8.0	120	80	0.040	0.200
5,000	9	153.0	70,000	10,400	17.33	13.00	7.43	3.71	50	10.0	150	100	0.050	0.250

## WEDGE HULL

Price Modifiers: No SL 0.5; SL 0.7; AF 1.5

Volume Factor

Airlocks

Size (T <sub>d</sub> )	Size Code	Length (m)	Total Volume (m <sup>3</sup> )	Surface Area (m <sup>2</sup> )	TL 8-9	TL 10-11	TL 12-13	TL 14-16	Qty	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)
10	7	17.5	140	285	0.48	0.36	0.20	0.10	1	0.2	3	2	0.001	0.005
20	7	20.0	280	345	0.58	0.43	0.25	0.12	1	0.2	3	2	0.001	0.005
30	7	23.0	420	405	0.68	0.51	0.29	0.14	1	0.2	3	2	0.001	0.005
40	7	26.0	560	465	0.78	0.58	0.33	0.17	1	0.2	3	2	0.001	0.005
50	7	28.0	700	570	0.95	0.71	0.41	0.20	1	0.2	3	2	0.001	0.005
60	7	29.0	840	630	1.05	0.79	0.45	0.23	1	0.2	3	2	0.001	0.005
70	7	31.3	980	690	1.15	0.86	0.49	0.25	1	0.2	3	2	0.001	0.005
80	7	33.0	1,120	765	1.28	0.96	0.55	0.27	1	0.2	3	2	0.001	0.005
90	7	34.0	1,260	825	1.38	1.03	0.59	0.29	1	0.2	3	2	0.001	0.005
100	8	35.0	1,400	900	1.50	1.13	0.64	0.32	1	0.2	3	2	0.001	0.005
200	8	42.5	2,800	1,350	2.25	1.69	0.96	0.48	2	0.4	6	4	0.002	0.010
300	8	50.0	4,200	1,800	3.00	2.25	1.29	0.64	3	0.6	9	6	0.003	0.015
400	8	55.0	5,600	2,250	3.75	2.81	1.61	0.80	4	0.8	12	8	0.004	0.020
500	8	60.0	7,000	2,550	4.25	3.19	1.82	0.91	5	1.0	15	10	0.005	0.025
600	8	62.5	8,400	3,000	5.00	3.75	2.14	1.07	6	1.2	18	12	0.006	0.030
700	8	67.5	9,800	3,300	5.50	4.13	2.36	1.18	7	1.4	21	14	0.007	0.035
800	8	70.0	11,200	3,600	6.00	4.50	2.57	1.29	8	1.6	24	16	0.008	0.040
900	8	72.5	12,600	3,900	6.50	4.88	2.79	1.39	9	1.8	27	18	0.009	0.045
1,000	9	75.0	14,000	4,200	7.00	5.25	3.00	1.50	10	2.0	30	20	0.010	0.050
2,000	9	90.0	28,000	6,450	10.75	8.06	4.61	2.30	20	4.0	60	40	0.020	0.100
3,000	9	105.0	42,000	8,550	14.25	10.69	6.11	3.05	30	6.0	90	60	0.030	0.150
4,000	9	117.5	56,000	10,500	17.50	13.13	7.50	3.75	40	8.0	120	80	0.040	0.200
5,000	9	127.5	70,000	12,000	20.00	15.00	8.57	4.29	50	10.0	150	100	0.050	0.250

## CYLINDER HULL

Price Modifiers: No SL 0.6; SL 0.8; AF 2.0

Size (T <sub>d</sub> )	Size Code	Length (m)	Volume Factor		Airlocks				Qty	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)
			Total Volume (m <sup>3</sup> )	Surface Area (m <sup>2</sup> )	TL 8-9	TL 10-11	TL 12-13	TL 14-16						
10	7	14.0	140	209	0.35	0.26	0.15	0.07	1	0.2	3	2	0.001	0.005
20	7	16.0	280	253	0.42	0.32	0.18	0.09	1	0.2	3	2	0.001	0.005
30	7	18.4	420	297	0.50	0.37	0.21	0.11	1	0.2	3	2	0.001	0.005
40	7	20.8	560	341	0.57	0.43	0.24	0.12	1	0.2	3	2	0.001	0.005
50	7	22.4	700	418	0.70	0.52	0.30	0.15	1	0.2	3	2	0.001	0.005
60	7	23.2	840	462	0.77	0.58	0.33	0.17	1	0.2	3	2	0.001	0.005
70	7	25.0	980	506	0.84	0.63	0.36	0.18	1	0.2	3	2	0.001	0.005
80	7	26.4	1,120	561	0.94	0.70	0.40	0.20	1	0.2	3	2	0.001	0.005
90	7	27.2	1,260	605	1.01	0.76	0.43	0.22	1	0.2	3	2	0.001	0.005
100	8	28.0	1,400	660	1.10	0.83	0.47	0.24	1	0.2	3	2	0.001	0.005
200	8	34.0	2,800	990	1.65	1.24	0.71	0.35	2	0.4	6	4	0.002	0.010
300	8	40.0	4,200	1,320	2.20	1.65	0.94	0.47	3	0.6	9	6	0.003	0.015
400	8	44.0	5,600	1,650	2.75	2.06	1.18	0.59	4	0.8	12	8	0.004	0.020
500	8	48.0	7,000	1,870	3.12	2.34	1.34	0.67	5	1.0	15	10	0.005	0.025
600	8	50.0	8,400	2,200	3.67	2.75	1.57	0.79	6	1.2	18	12	0.006	0.030
700	8	54.0	9,800	2,420	4.03	3.03	1.73	0.86	7	1.4	21	14	0.007	0.035
800	8	56.0	11,200	2,640	4.40	3.30	1.89	0.94	8	1.6	24	16	0.008	0.040
900	8	58.0	12,600	2,860	4.77	3.58	2.04	1.02	9	1.8	27	18	0.009	0.045
1,000	9	60.0	14,000	3,080	5.13	3.85	2.20	1.10	10	2.0	30	20	0.010	0.050
2,000	9	72.0	28,000	4,730	7.88	5.91	3.38	1.69	20	4.0	60	40	0.020	0.100
3,000	9	84.0	42,000	6,270	10.45	7.84	4.48	2.24	30	6.0	90	60	0.030	0.150
4,000	9	94.0	56,000	7,700	12.83	9.63	5.50	2.75	40	8.0	120	80	0.040	0.200
5,000	9	102.0	70,000	8,800	14.67	11.00	6.29	3.14	50	10.0	150	100	0.050	0.250

## Box HULL

Price Modifiers: No SL 0.4; SL 0.6; AF n/a

Size (T <sub>d</sub> )	Size Code	Length (m)	Volume Factor		Airlocks				Qty	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)
			Total Volume (m <sup>3</sup> )	Surface Area (m <sup>2</sup> )	TL 8-9	TL 10-11	TL 12-13	TL 14-16						
10	7	8.8	140	228	0.38	0.29	0.16	0.08	1	0.2	3	2	0.001	0.005
20	7	10.0	280	276	0.46	0.35	0.20	0.10	1	0.2	3	2	0.001	0.005
30	7	11.5	420	324	0.54	0.41	0.23	0.12	1	0.2	3	2	0.001	0.005
40	7	13.0	560	372	0.62	0.47	0.27	0.13	1	0.2	3	2	0.001	0.005
50	7	14.0	700	456	0.76	0.57	0.33	0.16	1	0.2	3	2	0.001	0.005
60	7	14.5	840	504	0.84	0.63	0.36	0.18	1	0.2	3	2	0.001	0.005
70	7	15.6	980	552	0.92	0.69	0.39	0.20	1	0.2	3	2	0.001	0.005
80	7	16.5	1,120	612	1.02	0.77	0.44	0.22	1	0.2	3	2	0.001	0.005
90	7	17.0	1,260	660	1.10	0.83	0.47	0.24	1	0.2	3	2	0.001	0.005
100	8	17.5	1,400	720	1.20	0.90	0.51	0.26	1	0.2	3	2	0.001	0.005
200	8	21.3	2,800	1,080	1.80	1.35	0.77	0.39	2	0.4	6	4	0.002	0.010
300	8	25.0	4,200	1,440	2.40	1.80	1.03	0.51	3	0.6	9	6	0.003	0.015
400	8	27.5	5,600	1,800	3.00	2.25	1.29	0.64	4	0.8	12	8	0.004	0.020
500	8	30.0	7,000	2,040	3.40	2.55	1.46	0.73	5	1.0	15	10	0.005	0.025
600	8	31.3	8,400	2,400	4.00	3.00	1.71	0.86	6	1.2	18	12	0.006	0.030
700	8	33.8	9,800	2,640	4.40	3.30	1.89	0.94	7	1.4	21	14	0.007	0.035
800	8	35.0	11,200	2,880	4.80	3.60	2.06	1.03	8	1.6	24	16	0.008	0.040
900	8	36.3	12,600	3,120	5.20	3.90	2.23	1.11	9	1.8	27	18	0.009	0.045
1,000	9	37.5	14,000	3,360	5.60	4.20	2.40	1.20	10	2.0	30	20	0.010	0.050
2,000	9	45.0	28,000	5,160	8.60	6.45	3.69	1.84	20	4.0	60	40	0.020	0.100
3,000	9	52.5	42,000	6,840	11.40	8.55	4.89	2.44	30	6.0	90	60	0.030	0.150
4,000	9	58.8	56,000	8,400	14.00	10.50	6.00	3.00	40	8.0	120	80	0.040	0.200
5,000	9	63.8	70,000	9,600	16.00	12.00	6.86	3.43	50	10.0	150	100	0.050	0.250



## SPHERE HULL

Price Modifiers: No SL 0.8; SL 1.0; AF n/a

Size (T <sub>d</sub> )	Size Code	Length (m)	Total Volume (m <sup>3</sup> )	Surface Area (m <sup>2</sup> )	Volume Factor				Qty	Airlocks					
					TL 8-9	TL 10-11	TL 12-13	TL 14-16		Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCR)	
10	7	7.0	140	190	0.32	0.24	0.14	0.07	1	0.2	3	2	0.001	0.005	
20	7	8.0	280	230	0.38	0.29	0.16	0.08	1	0.2	3	2	0.001	0.005	
30	7	9.2	420	270	0.45	0.34	0.19	0.10	1	0.2	3	2	0.001	0.005	
40	7	10.4	560	310	0.52	0.39	0.22	0.11	1	0.2	3	2	0.001	0.005	
50	7	11.2	700	380	0.63	0.48	0.27	0.14	1	0.2	3	2	0.001	0.005	
60	7	11.6	840	420	0.70	0.53	0.30	0.15	1	0.2	3	2	0.001	0.005	
70	7	12.5	980	460	0.77	0.58	0.33	0.16	1	0.2	3	2	0.001	0.005	
80	7	13.2	1,120	510	0.85	0.64	0.36	0.18	1	0.2	3	2	0.001	0.005	
90	7	13.6	1,260	550	0.92	0.69	0.39	0.20	1	0.2	3	2	0.001	0.005	
100	8	14.0	1,400	600	1.00	0.75	0.43	0.21	1	0.2	3	2	0.001	0.005	
200	8	17.0	2,800	900	1.50	1.13	0.64	0.32	2	0.4	6	4	0.002	0.010	
300	8	20.0	4,200	1,200	2.00	1.50	0.86	0.43	3	0.6	9	6	0.003	0.015	
400	8	22.0	5,600	1,500	2.50	1.88	1.07	0.54	4	0.8	12	8	0.004	0.020	
500	8	24.0	7,000	1,700	2.83	2.13	1.21	0.61	5	1.0	15	10	0.005	0.025	
600	8	25.0	8,400	2,000	3.33	2.50	1.43	0.71	6	1.2	18	12	0.006	0.030	
700	8	27.0	9,800	2,200	3.67	2.75	1.57	0.79	7	1.4	21	14	0.007	0.035	
800	8	28.0	11,200	2,400	4.00	3.00	1.71	0.86	8	1.6	24	16	0.008	0.040	
900	8	29.0	12,600	2,600	4.33	3.25	1.86	0.93	9	1.8	27	18	0.009	0.045	
1,000	9	30.0	14,000	2,800	4.67	3.50	2.00	1.00	10	2.0	30	20	0.010	0.050	
2,000	9	36.0	28,000	4,300	7.17	5.38	3.07	1.54	20	4.0	60	40	0.020	0.100	
3,000	9	42.0	42,000	5,700	9.50	7.13	4.07	2.04	30	6.0	90	60	0.030	0.150	
4,000	9	47.0	56,000	7,000	11.67	8.75	5.00	2.50	40	8.0	120	80	0.040	0.200	
5,000	9	51.0	70,000	8,000	13.33	10.00	5.71	2.86	50	10.0	150	100	0.050	0.250	

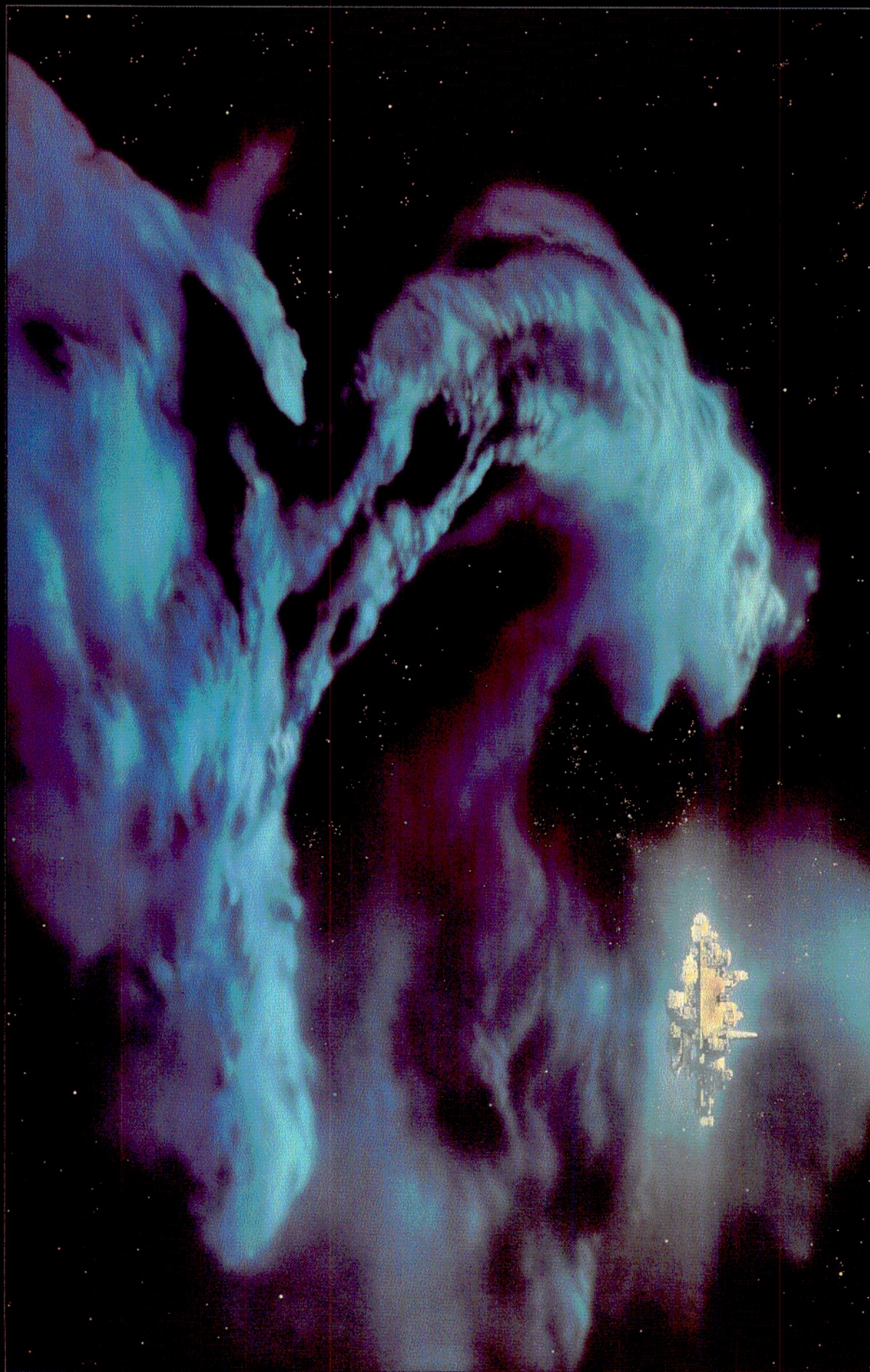
## DOME/DISC HULL

Price Modifiers: No SL 1.4; SL 1.6; AF 1.2

Size (T <sub>d</sub> )	Size Code	Length (m)	Total Volume (m <sup>3</sup> )	Surface Area (m <sup>2</sup> )	Volume Factor				Qty	Airlocks					
					TL 8-9	TL 10-11	TL 12-13	TL 14-16		Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCR)	
10	7	10.5	140	228	0.38	0.29	0.16	0.08	1	0.2	3	2	0.001	0.005	
20	7	12.0	280	276	0.46	0.35	0.20	0.10	1	0.2	3	2	0.001	0.005	
30	7	13.8	420	324	0.54	0.41	0.23	0.12	1	0.2	3	2	0.001	0.005	
40	7	15.6	560	372	0.62	0.47	0.27	0.13	1	0.2	3	2	0.001	0.005	
50	7	16.8	700	456	0.76	0.57	0.33	0.16	1	0.2	3	2	0.001	0.005	
60	7	17.4	840	504	0.84	0.63	0.36	0.18	1	0.2	3	2	0.001	0.005	
70	7	18.8	980	552	0.92	0.69	0.39	0.20	1	0.2	3	2	0.001	0.005	
80	7	19.8	1,120	612	1.02	0.77	0.44	0.22	1	0.2	3	2	0.001	0.005	
90	7	20.4	1,260	660	1.10	0.83	0.47	0.24	1	0.2	3	2	0.001	0.005	
100	8	21.0	1,400	720	1.20	0.90	0.51	0.26	1	0.2	3	2	0.001	0.005	
200	8	25.5	2,800	1,080	1.80	1.35	0.77	0.39	2	0.4	6	4	0.002	0.010	
300	8	30.0	4,200	1,440	2.40	1.80	1.03	0.51	3	0.6	9	6	0.003	0.015	
400	8	33.0	5,600	1,800	3.00	2.25	1.29	0.64	4	0.8	12	8	0.004	0.020	
500	8	36.0	7,000	2,040	3.40	2.55	1.46	0.73	5	1.0	15	10	0.005	0.025	
600	8	37.5	8,400	2,400	4.00	3.00	1.71	0.86	6	1.2	18	12	0.006	0.030	
700	8	40.5	9,800	2,640	4.40	3.30	1.89	0.94	7	1.4	21	14	0.007	0.035	
800	8	42.0	11,200	2,880	4.80	3.60	2.06	1.03	8	1.6	24	16	0.008	0.040	
900	8	43.5	12,600	3,120	5.20	3.90	2.23	1.11	9	1.8	27	18	0.009	0.045	
1,000	9	45.0	14,000	3,360	5.60	4.20	2.40	1.20	10	2.0	30	20	0.010	0.050	
2,000	9	54.0	28,000	5,160	8.60	6.45	3.69	1.84	20	4.0	60	40	0.020	0.100	
3,000	9	63.0	42,000	6,840	11.40	8.55	4.89	2.44	30	6.0	90	60	0.030	0.150	
4,000	9	70.5	56,000	8,400	14.00	10.50	6.00	3.00	40	8.0	120	80	0.040	0.200	
5,000	9	76.5	70,000	9,600	16.00	12.00	6.86	3.43	50	10.0	150	100	0.050	0.250	















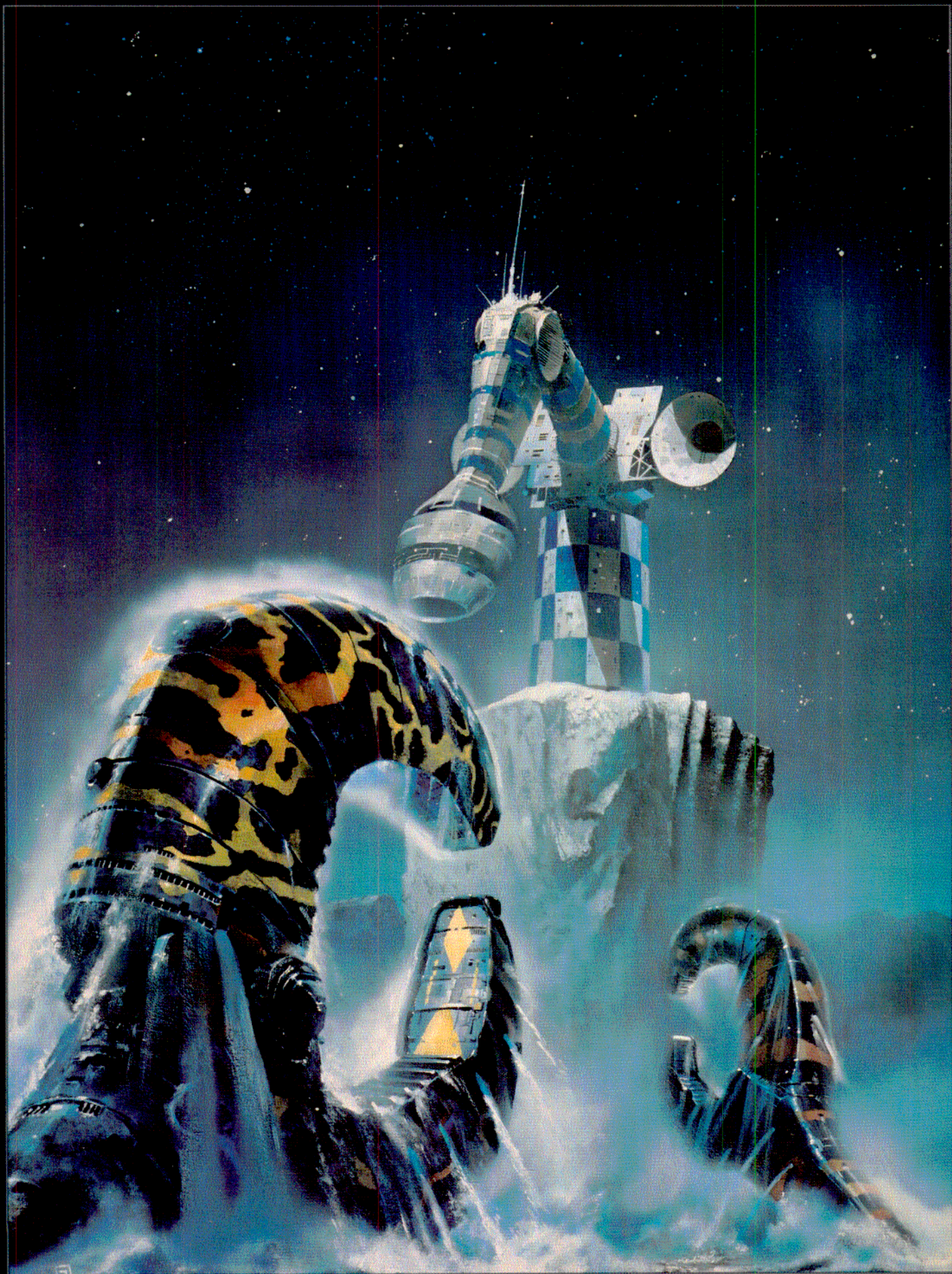
















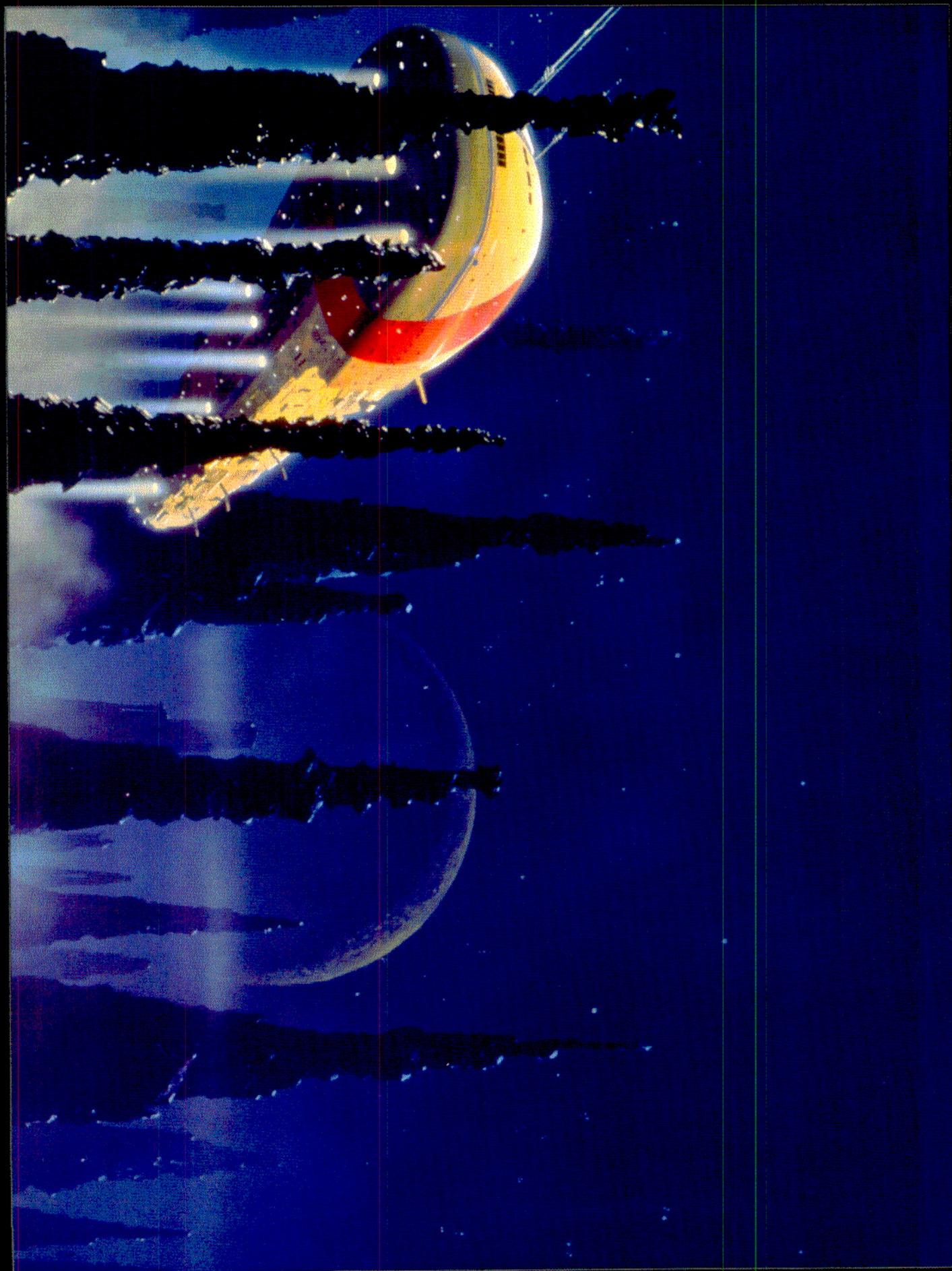


















## CLOSE STRUCTURE HULL

Price Modifiers: No SL 0.3; SL n/a; AF n/a					Volume Factor				Airlocks					
Size (T <sub>d</sub> )	Size Code	Length (m)	Total Volume (m <sup>3</sup> )	Surface Area (m <sup>2</sup> )	TL 8-9	TL 10-11	TL 12-13	TL 14-16	Qty	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)
10	7	12.3	140	266	0.44	0.33	0.19	0.10	1	0.2	3	2	0.001	0.005
20	7	14.0	280	322	0.54	0.40	0.23	0.12	1	0.2	3	2	0.001	0.005
30	7	16.1	420	378	0.63	0.47	0.27	0.14	1	0.2	3	2	0.001	0.005
40	7	18.2	560	434	0.72	0.54	0.31	0.16	1	0.2	3	2	0.001	0.005
50	7	19.6	700	532	0.89	0.67	0.38	0.19	1	0.2	3	2	0.001	0.005
60	7	20.3	840	588	0.98	0.74	0.42	0.21	1	0.2	3	2	0.001	0.005
70	7	21.9	980	644	1.07	0.81	0.46	0.23	1	0.2	3	2	0.001	0.005
80	7	23.1	1,120	714	1.19	0.89	0.51	0.26	1	0.2	3	2	0.001	0.005
90	7	23.8	1,260	770	1.28	0.96	0.55	0.28	1	0.2	3	2	0.001	0.005
100	8	24.5	1,400	840	1.40	1.05	0.60	0.30	1	0.2	3	2	0.001	0.005
200	8	29.8	2,800	1,260	2.10	1.58	0.90	0.45	2	0.4	6	4	0.002	0.010
300	8	35.0	4,200	1,680	2.80	2.10	1.20	0.60	3	0.6	9	6	0.003	0.015
400	8	38.5	5,600	2,100	3.50	2.63	1.50	0.75	4	0.8	12	8	0.004	0.020
500	8	42.0	7,000	2,380	3.97	2.98	1.70	0.85	5	1.0	15	10	0.005	0.025
600	8	43.8	8,400	2,800	4.67	3.50	2.00	1.00	6	1.2	18	12	0.006	0.030
700	8	47.3	9,800	3,080	5.13	3.85	2.20	1.10	7	1.4	21	14	0.007	0.035
800	8	49.0	11,200	3,360	5.60	4.20	2.40	1.20	8	1.6	24	16	0.008	0.040
900	8	50.8	12,600	3,640	6.07	4.55	2.60	1.30	9	1.8	27	18	0.009	0.045
1,000	9	52.5	14,000	3,920	6.53	4.90	2.80	1.40	10	2.0	30	20	0.010	0.050
2,000	9	63.0	28,000	6,020	10.03	7.53	4.30	2.15	20	4.0	60	40	0.020	0.100
3,000	9	73.5	42,000	7,980	13.30	9.98	5.70	2.85	30	6.0	90	60	0.030	0.150
4,000	9	82.3	56,000	9,800	16.33	12.25	7.00	3.50	40	8.0	120	80	0.040	0.200
5,000	9	89.3	70,000	11,200	18.67	14.00	8.00	4.00	50	10.0	150	100	0.050	0.250

## SLAB HULL

Price Modifiers: No SL 0.5; SL 0.7; AF 1.5					Volume Factor				Airlocks					
Size (T <sub>d</sub> )	Size Code	Length (m)	Total Volume (m <sup>3</sup> )	Surface Area (m <sup>2</sup> )	TL 8-9	TL 10-11	TL 12-13	TL 14-16	Qty	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)
10	7	19.3	140	285	0.48	0.36	0.20	0.10	1	0.2	3	2	0.001	0.005
20	7	22.0	280	345	0.58	0.43	0.25	0.12	1	0.2	3	2	0.001	0.005
30	7	25.3	420	405	0.68	0.51	0.29	0.14	1	0.2	3	2	0.001	0.005
40	7	28.6	560	465	0.78	0.58	0.33	0.17	1	0.2	3	2	0.001	0.005
50	7	30.8	700	570	0.95	0.71	0.41	0.20	1	0.2	3	2	0.001	0.005
60	7	31.9	840	630	1.05	0.79	0.45	0.23	1	0.2	3	2	0.001	0.005
70	7	34.4	980	690	1.15	0.86	0.49	0.25	1	0.2	3	2	0.001	0.005
80	7	36.3	1,120	765	1.28	0.96	0.55	0.27	1	0.2	3	2	0.001	0.005
90	7	37.4	1,260	825	1.38	1.03	0.59	0.29	1	0.2	3	2	0.001	0.005
100	8	38.5	1,400	900	1.50	1.13	0.64	0.32	1	0.2	3	2	0.001	0.005
200	8	46.8	2,800	1,350	2.25	1.69	0.96	0.48	2	0.4	6	4	0.002	0.010
300	8	55.0	4,200	1,800	3.00	2.25	1.29	0.64	3	0.6	9	6	0.003	0.015
400	8	60.5	5,600	2,250	3.75	2.81	1.61	0.80	4	0.8	12	8	0.004	0.020
500	8	66.0	7,000	2,550	4.25	3.19	1.82	0.91	5	1.0	15	10	0.005	0.025
600	8	68.8	8,400	3,000	5.00	3.75	2.14	1.07	6	1.2	18	12	0.006	0.030
700	8	74.3	9,800	3,300	5.50	4.13	2.36	1.18	7	1.4	21	14	0.007	0.035
800	8	77.0	11,200	3,600	6.00	4.50	2.57	1.29	8	1.6	24	16	0.008	0.040
900	8	79.8	12,600	3,900	6.50	4.88	2.79	1.39	9	1.8	27	18	0.009	0.045
1,000	9	82.5	14,000	4,200	7.00	5.25	3.00	1.50	10	2.0	30	20	0.010	0.050
2,000	9	99.0	28,000	6,450	10.75	8.06	4.61	2.30	20	4.0	60	40	0.020	0.100
3,000	9	115.5	42,000	8,550	14.25	10.69	6.11	3.05	30	6.0	90	60	0.030	0.150
4,000	9	129.3	56,000	10,500	17.50	13.13	7.50	3.75	40	8.0	120	80	0.040	0.200
5,000	9	140.3	70,000	12,000	20.00	15.00	8.57	4.29	50	10.0	150	100	0.050	0.250



## JUMP DRIVES

Ship Size	1 Parsec (TL9)					2 Parsecs (TL11)					3 Parsecs (TL12)					Fuel (m <sup>3</sup> /psc)
	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)	Crew (Mx)	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)	Crew (Mx)	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)	Crew (Mx)	
100	84	28	9	8.4	0.17	126	42	14	12.6	0.26	168	56	19	16.8	0.34	140
200	168	56	19	16.8	0.34	252	84	28	25.2	0.51	336	112	37	33.6	0.68	280
300	252	84	28	25.2	0.51	378	126	42	37.8	0.76	504	168	56	50.4	1.01	420
400	336	112	37	33.6	0.68	504	168	56	50.4	1.01	672	224	75	67.2	1.35	560
500	420	140	47	42.0	0.84	630	210	70	63.0	1.26	840	280	93	84.0	1.68	700
600	504	168	56	50.4	1.01	756	252	84	75.6	1.52	1,008	336	112	100.8	2.02	840
700	588	196	65	58.8	1.18	882	294	98	88.2	1.77	1,176	392	131	117.6	2.36	980
800	672	224	75	67.2	1.35	1,008	336	112	100.8	2.02	1,344	448	149	134.4	2.69	1,120
900	756	252	84	75.6	1.52	1,134	378	126	113.4	2.27	1,512	504	168	151.2	3.03	1,260
1,000	840	280	93	84.0	1.68	1,260	420	140	126.0	2.52	1,680	560	187	168.0	3.36	1,400
2,000	1,680	560	187	168.0	3.36	2,520	840	280	252.0	5.04	3,360	1,120	373	336.0	6.72	2,800
3,000	2,520	840	280	252.0	5.04	3,780	1,260	420	378.0	7.56	5,040	1,680	560	504.0	10.08	4,200
4,000	3,360	1,120	373	336.0	6.72	5,040	1,680	560	504.0	10.08	6,720	2,240	747	672.0	13.44	5,600
5,000	4,200	1,400	467	420.0	8.40	6,300	2,100	700	630.0	12.60	8,400	2,800	933	840.0	16.80	7,000

Ship Size	4 Parsecs (TL13)					5 Parsecs (TL14)					6 Parsecs (TL15)					Fuel (m <sup>3</sup> /psc)
	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)	Crew (Mx)	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)	Crew (Mx)	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)	Crew (Mx)	
100	210	70	23	21.0	0.42	210	84	28	25.2	0.42	196	98	33	29.4	0.40	140
200	420	140	47	42.0	0.84	420	168	56	50.4	0.84	392	196	65	58.8	0.79	280
300	630	210	70	63.0	1.26	630	252	84	75.6	1.26	588	294	98	88.2	1.18	420
400	840	280	93	84.0	1.68	840	336	112	100.8	1.68	784	392	131	117.6	1.57	560
500	1,050	350	117	105.0	2.10	1,050	420	140	126.0	2.10	980	490	163	147.0	1.96	700
600	1,260	420	140	126.0	2.52	1,260	504	168	151.2	2.52	1,176	588	196	176.4	2.36	840
700	1,470	490	163	147.0	2.94	1,470	588	196	176.4	2.94	1,372	686	229	205.8	2.75	980
800	1,680	560	187	168.0	3.36	1,680	672	224	201.6	3.36	1,568	784	261	235.2	3.14	1,120
900	1,890	630	210	189.0	3.78	1,890	756	252	226.8	3.78	1,764	882	294	264.6	3.53	1,260
1,000	2,100	700	233	210.0	4.20	2,100	840	280	252.0	4.20	1,960	980	327	294.0	3.92	1,400
2,000	4,200	1,400	467	420.0	8.40	4,200	1,680	560	504.0	8.40	3,920	1,960	653	588.0	7.84	2,800
3,000	6,300	2,100	700	630.0	12.60	6,300	2,520	840	756.0	12.60	5,880	2,940	980	882.0	11.76	4,200
4,000	8,400	2,800	933	840.0	16.80	8,400	3,360	1,120	1,008.0	16.80	7,840	3,920	1,307	1,176.0	15.68	5,600
5,000	10,500	3,500	1,167	1,050.0	21.00	10,500	4,200	1,400	1,260.0	21.00	9,800	4,900	1,633	1,470.0	19.60	7,000

### BASIC CONTRAGRAVITY DRIVES (TL 9)

Thrust (tonnes)	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (Mx)
100	2.7	3.4	2	2.0	0.14	0.1
200	5.3	6.7	4	4.0	0.27	0.1
300	8.0	10.0	6	6.0	0.40	0.1
400	10.7	13.4	8	8.0	0.54	0.1
500	13.3	16.7	10	10.0	0.67	0.1
600	16.0	20.0	12	12.0	0.80	0.1
800	21.3	26.7	16	16.0	1.07	0.1
900	24.0	30.0	18	18.0	1.20	0.1
1,000	26.7	33.4	20	20.0	1.34	0.1
1,200	32.0	40.0	24	24.0	1.60	0.1
1,400	37.3	46.7	28	28.0	1.87	0.1
1,500	40.0	50.0	30	30.0	2.00	0.1
1,600	42.7	53.4	32	32.0	2.14	0.1
1,800	48.0	60.0	36	36.0	2.40	0.1
2,000	53.3	66.7	40	40.0	2.67	0.2
2,100	56.0	70.0	42	42.0	2.80	0.2
2,400	64.0	80.0	48	48.0	3.20	0.2
2,500	66.7	83.4	50	50.0	3.34	0.2
2,700	72.0	90.0	54	54.0	3.60	0.2
2,800	74.7	93.4	56	56.0	3.74	0.2
3,000	80.0	100.0	60	60.0	4.00	0.2
3,200	85.3	106.7	64	64.0	4.27	0.2
3,500	93.3	116.7	70	70.0	4.67	0.2
3,600	96.0	120.0	72	72.0	4.80	0.2
4,000	106.7	133.4	80	80.0	5.34	0.3
4,200	112.0	140.0	84	84.0	5.60	0.3
4,500	120.0	150.0	90	90.0	6.00	0.3
4,800	128.0	160.0	96	96.0	6.40	0.3
5,000	133.3	166.7	100	100.0	6.67	0.3
5,400	144.0	180.0	108	108.0	7.20	0.3
6,000	160.0	200.0	120	120.0	8.00	0.4
8,000	213.3	266.7	160	160.0	10.67	0.5
9,000	240.0	300.0	180	180.0	12.00	0.5
10,000	266.7	333.4	200	200.0	13.34	0.6
12,000	320.0	400.0	240	240.0	16.00	0.7
14,000	373.3	466.7	280	280.0	18.67	0.8
15,000	400.0	500.0	300	300.0	20.00	0.8
16,000	426.7	533.4	320	320.0	21.34	0.9
18,000	480.0	600.0	360	360.0	24.00	1.0
20,000	533.3	666.7	400	400.0	26.67	1.1
21,000	560.0	700.0	420	420.0	28.00	1.2
24,000	640.0	800.0	480	480.0	32.00	1.3
25,000	666.7	833.4	500	500.0	33.34	1.4
27,000	720.0	900.0	540	540.0	36.00	1.5
28,000	746.7	933.4	560	560.0	37.34	1.5
30,000	800.0	1,000.0	600	600.0	40.00	1.6
32,000	853.3	1,066.7	640	640.0	42.67	1.8
35,000	933.3	1,166.7	700	700.0	46.67	1.9
36,000	960.0	1,200.0	720	720.0	48.00	2.0
40,000	1,066.7	1,333.4	800	800.0	53.34	2.2
42,000	1,120.0	1,400.0	840	840.0	56.00	2.3
45,000	1,200.0	1,500.0	900	900.0	60.00	2.4
48,000	1,280.0	1,600.0	960	960.0	64.00	2.6
50,000	1,333.3	1,666.7	1,000	1,000.0	66.67	2.7
54,000	1,440.0	1,800.0	1,080	1,080.0	72.00	2.9
60,000	1,600.0	2,000.0	1,200	1,200.0	80.00	3.2
80,000	2,133.3	2,666.7	1,600	1,600.0	106.67	4.3
90,000	2,400.0	3,000.0	1,800	1,800.0	120.00	4.8
100,000	2,666.7	3,333.4	2,000	2,000.0	133.34	5.4
120,000	3,200.0	4,000.0	2,400	2,400.0	160.00	6.4
150,000	4,000.0	5,000.0	3,000	3,000.0	200.00	8.0
160,000	4,266.7	5,333.4	3,200	3,200.0	213.34	8.6
180,000	4,800.0	6,000.0	3,600	3,600.0	240.00	9.6
200,000	5,333.3	6,666.7	4,000	4,000.0	266.67	10.7
240,000	6,400.0	8,000.0	4,800	4,800.0	320.00	12.8
250,000	6,666.7	8,333.4	5,000	5,000.0	333.34	13.4
300,000	8,000.0	10,000.0	6,000	6,000.0	400.00	16.0

### STANDARD CONTRAGRAVITY DRIVES (TL 10)

Thrust (tonnes)	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (Mx)
100	2.0	2.0	2	1.4	0.17	0.1
200	4.0	4.0	4	2.7	0.34	0.1
300	6.0	6.0	6	4.0	0.50	0.1
400	8.0	8.0	8	5.4	0.67	0.1
500	10.0	10.0	10	6.7	0.84	0.1
600	12.0	12.0	12	8.0	1.00	0.1
800	16.0	16.0	16	10.7	1.34	0.1
900	18.0	18.0	18	12.0	1.50	0.1
1,000	20.0	20.0	20	13.4	1.67	0.1
1,200	24.0	24.0	24	16.0	2.00	0.1
1,400	28.0	28.0	28	18.7	2.34	0.1
1,500	30.0	30.0	30	20.0	2.50	0.1
1,600	32.0	32.0	32	21.4	2.67	0.1
1,800	36.0	36.0	36	24.0	3.00	0.1
2,000	40.0	40.0	40	26.7	3.34	0.1
2,100	42.0	42.0	42	28.0	3.50	0.1
2,400	48.0	48.0	48	32.0	4.00	0.1
2,500	50.0	50.0	50	33.4	4.17	0.1
2,700	54.0	54.0	54	36.0	4.50	0.2
2,800	56.0	56.0	56	37.4	4.67	0.2
3,000	60.0	60.0	60	40.0	5.00	0.2
3,200	64.0	64.0	64	42.7	5.34	0.2
3,500	70.0	70.0	70	46.7	5.84	0.2
3,600	72.0	72.0	72	48.0	6.00	0.2
4,000	80.0	80.0	80	53.4	6.67	0.2
4,200	84.0	84.0	84	56.0	7.00	0.2
4,500	90.0	90.0	90	60.0	7.50	0.2
4,800	96.0	96.0	96	64.0	8.00	0.2
5,000	100.0	100.0	100	66.7	8.34	0.2
5,400	108.0	108.0	108	72.0	9.00	0.3
6,000	120.0	120.0	120	80.0	10.00	0.3
8,000	160.0	160.0	160	106.7	13.34	0.4
9,000	180.0	180.0	180	120.0	15.00	0.4
10,000	200.0	200.0	200	133.4	16.67	0.4
12,000	240.0	240.0	240	160.0	20.00	0.5
14,000	280.0	280.0	280	186.7	23.34	0.6
15,000	300.0	300.0	300	200.0	25.00	0.6
16,000	320.0	320.0	320	213.4	26.67	0.7
18,000	360.0	360.0	360	240.0	30.00	0.8
20,000	400.0	400.0	400	266.7	33.34	0.8
21,000	420.0	420.0	420	280.0	35.00	0.9
24,000	480.0	480.0	480	320.0	40.00	1.0
25,000	500.0	500.0	500	333.4	41.67	1.0
27,000	540.0	540.0	540	360.0	45.00	1.1
28,000	560.0	560.0	560	373.4	46.67	1.2
30,000	600.0	600.0	600	400.0	50.00	1.2
32,000	640.0	640.0	640	426.7	53.34	1.3
35,000	700.0	700.0	700	466.7	58.34	1.4
36,000	720.0	720.0	720	480.0	60.00	1.5
40,000	800.0	800.0	800	533.4	66.67	1.6
42,000	840.0	840.0	840	560.0	70.00	1.7
45,000	900.0	900.0	900	600.0	75.00	1.8
48,000	960.0	960.0	960	640.0	80.00	2.0
50,000	1,000.0	1,000.0	1,000	666.7	83.34	2.0
54,000	1,080.0	1,080.0	1,080	720.0	90.00	2.2
60,000	1,200.0	1,200.0	1,200	800.0	100.00	2.4
80,000	1,600.0	1,600.0	1,600	1,066.7	133.34	3.2
90,000	1,800.0	1,800.0	1,800	1,200.0	150.00	3.6
100,000	2,000.0	2,000.0	2,000	1,333.4	166.67	4.0
120,000	2,400.0	2,400.0	2,400	1,600.0	200.00	4.8
150,000	3,000.0	3,000.0	3,000	2,000.0	250.00	6.0
160,000	3,200.0	3,200.0	3,200	2,133.4	266.67	6.4
180,000	3,600.0	3,600.0	3,600	2,400.0	300.00	7.2
200,000	4,000.0	4,000.0	4,000	2,666.7	333.34	8.0
240,000	4,800.0	4,800.0	4,800	3,200.0	400.00	9.6
250,000	5,000.0	5,000.0	5,000	3,333.4	416.67	10.0
300,000	6,000.0	6,000.0	6,000	4,000.0	500.00	12.0

## High Efficiency ContraGravity Drv (TL 12)

Thrust (tonnes)	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (Mx)
100	1.3	2.0	2	0.7	0.20	0.1
200	2.7	4.0	4	1.4	0.40	0.1
300	4.0	6.0	6	2.0	0.60	0.1
400	5.3	8.0	8	2.7	0.80	0.1
500	6.7	10.0	10	3.4	1.00	0.1
600	8.0	12.0	12	4.0	1.20	0.1
800	10.7	16.0	16	5.4	1.60	0.1
900	12.0	18.0	18	6.0	1.80	0.1
1,000	13.3	20.0	20	6.7	2.00	0.1
1,200	16.0	24.0	24	8.0	2.40	0.1
1,400	18.7	28.0	28	9.4	2.80	0.1
1,500	20.0	30.0	30	10.0	3.00	0.1
1,600	21.3	32.0	32	10.7	3.20	0.1
1,800	24.0	36.0	36	12.0	3.60	0.1
2,000	26.7	40.0	40	13.4	4.00	0.1
2,100	28.0	42.0	42	14.0	4.20	0.1
2,400	32.0	48.0	48	16.0	4.80	0.1
2,500	33.3	50.0	50	16.7	5.00	0.1
2,700	36.0	54.0	54	18.0	5.40	0.1
2,800	37.3	56.0	56	18.7	5.60	0.1
3,000	40.0	60.0	60	20.0	6.00	0.1
3,200	42.7	64.0	64	21.4	6.40	0.1
3,500	46.7	70.0	70	23.4	7.00	0.1
3,600	48.0	72.0	72	24.0	7.20	0.1
4,000	53.3	80.0	80	26.7	8.00	0.2
4,200	56.0	84.0	84	28.0	8.40	0.2
4,500	60.0	90.0	90	30.0	9.00	0.2
4,800	64.0	96.0	96	32.0	9.60	0.2
5,000	66.7	100.0	100	33.4	10.00	0.2
5,400	72.0	108.0	108	36.0	10.80	0.2
6,000	80.0	120.0	120	40.0	12.00	0.2
8,000	106.7	160.0	160	53.4	16.00	0.3
9,000	120.0	180.0	180	60.0	18.00	0.3
10,000	133.3	200.0	200	66.7	20.00	0.3
12,000	160.0	240.0	240	80.0	24.00	0.4
14,000	186.7	280.0	280	93.4	28.00	0.4
15,000	200.0	300.0	300	100.0	30.00	0.4
16,000	213.3	320.0	320	106.7	32.00	0.5
18,000	240.0	360.0	360	120.0	36.00	0.5
20,000	266.7	400.0	400	133.4	40.00	0.6
21,000	280.0	420.0	420	140.0	42.00	0.6
24,000	320.0	480.0	480	160.0	48.00	0.7
25,000	333.3	500.0	500	166.7	50.00	0.7
27,000	360.0	540.0	540	180.0	54.00	0.8
28,000	373.3	560.0	560	186.7	56.00	0.8
30,000	400.0	600.0	600	200.0	60.00	0.8
32,000	426.7	640.0	640	213.4	64.00	0.9
35,000	466.7	700.0	700	233.4	70.00	1.0
36,000	480.0	720.0	720	240.0	72.00	1.0
40,000	533.3	800.0	800	266.7	80.00	1.1
42,000	560.0	840.0	840	280.0	84.00	1.2
45,000	600.0	900.0	900	300.0	90.00	1.2
48,000	640.0	960.0	960	320.0	96.00	1.3
50,000	666.7	1,000.0	1,000	333.4	100.00	1.4
54,000	720.0	1,080.0	1,080	360.0	108.00	1.5
60,000	800.0	1,200.0	1,200	400.0	120.00	1.6
80,000	1,066.7	1,600.0	1,600	533.4	160.00	2.2
90,000	1,200.0	1,800.0	1,800	600.0	180.00	2.4
100,000	1,333.3	2,000.0	2,000	666.7	200.00	2.7
120,000	1,600.0	2,400.0	2,400	800.0	240.00	3.2
150,000	2,000.0	3,000.0	3,000	1,000.0	300.00	4.0
160,000	2,133.3	3,200.0	3,200	1,066.7	320.00	4.3
180,000	2,400.0	3,600.0	3,600	1,200.0	360.00	4.8
200,000	2,666.7	4,000.0	4,000	1,333.4	400.00	5.4
240,000	3,200.0	4,800.0	4,800	1,600.0	480.00	6.4
250,000	3,333.3	5,000.0	5,000	1,666.7	500.00	6.7
300,000	4,000.0	6,000.0	6,000	2,000.0	600.00	8.0

## FUSION DRIVE (TL 9)

Thrust (tonnes)	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Fuel (m <sup>3</sup> /hr)	Crew (Mx)
100	11	11	1	(2.0)	3.9	0.49	0.1
200	22	22	1	(4.0)	7.8	0.98	0.1
300	33	33	2	(6.0)	11.7	1.47	0.1
400	45	45	2	(8.0)	15.6	1.96	0.1
500	56	56	3	(10.0)	19.4	2.45	0.2
600	67	67	3	(12.0)	23.3	2.94	0.2
800	89	89	4	(16.0)	31.1	3.92	0.2
900	100	100	5	(18.0)	35.0	4.41	0.2
1,000	111	111	5	(20.0)	38.9	4.90	0.3
1,200	133	133	6	(24.0)	46.7	5.88	0.3
1,400	156	156	7	(28.0)	54.4	6.86	0.4
1,500	167	167	8	(30.0)	58.3	7.35	0.4
1,600	178	178	8	(32.0)	62.2	7.84	0.4
1,800	200	200	9	(36.0)	70.0	8.82	0.4
2,000	222	222	10	(40.0)	77.8	9.80	0.5
2,100	233	233	11	(42.0)	81.7	10.29	0.5
2,400	267	267	12	(48.0)	93.3	11.76	0.6
2,500	278	278	13	(50.0)	97.2	12.25	0.6
2,700	300	300	14	(54.0)	105.0	13.23	0.6
2,800	311	311	14	(56.0)	108.9	13.72	0.7
3,000	333	333	15	(60.0)	116.7	14.70	0.7
3,200	356	356	16	(64.0)	124.4	15.68	0.8
3,500	389	389	18	(70.0)	136.1	17.15	0.8
3,600	400	400	18	(72.0)	140.0	17.64	0.8
4,000	445	445	20	(80.0)	155.6	19.60	0.9
4,200	467	467	21	(84.0)	163.3	20.58	1.0
4,500	500	500	23	(90.0)	175.0	22.05	1.0
4,800	533	533	24	(96.0)	186.7	23.52	1.1
5,000	556	556	25	(100.0)	194.4	24.50	1.2
5,400	600	600	27	(108.0)	210.0	26.46	1.2
6,000	667	667	30	(120.0)	233.3	29.40	1.4
8,000	889	889	40	(160.0)	311.1	39.70	1.8
9,000	1,000	1,000	45	(180.0)	350.0	44.10	2.0
10,000	1,111	1,111	50	(200.0)	388.9	49.00	2.3
12,000	1,333	1,333	60	(240.0)	466.7	58.80	2.7
14,000	1,556	1,556	70	(280.0)	544.4	68.60	3.2
15,000	1,667	1,667	75	(300.0)	583.3	73.50	3.4
16,000	1,778	1,778	80	(320.0)	622.2	78.40	3.6
18,000	2,000	2,000	90	(360.0)	700.0	88.20	4.0
20,000	2,222	2,222	100	(400.0)	777.8	98.00	4.5
21,000	2,333	2,333	105	(420.0)	816.7	102.90	4.7
24,000	2,667	2,667	120	(480.0)	933.3	117.60	5.4
25,000	2,778	2,778	125	(500.0)	972.2	122.50	5.6
27,000	3,000	3,000	135	(540.0)	1,050.0	132.30	6.0
28,000	3,111	3,111	140	(560.0)	1,088.9	137.20	6.3
30,000	3,333	3,333	150	(600.0)	1,166.7	147.00	6.7
32,000	3,556	3,556	160	(640.0)	1,244.4	156.80	7.2
35,000	3,889	3,889	175	(700.0)	1,361.1	171.50	7.8
36,000	4,000	4,000	180	(720.0)	1,400.0	176.40	8.0
40,000	4,445	4,445	200	(800.0)	1,555.6	196.00	8.9
42,000	4,667	4,667	210	(840.0)	1,633.3	205.80	9.4
45,000	5,000	5,000	225	(900.0)	1,750.0	220.50	10.0
48,000	5,333	5,333	240	(960.0)	1,866.7	235.20	10.7
50,000	5,556	5,556	250	(1,000.0)	1,944.4	245.00	11.2
54,000	6,000	6,000	270	(1,080.0)	2,100.0	264.60	12.0
60,000	6,667	6,667	300	(1,200.0)	2,333.3	294.00	13.4
80,000	8,889	8,889	400	(1,600.0)	3,111.1	392.00	17.8
90,000	10,000	10,000	450	(1,800.0)	3,500.0	441.00	20.0
100,000	11,111	11,111	500	(2,000.0)	3,888.9	490.00	22.3
120,000	13,333	13,333	600	(2,400.0)	4,666.7	588.00	26.7
150,000	16,667	16,667	750	(3,000.0)	5,833.3	735.00	33.4
160,000	17,778	17,778	800	(3,200.0)	6,222.2	784.00	35.6
180,000	20,000	20,000	900	(3,600.0)	7,000.0	882.00	40.0
200,000	22,222	22,222	1,000	(4,000.0)	7,777.8	980.00	44.5
240,000	26,667	26,667	1,200	(4,800.0)	9,333.3	1,176.00	53.4
250,000	27,778	27,778	1,250	(5,000.0)	9,722.2	1,225.00	55.6
300,000	33,333	33,333	1,500	(6,000.0)	11,666.7	1,470.00	66.7



## HEPLAR DRIVES (TL 10)

Thrust (tonnes)	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Fuel (m <sup>3</sup> /hr)	Crew (Mx)
100	0.5	0.5	1	5.0	0.005	1.25	0.1
200	1.0	1.0	1	10.0	0.010	2.50	0.1
300	1.5	1.5	2	15.0	0.015	3.75	0.1
400	2.0	2.0	2	20.0	0.020	5.00	0.1
500	2.5	2.5	3	25.0	0.025	6.25	0.1
600	3.0	3.0	3	30.0	0.030	7.50	0.1
800	4.0	4.0	4	40.0	0.040	10.00	0.1
900	4.5	4.5	5	45.0	0.045	11.25	0.1
1,000	5.0	5.0	5	50.0	0.050	12.50	0.1
1,200	6.0	6.0	6	60.0	0.060	15.00	0.1
1,400	7.0	7.0	7	70.0	0.070	17.50	0.1
1,500	7.5	7.5	8	75.0	0.075	18.75	0.1
1,600	8.0	8.0	8	80.0	0.080	20.00	0.1
1,800	9.0	9.0	9	90.0	0.090	22.50	0.1
2,000	10.0	10.0	10	100.0	0.100	25.00	0.1
2,100	10.5	10.5	11	105.0	0.105	26.25	0.1
2,400	12.0	12.0	12	120.0	0.120	30.00	0.1
2,500	12.5	12.5	13	125.0	0.125	31.25	0.1
2,700	13.5	13.5	14	135.0	0.135	33.75	0.1
2,800	14.0	14.0	14	140.0	0.140	35.00	0.1
3,000	15.0	15.0	15	150.0	0.150	37.50	0.1
3,200	16.0	16.0	16	160.0	0.160	40.00	0.1
3,500	17.5	17.5	18	175.0	0.175	43.75	0.1
3,600	18.0	18.0	18	180.0	0.180	45.00	0.1
4,000	20.0	20.0	20	200.0	0.200	50.00	0.1
4,200	21.0	21.0	21	210.0	0.210	52.50	0.1
4,500	22.5	22.5	23	225.0	0.225	56.25	0.1
4,800	24.0	24.0	24	240.0	0.240	60.00	0.1
5,000	25.0	25.0	25	250.0	0.250	62.50	0.1
5,400	27.0	27.0	27	270.0	0.270	67.50	0.1
6,000	30.0	30.0	30	300.0	0.300	75.00	0.1
8,000	40.0	40.0	40	400.0	0.400	100.00	0.1
9,000	45.0	45.0	45	450.0	0.450	112.50	0.1
10,000	50.0	50.0	50	500.0	0.500	125.00	0.1
12,000	60.0	60.0	60	600.0	0.600	150.00	0.2
14,000	70.0	70.0	70	700.0	0.700	175.00	0.2
15,000	75.0	75.0	75	750.0	0.750	187.50	0.2
16,000	80.0	80.0	80	800.0	0.800	200.00	0.2
18,000	90.0	90.0	90	900.0	0.900	225.00	0.2
20,000	100.0	100.0	100	1,000.0	1.000	250.00	0.2
21,000	105.0	105.0	105	1,050.0	1.050	262.50	0.3
24,000	120.0	120.0	120	1,200.0	1.200	300.00	0.3
25,000	125.0	125.0	125	1,250.0	1.250	312.50	0.3
27,000	135.0	135.0	135	1,350.0	1.350	337.50	0.3
28,000	140.0	140.0	140	1,400.0	1.400	350.00	0.3
30,000	150.0	150.0	150	1,500.0	1.500	375.00	0.3
32,000	160.0	160.0	160	1,600.0	1.600	400.00	0.4
35,000	175.0	175.0	175	1,750.0	1.750	437.50	0.4
36,000	180.0	180.0	180	1,800.0	1.800	450.00	0.4
40,000	200.0	200.0	200	2,000.0	2.000	500.00	0.4
42,000	210.0	210.0	210	2,100.0	2.100	525.00	0.5
45,000	225.0	225.0	225	2,250.0	2.250	562.50	0.5
48,000	240.0	240.0	240	2,400.0	2.400	600.00	0.5
50,000	250.0	250.0	250	2,500.0	2.500	625.00	0.5
54,000	270.0	270.0	270	2,700.0	2.700	675.00	0.6
60,000	300.0	300.0	300	3,000.0	3.000	750.00	0.6
80,000	400.0	400.0	400	4,000.0	4.000	1,000.00	0.8
90,000	450.0	450.0	450	4,500.0	4.500	1,125.00	0.9
100,000	500.0	500.0	500	5,000.0	5.000	1,250.00	1.0
120,000	600.0	600.0	600	6,000.0	6.000	1,500.00	1.2
150,000	750.0	750.0	750	7,500.0	7.500	1,875.00	1.5
160,000	800.0	800.0	800	8,000.0	8.000	2,000.00	1.6
180,000	900.0	900.0	900	9,000.0	9.000	2,250.00	1.8
200,000	1,000.0	1,000.0	1,000	10,000.0	10.000	2,500.00	2.0
240,000	1,200.0	1,200.0	1,200	12,000.0	12.000	3,000.00	2.4
250,000	1,250.0	1,250.0	1,250	12,500.0	12.500	3,125.00	2.5
300,000	1,500.0	1,500.0	1,500	15,000.0	15.000	3,750.00	3.0

## THRUSTER PLATE DRIVES (TL 11+)

Thrust (tonnes)	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (Mx)
100	5	3	1	2.5	0.6	0.1
200	10	5	1	5.0	1.3	0.1
300	15	8	2	7.5	1.9	0.1
400	20	10	2	10.0	2.5	0.1
500	25	13	3	12.5	3.1	0.1
600	30	15	3	15.0	3.8	0.1
800	40	20	4	20.0	5.0	0.1
900	45	23	5	22.5	5.6	0.1
1,000	50	25	5	25.0	6.3	0.1
1,200	60	30	6	30.0	7.5	0.2
1,400	70	35	7	35.0	8.8	0.2
1,500	75	38	8	37.5	9.4	0.2
1,600	80	40	8	40.0	10.0	0.2
1,800	90	45	9	45.0	11.3	0.2
2,000	100	50	10	50.0	12.5	0.2
2,100	105	53	11	52.5	13.1	0.3
2,400	120	60	12	60.0	15.0	0.3
2,500	125	63	13	62.5	15.6	0.3
2,700	135	68	14	67.5	16.9	0.3
2,800	140	70	14	70.0	17.5	0.3
3,000	150	75	15	75.0	18.8	0.3
3,200	160	80	16	80.0	20.0	0.4
3,500	175	88	18	87.5	21.9	0.4
3,600	180	90	18	90.0	22.5	0.4
4,000	200	100	20	100.0	25.0	0.4
4,200	210	105	21	105.0	26.3	0.5
4,500	225	113	23	112.5	28.1	0.5
4,800	240	120	24	120.0	30.0	0.5
5,000	250	125	25	125.0	31.3	0.5
5,400	270	135	27	135.0	33.8	0.6
6,000	300	150	30	150.0	37.5	0.6
8,000	400	200	40	200.0	50.0	0.8
9,000	450	225	45	225.0	56.3	0.9
10,000	500	250	50	250.0	62.5	1.0
12,000	600	300	60	300.0	75.0	1.2
14,000	700	350	70	350.0	87.5	1.4
15,000	750	375	75	375.0	93.8	1.5
16,000	800	400	80	400.0	100.0	1.6
18,000	900	450	90	450.0	112.5	1.8
20,000	1,000	500	100	500.0	125.0	2.0
21,000	1,050	525	105	525.0	131.3	2.1
24,000	1,200	600	120	600.0	150.0	2.4
25,000	1,250	625	125	625.0	156.3	2.5
27,000	1,350	675	135	675.0	168.8	2.7
28,000	1,400	700	140	700.0	175.0	2.8
30,000	1,500	750	150	750.0	187.5	3.0
32,000	1,600	800	160	800.0	200.0	3.2
35,000	1,750	875	175	875.0	218.8	3.5
36,000	1,800	900	180	900.0	225.0	3.6
40,000	2,000	1,000	200	1,000.0	250.0	4.0
42,000	2,100	1,050	210	1,050.0	262.5	4.2
45,000	2,250	1,125	225	1,125.0	281.3	4.5
48,000	2,400	1,200	240	1,200.0	300.0	4.8
50,000	2,500	1,250	250	1,250.0	312.5	5.0
54,000	2,700	1,350	270	1,350.0	337.5	5.4
60,000	3,000	1,500	300	1,500.0	375.0	6.0
80,000	4,000	2,000	400	2,000.0	500.0	8.0
90,000	4,500	2,250	450	2,250.0	562.5	9.0
100,000	5,000	2,500	500	2,500.0	625.0	10.0
120,000	6,000	3,000	600	3,000.0	750.0	12.0
150,000	7,500	3,750	750	3,750.0	937.5	15.0
160,000	8,000	4,000	800	4,000.0	1,000.0	16.0
180,000	9,000	4,500	900	4,500.0	1,125.0	18.0
200,000	10,000	5,000	1,000	5,000.0	1,250.0	20.0
240,000	12,000	6,000	1,200	6,000.0	1,500.0	24.0
250,000	12,500	6,250	1,250	6,250.0	1,562.5	25.0
300,000	15,000	7,500	1,500	7,500.0	1,875.0	30.0

## EMPTY TURRET SOCKETS

TL	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCR)
Any	42	10	0.005
Any	84	16	0.005

## LIGHT LASER TURRETS (3 DISPLACEMENT TON SOCKET)

Description	TL	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCR)	Crew		Very Short Range	Short Range	Medium Range	Long Range	ROF
							Gn	Mx					
67Mj Laser	10	61.82	42	10	1.86	1.75	1	0.12	1: 1/7-20	2: 1/6-20	4: 1/3-10	8: 1/2-5	10
72Mj Laser	11	56.73	42	10	2.00	2.28	1	0.11	5: 1/7-21	10: 1/5-15	20: 1/2-7	40: 1/1-4	10
95Mj Laser	12	58.67	42	10	2.64	1.43	1	0.12	10: 1/8-24	20: 1/4-13	40: 1/2-7	80: 1/1-3	10
105Mj Laser	13	58.52	42	10	2.92	1.45	1	0.12	10: 1/8-26	20: 1/8-26	40: 1/8-26	80: 1/8-26	10
314Mj Laser•	13	56.87	42	10	2.68	1.86	1	0.11	10: 1/14-44	20: 1/8-27	40: 1/4-13	80: 1/2-7	10
135Mj Laser	14	61.57	42	10	3.75	1.15	1	0.12	10: 1/9-29	20: 1/9-29	40: 1/9-29	80: 1/9-29	10
455Mj Laser•	14	59.36	42	10	3.37	1.77	1	0.12	10: 1/17-53	20: 1/10-32	40: 1/5-16	80: 1/3-8	10
170Mj Laser	15	64.43	42	10	4.72	0.95	1	0.13	10: 1/10-33	20: 1/10-33	40: 1/10-33	80: 1/10-33	10
620Mj Laser•	15	60.57	42	10	4.05	1.82	1	0.12	10: 1/20-62	20: 1/12-37	40: 1/6-19	80: 1/3-9	10

## HEAVY LASER TURRETS (6 DISPLACEMENT TON SOCKET)

Description	TL	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCR)	Crew		Very Short Range	Short Range	Medium Range	Long Range	ROF
							Gn	Mx					
130Mj Laser	10	128.58	84	16	3.61	5.03	1	0.26	3: 1/9-29	6: 1/5-14	12: 1/2-7	24: 1/1-4	10
143Mj Laser	11	119.74	84	16	3.97	6.08	1	0.24	10: 1/10-30	20: 1/5-16	40: 1/3-8	80: 1/1-4	10
251Mj Laser	12	139.69	84	16	6.97	2.43	1	0.28	10: 1/13-40	20: 1/11-33	40: 1/5-17	80: 1/3-8	10
275Mj Laser	13	138.32	84	16	7.64	2.49	1	0.28	10: 1/13-41	20: 1/13-41	40: 1/13-41	80: 1/13-41	10
650Mj Laser•	13	110.54	84	16	5.56	3.52	1	0.22	10: 1/20-64	20: 1/15-48	40: 1/8-24	80: 1/4-12	10
325Mj Laser	14	141.37	84	16	9.03	2.29	1	0.28	10: 1/14-45	20: 1/14-45	40: 1/14-45	80: 1/14-45	10
700Mj Laser•	14	92.00	84	16	5.19	3.20	1	0.18	10: 1/21-66	20: 1/16-50	40: 1/8-25	80: 1/4-12	10
385Mj Laser	15	144.07	84	16	10.69	2.20	1	0.29	10: 1/16-49	20: 1/16-49	40: 1/16-49	80: 1/16-49	10
750Mj Laser•	15	76.89	84	16	4.90	3.00	1	0.15	10: 1/22-68	20: 1/16-51	40: 1/8-26	80: 1/4-13	10

## MISSILE LAUNCHER TURRETS

Type	TL	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCR)	Crew Factor	Missile Size (m <sup>3</sup> )	Ready Missiles
Standard	8	28.4	42	10	0.15	0.08	Gn 1, Mx 0.06	7	3
Heavy	8	70.4	84	16	0.15	0.11	Gn 1, Mx 0.15	7	5

## LASER BAYS (50 DISPLACEMENT TON)

Description	TL	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCR)	Crew		Very Short Range	Short Range	Medium Range	Long Range	ROF
							Gn	Mx					
550Mj Laser	11	630.08	700	48	21.68	85.45	1	1.26	10: 1/19-59	20: 1/19-59	40: 1/14-44	80: 1/7-22	10
600Mj Laser	12	367.61	700	47	19.77	33.40	1	0.74	10: 1/20-61	20: 1/20-61	40: 1/20-61	80: 1/11-36	10
600Mj Laser	12	394.31	700	47	336.43	38.70	1	0.79	10: 1/20-61	20: 1/20-61	40: 1/20-61	80: 1/11-36	200
600Mj Laser	12	447.33	700	47	669.77	49.31	1	0.89	10: 1/20-61	20: 1/20-61	40: 1/20-61	80: 1/11-36	400
600Mj Laser	12	553.36	700	47	1,336.4	70.51	1	1.11	10: 1/20-61	20: 1/20-61	40: 1/20-61	80: 1/11-36	800
650Mj Laser	13	362.32	700	47	21.16	33.81	1	0.72	10: 1/20-64	20: 1/20-64	40: 1/20-64	80: 1/20-64	10
650Mj Laser	13	391.23	700	47	364.21	39.55	1	0.78	10: 1/20-64	20: 1/20-64	40: 1/20-64	80: 1/20-64	200
650Mj Laser	13	448.66	700	47	725.32	51.04	1	0.90	10: 1/20-64	20: 1/20-64	40: 1/20-64	80: 1/20-64	400
650Mj Laser	13	563.53	700	47	1,447.5	74.01	1	1.13	10: 1/20-64	20: 1/20-64	40: 1/20-64	80: 1/20-64	800
700Mj Laser	14	335.03	700	46	21.24	23.29	1	0.67	10: 1/21-66	20: 1/21-66	40: 1/21-66	80: 1/21-66	10
700Mj Laser	14	366.15	700	46	390.69	29.47	1	0.73	10: 1/21-66	20: 1/21-66	40: 1/21-66	80: 1/21-66	200
700Mj Laser	14	428.00	700	46	779.58	41.84	1	0.86	10: 1/21-66	20: 1/21-66	40: 1/21-66	80: 1/21-66	400
700Mj Laser	14	551.70	700	46	1,557.4	66.58	1	1.10	10: 1/21-66	20: 1/21-66	40: 1/21-66	80: 1/21-66	800
750Mj Laser	15	310.73	700	46	22.63	17.34	1	0.62	10: 1/22-68	20: 1/22-68	40: 1/22-68	80: 1/22-68	10
750Mj Laser	15	344.07	700	46	418.47	23.97	1	0.69	10: 1/22-68	20: 1/22-68	40: 1/22-68	80: 1/22-68	200
750Mj Laser	15	410.34	700	46	835.13	37.22	1	0.82	10: 1/22-68	20: 1/22-68	40: 1/22-68	80: 1/22-68	400
750Mj Laser	15	542.87	700	46	1,668.5	63.73	1	1.09	10: 1/22-68	20: 1/22-68	40: 1/22-68	80: 1/22-68	800

## LASER BAYS (100 DISPLACEMENT TON)

Description	TL	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew		Very Short Range	Short Range	Medium Range	Long Range	ROF
							Gn	Mx					
500Mj Laser	10	839.51	1,400	78	27.29	122.08	1	1.68	10: 1/18-56	20: 1/12-38	40: 1/6-19	80: 1/3-9	10
500Mj Laser	10	1,194.1	1,400	78	291.18	192.97	1	2.39	10: 1/18-56	20: 1/12-38	40: 1/6-19	80: 1/3-9	200

## MISSILE BAYS

TL	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Gn	Mx	Launchers		Reloads per Launcher
10	382.4	700	8	13.55	48.29	1	0.77	4		12
10	732.4	1,400	8	13.55	48.43	1	1.47	8		13
11	375.4	700	5	6.55	34.30	1	0.76	4		13
11	711.4	1,400	5	6.55	34.46	1	1.43	10		10
12	363.9	700	4	3.25	25.81	1	0.73	5		10
12	696.4	1,400	4	3.25	25.96	1	1.40	10		10
14	350.9	700	3	1.95	15.31	1	0.71	5		10
14	690.4	1,400	3	1.95	15.50	1	1.39	12		8
15	348.4	700	3	1.95	9.33	1	0.70	6		8
15	684.4	1,400	3	1.95	9.50	1	1.37	12		8

## MESON BAYS

Description	TL	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Gn	Mx	Len (m)	Very Short Range	Short Range	Medium Range	Long Range	ROF
2,020Mj Meson Gun	11	1,911.02	1400	44	62.51	105.40	3	3.82	16	5: 20	10: 10	20: 5	40: 2	10
3,250Mj Meson Gun	12	2,066.46	1400	37	96.68	94.73	2	4.13	16	5: 30	10: 15	20: 8	40: 4	10
3,200Mj Meson Gun	13	1,875.41	1400	36	95.29	93.00	2	3.75	16	5: 30	10: 15	20: 8	40: 4	10
3,200Mj Meson Gun	14	1,636.56	1400	36	95.29	92.00	1	3.27	16	5: 35	10: 18	20: 9	40: 5	10
4,000Mj Meson Gun	15	1,831.86	1400	44	117.51	105.25	1	3.66	16	5: 40	10: 20	20: 10	40: 5	10

## MESON GUN SPINAL MOUNTS

Description	TL	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Gn	Mx	Len (m)	Very Short Range	Short Range	Medium Range	Long Range	ROF
1,000Mj Meson Gun	11	1,572.84	1,285.86	24	34.18	129.71	4	3.15	46	5: 40	10: 20	20: 10	40: 5	10
2,000Mj Meson Gun	11	4,014.31	3,477.38	44	61.96	316.72	11	8.03	69	5: 89	10: 41	20: 20	40: 10	10
5,000Mj Meson Gun	11	11,959.22	10,689.30	104	145.29	939.75	36	24.0	89	5: 177	10: 88	20: 42	40: 21	10
1,000Mj Meson Gun	12	813.86	659.67	13	30.88	65.60	1	1.63	37	5: 40	10: 20	20: 10	40: 5	10
2,000Mj Meson Gun	12	1,861.87	1,657.55	23	58.66	141.11	4	3.72	55	5: 89	10: 41	20: 20	40: 10	10
5,000Mj Meson Gun	12	5,201.09	4,917.58	53	141.99	393.62	12	10.4	71	5: 177	10: 88	20: 42	40: 21	10
1,000Mj Meson Gun	13	763.82	633.37	13	30.88	65.35	1	1.53	37	5: 40	10: 20	20: 10	40: 5	10
2,000Mj Meson Gun	13	1,761.76	1,603.70	23	58.66	140.60	3	3.52	55	5: 89	10: 41	20: 20	40: 10	10
5,000Mj Meson Gun	13	4,950.73	4,780.15	53	141.99	392.37	11	9.90	71	5: 177	10: 88	20: 42	40: 21	10
1,000Mj Meson Gun	14	607.26	533.53	12	29.58	48.40	1	1.21	31	5: 40	10: 20	20: 10	40: 5	10
2,000Mj Meson Gun	14	1,373.56	1,354.20	22	57.36	111.40	2	2.75	46	5: 89	10: 41	20: 20	40: 10	10
5,000Mj Meson Gun	14	3,792.58	4,019.73	52	140.69	320.41	7	7.59	59	5: 177	10: 88	20: 42	40: 21	10
1,000Mj Meson Gun	15	549.72	499.94	12	29.58	42.00	1	1.10	31	5: 40	10: 20	20: 10	40: 5	10
2,000Mj Meson Gun	15	1,265.97	1,293.48	22	57.36	104.75	2	2.53	46	5: 89	10: 41	20: 20	40: 10	10
5,000Mj Meson Gun	15	3,534.78	3,876.90	52	140.69	313.01	6	7.07	59	5: 177	10: 88	20: 42	40: 21	10

## PARTICLE ACCELERATOR SPINAL MOUNTS

Description	TL	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Gn	Mx	Len (m)	Very Short Range	Short Range	Medium Range	Long Range	ROF
1,025Mj NPAW	10	2,783.08	2,404.49	38	41.87	240.94	8	5.57	60	10: 160	20: 80	40: 40	80: 20	10
2,500Mj NPAW	10	4,489.36	3,536.86	41	82.84	299.43	11	8.98	70	10: 250	20: 160	40: 80	80: 40	10
3,600Mj NPAW	10	6,950.21	5,606.05	47	113.40	461.78	18	13.90	100	10: 300	20: 300	40: 160	80: 80	10
1,025Mj NPAW	11	1,238.43	1,128.02	23	34.87	113.71	3	2.48	40	10: 160	20: 80	40: 40	80: 20	10
2,500Mj NPAW	11	2,716.55	2,382.63	28	75.84	197.14	6	5.43	65	10: 250	20: 250	40: 129	80: 64	10
3,600Mj NPAW	11	4,664.44	4,476.01	51	106.40	371.98	13	9.33	70	10: 300	20: 300	40: 300	80: 163	10
1,025Mj NPAW	12	854.17	702.05	13	31.57	69.20	1	1.71	40	10: 160	20: 80	40: 40	80: 20	10
2,025Mj NPAW	12	1,692.58	1,413.88	17	59.35	116.78	3	3.39	60	10: 225	20: 225	40: 120	80: 60	10
3,600Mj NPAW	12	3,135.39	2,701.95	28	103.10	208.02	6	6.27	70	10: 300	20: 300	40: 300	80: 161	10
1,025Mj NPAW	13	1,003.49	947.90	20	31.57	95.67	2	2.01	40	10: 160	20: 160	40: 80	80: 40	10
2,500Mj NPAW	13	1,806.33	1,468.97	19	72.54	117.52	3	3.61	52	10: 250	20: 250	40: 160	80: 80	10
3,600Mj NPAW	13	3,655.76	3,558.82	43	103.10	300.45	8	7.31	66	10: 300	20: 300	40: 300	80: 300	10
1,025Mj NPAW	14	660.68	533.29	10	30.27	47.94	1	1.32	40	10: 160	20: 160	40: 80	80: 40	10
2,500Mj NPAW	14	1,474.67	1,131.97	14	71.24	80.74	2	2.95	50	10: 250	20: 250	40: 250	80: 125	10
3,600Mj NPAW	14	2,362.13	1,958.61	26	101.80	142.56	3	4.72	50	10: 300	20: 300	40: 300	80: 300	10
1,025Mj NPAW	15	826.11	802.61	17	30.27	71.47	1	1.65	40	10: 160	20: 160	40: 160	80: 160	10
2,500Mj NPAW	15	1,342.36	1,060.73	17	71.24	74.05	1	2.68	40	10: 250	20: 250	40: 250	80: 250	10
3,600Mj NPAW	15	1,727.36	1,253.23	17	101.80	75.97	1	3.45	40	10: 300	20: 300	40: 300	80: 300	10



## MASTER FIRE DIRECTORS\*

TL	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (Gn)	Crew (Mx)	FC Rating
TL 10	74.1	48.1	7	13.4	48.1	1	0.15	3
TL 11	46.1	34.1	4	6.4	34.1	1	0.10	3
TL 12	31.1	25.6	3	3.1	25.6	1	0.07	4
TL 14	18.1	15.1	2	1.8	15.1	1	0.04	5
TL 15	12.1	9.1	2	1.8	9.1	1	0.03	6

\*The maximum number of weapons per MFD is 10.

## NUCLEAR DAMPERS (TL 12)

Range (km)	USD Rating	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (Gn)	Crew (Mx)
30,000	1	76.2	83	7.5	15	2.05	1	0.16
60,000	2	152	159	15.0	30	4.10	1	0.31
90,000	3	228	235	22.5	45	6.15	1	0.46
120,000	4	304	311	30.0	60	8.20	1	0.61
150,000	5	380	387	37.5	75	10.25	1	0.76
180,000	6	456	463	45.0	90	12.30	1	0.92
210,000	7	532	539	52.5	105	14.35	1	1.07
240,000	8	608	615	60.0	120	16.40	1	1.22
270,000	9	684	691	67.5	135	18.45	1	1.37
300,000	10	760	767	75.0	150	20.50	1	1.52

## BLACK GLOBES

TL	Flicker	Mass (t)	Volume (m <sup>3</sup> )	Power (MW)	Price (MCr)	Crew Factor
15+	10%	135	135	15	400	Mn: 0.27

## NUCLEAR DAMPERS (TL 14)

Range (km)	USD Rating	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (Gn)	Crew (Mx)
30,000	1	60.8	67.6	6.0	6	4.08	1	0.13
60,000	2	121	128.2	12.0	12	8.16	1	0.25
90,000	3	182	188.8	18.0	18	12.24	1	0.37
120,000	4	243	249.4	24.0	24	16.32	1	0.49
150,000	5	303	310	30.0	30	20.40	1	0.61
180,000	6	364	370.6	36.0	36	24.48	1	0.73
210,000	7	424	431.2	42.0	42	28.56	1	0.85
240,000	8	485	491.8	48.0	48	32.64	1	0.97
270,000	9	546	552.4	54.0	54	36.72	1	1.1
300,000	10	606	613	60.0	60	40.80	1	1.22

## MESON SCREENS

TL	Ship Size Class	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (Gn)	Crew (Mx)
	7	8 or 9						
12	158	112	155	207	100	20.7	1.6	0.4
12	250	177	380	507	250	50.7	4.0	0.8
12	354	250	755	1,007	500	100.7	7.6	1.6
12	500	354	1,505	2,007	1,000	200.7	15.2	3.2
12	791	559	3,755	5,007	2,500	500.7	37.6	7.6
13	190	134	155	207	100	20.7	1.6	0.4
13	300	212	380	507	250	50.7	4.0	0.8
13	424	300	755	1,007	500	100.7	7.6	1.6
13	600	424	1,505	2,007	1,000	200.7	15.2	3.2
13	949	671	3,755	5,007	2,500	500.7	37.6	7.6
14	221	157	155	207	100	20.7	1.6	0.4
14	350	247	380	507	250	50.7	4.0	0.8
14	495	350	755	1,007	500	100.7	7.6	1.6
14	700	495	1,505	2,007	1,000	200.7	15.2	3.2
14	1,107	783	3,755	5,007	2,500	500.7	37.6	7.6
15	253	179	155	207	100	20.7	1.6	0.4
15	400	283	380	507	250	50.7	4.0	0.8
15	566	400	755	1,007	500	100.7	7.6	1.6
15	800	566	1,505	2,007	1,000	200.7	15.2	3.2
15	1,265	894	3,755	5,007	2,500	500.7	37.6	7.6

## SANDCASTERS

TL	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew Factor	Canisters Carried	Beam Reduction	USD Rating	Canister (Cr)
8	50	42	10	1	0.60	Gn 1, Mx 0.1	16	1d6x 5	1	400
9	50	42	10	1	0.65	Gn 1, Mx 0.1	18	1d6x 5	1	400
10	50	42	10	1	0.70	Gn 1, Mx 0.1	20	1d10x 5	2	600
11	50	42	10	1	0.75	Gn 1, Mx 0.1	24	1d10x 5	2	600
12	50	42	10	1	0.80	Gn 1, Mx 0.1	30	1d10x 5	2	600
13	50	42	10	1	0.85	Gn 1, Mx 0.1	35	2d6x 5	2	800
14	50	42	10	1	0.90	Gn 1, Mx 0.1	40	2d6x 5	2	800
15	50	42	10	1	1.00	Gn 1, Mx 0.1	50	2d10x 5	2	1,000

## BASIC CONTROLS

Ship Size	TL9: Computer Linked		TL10-12: Dynamic Linked		TL13-16 Holographic Linked		Mass (t)	Volume (m <sup>3</sup> )	Crew (Mx)
	Power (MW)	Price (MCr)	Power (MW)	Price (MCr)	Power (MW)	Price (MCr)			
10	0.005	0.010	0.010	0.015	0.010	0.020	0.014	0.140	0.0
20	0.010	0.020	0.020	0.030	0.020	0.040	0.028	0.280	0.0
30	0.015	0.030	0.030	0.045	0.030	0.060	0.042	0.420	0.0
40	0.020	0.040	0.040	0.060	0.040	0.080	0.056	0.560	0.0
50	0.025	0.050	0.050	0.075	0.050	0.100	0.070	0.700	0.0
60	0.030	0.060	0.060	0.090	0.060	0.120	0.084	0.840	0.0
70	0.035	0.070	0.070	0.105	0.070	0.140	0.098	0.980	0.0
80	0.040	0.080	0.080	0.120	0.080	0.160	0.112	1.120	0.0
90	0.045	0.090	0.090	0.135	0.090	0.180	0.126	1.260	0.0
100	0.050	0.100	0.100	0.150	0.100	0.200	0.140	1.400	0.0
200	0.100	0.200	0.200	0.300	0.200	0.400	0.280	2.800	0.0
300	0.150	0.300	0.300	0.450	0.300	0.600	0.420	4.200	0.0
400	0.200	0.400	0.400	0.600	0.400	0.800	0.560	5.600	0.0
500	0.250	0.500	0.500	0.750	0.500	1.000	0.700	7.000	0.0
600	0.300	0.600	0.600	0.900	0.600	1.200	0.840	8.400	0.0
700	0.350	0.700	0.700	1.050	0.700	1.400	0.980	9.800	0.0
800	0.400	0.800	0.800	1.200	0.800	1.600	1.120	11.200	0.0
900	0.450	0.900	0.900	1.350	0.900	1.800	1.260	12.600	0.0
1,000	0.500	1.000	1.000	1.500	1.000	2.000	1.400	14.000	0.0
2,000	1.000	2.000	2.000	3.000	2.000	4.000	2.800	28.000	0.1
3,000	1.500	3.000	3.000	4.500	3.000	6.000	4.200	42.000	0.1
4,000	2.000	4.000	4.000	6.000	4.000	8.000	5.600	56.000	0.2
5,000	2.500	5.000	5.000	7.500	5.000	10.000	7.000	70.000	0.2

## MINIMAL ELECTRONICS PACKAGES

TL	Sensors		Min Length	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (EI)	Crew (Mx)
	Active Range	Passive Range								
8	0.1	0.1	5	67.2	47.6	51	6.95	33.91	3.00	0.15
9	0.1	0.1	5	34.9	31.2	19	4.01	18.11	3.00	0.09
10	0.1	0.1	5	19.1	25.9	19	36.16	18.66	3.00	0.05
11	0.1	0.1	5	11.2	24.6	9	16.29	13.16	3.00	0.04
12	0.1	0.1	5	8.7	26.0	6	9.43	13.11	3.00	0.03
13	0.1	0.1	5	9.3	29.0	5	9.58	16.08	3.00	0.04
14	0.1	0.1	5	7.5	25.4	4	6.73	17.87	3.00	0.03
15	0.1	0.1	5	6.9	22.4	4	6.88	20.86	3.00	0.03

## STANDARD CIVILIAN ELECTRONICS PACKAGES

TL	Sensors		Min Length	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (EI)	Crew (Mx)
	Active Range	Passive Range								
8	1	2	10	93.6	62.3	131	10.15	48.47	4.00	0.21
9	1	2	10	48.4	38.7	71	6.15	25.57	4.00	0.11
10	1	2	5	27.3	30.1	39	52.30	26.72	4.00	0.07
11	1	2	5	16.7	27.4	25	27.40	18.52	4.00	0.04
12	1	2	5	10.1	24.0	18	13.36	12.02	4.00	0.03
13	1	2	5	11.2	30.0	17	13.66	17.97	4.00	0.04
14	1	2	5	8.2	25.7	14	8.79	18.55	4.00	0.03
15	1	2	5	8.7	28.7	14	8.64	15.53	4.00	0.04

## ADVANCED CIVILIAN ELECTRONICS PACKAGES

TL	Sensors		Min Length	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (EI)	Crew (Mx)
	Active Range	Passive Range								
8	2	4	40	175.8	131.4	1,351	21.45	117.53	4.00	0.38
9	2	4	10	99.9	78.5	711	17.30	65.13	4.00	0.23
10	4	4	20	47.3	42.9	253	91.40	46.38	4.00	0.13
11	4	4	20	27.9	34.4	177	51.50	29.38	4.00	0.09
12	4	4	20	15.8	27.6	138	27.95	17.48	4.00	0.05
13	4	4	20	16.2	32.8	123	28.25	22.73	4.00	0.06
14	4	4	20	11.3	27.5	114	20.85	21.43	4.00	0.04
15	4	4	20	11.4	30.1	108	20.70	18.13	4.00	0.04

## EXPLORATION/SURVEY ELECTRONICS PACKAGE

TL	Sensors		Min Length	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (EI)	Crew (Mx)
	Active Range	Passive Range								
8	2	4	40	348.6	247.8	2,603	32.80	233.66	8.00	0.75
9	2	4	40	196.9	142.0	1,333	25.25	128.63	8.00	0.45
10	10	4	20	230.8	187.6	447	273.31	142.88	9.00	0.52
11	10	4	20	177.4	185.6	521	135.86	76.63	10.00	0.40
12	10	4	20	51.6	66.4	285	69.41	46.78	10.00	0.14
13	10	4	20	48.7	64.9	246	69.47	46.85	11.00	0.15
14	10	4	20	29.5	47.3	184	44.12	37.70	11.00	0.11
15	10	4	20	27.9	42.1	174	44.17	41.20	11.00	0.11

## MILITARY ELECTRONICS PACKAGES

TL	Sensors		Min Length	Mass	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (EI)	Crew (Mx)
	Active Range	Passive Range								
8	2	4	—	571.9	433.0	2,709	53.40	455.01	11.00	0.72
9	2	4	—	319.9	247.0	1,436	41.70	250.46	11.00	0.46
10	10	4	—	198.8	143.8	554	413.90	248.91	11.00	0.41
11	10	4	—	102.0	94.8	375	204.10	128.91	11.00	0.23
12	10	4	—	55.4	37.9	288	106.80	74.91	11.00	0.13
13	10	4	—	53.6	76.9	258	107.10	77.91	11.00	0.14
14	10	4	—	34.2	61.2	235	69.80	60.71	11.00	0.10
15	10	4	—	31.3	53.8	223	70.10	65.51	11.00	0.10

## STEALTH

Ship Size	Mass (t)	Volume (m <sup>3</sup> )	Price (MCr)	Crew (Mx)
10	1	5	0.5	0.01
20	2	10	1.0	0.01
30	3	15	1.5	0.01
40	4	20	2.0	0.01
50	5	25	2.5	0.01
60	6	30	3.0	0.02
70	7	35	3.5	0.02
80	8	40	4.0	0.02
90	9	45	4.5	0.02
100	10	50	5.0	0.02
200	20	100	10.0	0.04
300	30	150	15.0	0.06
400	40	200	20.0	0.08
500	50	250	25.0	0.10
600	60	300	30.0	0.12
700	70	350	35.0	0.14
800	80	400	40.0	0.16
900	90	450	45.0	0.18
1,000	100	500	50.0	0.20
2,000	200	1,000	100.0	0.40
3,000	300	1,500	150.0	0.60
4,000	400	2,000	200.0	0.80
5,000	500	2,500	250.0	1.00

## ELECTROMAGNETIC MASKING (EMM)

Ship Size	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)	Crew (Mx)
10	1.4	2.8	1.4	0.14	0.7	0.0
20	2.8	5.6	2.8	0.28	1.4	0.1
30	4.2	8.4	4.2	0.42	2.1	0.1
40	5.6	11.2	5.6	0.56	2.8	0.1
50	7.0	14.0	7.0	0.70	3.5	0.1
60	8.4	16.8	8.4	0.84	4.2	0.1
70	9.8	19.6	9.8	0.98	4.9	0.1
80	11.2	22.4	11.2	1.12	5.6	0.1
90	12.6	25.2	12.6	1.26	6.3	0.1
100	14.0	28.0	14.0	1.40	7.0	0.1
200	28.0	56.0	28.0	2.80	14.0	0.1
300	42.0	84.0	42.0	4.20	21.0	0.1
400	56.0	112.0	56.0	5.60	28.0	0.2
500	70.0	140.0	70.0	7.00	35.0	0.2
600	84.0	168.0	84.0	8.40	42.0	0.2
700	98.0	196.0	98.0	9.80	49.0	0.2
800	112.0	224.0	112.0	11.20	56.0	0.3
900	126.0	252.0	126.0	12.60	63.0	0.3
1,000	140.0	280.0	140.0	14.00	70.0	0.3
2,000	280.0	560.0	280.0	28.00	140.0	0.6
3,000	420.0	840.0	420.0	42.00	210.0	0.9
4,000	560.0	1,120.0	560.0	56.00	280.0	1.2
5,000	700.0	1,400.0	700.0	70.00	350.0	1.4



## BASIC LIFE SUPPORT

Size (T <sub>d</sub> )	Mass (t)	Volume (m <sup>3</sup> )	Price (MW)	Crew (MCr)
10	0.05	0.05	0.001	0.003
20	0.10	0.10	0.002	0.006
30	0.15	0.15	0.003	0.009
40	0.20	0.20	0.004	0.012
50	0.25	0.25	0.005	0.015
60	0.30	0.30	0.006	0.018
70	0.35	0.35	0.007	0.021
80	0.40	0.40	0.008	0.024
90	0.45	0.45	0.009	0.027
100	0.50	0.50	0.010	0.030
200	1.00	1.00	0.020	0.060
300	1.50	1.50	0.030	0.090
400	2.00	2.00	0.040	0.120
500	2.50	2.50	0.050	0.150
600	3.00	3.00	0.060	0.180
700	3.50	3.50	0.070	0.210
800	4.00	4.00	0.080	0.240
900	4.50	4.50	0.090	0.270
1,000	5.00	5.00	0.100	0.300
2,000	10.00	10.00	0.200	0.600
3,000	15.00	15.00	0.300	0.900
4,000	20.00	20.00	0.400	1.200
5,000	25.00	25.00	0.500	1.500

## STANDARD LIFE SUPPORT

Size (T <sub>d</sub> )	Mass (t)	Volume (m <sup>3</sup> )	Price (MW)	Crew (MCr)
10	0.08	0.08	0.002	0.005
20	0.16	0.16	0.004	0.010
30	0.24	0.24	0.006	0.015
40	0.32	0.32	0.008	0.020
50	0.40	0.40	0.010	0.025
60	0.48	0.48	0.012	0.030
70	0.56	0.56	0.014	0.035
80	0.64	0.64	0.016	0.040
90	0.72	0.72	0.018	0.045
100	0.80	0.80	0.020	0.050
200	1.60	1.60	0.040	0.100
300	2.40	2.40	0.060	0.150
400	3.20	3.20	0.080	0.200
500	4.00	4.00	0.100	0.250
600	4.80	4.80	0.120	0.300
700	5.60	5.60	0.140	0.350
800	6.40	6.40	0.160	0.400
900	7.20	7.20	0.180	0.450
1,000	8.00	8.00	0.200	0.500
2,000	16.00	16.00	0.400	1.000
3,000	24.00	24.00	0.600	1.500
4,000	32.00	32.00	0.800	2.000
5,000	40.00	40.00	1.000	2.500

## G-TANKS (TL 8-9)

Description	Mass (t)	Volume (m <sup>3</sup> )	Price (MCr)
G-Tanks (passenger)	2	2	0.01
G-Tanks (crew)	2	2	1

Note that the difference between passenger and crew tanks (other than the price) is the special fittings and controls in the crew tanks that allow the crewmember to continue to perform duties.

## MAXIMUM GS COMPENSATED

TL	Compensated Gs	Max Accel out of/ in workstation	Max Evade out of/ in workstation
10	1G	2G/3G	1G/2G
11	2G	3G/4G	2G/3G
12	3G	4G/5G	3G/4G
13	4G	5G/6G	4G/5G
14	5G	6G/7G	5G/6G
15	6G	7G/8G	6G/7G

## ARTIFICIAL GRAVITY / INERTIAL COMPENSATORS

Ship Size	Mass (t)	Volume (m <sup>3</sup> )	Power (MW)	Price (MCr)	Crew (Mx)
10	2.8	1.4	1	0.07	0.01
20	5.6	2.8	1	0.14	0.02
30	8.4	4.2	2	0.21	0.02
40	11.2	5.6	3	0.28	0.03
50	14.0	7.0	4	0.35	0.03
60	16.8	8.4	4	0.42	0.04
70	19.6	9.8	5	0.49	0.04
80	22.4	11.2	6	0.56	0.05
90	25.2	12.6	6	0.63	0.05
100	28.0	14.0	7	0.70	0.06
200	56.0	28.0	14	1.40	0.12
300	84.0	42.0	21	2.10	0.17
400	112.0	56.0	28	2.80	0.23
500	140.0	70.0	35	3.50	0.28
600	168.0	84.0	42	4.20	0.34
700	196.0	98.0	49	4.90	0.40
800	224.0	112.0	56	5.60	0.45
900	252.0	126.0	63	6.30	0.51
1,000	280.0	140.0	70	7.00	0.56
2,000	560.0	280.0	140	14.00	1.12
3,000	840.0	420.0	210	21.00	1.68
4,000	1,120.0	560.0	280	28.00	2.24
5,000	1,400.0	700.0	350	35.00	2.80

## LABS AND SHOPS

Description	Volume (m <sup>3</sup> )	Mass (t)	Price (MCr)	Power (MW)
Electronics Shop	84	40	1	0.6
Machine Shop	140	120	2	1
Laboratory	112	50	5	0.8
Sick Bay	112	50	5	0.8

## DOCKING RINGS

Small Craft Displacement	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)
10	0	140	49	0.11
20	0	280	64	0.18
30	0	420	85	0.26
40	0	560	109	0.34
50	0	700	126	0.41
60	0	840	135	0.47
70	0	980	157	0.55
80	0	1,120	175	0.63
90	0	1,260	185	0.69

## INTERNAL HANGAR (MINIMAL)

Small Craft Displacement	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)
10	56	280	49	0.11
20	112	560	64	0.18
30	168	840	85	0.26
40	224	1,120	109	0.34
50	280	1,400	126	0.41
60	336	1,680	135	0.47
70	392	1,960	157	0.55
80	448	2,240	175	0.63

## FUEL PURIFICATION PLANTS

TL	Capacity (m <sup>3</sup> / 6 hrs)	Mass (t)	Volume (m <sup>3</sup> )	Power (MW)	Price (MCr)
8	700	1,050	490	7.0	0.140
8	1,400	2,100	980	14.0	0.280
8	2,800	4,200	1,960	28.0	0.560
9	700	840	420	6.3	0.13
9	1,400	1,680	840	12.6	0.266
9	2,800	3,360	1,680	25.2	0.532
10	700	770	385	5.6	0.126
10	1,400	1,540	770	11.2	0.252
10	2,800	3,080	1,540	22.4	0.504
11	700	630	315	4.9	0.119
11	1,400	1,260	630	9.8	0.238
11	2,800	2,520	1,260	19.6	0.476
12	700	560	280	4.2	0.112
12	1,400	1,120	560	8.4	0.224
12	2,800	2,240	1,120	16.8	0.448
13	700	490	245	3.5	0.105
13	1,400	980	490	7.0	0.210
13	2,800	1,960	980	14.0	0.420
14	700	350	175	3.5	0.098
14	1,400	700	350	7.0	0.196
14	2,800	1,400	700	14.0	0.392
15	700	280	140	3.5	0.105
15	1,400	560	280	7.0	0.210
15	2,800	1,120	560	14.0	0.420

## INTERNAL HANGAR (SPACIOUS)

Small Craft Displacement	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)
10	112	560	49	0.16
20	224	1,120	64	0.29
30	336	1,680	85	0.42
40	448	2,240	109	0.56
50	560	2,800	126	0.69
60	672	3,360	135	0.81
70	784	3,920	157	0.94
80	896	4,480	175	1.07
90	1,008	5,040	185	1.20

## LAUNCH TUBES

Small Craft Displacement	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Power (MW)	Price (MCr)
10	1,750	3,500	98	35	0.53
20	3,500	7,000	128	70	1.05
30	5,250	10,500	170	105	1.58
40	7,000	14,000	217	140	2.10
50	8,750	17,500	251	175	2.63
60	10,500	21,000	270	210	3.15
70	12,250	24,500	313	245	3.68
80	14,000	28,000	349	280	4.20
90	15,750	31,500	370	315	4.73

## CARGO HATCHES

Hatch	Area (m <sup>2</sup> )	Price (MCr)
Small Cargo Hatch	12	0.012
Large Cargo Hatch	20	0.02

## FISSION PLANTS (TL 8)

Power (MW)	Mass (t)	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)	Crew (En)	Crew (Mx)	Fuel (m <sup>3</sup> /yr)
5	na	na	na	na	na	na	na
10	60.0	10.0	10	1.00	0.40	0.12	1.00
25	150.0	25.0	25	2.50	0.90	0.30	2.50
50	300.0	50.0	50	5.00	1.70	0.60	5.00
75	450.0	75.0	75	7.50	2.50	0.90	7.50
100	600.0	100.0	100	10.00	3.40	1.20	10.0
250	1,500.0	250.0	250	25.00	8.40	3.00	25.00
500	3,000.0	500.0	500	50.00	16.70	6.00	50.00
1,000	6,000.0	1,000.0	1,000	100.00	33.40	12.00	100.00
2,500	15,000.0	2,500.0	2,500	250.00	83.40	30.00	250.00
5,000	30,000.0	5,000.0	5,000	500.00	166.70	60.00	500.00

### FUSION PLANTS (TL 9)

Power (MW)	Mass (t )	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)	Crew (En)	Crew (Mx)	Fuel (m <sup>3</sup> /yr)
5	na	na	na	na	na	na	na
10	na	na	na	na	na	na	na
25	na	na	na	na	na	na	na
50	na	na	na	na	na	na	na
75	na	na	na	na	na	na	n
100	na	na	na	na	na	na	na
250	na	na	na	na	na	na	na
500	na	na	na	na	na	na	na
1,000	na	na	na	na	na	na	na
2,500	5,000.0	1,250.0	2,500	250.00	83.40	10.00	375.00
5,000	10,000.0	2,500.0	5,000	500.00	166.70	20.00	750.00

### FUSION PLANTS (TL 10)

Power (MW)	Mass (t )	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)	Crew (En)	Crew (Mx)	Fuel (m <sup>3</sup> /yr)
5	na	na	na	na	na	na	na
10	na	na	na	na	na	na	na
25	na	na	na	na	na	na	na
50	na	na	na	na	na	na	na
75	na	na	na	na	na	na	na
100	na	na	na	na	na	na	na
250	na	na	na	na	na	na	na
500	na	na	na	na	na	na	na
1,000	2,000.0	500.0	1,000	100.00	33.40	4.00	150.00
2,500	5,000.0	1,250.0	2,500	250.00	83.40	10.00	375.00
5,000	10,000.0	2,500.0	5,000	500.00	166.70	20.00	750.00

### FUSION PLANTS (TL11)

Power (MW)	Mass (t )	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)	Crew (En)	Crew (Mx)	Fuel (m <sup>3</sup> /yr)
5	na	na	na	na	na	na	na
10	na	na	na	na	na	na	na
25	na	na	na	na	na	na	na
50	na	na	na	na	na	na	na
75	na	na	na	na	na	na	na
100	na	na	na	na	na	na	na
250	na	na	na	na	na	na	na
500	1,000.0	250.0	500	50.00	16.70	2.00	75.00
1,000	2,000.0	500.0	1,000	100.00	33.40	4.00	150.00
2,500	5,000.0	1,250.0	2,500	250.00	83.40	10.00	375.00
5,000	10,000.0	2,500.0	5,000	500.00	166.70	20.00	750.00

### FUSION PLANTS (TL 12)

Power (MW)	Mass (t )	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)	Crew (En)	Crew (Mx)	Fuel (m <sup>3</sup> /yr)
5	na	na	na	na	na	na	na
10	na	na	na	na	na	na	na
25	50.0	12.5	25	2.50	0.90	0.10	3.75
50	100.0	25.0	50	5.00	1.70	0.20	7.50
75	150.0	37.5	75	7.50	2.50	0.30	11.25
100	200.0	50.0	100	10.00	3.40	0.40	15.00
250	500.0	125.0	250	25.00	8.40	1.00	37.50
500	1,000.0	250.0	500	50.00	16.70	2.00	75.00
1,000	2,000.0	500.0	1,000	100.00	33.40	4.00	150.00
2,500	5,000.0	1,250.0	2,500	250.00	83.40	10.00	375.00
5,000	10,000.0	2,500.0	5,000	500.00	166.70	20.00	750.00



## FUSION PLANTS (TL 13-14)

Power (MW)	Mass (t )	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)	Crew (En)	Crew (Mx)	Fuel (m <sup>3</sup> /yr)
5	5.0	1.7	5	0.33	0.20	0.01	0.50
10	10.0	3.3	10	0.67	0.40	0.02	1.00
25	25.0	8.3	25	1.67	0.90	0.05	2.50
50	50.0	16.7	50	3.33	1.70	0.10	5.00
75	75.0	25.0	75	5.00	2.50	0.15	7.50
100	100.0	33.3	100	6.67	3.40	0.20	10.00
250	250.0	83.3	250	16.67	8.40	0.50	25.00
500	500.0	166.7	500	33.33	16.70	1.00	50.00
1,000	1,000.0	333.3	1,000	66.67	33.40	2.00	100.00
2,500	2,500.0	833.3	2,500	166.67	83.40	5.00	250.00
5,000	5,000.0	1,666.7	5,000	333.33	166.70	10.00	500.00

## FUSION PLANTS (TL 15)

Power (MW)	Mass (t )	Volume (m <sup>3</sup> )	Area (m <sup>2</sup> )	Price (MCr)	Crew (En)	Crew (Mx)	Fuel (m <sup>3</sup> /yr)
5	1.7	0.8	5	0.17	0.20	0.01	0.50
10	3.3	1.7	10	0.33	0.40	0.01	1.00
25	8.3	4.2	25	0.83	0.90	0.02	2.50
50	16.7	8.3	50	1.67	1.70	0.04	5.00
75	25.0	12.5	75	2.50	2.50	0.05	7.50
100	33.3	16.7	100	3.33	3.40	0.07	10.00
250	83.3	41.7	250	8.33	8.40	0.17	25.00
500	166.7	83.3	500	16.67	16.70	0.34	50.00
1,000	333.3	166.7	1,000	33.33	33.40	0.67	100.00
2,500	833.3	416.7	2,500	83.33	83.40	1.67	250.00
5,000	1,666.7	833.3	5,000	166.67	166.70	3.34	500.00

## FUEL CELLS (TL 12)

Output (MW)	Mass (t )	Volume (m <sup>3</sup> )	Price (MCr)	Crew (En)	Crew (Mx)	Fuel (m <sup>3</sup> /hr)
5	6.7	6.7	0.13	0.20	0.02	1.25
10	13.3	13.3	0.27	0.40	0.03	2.50
25	33.3	33.3	0.67	0.90	0.07	6.25
50	66.7	66.7	1.33	1.70	0.14	12.50
75	100.0	100.0	2.00	2.50	0.20	18.75
100	133.3	133.3	2.67	3.40	0.27	25.00
250	333.3	333.3	6.67	8.40	0.67	62.50
500	666.7	666.7	13.33	16.70	1.34	125.00
1,000	1,333.3	1,333.3	26.67	33.40	2.67	250.00
2,500	3,333.3	3,333.3	66.67	83.40	6.67	625.00
5,000	6,666.7	6,666.7	133.33	166.70	13.34	1,250.00

## FUEL CELLS (TL 14)

Output (MW)	Mass (t )	Volume (m <sup>3</sup> )	Price (MCr)	Crew (En)	Crew (Mx)	Fuel (m <sup>3</sup> /hr)
5	3.3	3.3	0.07	0.20	0.01	0.10
10	6.7	6.7	0.13	0.40	0.02	0.20
25	16.7	16.7	0.33	0.90	0.04	0.50
50	33.3	33.3	0.67	1.70	0.07	1.00
75	50.0	50.0	1.00	2.50	0.10	1.5
100	66.7	66.7	1.33	3.40	0.14	2.00
250	166.7	166.7	3.33	8.40	0.34	5.00
500	333.3	333.3	6.67	16.70	0.67	10.00
1,000	666.7	666.7	13.33	33.40	1.34	20.00
2,500	1,666.7	1,666.7	33.33	83.40	3.34	50.00
5,000	3,333.3	3,333.3	66.67	166.70	6.67	100.00

## CONTROL MODIFIER

TL	Modifier
8	0.60
9	0.50
10	0.45
11	0.40
12	0.35
13	0.30
14	0.25
15	0.20

## WORKSTATIONS

	Bridge W/S	Regular W/S	Mass	Price
	Volume	Volume		
TL	(m <sup>3</sup> )	(m <sup>3</sup> )	(t)	(Mcr)
8	14	7	0.2	0.00075
9	14	7	0.2	0.00100
10-12	14	7	0.2	0.00150
13-16	14	7	0.2	0.00200

## ACCOMMODATIONS

	Description	Volume (m <sup>3</sup> )	Mass (t)	Power (MW)	Price (Mcr)
	Bunk	14	0.5	—	0.005
	Low Berth	14	1.0	0.0010	0.050
Emergency	Low Berth (holds 4)	28	2.0	0.0020	0.100
	Small Stateroom	28	2.0	0.0005	0.040
	Large Stateroom	56	4.0	0.0010	0.100

## HULL SIZE

Hull	USD Size
< 1	5
1+	6
10+	7
100+	8
1000+	9
10000+	10
100000+	11
1000000+	12

## FIRE CONTROL

TL	Rating
9	2
10	3
11	3
12	4
13	4
14	5

## USP CONVERSION CHART

Actual Value	USP Rating
1+	0
20+	1
40+	2
80+	3
120+	4
160+	5
200+	6
250+	7
300+	8
400+	9
500+	10
750+	11
1,000+	12
1,250+	13
1,500+	14
1,750+	15
2,000+	16
2,500+	17
3,000+	18
3,500+	19
4,000+	20
4,500+	21
5,000+	22
6,000+	23
7,000+	24
8,000+	25
9,000+	26
10,000+	27
11,000+	28
13,000+	29
15,000+	30
17,000+	31
19,000+	32
21,000+	33
23,000+	34
27,000+	35
31,000+	36
35,000+	37
39,000+	38
43,000+	39
47,000+	40
55,000+	41
63,000+	42
71,000+	43
79,000+	44
87,000+	45
95,000+	46
111,000+	47
127,000+	48
143,000+	49
159,000+	50
175,000+	51
191,000+	52
223,000+	53
255,000+	54
287,000+	55
319,000+	56
351,000+	57
383,000+	58
447,000+	59

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**TRAVELLER 4TH EDITION**

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