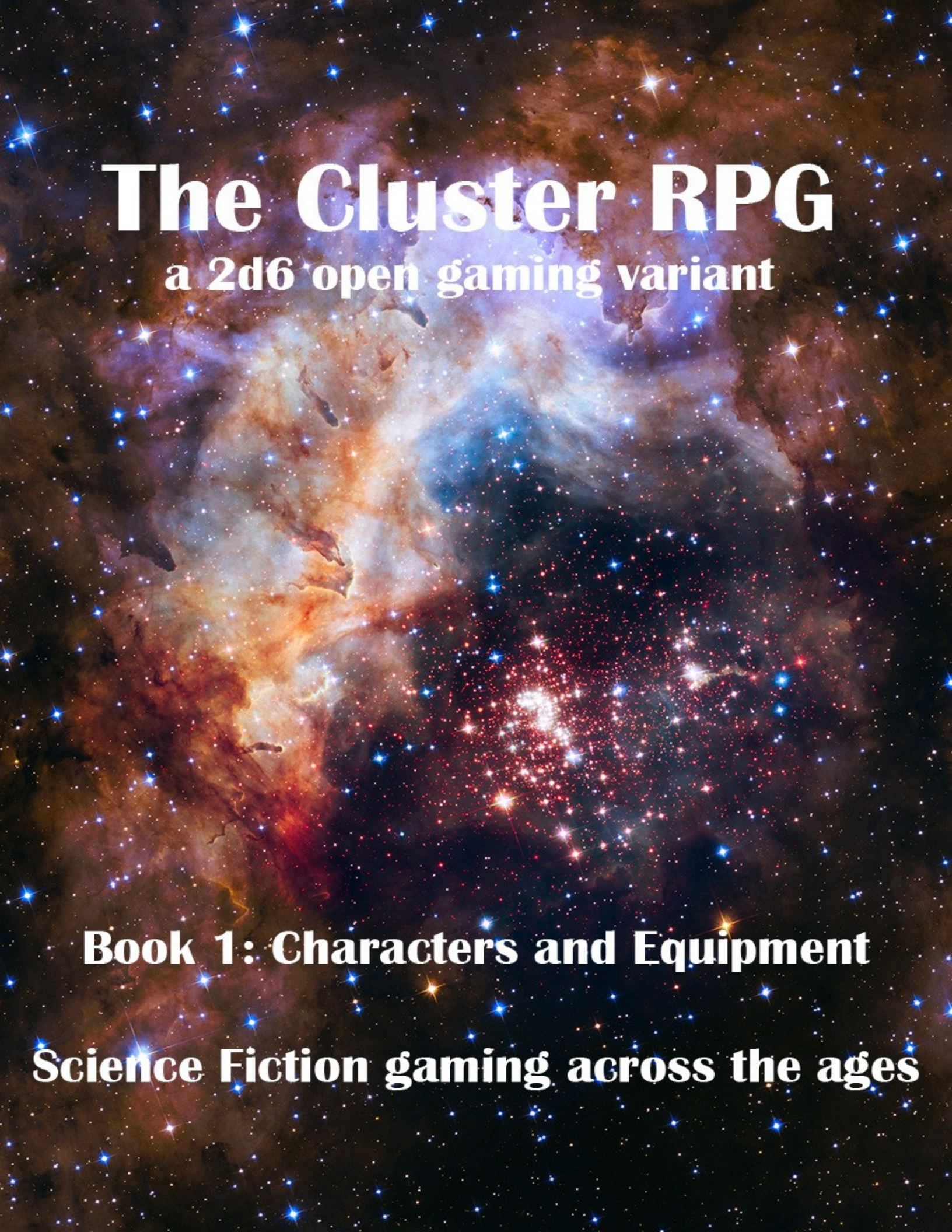
The Cluster RPG
a 2d6 open gaming variant
Book 1: Characters and Equipment
Science Fiction gaming across the ages

Cluster RPG Book 1

Characters and Equipment

A modified version of the Cepheus Engine SRD

by

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Chapter 1: Character Creation

Characters are the individuals who inhabit the Universe. They may be young or old, experienced or neophytes, athletes or couch potatoes. For game purposes, however, every character must have a set of characteristics which define their inherent abilities. These abilities may change during the game due to experiences, injuries, aging, etc, but all sophonts (a general term for intelligent life forms) use essentially the same set of characteristics.

Every character has 6 characteristics used for most activities, while a few rare characters (with the Referee's permission) may have a 7th characteristic (psionics, or Psi) which give them mental abilities beyond the norm. Characteristic scores range between 2-15 for humans, with an average of 7. Some alien races have different characteristic ranges because they're, well, alien. High characteristic scores give bonuses for performing activities related to that characteristic; low scores give penalties. These modifiers combine with skills (discussed later) to determine how likely a character is to carry out an important action.

The characteristics are divided into 2 main groups: physical and mental. The mental characteristics are **Strength (Str),** A character's muscle power, fitness and forcefulness; **Dexterity (Dex),** Physical co-ordination, agility, and reflexes; and **Endurance (End),** a character's ability to sustain damage, their stamina, and determination. Mental characteristics are **Intelligence (Int),** a character's problem solving ability and quickness of mind; **Education (Edu),** a measure of a character's learning and experience; and **Social Standing (Soc),** a measure of the character's ability to fit into society.

Purchasing Characteristics Using Points

One way of generating characteristics is to purchase them using points. Point costs are counted from a base of 5 for species such as humans with 2 dice in a characteristic. Races with 3 dice in a characteristic start with a base of 8 instead of 5, while races with 1 die in a characteristic start with 3 instead of 5. Modifiers to the die rolls (ie. 2d6+1) simply move the base by that amount (ie. from 5 to 6). Note that in some cases the base value will be the same; whether the range is 1d6+1 or 2d6-1, the base is 4.

Characteristic Cost Table

Characteristic difference	Point cost (base=5)
-5	-9
-4	-6
-3	-4
-2	-2
-1	-1
0	0
+1	1
+2	2
+3	3
+4	5
+5	7
+6	9
+7	12
+8	15
+9	18
+10	22

The Characteristic Cost Table is used to change the base value of a characteristic to a desired value. Thus it would take 5 points to go from a Dex of 5 to 9 and NOT +1+2+3+5 to reach 9. A race with 3d6 for Dex has a base 8 so they need only spend 1 point to reach 9 (ie. 1 above base). Using 20 character points to purchase characteristics gives an average score of just over 8, so characters end up just slightly above average. If a player wants their character to excel at a certain characteristic, other characteristics must be lower. Giving players more points to spend will naturally result in more superlative characteristics. 30 points, for example, would allow a player to have 9's in all 6 characteristics giving a +1 bonus for every skill roll. All characteristic points must be spent before moving to the next stage of character creation.

A race's maximum natural characteristic score is always 3 points higher than the maximum they can roll; ie. a race with 3d6 Dex would technically be able to increase their Dex to 18+3=21, while a race with 1d6+2 Str would be limited to a Str of 8+3=11. If a character has the chance to increase a characteristic above their maximum sometime during their career, they must choose a different characteristic to increase. There are, however, technologies which can increase a characteristic above the racial maximums.

If the referee allows psionic characters, it costs 4 points to get to psionic strength 5 (unless the race has a different psionic base score or it is a minor race where all members are psionic). This leaves 16 points to increase the now 7 characteristics. (All seven characteristics would otherwise be about average, but being psionic puts the character overall above average.) Buying psionics in this way guarantees a psionic character. Note that while psionics can give a character unique powers that often cannot be duplicated by advanced technology, psions are also subject to their own special challenges which are much less dangerous to non-psionics. Before taking this option, make sure that your referee is willing to allow a psionic character.

Characteristic Modifier Table

score	pseudo hex	modifier
0-2	0-2	-2
3-5	3-5	-1
6-8	6-8	0
9-11	9-B	+1
12-14	C-E	+2
15-19	G-K	+3

Random Characteristics Method #1: Sort the Numbers

One way to randomly generate characteristics is to roll 7-9 pairs of dice and allow the player to put the 6 best numbers into the different characteristics. Psionic players use 7 sets of dice. This is the cost of having a psionic character. Each player is then given 3 points which they can use to customize their characteristics. For races where they have more or less than 2 dice, convert to a 2d score (ie. 3d-2 becomes 2d+1), and 50% of the time add an additional +1 (roll for it).

Random Characteristics Method #2: Roll each die, then Sort

A second method that can be used to randomly generate characteristics is to roll some number of six sided dice and then arrange the dice as desired. Players would use a minimum of 12 dice for human characters, while aliens may have a different number of base dice. The referee can allow players to roll more than the minimum number of dice, then let them discard the worst rolls. Die modifiers can be applied after the dice are chosen. This method allows a character to possess one very strong characteristic, at the cost of one or more weaker scores. Psionic characters would use extra dice for their 7 characteristics, but then need to include lower dice because they have fewer spares.

Notes on Social Standing

Not all systems recognize another world's noble titles, although quite a few individual planets have a ruling aristocracy. The concept of social standing, however, is nearly universal. Individuals with a high social standing receive numerous advantages; some obvious, some subtle. It provides a mechanism for valuing family connections and inherited wealth even if the sophont itself is not wealthy. The Soc modifier is applied during character creation as a +DM modifier for non-cash material benefit rolls to represent the advantages of social connections.

Social standing is dependent upon the culture. There is a baseline social network among star faring systems where most individuals recognize a set of societal norms once they reach TL8-9 and are interacting with other societies. These common norms are recognized even between enemies. Annoying a free trader from a hostile neighbor is one thing; annoying a planetary governor is quite another! In regions such as low tech societies and isolated native homeworlds, social standing still exists, but the rules are different. It takes months before one's social standing is properly adjusted to the new environment. Initially there is a -3DM unskilled penalty, which decreases by 1 point per month until eventually bonuses reach a character's normal level.

When dealing in certain specialized environments, a high social standing may actually be a negative modifier instead of a positive. The criminal underworld, for example, generally doesn't trust the upper echelons of society. Skilled military officers dislike being ordered around by stuffed shirt civilians. In these cases the referee should warn characters that their social standing is actually working against them. If the players do not take the hint, well, that is their choice.

> Where justice is denied, where poverty is enforced, where ignorance prevails, and where any one class is made to feel that society is an organized conspiracy to oppress, rob and degrade them, neither persons nor property will be safe.
>
> *Frederick Douglass*

Social standing also has a cost to maintain the appropriate appearance, connections, and living circumstances on a given planet. A low tech world may have a nomadic chief who lives in a tent, but it will be the nicest tent in the village with the best horse nearby and frequent high status visitors. Costs will vary based on the average income of the world, but living relatively poorly when of a high social standing will eventually reduce that standing. Similarly, a lottery winner (or successful criminal) may buy social standing slowly by giving to charities, being seen with the right people, living in the right neighborhood, etc.

Purchasing Skills

There are two ways characters may obtain skills in the Cluster variant rules: careers and purchasing. For referees and players that prefer a less random character, players may purchase skills using a point system. Referees using the point system give 7 to 10 skill points per term that may not be used to increase characteristics. The Edu modifier is added to the final number of skill points to account for educational differences. Skills are bought for 1 point to level 0, 1+2=3 for level 1, 1+2+3=6 for level 2, etc. Each skill level must be purchased individually; 1 point to get to level 0, 3 more points for level 1, etc. The Jack of all Trades skill operates differently: it starts at level 1 but costs 10 points for that first level, and then increases at 5 times

normal so that level 2 costs 15 more points and level 3 costs 30 beyond that. Characters get 1 benefit roll per term, with Gambling skill adding a positive DM to monetary rolls and social standing adding to material benefits. Pensions are available for 1 point per term served when buying skills. The pension may be smaller than 5 terms and maxes out at twice the number of terms served. The referee decides which table(s) to roll on for material benefits. Each character then rolls 1d6 for each term served. The have 1 enemy for every #1 rolled, 1 rival for every #2 rolled, 1 contact for every #5 rolled, and 1 ally for every #6 rolled.

For psionic characters using a points based system, it is recommended that even when choosing skills that they still be required to make the learning roll as described in the section on Psionics. Psionic disciplines vary in terms of their difficulty and utility, and not all characters should have every discipline. In terms of points, each discipline is considered a separate skill and must be purchased first to level 0, then 1, etc at the same cost as any other skill. Rolls are only required to learn a particular discipline, not to increase them once learned. Note that if a particular character concept requires a particular discipline (an elite teleport trooper who can't teleport doesn't work), a referee may certainly allow whatever they want. It might also be appropriate to incorporate a penalty of some sort when the dice do not oblige (unable to learn more than 1 other psionic discipline, an extra enemy who wants revenge, etc).

The point based skill system also provides for a possible experience point system for improving characters during play. Skill points could be awarded by the referee for successful missions or superior character development. A training time of 1 week per total skill level obtained (with zeros counting as 1) should also be maintained to limit character progression, but jump space gives a lot of time with nothing much to do.

Homeworld Skills Tables

specific		general
law 0-5	Gun Combat-0	Admin-0
law 6+	Advocate-0	Art-0
grav<0.5	Zero G-0	Athletics-0
Ag	Animals-0	Carouse-0
Ds	Survival-0	Comms-0
Fl	Vacc Suit-0	Computer-0
Ga	Animals-0	Deception-0
Hi	Streetwise-0	Gambling-0
Ht	Electronics-0	Linguistics-0
Ic	Survival-0	Mechanic-0
In	Broker-0	Medicine-0
Lt	Survival-0	Melee-0
Po	Animals-0	Recon-0
Ri	Liaison-0	Science-0
Wa	Navigation-0	Steward-0
Va	Vacc Suit-0	Vehicle-0

Skills Through Careers

Many referees and players like a more random and unpredictable character generation system. Characters in careers begin their training at birth, learning the basics of how to survive in their world. Each youngster receives 3+ (Edu modifier) skills based on their homeworld trade characteristics as described in the Homeworld Skill Table. All of these basic skills are at level 0. Anyone may choose skills from the general table.

A character's official training begins when they choose a career as they become an adult. For humans this is age 18, but it varies depending upon race. Careers are divided into 4 year increments referred to as terms. During each term, a character receives 1 skill roll early, an advancement check in the middle of their term, followed by a potential second skill roll. At the end of a term, characters then make an aging check (if necessary). Characters choose how many terms they serve and thus how many skill rolls they make, but each term increases the likelihood of a disaster or injury.

Certain careers entitle a person to a pension if they serve 5 or more terms in one career or closely related career (ie. a navy NCO commissioned as an officer would add the terms together). Pensions are 2000 credits annually times the sum of their terms+ ranks obtained in that career. Pensions are paid once a year, usually 6 months after their service severance date, and are meant to cover at least minimal living expenses. As with many military careers today, it

is possible to obtain a pension relatively early in life which allows them to develop a second career with a secure income to fall back upon if hard times arise.

To enter a career, a character must make an initial qualification roll. If successful, they enter that career; if unsuccessful, they must choose a different career and may not re-roll to enter the original career. (Note that there may be a back door to certain careers.) A second failed qualification roll forces the character into the drifter career for that term. If a player has not started aging and has not been convicted of a felony, they may choose to enter the Draft instead of the drifter career. They may only enter the draft once, and while this guarantees entry into a military career the service may not be specified. When entering the draft, roll d6. 1-2 = army NCO, 3-4, navy NCO, 5= marine NCO, 6=agent. An initial qualification roll is not necessary with the draft, but advancement through the first term is not guaranteed.

During their first career ONLY, characters receive 6 service skills at level 0 and skill-1 in the key skill for that profession in lieu of their first skill roll as basic training in that career. Future terms allow a choice among 4 different tables: personal (focusing on improving characteristics and/or more general knowledge), service (support skills for a career), specialist (key, sometimes unusual skills), and advanced (requires a successful Edu check of 8+ or already having 2+ ranks in that career, otherwise a different table must be used).

Personal Development Tables (usable by everyone)

roll d6: 1-2= Characteristics, 3-4= Primary Skills, 5-6= Life Skills

Characteristics (d6)		Primary Skills (2d6)				Life Skills (2d6)		
#		#	1-2	3-4	5-6	#	1-3	4-6
1	Strength	1	Science	Medicine	Animals	1	Art	Deception
2	Dexterity	2	Tactics	Leadership	Broker	2	Athletics	Linguistics
3	Endurance	3	Computers	Electronics	Engineering	3	Melee	Gun Combat
4	Intelligence	4	Admin	Advocate	Streetwise	4	Liaison	Steward
5	Education	5	Mechanic	Sensors	Athletics	5	Vehicle	Flying
6	Social Standing	6	Comms	Carouse	Linguistics	6	Survival	Gambling

After their first skill roll each term including the first, characters roll for advancement. If they beat their advancement number, characters receive 1 rank in their career with a random skill roll on either personal development, service, or specialist skill tables and possibly other benefits based on the Advancement Table below. Characters who fail their advancement by less than 2 points fail to advance but nothing bad actually happens that term. In either case, characters then make a second skill roll on whatever table they choose before ending that term.

If characters fail their advancement check by 2 or more points, they have a mishap. Mishaps may replace the second skill roll for a term if they must make a second mishap roll or are ejected from the career. Major mishaps force a character from a career; minor mishaps do not. Specific mishaps should be tailored to the character's career and background information and developed by the player. Mishaps types vary in frequency by career, but fall into 6 main categories: social, professional, violent, lost, injury, and felony. The results of the mishap are not always bad, but it can substantially alter the career progression of a person. More than 1 roll may be needed to resolve what happens after a mishap, in which case their second skill roll for that term is lost.

If characters are forced from or voluntarily change a career, they may choose to qualify at a different career with a -1 DM per previous career followed. This new career is listed separately from any previous careers and

may have different benefit rolls or pension possibilities. Any number of careers may be pursued as long as the character is able to make the qualification roll.

Advancement Table

2	You extended yourself! increase any skill by +1 (may not go above 2, may not increase Jack of all Trades)
3	extra learning time. make an Edu roll of 8+ to try and learn an advanced skill in your career
4	get involved in a good relationship. +1 contact and 1 life skill roll
5	take advantage of a social connection. Make a Soc 8+ roll and gain 1 primary skill roll
6	do a good job. +1 DM on a cash benefit roll
7	a productive but otherwise uneventful term
8	impress a boss. +1 DM on one material benefits roll
9	choose to protect a colleague and gain 1 ally, otherwise gain 1 extra benefit roll and 1 rival
10	find an opportunity at work. Make any specialist skill roll of 8+ and gain +1 in that skill
11	work with a brilliant mentor. Gain +1 contact and a service skill roll
12	outstanding review! gain bonus rank or +1 ally, a benefit roll at a +2 DM, and +2 for next advancement

Mishaps

Social Mishaps

Social mishaps cover any type of mistake within a social context. Having an affair with the boss's husband, punching, the CEO of your company's most important client, or insulting the religion of your major stockholder would all be extreme examples of social mishaps. Minor social mishaps are unpleasant but will definitely influence advancement or promotion. A number of social mishaps will interfere not only with the current term, but also influence the long term possibilities in a given career. If several negative modifiers are obtained, they are additive and make changing careers an advisable option. Advancement penalties do not follow from one career to another.

Social Mishap Table

1	offended a superior or their family. Gain a rival and -1 DM on a benefits roll.
2	behaved poorly in a critical situation. Lose benefit roll this term.
3	embarrassed a superior where it hurt that sophont. Gain an enemy.
4	embarrassed someone important for their future. -1DM for future advancement in this career and gain a rival.
5	romantic involvement in an inappropriate relationship. Gain an enemy and -2 DM for advancement in this career.
6	erroneously accuse a superior of a crime. Ejected from career, lose 1 benefit roll, -1 Soc and gain 1 enemy.

Professional Mishaps

Professional mishaps are events which are related to the chosen profession. Every career choice has ways of screwing up professionally which can cause legal, monetary, or physical losses depending upon the severity of the mistake. Sometimes it can be as simple as trusting the wrong person. Other times, it can be an active choice by the character to take a legal risk for material gain. These include anything from falsifying an invoice for a fake insurance claim to overlooking a smuggled illegal cargo on a tramp freighter in exchange for money. Felonies are often associated with professional mishaps and convictions here will basically exclude characters from any non-fringe careers for the future.

Professional Mishap Table

1	bonehead mistake. Lose benefit roll this term.
2	got involved with the wrong person. turn them in to gain an enemy but protect your career, muddle through and gain an ally but make a Streetwise roll. Gain Advocate or Streetwise if successful, else go to Felony.
3	opportunity to commit fraud. Refuse and gain a rival; accept and make an Admin roll. success= an extra cash benefit roll at +2 DM; fail= Felony
4	make a serious error in judgement. gain a rival and -2DM for future advancement in career.
5	professional misconduct. Ejected from career, gain a rival, and lose 1 benefit roll.
6	professional suicide. Ejected from career, lose 2 benefit rolls, -1 Soc and gain an enemy.

Violent Mishaps

The universe can be a violent place, and many professions can be hazardous to one's health. Even normally non-violent professions can have violent accidents or incidents as a random part of society. Simple assaults, vehicle accidents, and even terrorist activity are not foreign to the far future any more than they are today. Depending upon the outcome of the violence, a person may learn from the experience or may be injured by it. While violence is not necessarily deadly, fighting with energy rifles and PGMPs kill experienced warriors on a regular basis. These characters never make it to the actual game, howeer, and so the Cluster Variant rules do not kill off potential player characters. The start of the adventure seems early enough to introduce characters to the grim reaper.

Violent Mishap Table

1	You are in a vehicle and have an accident. make a Dex check. success= gain Recon skill; fail= go to Injury Table
2	roll melee or gun combat. success= gain that skill; fail= go to Injury Table
3	get into a fight. roll melee. success= gain a rival; fail= go to Injury Table
4	accident. make a flying or Vehicle check. success= gain that skill; fail= go to Injury with a +1 DM
5	firefight. make a gun combat check. success= gain Tactics; fail= go to Injury Table with a +2 DM
6	lose your head and create havoc/riot. roll Advocate. success= ejected from career. fail= roll on both Injury and Felony Tables plus ejected from career.

Injuries

Injury costs may be partly paid by a sponsoring organization depending upon the career. Roll 2d6 and compare to the appropriate row of the chart based on the Injury heading found under the career notes. Characteristic points lost due to injury cost 5000 Cr per point to repair. Cybernetic or genetic replacement limbs (player's choice) are described under Augment, Drones, and Robots. For referees that prefer the possibility of dying during character creation, substitute death for results above 6. Note that any costs associated with injuries or mishaps follow a player into the game. It is very difficult to welch on debts in the far future.

	2d6 result		
injury payments	<6	6-8	9+
high	50%	75%	100%
med	25%	50%	75%
low	0%	25%	50%

Injury Mishap Table

1	strung out on drugs. Roll Medicine. Success= gain streetwise, Fail= lose 1 benefit, ejected from career
2	Malpractice. Lose 2 pts of one characteristic, gain 1 extra cash benefit at +2DM.
3	Injured. lose 1 pt from two characteristics, roll Deception. Success= stay in career; Fail= Ejected from career.
4	Seriously injured. Lose 2 pts from 2 characteristics, -2 DM for future advancement in this career.
5	Critically injured. Lose 2 pts from 3 characteristics, ejected from career.
6+	Massive trauma. Lose 1 pt from each characteristic, lose a limb, and ejected from career.

Lost Mishaps

Jump travel is dangerous. One of the biggest threats during travel is that of a misjump. Misjumps occur when a pilot is not skillful enough to maneuver the ship into jump space as directed by the navigation computer. External factors such as contaminated fuel, engineering failures, weapons fire, or large masses 'nearby' (where nearby is relative!) only contribute to the pilot's troubles. Many misjumps are minor in nature. Others are more of a problem and may take years to return, if returning is even possible.

Even without Jumping, space is dangerous. Ships have been marooned on poorly explored planets for years before being relieved. Even within a system, ships disappear and may not be found for years. Accidents can happen to anyone, but certain careers are inherently riskier than others.

Lost Mishap Table

1	stranded in wilderness. Roll Navigation. Success= gain Survival; Fail= go to Injury Table
2	stranded in a bad neighborhood. Roll Streetwise. Success= gain Deception; Fail= lose 1 benefit and go to Injury Table
3	ship misjumps and takes time to return. Lose 1 benefits roll but gain Navigation.
4	ship is damaged and crew reduced. Gain Jack-of-all-Trades and roll on Injury Table.
5	ship crashes and you make it back alone. Ejected from career, +1d3 contacts, +1d3 rivals.
6	cause an accident where others are killed. roll Advocate. Success= Ejected from career; fail= Ejected from career, lose 2 benefit rolls, go to Felony Table.

Felony Mishaps

Under certain circumstances, careers can lead to felony convictions. Once convicted of a felony, a sophont is ineligible for any career that is not considered fringe. While not precisely discriminated against, law enforcement and governments will keep a closer eye on a former criminal and prevent them from entering a sensitive occupation. This is a common reason sophonts leave their homeworld, looking for a fresh start in new circumstances. Even on other worlds, though, the past always seem to have a way of popping up when it is most inconvenient.

Felony Mishap Table

1	get off on a technicality. -2DM for most future advancement, +1 DM in fringe careers
2	Roll Advocate. success=innocent; fail= convicted, ejected from non-fringe career
3	Roll Advocate. success= ejected from non-fringe careers; fail= convicted, ejected from career and roll on Incarcerated table
4	ejected from career. roll Advocate. success= plea bargain, gain an enemy; fail= you take the fall, lose 1 benefit roll and roll on Incarcerated Table
5	ejected from career. Convicted, lose 2 benefit rolls, roll on Incarcerated Table
6	ejected from career. Convicted, serve rest of term +1 additional term, lose 2 benefit rolls, roll 3x on Incarcerated Table.

Incarceration Mishaps

When convicted of a felony, most people end up being incarcerated for a period of time. Characters can learn things in prison; most of it is probably bad, but allies in a cell block are sophonts that you have learned to trust in a pinch. Spending time in prison is not considered advantageous in polite society, and therefore it is very easy to lose social standing under such conditions. There are, however, many areas of interstellar society which are much rougher than 'polite society'. Here, felonies and jail time are normal and not looked down upon. Fringe careers are still potentially profitable and offer characters willing to stretch their morality a chance to move on. Of course there are still alleys and backrooms on most planets where sophonts of dubious reputation but real skills manipulate, trade, and exploit the system when possible. How a character responds to their situation is where true role playing begins.

Incarcerated Mishap Table

1	help your cellmate. Gain 1 ally.
2	gain 1 rival
3	bad company. choose to help a criminal and gain a contact, -1 Soc; chose not to help their friend and gain an enemy.
4	strung out on drugs. Roll Medicine. Success= gain Streetwise; Fail= -1 Soc, 10,000 Cr debt to a pusher
5	get into a fight with another inmate. Gain 1 enemy. Roll Melee. Success= gain Streetwise; Fail= roll on Injury Table
6	warden blackmails you to spy on prisoners. If agree, gain 1 bonus cash benefit, 1 contact +1d6 enemies; if refuse, lose 1 benefit roll and gain a rival.

Character Aging

Aging takes place at different rates for different sophont species. Humans begin aging after 4 terms (age 34) whether using careers or the skill purchasing option. Upon finishing their 4th term, an aging roll is made with a (-1/term) DM modifier and compare to the aging table below. During the game, additional aging rolls should be made as time goes on and players get older. Aliens that age at different rates would use their own aging characteristics, and any DM on rolls would be applied along with the number of terms served. Aging is not optional and affects us all unless high tech methods are used to limit its effect.

Anagathics are a TL15 drug which inhibits the aging process and prevents the necessity of making an aging roll only if the drugs are taken continuously. Anagathics cost 1000 Cr/month and once started they must be continued permanently or the character must make an aging roll immediately at -2 DM (in addition to all other modifiers) due to the stress placed upon their system. Anagathics are only produced on high technology worlds and are 5x as expensive on lower tech planets if they are available at all. For players who wish to overcome the ravages of time, it IS possible to live, essentially, forever. The danger, however, is that even a brief interruption in one's anagathic supply causes a rapid and profound deterioration which easily leads to death.

Aging Table

roll	effect
< -5	reduce 4 characteristics by -2
-5	reduce 3 characteristics by -2
-4	reduce 2 characteristics by -2, one by -1
-3	reduce 1 characteristic by -2, two others by 1
-2	reduce 3 characteristics by -1
-1	reduce two characteristics by -1
0	reduce one characteristic by -1
1+	no effect

Ending Character Creation

When a character chooses to end their career before beginning play, they make 1 benefit roll per term served +1 extra roll per rank obtained. Rolls must be made on the benefit tables according to the career track chosen as certain careers are more lucrative cash-wise while other careers may bring a variety of benefits. A character may normally only make 3 cash rolls (+ any bonus cash rolls) and the rest must be taken as material benefits. Note that characteristic increases are handled randomly as on the Life Skills table and an augment result allows a character to choose a biological or technological augment with the approval of the referee. The character may also choose a piece of technology (again with the approval of the referee) appropriate for their career. Note that the item should be reasonable; no planetary soldier could choose a battleship or a tank, for example.

Benefits Tables

roll 1d6 + career specific

Cash		Space		Military		Planetary	
<1	none	<1	none	<1	none	<1	none
1	1,000	1	sidearm or melee	1	sidearm or melee	1	sidearm or melee
2	2,000	2	vacc suit	2	firearm	2	hand computer
3	5,000	3	toolkit	3	toolkit	3	toolkit
4	9,000	4	1 contact	4	1 contact	4	1 contact
5	15,000	5	augment	5	augment	5	augment
6	25,000	6	+1 characteristic	6	+1 characteristic	6	+1 characteristic
7	40,000	7	mesh armor	7	flak jacket	7	mesh armor
8	60,000	8	radiation suit	8	military weapon	8	surface vehicle
9+	80,000	9+	environmental suit	9+	ballistic armor	9+	flying unit

Because career tracks cannot always give the desired character or one that fits the tenor of the referee's campaign, extra skill points may be awarded at the end of character creation to help round out the characters. Players should be encouraged to form connections to other player characters in their background, giving a +1

skill bonus to any one skill per character connection formed, up to a maximum of 2. The bonus should be somehow related to the character connection. A final +1 to some random chosen skill allows the character to be rounded out. These bonus skills must 1) not push any skill above 3; 2) not include Jack of all Trades; 3) only 1 bonus point may be spent on any particular skill; and 4) not include a psionic skill unless the referee specifically allows this.

Many of the events encountered during character creation can happen during play. Characters smuggling weapons or drugs into a law abiding system may be caught and prosecuted by the local authorities. Players rescuing a kidnapped heiress may get shot. These actions should be dealt with in the game by role playing through them. The players may escape punishment by breaking out of jail and then joining a pirate band. The joyous mother might pay for a characteristic upgrade for an injured character. The events occurring during the character development are meant to flesh out a character in ways that may not have been envisioned initially. Very few people go through life exactly the way they planned when turning 18 years old, and the career terms are meant to simulate this randomness. Purchasing skills provides a predictable character that fits an initial concept and is completely under the control of the player. Career based character development provides more surprises and trade-offs. Both methods can create a fun character.

Professional Careers

Careers are professions or jobs that sophonts can train in to become 'productive' individuals in society. Many different careers exist, and each gives opportunities to learn new and useful skills. Some of these skills overlap, but people rarely have exactly the same set of training and experiences in any given career. As people advance in a career, they often learn unique skills. Some careers, particularly in the military, have a pension option where a sophont may retire with a pension of 2,000 credits annually per term served+ rank earned. These careers also have a tendency to injure or kill those members before they can collect their pension. Each Career (other than psionic) has a key skill which a person automatically acquires at Skill 1 when they first qualify for a particular career. Psionics increase their Psi Characteristic as they advance in ranks. Note that since they cannot increase Psi on the Personal Development Table and psionics have so far proven to be intractable to genetic or technological manipulation long term, the only way for a character to increase the Psi characteristic is by gaining ranks.

Career Table

Name	Qualification	Key Skill	Advancement	Injury Payout	Material Benefits
Agent	Dex 8+	Streetwise	Int 7+	high	planetary
Army NCO	Str 8+	Gun Combat	Dex 7+	high	planetary, military
Army Officer	Edu 9+	Tactics	End 6+	high	planetary, military
Barbarian*	End 8+	Survival	Dex 7+	low	planetary
Belter*	Int 6+	Zero-G	Edu 8+	medium	space
Colonist	Str 6+	Animals	End 8+	low	planetary
Construction*	Int 8+	Mechanic	Edu 7+	high	space, planetary
Diplomat	Soc 9+	Liaison	Int 6+	medium	planetary
Drifter*	none	Streetwise	Str 8+	low	planetary
Driver	Int 6+	Vehicle	Dex 8+	medium	planetary, space
Engineer	Int 8+	Engineer	Edu 7+	medium	planetary, space
Entertainer	Int 6+	Art	Edu 8+	low	planetary
Farmer	none	Animals	End 8+	low	planetary
Fence*	Edu 6+	Broker	Int 8+	low	planetary
Hunter	Str 6+	Survival	Dex 8+	medium	planetary
Lawyer	Edu 9+	Advocate	Int 6+	medium	planetary
Logistician	Int 8+	Comms	Edu 7+	medium	planetary, space
Manager	Int 8+	Admin	Edu 7+	medium	planetary, space
Manufacturer	Str 6+	Mechanic	Edu 8+	high	planetary, space
Marine NCO	Str 8+	Gun Combat	Dex 7+	high	space, military
Marine Officer	Str 9+	Tactics	Edu 6+	high	military, space
Merchant	Int 8+	Broker	Edu 7+	high	space, planetary
Miner	Dex 6+	Vehicle	Edu 8+	medium	space, planetary
Minister	Edu 9+	Liaison	Int 6+	low	planetary
Navy NCO	Str 8+	Melee	Dex 7+	high	space, military
Navy Officer	Dex 9+	Tactics	Soc 6+	high	military, space
Pilot	Dex 8+	Pilot	Int 7+	medium	space
Physician	Edu 9+	Medicine	Int 6+	medium	planetary
Pirate*	none	Streetwise	Int 9+	low	space, military
Programmer	Edu 8+	Computers	Int 7+	low	planetary
Psionic	Psi>0	special	Psi 8+	medium	planetary
Ranger*	Dex 8+	Survival	End 7+	low	planetary
Rogue*	none	Streetwise	Dex 9+	low	planetary
Scholar	Int 8+	Comms	Edu 7+	med	planetary
Scientist	Int 8+	Science	Edu 7+	med	planetary, space
Scout	Dex 6+	Navigation	Int 8+	high	space, military
Service Worker	none	Steward	End 8+	low	planetary
Technician	Edu 8+	Mechanic	Int 7+	medium	planetary, space

*identifies fringe careers that are open to characters after felonies

Agent

Qualification: Dex 8+ (Streetwise)
Advancement: Int 7+
Injury: high payout
material benefit rolls: planetary
Notes: -1 DM cash benefits

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Lost	Computer	Gun Combat	Advocate
2	Violent	Interrogation	Melee Combat	Computer
3	Professional	Deception	Deception	Liaison
4	Professional	Admin	Leadership	Linguistics
5	Social	Leadership	Vehicle	Medicine
6	Social	Recon	Streetwise	Leadership

Agents are the people who actively work for governments and corporations to pursue their interests. Governmnet agents typically investigate crimes and strive to bring lawbreakers to justice. Agents who work for corporations, political groups, religious organizations, etc may have a very different agenda and set of resources. They occasionally use semi-legal tactics in pursuit of their goal.

Army NCO

Qualification: Str 8+ (Gun Combat)
Advancement: Dex 7+
Injury: high payout
material benefit rolls: planetary, military
Notes: -2 DM for cash bonuses, pension plan

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Injury	Mechanic	Gunnery	Computer
2	Violent	Gun Combat	Vacc Suit	Jack of all Trades
3	Violent	Melee Combat	Sensors	Flying
4	Professional	Recon	Demolitions	Sensors
5	Professional	Vacc Suit	Comms	Gunnery
6	Social	Vehicle	Survival	Tactics

These are the people doing the fighting on planetary surfaces. They are at the bloody end of combat, and are trained to come out on top. These characters are typically going to have more hands-on combat types of skills and are more of a follower type than a leader. An experienced NCO will often know more about the mechanics of actual combat than the young officers who are commanding them. Soldiers recognize the value of a good NCO. It is often said that sergeants run the army, and NCOs who leave the service in good health and good standing are highly sought after.

Army Officer

Qualification: Edu 9+ (Tactics)
Advancement: End 7+
Injury: high payout
material benefits rolls: planetary, military
Notes: pension plan, pension carries over to any military field

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Injury	Navigation	Gunnery	Mechanic
2	Violent	Liaison	Flying	Computers
3	Violent	Comms	Sensors	Electronics
4	Professional	Gun Combat	Tactics	Medicine
5	Professional	Vehicle	Admin	Engineering
6	Social	Recon	Leadership	Demolitions

These are the people who lead soldiers into combat, typically on a planetary surface. They know how to fight, but more importantly they can direct the materials and people needed to the right place at the right time. While requiring many of the skills of an NCO, they also must be able to prioritize targets, communicate with other military or civilian officials, and recognize the larger environment surrounding their unit.

Barbarian

Qualification: End 8+ (Survival)
Advancement: Dex 7+
Injury: low payout
material benefits rolls: planetary
Notes: fringe, -2 DM cash benefits, -1 DM material benefits

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Violent	Animals	Animals	Medicine
2	Violent	Melee	Carouse	Mechanic
3	Lost	Recon	Interrogate	Leadership
4	Lost	Survival	Liaison	Linguistics
5	Social	Athletics	Gun Combat	Tactics
6	Social	Streetwise	Deception	Jack of all Trades

Barbarians are people of low tech worlds who know how to live off the land without technology. They are practical and survival oriented with minimal interest in technology or scientific solutions. While they are not usually very experienced with high technology, barbarians are good at making the best of what they have available. They know a lot about their environment and what the danger points are. Anyone regularly exploring new or unfamiliar planets that are not civilized would benefit from a barbarian's skill set.

Belter

Qualification: Int 6+ (Zero-G)
Advancement: Edu 8+
Injury: medium payout
material benefits rolls: space
Notes: fringe, +1DM cash benefits

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Injury	Zero-G	Engineering	Broker
2	Violent	Vacc Suit	Pilot	Medicine
3	Lost	Sensors	Mechanic	Flying
4	Professional	Mechanic	Sensors	Computers
5	Professional	Navigation	Comms	Engineering
6	Social	Demolitions	Electronics	Jack of all Trades

Belters are individuals working in asteroid fields looking for valuable minerals among the endless rocks of space. It can be a lucrative and dangerous life, much of it spent alone and away from all support. Belters must be independent and self sufficient in order to make a decent living. They often work in a dangerous environment, sometimes with substandard equipment, and do not like foolishness which can get people killed. In a more relaxed atmosphere they tend to be far less serious and sometimes appear reckless. They understand the difference between their job and their time off.

Colonist

Qualification: Str 6+ (Animals)
Advancement: End 8+
Injury: low payout
material benefits rolls: planetary
Notes:

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Lost	Animals	Medicine	Liaison
2	Lost	Mechanic	Electronics	Leadership
3	Violent	Survival	Engineering	Jack of all Trades
4	Professional	Gun Combat	Flying	Computers
5	Social	Athletics	Comms	Science
6	Social	Vehicle	Sensors	Broker

Colonists are the people who leave one world to settle on another. They must be able to fend for themselves on a likely hostile world, and they generally have a sense of adventure as well as practical skills for survival. They also tend to rely on each other, as new planets always have unexpected challenges that threaten their lives. While generous with each other, colonists tend to be distrustful of outsiders, treating them warily until they have proven themselves.

Construction Worker

Qualification: Int 8+ (Mechanic)
Advancement: Edu 7+
Injury: high payout
material benefits rolls: space, planetary
Notes: fringe

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Violent	Zero-G	Engineering	Engineering
2	Lost	Vacc Suit	Flying	Computers
3	Professional	Engineering	Vehicle	Pilot
4	Professional	Mechanic	Admin	Advocate
5	Professional	Electronics	Liaison	Leadership
6	Social	Vehicle	Electronics	Science

These are the people who build the ships, stations, and buildings in higher tech societies. They understand the technology, but require the machinery to work and care more about practical solutions. Unlike engineers, their goal is to construct objects according to a set of specifications so that the object works with a minimum of fuss. They are less interested in eking out every last bit of performance or cost out of an item. Their goal is to build it, test it, and then move on to the next project.

Diplomat

Qualification: Soc 9+ (Liaison)
Advancement: Int 6+
Injury: medium payout
material benefits rolls: planetary
Notes: pension

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Lost	Liaison	Comms	Art
2	Violent	Deception	Recon	Advocate
3	Social	Interrogate	Broker	Science
4	Professional	Admin	Liaison	Leadership
5	Professional	Carouse	Admin	Computers
6	Social	Advocate	Linguistics	Linguistics

Diplomats negotiate for the rich and powerful to get what they want. They tend to work mostly in formal areas such as government and corporations, and typically stay well within the laws of their land. They always work with the higher strata of society on whatever world they are found, and their skills tend toward more refined and intellectual pursuits. They generally work for those even more powerful than themselves, and are supposed to put their client's interests at the forefront.

Drifter

Qualification: none (Streetwise)
Advancement: Str 8+
Injury: low payout
material benefits rolls: planetary
Notes: fringe

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Violent	Streetwise	Melee Combat	Jack of all Trades
2	Violent	Survival	Streetwise	Medicine
3	Violent	Deception	Comms	Advocate
4	Social	Recon	Athletics	Admin
5	Lost	Carouse	Broker	Vehicle
6	Social	Gambling	Mechanic	Gun Combat

Drifters are itinerant laborers, working here and there doing piecemeal type work. They tend to be rather aimless without a clear idea or motivation to drive them toward something worthwhile. Many are young and do not have a clear idea of what they want from life. Note that other drifters may have advanced skill but, for one reason or another, were forced out of their original career and needed something new. They may not have current career prospects, but some of them can tell gut-wrenching stories of how they used to be someone...

Driver

Qualification: Int 6+ (Vehicle)
Advancement: Dex 8+
Injury: medium payout
material benefits rolls: planetary, space
Notes:

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Violent	Vehicle	Vehicle	Computers
2	Lost	Mechanic	Flying	Sensors
3	Social	Recon	Pilot	Pilot
4	Professional	Carouse	Zero-G	Admin
5	Professional	Streetwise	Comms	Liaison
6	Social	Flying	Navigation	Engineering

Drivers are the folk who move planetary vehicles of any sort, be it ground, water, air, or near space. They typically have more than one specialization and can switch between vehicle types fairly easily. They often know how to repair their equipment, but they enjoy the thrill of going from one place to another and home is the cockpit. Drivers tend to focus on smaller craft instead of spaceships or capital ships, but many have at least minimal spacer qualifications.

Engineer

Qualification: Int 8+ (Engineering)
Advancement: Edu 7+
Injury: medium payout
material benefits rolls: planetary, space
Notes:

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Violent	Engineering	Zero-G	Science
2	Social	Computers	Vacc Suit	Engineering
3	Professional	Electronics	Engineering	Computers
4	Professional	Mechanic	Science	Admin
5	Professional	Sensors	Mechanic	Advocate
6	Social	Science	Electronics	Sensors

These are the practical people who design the ships, buildings, and equipment which keep high tech societies going. They are good at keeping things working and plan extensively for possibilities and situations that may happen. Engineers are often the brains behind building projects of all sorts and enjoy improving the effectiveness or efficiency of their creations. They are often meticulous and focused, willing to spend hours to find that last bit of improvement.

Entertainer

Qualification: Int 6+ (Art)
Advancement: Edu 8+
Injury: low payout
material benefits rolls: planetary
Notes: +2 DM cash benefits

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Violent	Art	Deception	Art
2	Social	Liaison	Art	Liaison
3	Social	Steward	Streetwise	Admin
4	Professional	Comms	Carouse	Advocate
5	Professional	Carouse	Interrogate	Linguistics
6	Social	Gambling	Electronics	Sensors

These are the singers, dancers, comedians, etc who use art to entertain and educate others. They tend to be extroverted and outgoing, often being the center of attention. Entertainers cover a broad gamut of media and styles, but they all are, at least to some extent, focused on giving their audience a performance. Whether rich or poor, crass or erudite, they have a target audience and know how to reach them.

Farmer

Qualification: none (Animals)
Advancement: End 8+
Injury: low payout
material benefits rolls: planetary
Notes:

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Violent	Animals	Animals	Animals
2	Violent	Mechanic	Mechanic	Broker
3	Social	Survival	Sensors	Engineering
4	Professional	Streetwise	Recon	Science
5	Professional	Admin	Liaison	Medicine
6	Social	Vehicle	Steward	Advocate

These are the people who grow crops or raise animals in space or on planets. They provide the food that everyone else eats. They are very practical and tend to do whatever works and is simple. Farmers are mostly planet based, although hydroponics and solar power do allow crops to be grown in space. Animals may be carried to distant worlds, but consume too many resources for them to be viable food in space. Farmers are keenly aware of weather, markets, and all factors which will affect their ability to deliver their product.

Fence

Qualification: Edu 6+ (Broker)
Advancement: Int 8+
Injury: low payout
material benefits rolls: planetary
Notes: fringe, +1 DM cash benefits

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Violent	Streetwise	Broker	Advocate
2	Felony	Broker	Comms	Broker
3	Felony	Gambling	Liaison	Flying
4	Professional	Advocate	Carouse	Admin
5	Social	Deception	Vehicle	Sensors
6	Social	Recon	Gun Combat	Computers

Fences are people who buy and sell illegally obtained property and reintroduce it into legal circulation. They always have extensive underworld contacts and often contacts in law enforcement as well. They make money by buying expensive, illegal material and passing it forward to others. Fences tend to specialize in particular areas, whether stolen electronics, high end artwork, or food rations, but they must have contacts who they work with on a regular basis. Many fences are lowlife, but there are also high-end fences who specialize in exotic merchandise that sell to the less discriminating collector.

Hunter

Qualification: Str 6+ (Survival)
Advancement: Dex 8+
Injury: medium payout
material benefits rolls: planetary
Notes: fringe

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Injury	Survival	Melee	Steward
2	Violent	Gun Combat	Gun Combat	Flying
3	Lost	Athletics	Animals	Jack of all Trades
4	Professional	Animals	Survival	Navigation
5	Professional	Recon	Mechanic	Comms
6	Social	Gambling	Vehicle	Sensors

Hunters are guides and explorers who live and work in natural habitats helping others navigate there safely. They typically know the dangers of the planets they're on as well as how to overcome them. Their personal survival depends upon their training and their knowledge, and most are willing to take calculated risks for profit. They generally prefer good, reliable equipment and trustworthy companions as their survival may depend on those other people.

Lawyer

Qualification: Edu 9+ (Advocate)
Advancement: Int 6+
Injury: medium payout
material benefits rolls: planetary
Notes: +2 DM cash benefits

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Professional	Advocate	Advocate	Advocate
2	Social	Admin	Interrogate	Linguistics
3	Social	Liaison	Comms	Admin
4	Professional	Computers	Vehicle	Science
5	Professional	Carouse	Carouse	Broker
6	Social	Deception	Gambling	Leadership

Lawyers use the legal system to fight for their clients (or themselves). They are experts at the law and typically know what is allowed and is not allowed. Some lawyers specialize in getting around the laws using technicalities. They are available for hire on most worlds, and are supposed to put their client interests in the forefront. Other lawyers know the law and intentionally work on the wrong side of it, using rules and regulations to hide wrongdoing and otherwise protect their criminal bosses.

Logistician

Qualification: Int 8+ (Comms)
Advancement: Edu 7+
Injury: medium payout
material benefits rolls: planetary, space
Notes: +1 DM cash benefits

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Lost	Admin	Flying	Broker
2	Violent	Streetwise	Pilot	Pilot
3	Social	Liaison	Mechanic	Navigation
4	Professional	Broker	Navigation	Sensors
5	Professional	Vehicle	Liaison	Admin
6	Social	Mechanic	Comms	Computers

Logisticians specialize in getting the right things to the right place at the right time. They know scheduling and must be aware of how things move and where bottlenecks might show up. While not glamorous, logisticians keep products on the shelves and know how to get things done. Many have firsthand knowledge of moving things from place to place, and their skills come in handy at most civilized or semi-civilized ports of call.

Manager

Qualification: Int 8+ (Admin)
Advancement: Edu 7+
Injury: medium payout
material benefits rolls: planetary, space
Notes: +1 DM cash benefits

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Violent	Admin	Admin	Liaison
2	Social	Liaison	Carouse	Advocate
3	Social	Comms	Broker	Computers
4	Professional	Gambling	Steward	Science
5	Professional	Deception	Streetwise	Linguistics
6	Social	Vehicle	Interrogate	Flying

Managers are the people who get orders from above and make sure others carry out the instructions. They may be bureaucratic and fussy, but they generally know all of the procedures needed to get what they want. Most are honest and try to do their best for both their bosses and employees. Other managers are corrupt, using their knowledge of the company's inner workings to exploit weaknesses or take advantage of their employees. Managers do best on civilized worlds where their skills are most in demand.

Manufacturer

Qualification: Str 6+ (Mechanic)
Advancement: Edu 8+
Injury: low payout
material benefits rolls: planetary, space
Notes:

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Violent	Mechanic	Sensors	Engineering
2	Professional	Computers	Liaison	Electronics
3	Social	Sensors	Zero-G	Computers
4	Professional	Engineering	Mechanic	Science
5	Professional	Electronics	Streetwise	Broker
6	Social	Vehicle	Flying	Comms

These are the people running the machinery to make mass produced goods. They are not designers but keep the machinery functioning smoothly and can improve the processes behind the goods. Manufacturers generally understand the machinery of their trade, but also appreciate some elements of trading and logistics which keep their operations running. Found both on planets and in space, they take the raw materials and produce the finished products sold across the galaxy.

Marine NCO

Qualification: Str 8+ (Gun Combat)
Advancement: Dex 7+
Injury: high payout
material benefits rolls: space, military
Notes: -1 DM cash benefits, pension

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Injury	Gun Combat	Pilot	Tactics
2	Violent	Melee Combat	Vacc Suit	Medicine
3	Violent	Recon	Flying	Navigation
4	Professional	Vacc Suit	Demolitions	Gunnery
5	Professional	Zero-G	Gunnery	Leadership
6	Social	Athletics	Survival	Vehicle

These are the soldiers fighting in space for their unit and their duty. They must be able to fight on planets or in space, and so their knowledge of many weapons is usually unparalleled. They tend to fight mostly in smaller groups which particularly suits space and vacuum environments. Marines generally have a strong esprit-de-corps and a certain amount of arrogance regarding their skills. That arrogance is often deserved, as they are often deadly fighters.

Marine Officer

Qualification: Str 9+ (Tactics)
Advancement: Edu 6+
Injury: high payout
material benefits rolls: military, space
Notes: pension

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Injury	Gun Combat	Tactics	Comms
2	Violent	Melee Combat	Leadership	Leadership
3	Violent	Recon	Gunnery	Navigation
4	Professional	Vacc Suit	Interrogate	Computers
5	Professional	Zero-G	Admin	Mechanic
6	Social	Athletics	Sensors	Pilot

Marine officers are responsible for leading their troops into combat and making sure they achieve victory and glory. Or die trying. While needing the combat skills of every marine, officers also must know how to lead warriors and develop plans to win the battles. They must also handle all of the paperwork and officialdom inherent in any military organization. They know their mistakes often cost lives, and share the sense of duty and arrogance found in most marines.

Merchant

Qualification: Int 8+ (Broker)
Advancement: Edu 7+
Injury: high payout
material benefits rolls: space, planetary
Notes:+2 DM Cash Benefits

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Lost	Broker	Vacc Suit	Computers
2	Violent	Pilot	Zero-G	Engineering
3	Social	Admin	Mechanic	Navigation
4	Professional	Deception	Broker	Advocate
5	Professional	Carouse	Sensors	Electronics
6	Social	Liaison	Comms	Leadership

Merchants are the people who sell everything from battleships to donuts. Many merchants specialize in a few wares or locations they know well and make money by having the right stuff at the right time. Often having a cadre of regular clients, they know their customers and their market. Other merchants sell anything they can get their hands on at a good price, working to profit from their wits and speed. Less honest merchants misrepresent their wares or accept merchandise without questioning its origin.

Miner

Qualification: Dex 6+ (Vehicle-Mole)
Advancement: Edu 8+
Injury: medium payout
material benefits rolls: space, planetary
Notes: fringe

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Lost	Zero-G	Vacc Suit	Computers
2	Violent	Pilot	Admin	Engineering
3	Violent	Vehicle	Vehicle	Navigation
4	Professional	Streetwise	Broker	Science
5	Professional	Carouse	Sensors	Electronics
6	Social	Liaison	Mechanic	Jack of all Trades

Miners work underground to dig tunnels for space outposts or to extract valuable minerals from deep inside rocks. They must be technically minded and detail oriented to prevent accidents on the job. They often have some engineering or science knowledge to support their extraction of minerals. Off work, miners are usually very practical people and like to relax in a comfortable atmosphere.

Minister

Qualification: Edu 9+ (Steward)
Advancement: Int 6+
Injury: low payout
material benefits rolls: planetary
Notes:

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Lost	Admin	Steward	Advocate
2	Social	Liaison	Zero-G	Comms
3	Social	Carouse	Vehicle	Medicine
4	Professional	Streetwise	Flying	Computers
5	Professional	Deception	Leadership	Science
6	Social	Art	Broker	Jack of all Trades

Ministers are the day to day leaders of religious congregations. Their functions vary depending upon their beliefs, but they support fellow believers and tend to be the most fervent followers of their faith. Often a combination of counselor, advocate, supporter, and entertainer, ministers work to further their religions and its goals. They also have some administrative duties and requirements, often needing to organize events or make arrangements with governments and businesses.

Navy NCO

Qualification: Str 8+ (Melee)
Advancement: Dex 7+
Injury: high payout
material benefits rolls: space, military
Notes: -1 DM cash benefits, pension

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Injury	Recon	Gunnery	Electronics
2	Violent	Melee	Admin	Tactics
3	Violent	Gun Combat	Pilot	Navigation
4	Injury	Athletics	Sensors	Computers
5	Professional	Zero-G	Comms	Engineering
6	Social	Mechanic	Vacc Suit	Advocate

These are the people who keep the ships functioning and directly control the various systems during combat. They trust and rely on the people in their unit, knowing their lives depend on those around them. The space navy is the organization which is most directly on the front lines against extra-planetary threats, whether they are pirates or main battle fleets. Spacecraft are the heart of the Navy, and there is nothing between a spacer and hard vacuum except for their ship and their crewmates.

Navy Officer

Qualification: Dex 9+ (Tactics)
Advancement: Soc 6+
Injury: high payout
material benefits rolls: military, space
Notes: pension

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Injury	Zero-G	Comms	Medicine
2	Violent	Vacc Suit	Gunnery	Leadership
3	Social	Sensors	Pilot	Electronics
4	Professional	Liaison	Mechanic	Navigation
5	Professional	Melee	Tactics	Advocate
6	Social	Admin	Engineering	Computers

Navy officers execute orders from those above them, commanding spacecraft of various sorts depending on rank. They tend to fight ship to ship more than hand to hand, but must keep their vessel running smoothly. They command their enlisted spacers and develop plans to overcome their opponents. Naval officers must also keep their ships supplied, interact with civilians, and make sure their ship operates at top efficiency.

Pilot

Qualification: Dex 8+ (Pilot)
Advancement: Int 7+
Injury: medium payout
material benefits rolls: space
Notes: +1 DM cash benefit rolls

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Social	Pilot	Gunnery	Engineering
2	Lost	Zero-G	Pilot	Computers
3	Lost	Flying	Flying	Electronics
4	Professional	Comms	Vehicle	Leadership
5	Professional	Navigation	Vacc Suit	Admin
6	Social	Sensors	Mechanic	Science

Pilots are the people who make advanced vehicles and spacecraft move. They tend toward brash and risky behavior, but are skilled professionals who need to know and understand the capabilities of their machines. They serve on all size of spacecraft, from small craft to starships to capital ships, and it is quite common for pilots to have experience with more than one type of craft. Every ship needs at least one pilot, and there is always a new system to visit.

Physician

Qualification: Edu 9+ (Medicine)
Advancement: Int 6+
Injury: medium payout
material benefits rolls: space, planetary
Notes: +1 DM cash benefit rolls

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Social	Admin	Medicine	Medicine
2	Social	Advocate	Sensors	Science
3	Professional	Medicine	Flying	Engineering
4	Professional	Zero-G	Liaison	Art
5	Professional	Science	Deception	Electronics
6	Violent	Comms	Vehicle	Computers

Physicians heal the ills of sophonts everywhere. They may use technology or natural products, but the goal is to help fix what's wrong with the patient. As every race gets hurt, there are doctors of many sorts with all very different specialties. Physicians also use many associated skills to get their jobs done, whether interpreting neural activity scanner readings or driving an ambulance as part of an emergency medical response team.

Pirate

Qualification: none (Streetwise)
Advancement: Int 9+
Injury: low payout
material benefits rolls: space, military
Notes: +1 DM cash benefit rolls, fringe

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Felony	Zero-G	Gunnery	Electronics
2	Violent	Gun Combat	Recon	Navigation
3	Lost	Melee	Sensors	Engineering
4	Lost	Mechanic	Advocate	Computers
5	Professional	Carouse	Broker	Comms
6	Social	Streetwise	Pilot	Sensors

Pirates are the thieves that live illegally off of other people. Many are driven to this career when other avenues are closed to them. They tend toward callousness and exploitation, caring little about others. Most pirates hunt their prey near the jump limits of target systems, but more cunning hijackers sneak aboard their target while taking on cargo or passengers and then try to redirect the jump to a place of their own choosing.

Programmer

Qualification: Edu 8+ (Computers)
Advancement: Int 7+
Injury: low payout
material benefits rolls: planetary
Notes: +2 DM cash benefit rolls

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Social	Computers	Sensors	Computers
2	Social	Electronics	Comms	Engineering
3	Professional	Sensors	Computers	Science
4	Professional	Comms	Electronics	Electronics
5	Professional	Engineering	Liaison	Admin
6	Social	Admin	Carouse	Advocate

Programmers are the people who make the computers and robots do what they're supposed to do. They have a well earned reputation for being more comfortable with machines than other sophonts. While not much good in a straight up fight, when you're trying to hack into a security system and delay the authorities from catching you, it's really nice to have one of these specialists working with you.

Psionic

Qualification: Psi >0 (special- see below)
Advancement: Psi 8+
Injury: medium payout
material benefits rolls: planetary
Notes: unusual specialist skills

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Professional	Admin	Awareness	Computers
2	Professional	Advocate	Clairvoyance	Broker
3	Social	Liaison	Telekinesis	Medicine
4	Social	Steward	Telepathy	Flying
5	Violent	Comms	Teleportation	Electronics
6	Violent	Vehicle	choose	Sensors

Psionics are those trained to use mental powers to carry out real effects. Most sophonts do not have this ability, and those who do often face discrimination or personal violence. For psionics, the specialist skill roll is their key table and is where they obtain new psionic disciplines. Each time they make a roll on the specialist skill, if they roll a talent they do not yet possess they may make a psionics roll to obtain it at level 0. For each roll previously attempted to obtain a new talent, they receive a -1 DM as discussed in Chapter 3: Psionics. As the key skill in their class, psionics choose one specialist skill at level 1. If they fail to make a roll for a particular talent, they may roll again on the specialist skill table and try again for a same or different talent. If they roll a talent obtained previously, they improve that talent by +1. In addition, for every two ranks they achieve as a psionic, they receive +1 Psi.

Ranger

Qualification: Dex 8+ (Survival)
Advancement: End 7+
Injury: low payout
material benefits rolls: planetary
Notes: fringe

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Lost	Survival	Comms	Medicine
2	Social	Animals	Mechanic	Steward
3	Professional	Gun Combat	Liaison	Advocate
4	Professional	Streetwise	Deception	Sensors
5	Lost	Athletics	Flying	Electronics
6	Violent	Recon	Vehicle	Computers

Rangers are people who oversee wild lands and work to preserve nature. They are practical environmentalists generally involved in conservation. While technology is fine, nature is important. While related to hunters, rangers are more ecologically oriented toward their lands and less interested in capturing or killing trophies. Rangers use any necessary skills to protect their regions, including legal and technological methods to foil those looking to exploit the environment.

Rogue

Qualification: none+ (Streetwise)
Advancement: Dex 9+
Injury: low payout
material benefits rolls: planetary
Notes: +1 DM cash benefit rolls, fringe

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Lost	Melee	Admin	Advocate
2	Violent	Recon	Broker	Medicine
3	Felony	Deception	Comms	Mechanic
4	Professional	Streetwise	Carouse	Computers
5	Social	Survival	Electronics	Sensors
6	Felony	Athletics	Gun Combat	Jack of all Trades

Rogues are often thieves and pickpockets, but can be helpful anarchists or spies for another system. Their defining characteristic is that rules are for other people, not them. Free spirits thrive as rogues. While there is always an air of criminality about them, rogues may appear as respectable sophonts while they work toward their own ends. Rogues often run into legal trouble when their schemes get uncovered, and a good rogue always has an escape plan.

Scholar

Qualification: Int 8+ (Comms)
Advancement: Edu 7+
Injury: medium payout
material benefits rolls: planetary
Notes: -1 DM cash benefits

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Lost	Linguistics	Sensors	Advocate
2	Social	Admin	Vehicle	Engineering
3	Professional	Comms	Flying	Computers
4	Professional	Science	Electronics	Medicine
5	Professional	Art	Mechanic	Navigation
6	Social	Liaison	Carouse	Jack of all Trades

Scholars learn about the minutiae of various fields. They are not generally practical, and value information above all else. They tend to specialize early if they ever hope to achieve renown in a field. While their specialization is often esoteric, scholars must possess a broad selection of related knowledge that can prove very useful for many purposes. Some scholars move beyond the tapes and books to do active field research where they develop more practical skills to obtain their information.

Scientist

Qualification: Int 8+ (Science)
Advancement: Edu 7+
Injury: medium payout
material benefits rolls: planetary, space
Notes:

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Lost	Comms	Science	Science
2	Social	Vehicle	Flying	Engineering
3	Professional	Engineering	Sensors	Medicine
4	Professional	Computers	Electronics	Computers
5	Professional	Admin	Liaison	Advocate
6	Social	Linguistics	Mechanic	Jack of all Trades

These are the people who work to understand the rules that govern the universe. They are more theoretical than practical, but are very able to design new items and devices to achieve their ends. Their broad knowledge base allows them to understand how various machines work and gives them an edge to interpreting results. While often single minded, scientists who can step back from their narrow research agenda to work in the larger world tend to do very well.

Scout

Qualification: Dex 6+ (Navigation)
Advancement: Int 8+
Injury: high payout
material benefits rolls: space, military
Notes: +1 DM material benefits roll

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Lost	Zero-G	Melee	Engineering
2	Lost	Streetwise	Vacc Suit	Advocate
3	Professional	Survival	Sensors	Medicine
4	Professional	Pilot	Comms	Navigation
5	Social	Engineering	Admin	Electronics
6	Violent	Gun Combat	Mechanic	Jack of all Trades

Scouts are the explorers and investigators who travel from system to system learning what's out there. They encounter more strange situations and life forms in a month than most sophonts do in their lives. Most work for the CSS, but may work for any organization digging for information. They may serve on various size ships, from classic 2-sophont vessels to capital ship survey craft with dozens of crew. Their skills are often practical and oriented to function in an unknown and sometimes hostile environment.

Service Worker

Qualification: none (Steward)
Advancement: End 8+
Injury: low payout
material benefits rolls: planetary
Notes: fringe, -1 DM cash benefits

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Social	Admin	Steward	Advocate
2	Social	Liaison	Vehicle	Medicine
3	Social	Art	Flying	Electronics
4	Professional	Streetwise	Broker	Linguistics
5	Professional	Comms	Carouse	Science
6	Social	Recon	Deception	Sensors

Service workers are the cashiers, waitresses, clerks, hairdressers and the myriad others who do simple service jobs for other people. They are common in higher tech, higher population areas. They carry out many essential but unremarkable jobs, making life better for the rest of us. Often overlooked because of their lack of ship and combat skills, service workers can find jobs on nearly any civilized planet and are perfectly at home in a broad range of society.

Technician

Qualification: Edu 8+ (Mechanic)
Advancement: Int 7+
Injury: medium payout
material benefits rolls: planetary, space
Notes:

	Mishaps	Service Skills	Specialist Skills	Advanced Skills
1	Lost	Computers	Mechanic	Engineering
2	Social	Sensors	Electronics	Electronics
3	Professional	Comms	Computers	Navigation
4	Professional	Vacc Suit	Vacc Suit	Science
5	Professional	Streetwise	Zero-G	Advocate
6	Social	Electronics	Admin	Mechanic

Technicians are the skilled people who operate all the wonderful technology and keep things functioning. They repair equipment but do not design new devices. They may be familiar with many different types of equipment, but are not trained to build or design things from scratch. Technicians operate in a range of civilized environments, including space stations, outposts, as well as cities on planets.

Aliens

Humans are the most common sophont in most settings because, quite honestly, they are the species that most players relate to easily. These rules assume a human norm and the rules are designed around these norms. There are additional races, however, that can exist in any given setting. Some are particularly common, while others may only live on a single isolated planet. Aliens can have traits that differ substantially from humans in many respects, from body temperature, to natural weapons, to regenerative abilities that surpass high quality medical care. For a more complete listing of aliens and how to generate novel alien races, **Flynn's Guide to Alien Creation** by Samardam Press has a number of tables and tools to assist the process. Note that the inclusion of any race is at the sole discretion of the Referee and should be developed before character creation takes place.

Different races not only have morphological and psychological differences, but distinct physiologies are also part of what makes the Universe diverse. These may apply to body shapes and types obviously, but less obviously in terms of climate preferences and family structures. For example, a race that is hermaphroditic may not have any family structure at all because they do not need a partner to have offspring. In the case of differing environments, a high gravity adapted race may not be able to share a ship with a gravity intolerant race. A race that evolved on a hot, dry world may not be able to tolerate even a cool, moist climate that many humans would find ideal. Worlds that humans prefer may thus be 'uninhabitable' from an alien point of view. Such differences may ease conflicts between some races as there would be less conflict over living space (although not for limiting resources).

It should also be noted that some races have huge advantages in particular situations compared to other races or humans. A normal human challenging a 3m tall, 500kg behemoth with claws to a fistfight had better be planning something! Fortunately in science fiction, technology is a great equalizer. Even though a race might be able to live in a vacuum for a few hours, a breathing apparatus can give a regular human the same ability. Even the ability to fly (with the aid of a grav belt) is doable. Most races have disadvantages that go along with their more obvious advantages, and these are what make role playing science fiction games so much fun.

Race Descriptors

In order to describe alien races they must be compared to something and by default that something is human. These alien descriptors are meant to indicate differences from humans and thus the changes in the rules needed to accommodate those differences. Note that a referee might well decide to create an entirely new characteristic that is not included below, perhaps 'energy creature' as an ecological stock. Hey, it's their rules-have fun! Hopefully that energy creature never has to pick anything up, though.

Most if not all aliens players will meet have evolved on a homeworld somewhere. That homeworld will fundamentally shape the type of lifeforms typically found there. High gravity planets with thin atmospheres, for example, typically do not have many fliers as the conditions just aren't suited for them. Similarly, desert planets are not likely to have evolved an intelligent aquatic race unless the climate radically changed in recent years. Generally a race will consider the environment on their homeworld the 'ideal' environment and the one they are best suited to live in. Given that, aliens will typically have traits that fit their homeworld. Low gravity planets, for example, may have a race which is automatically adapted to low gravity conditions but cannot adjust to high gravity planets. Aliens who have sulfurous compounds in their homeworld atmosphere may need them as nutrients or gas transfer and may become physically ill when they are not present. Adapting the aliens to fit their homeworld is one way to create the 'otherness' aliens should have.

Ecological Stock

In the rules on wilderness encounters, animals are divided into 4 basic ecological stocks based on diet (herbivore, omnivore, carnivore, scavenger) and then a feeding descriptor. Animal races would tend to come from the same general families, but there is no reason that plants cannot be sophonts. This gives them a series

of potential advantages (not having to breathe oxygen) and disadvantages (potentially slow movement). The ecological stock can modify other aspects of their biology and characteristics.

Breathing and Size

Most organisms need to breathe, but exactly what is breathable varies. Aquatic organisms, for example, may breathe water or air or both. Atmospheric taints may be harmful, irrelevant, or necessary. Some organisms can breathe trace atmospheres but be poisoned by dense ones. Given the variety of worlds available, sophonts will have very different preferences.

In terms of size, sophonts vary greatly from the human norm. Size will matter in many ways from whether the large behemoth can fit into a taxi to how many staterooms need to be available in a starship. Aliens are given a range of height and weight options that are mostly near human size, but extremes are definitely possible. Larger creatures generally have greater strength and endurance, lower dexterity, greater reach in melee combat, and do more unarmed damage per hit in combat. Needless to say, smaller sophonts tend to prefer ranged combat when facing any of the larger aliens.

Size	Str	Dex	End	cm base height	height mod	kg base weight	weight mod	# per stateroom	base damage	reach
tiny	1d6	3d6	1d6	28+2d6	2d6	5+2d6	1d6	6	1	0.5 m
small	2d6-2	2d6+2	2d6-2	45+10d6	4d6	6+6d6	3d6	4	1d6-2	1 m
average	2d6	2d6	2d6	90+16d6	6d6	30+16d6	6d6	2	1d6	1.5 m
large	2d6+2	2d6-2	2d6+2	170+20d6	8d6	105+30d6	10d6	1	1d6+2	3 m
huge	3d6	1d6	3d6	270+20d6	10d6	260+40d6	15d6	0.5	2d6	4.5 m

Symmetry, Gender, and Reproduction

Humans and most Earth organisms are bilaterally symmetric with specialized arms and legs, but this is not a requirement for animals. Starfish and octopi, for example have radial symmetry and equally capable limbs. Their limbs are equal to one another, but for sophonts elsewhere there is no reason they cannot be prehensile legs. In addition, how organisms reproduce varies from live bearers (us) to egg layers who care for their offspring (penguins) to fish (salmon) who lay thousands of eggs hoping a few survive to maturity. Sexual reproduction on Earth has only males and females, but yeast can switch between forming buds and sexual reproduction. There is no inherent reason why 2 is the optimum number of sexes.

This is an area where creating an ecosystem of organisms that share one or more of these traits can emphasize the alien nature of the homeworld. Having all of the organisms use trilateral symmetry and 3 sexes that only reproduce together but not in a family will create a different mindset than our model of lifetime pairing. What that precise mindset is will be left to the creative Referee.

Movement

Sophonts travel, and in order to travel they have to be able to move around. Most sophonts are able to walk (crawl, skip, trot, etc) on land, but the speed at which they move can vary significantly. Humans have a movement rate of 6m per round and most average size sophonts can move at near that speed. Beyond normal walking/running, however, there are a number of other alternatives. Flying is a favored form on many low gravity worlds, whether it be by grav belt, wings, or sometimes even lighter than air gasses. For water planets, swimming is a useful mode of travel. While humans (and a number of other organisms) can swim, we are not at home in the water the way merfolk or true aquatic beings are. Climbing is another skill some sophonts have in abundance, and it can be a way of moving vertically as well as through a cargo bay filled with rigging and crates. Finally some aliens are well suited for burrowing and can tunnel through dirt and sands much better than any human.

Development, Maturity, and Aging

Sophonts everywhere hatch, grow up, reproduce, and die according to a relatively predictable schedule. While many races mature over roughly the same time frame, some are significantly shorter while others can live many years longer than humans without anagathics. Naturally aliens have many unusual ideas about the worth of individual lives and their place in the universe which are influenced by their inborn physiology as well as cultural training. Rates of healing and how susceptible they are to various hazards will also influence their attitudes. Memorable aliens which have a unique but believable worldview influenced by their environment are the races players remember for years afterwards.

Primary Characteristics

For the sake of consistency, all sophonts have the same six (or seven) primary characteristics: Str, End, Dex, Int, Edu, Soc (and Psi). Soc may vary based upon the cultural organization of a race and may be called Caste, Charisma, Pack or a variety of other terms, but it always confers a particular standing in the culture from which it was developed. Standing in one society may not transfer over to another society or race as cultural norms will vary dramatically. Aliens having no contact with stellar society will not be impressed by the claimed noble heritage of the hairless, declawed stranger wearing strangely colored cloth and speaking in the wrong mode.

Psi is a characteristic despised by some referees and may not be included in your universe. If it is allowed, all races that are not resistant or anti-psionic have the same small potential to develop psionic gifts as humans do. Resistant or anti-psionic races may never have Psi scores. Races which are considered psionic have most or all individuals with some level of psionic talent or talents. It may be that all individuals are telepathic, for example, or all have the alien racial ability to teleport. Perhaps the aliens have a caste system based upon which psionic talent an individual has. Referees should feel free to give different races psionic quirks that distinguish them from the 'run-of-the-mill' psionicist. Psionic races in particular might have base Psi scores above 2d6 as they have a clear predisposition to psionic talents.

Natural Weapons and Armor

While natural weapons and inherent armor are often some of the more visible and threatening alien characteristics, they are typically not the most dangerous. In a universe where plasma weapons and gauss guns are commonly employed, claws are not really that impressive. They may be somewhat harder to injure than a typical human, but wearing heavier armor can even the battlefield. The big difference is that aliens with inborn weapons or armor cannot lose them or have them easily stripped away on the high law planet that outlaws all firearms. There, a good stinger might be just the intimidating weapon needed to encourage cooperation. Then again, that stinger might be reason enough to put them on the next ship going out-system with orders never to return.

Senses

Aliens may have senses that are better or worse than human standard. Dogs, for example, detect odors far better than any human nose. Aliens could easily be much more sensitive than we are. Same thing for hearing and vision. Many organisms hear much higher frequencies than we do, or can see into the infrared or ultraviolet spectra where they perceive colors we cannot describe. There are also organisms that cannot see as well as we do; perhaps they have poor depth perception or cannot hear low tones, for example. Still other aliens may have senses we lack entirely, such as echolocation or sensitivity to magnetic fields which are completely beyond our experience. Such abilities may give those aliens art forms which are simply incomprehensible for those lacking eyes to see. These senses, however, will fundamentally alter their interactions with the environment and can easily lead to strange and 'alien' behaviors.

Alien Traits

Based on the features listed above, a number of alien advantages and disadvantages can be summarized in a few short words. Some sophonts love snow, while others are more comfortable in hot springs. There are many other features, however, which may not be included there. The various descriptors below are intended to give

Referees a good starting point on giving races unique abilities, while creating new and unexpected traits can unbalance even experienced players who think they've seen it all.

acid resistance: reduces the amount of acid damage done by 50%

acid vulnerability: increases the amount of acid damage done by 50%

alertness: gives +2 DM bonus on all perception based skill checks

altitude adaptation: automatically adapted to high altitude/low oxygen conditions

amphibious: lives both on land and in water; can hold breath 5 min x End if cannot breathe water

anti-psionic: unaffected by the direct use of psionic powers upon themselves. May be indirectly effected by a power. May never be trained in psionics.

aquatic: spends most of their time in water; can leave for short periods

armored: species possesses a natural protective covering in addition to any external armor worn

anti-psionic: gives immunity to all psionic abilities that directly affect them, but can never learn any psionics

athletic: gives +2 DM bonus on all athletics skill checks

atmospheric requirement: must breathe a very similar atmosphere to their planet, most are incompatible

bad first impression: causes an immediate but temporary dislike based on appearance and/or odor

bioelectric shock: gives a voluntary 1d6 electrical shock by touch once every 12 hours; very effective on electronic devices

blind fighter: reduces melee combat penalties for lack of vision by 50% (does not affect ranged weapons)

burst of speed: can increase movement by 1.5 m/sec for End minutes before becoming fatigued

closed book: gives anyone attempting to read or sense them a -2 DM penalty

cold blooded: gives a -2 DM initiative penalty in cold environments, but a +2 DM bonus against being located using IR detection

cold endurance: comfortable in colder environments; reduce all cold damage by 1d6

cold resistance: cold adapted. reduce all cold damage by 50% but increase fire damage by 50%

color blindness: sophont perceives the world in shades of gray

deep diver: allows an air breathing sophont to dive as deep as 240m and stay underwater longer

desert adaptation: gives a +2 DM bonus to survival and navigation in desert environments

eidetic memory: gives perfect recall of previously learned information

electricity resistance: reduce all damage from shocks or electrical current by 50%

fast healing: causes 1d6 additional points of healing per day

fast metabolism: gives a +2 initiative bonus but doubles life support requirements

fast movement: sophont moves faster than humans on land (more than 8 m/sec)

fast talker: gives a +2 DM bonus to verbal deception skill checks

feral: uneducatable; roll 1d6 Edu only

fire resistance: heat adapted. reduce all fire damage by 50% but increase cold damage by 50%

fragile: very susceptible to blunt weapons; +50% damage

frightful presence: make a leadership check or be intimidated, giving a -1 DM on all related skill checks

gearhead: gives +2 DM bonus to mechanics skill checks

gendermorphic: allows a sophont to switch sexes over 2d6 days under certain conditions

good first impression: causes an immediate but temporary appeal based on appearance and/or odor

gravity intolerance: gives a -2 DM penalty in normal gravity, -4 DM penalty in high gravity

haggler: gives a +2 DM bonus to any broker skill check

heat endurance: comfortable in hot environments; reduce all fire damage by 1d6

heavy gravity adaptation: automatically adapted to high gravity; -2 DM penalty in low gravity

hibernation: able to enter into a period of extended sleep or meditation for up to End days

hive mentality: sophonts have an overwhelming need to act for the collective good. Must make an Int check in order to protect their own welfare/life over the collective good

improved grab: give a +2 DM natural weapons skill for grappling attacks only

improved grab- constrict: give a +1 DM natural weapons skill for grappling and causes 1d6 constriction damage

improved grab- entangle: give a +1 DM natural weapons skill for grappling and holding an opponent motionless

improved reach: gives a +1.5m reach for melee combat ranges typical for their size

interrogator: gives a +2 DM for attempts to extract information from another being

intolerant: individual must make an Int check or they take offense at an insult

IR vision: sophont sees into the infrared (heat) range

large: sophont is significantly taller and heavier than humans. Typically they have Str and End of 3d6 or better and Dex of 1d6

light sensitivity: a quick bright light causes blindness for 1 minute on a failed End check; -1 DM penalty on all skills in bright light

low gravity adaptation: automatically adjusted to low gravity conditions; -2 DM in high gravity

low light vision: sophonts can see 2x as far as human norm under low light conditions

major unusual life support requirement: the species needs a particular unusual chemical or mineral to survive; will die as if dehydrating (1+1d3 days lacking the mineral) giving a -1 DM/day penalty on all skills when lacking it

minor unusual life support requirement: the species needs a particular unusual chemical or mineral to survive; will die as if starving (2+ 1d3 weeks lacking the mineral) giving a -1 DM/week penalty on all skills when lacking it

multiple limbs: sophont gains 1 extra minor action due to racial multi-tasking without penalty

natural advocate: gives a +2 DM to advocate skill checks due to their legal tendencies

natural born leader: gives a +2 DM to leadership skill checks due to their special charisma

natural compass: able to detect magnetic fields, gives a +2 DM bonus on navigation skill checks on planets

naturally honest: gives a -4 DM penalty when the sophont is telling a lie; -2 DM penalty on identifying a lie

natural pilot: gives +2 DM bonus on pilot checks due to spatial perception

natural survivalist: gives +2 DM bonus on survival checks in natural settings

natural swimmer: gives +2 DM bonus on all swimming checks

natural thief: gives +2 DM bonus on deception checks

natural weapon: species possesses one or more body weapons doing an additional 1d6 damage

no fine manipulators: lacks ability to handle small objects appropriately

no land movement: lacks the ability to move effectively on land; occurs in aquatic or flying species

no vocal cords: sophonts lack the ability to create audible speech

observant: +2DM bonus on recon checks

offensive stench: controllable ability which causes anyone else smelling it to make an End check or have a -1 DM penalty on all skill checks until they leave the area

organic radio communication: allows sophont to communicate up to 5 km using radio waves

overly aggressive: gives +2 DM bonus on initiatives in personal/vehicle combat due to violent tendencies

pleasant odor: +2 DM to detect individual by scent, but must make Int check or be unwilling to harm them

poisonous: bite or stinger attack does an additional 1d6 End damage on a failed End check

psionic: nearly all members of the species are psionic

racial defense: gives a +2 DM defensive bonus in personal combat against a single race

racial enemy: gives a +1 DM attack bonus in personal combat against a single race

racial phobia: requires a sophont to make an Int check to overcome their racial fear

racial weapon: gives a +1 DM attack bonus when using a single historically important melee weapon

radiation resistance: reduce all radiation exposures by 100 rads

regeneration: allows healing to take place in hours instead of days and allows limbs to regrow

resistant to diseases: gives +2 DM End bonus for infections and diseases

resistant to fear: gives +2 DM Int bonus against fear and intimidation

resistant to poisons: gives +2 DM End bonus against poisons and toxins

resistant to psionics: gives +2 DM bonus against any targeted psionic ability; may never be trained in psionics

slow metabolism: -2 DM to initiative, 50% less life support requirements

slow speed: race moves slower than humans on land (less than 6 m/sec)

spitting attack: gives a short range, 1d6 acid attack using athletics skill

stability: +2 DM to resist forced movement when standing (includes balancing, tripping, knockdown, etc)

stalwart movement: allows moves at full normal speed even when encumbered

taint breather: requires atmospheric taint for breathing; treat standard atmosphere as tainted

taint immunity: unaffected by presence or absence of atmospheric taint

telepathy, limited: allows communication to any sophont with a language within 3 meters

telepathy: allows communication to any sophont with a language out to medium range

trace breather: can breathe trace atmospheres indefinitely with no difficulty; cannot breathe dense atmosphere

trace breather, limited: can breathe trace atmosphere safely for up to 1 hr

trustworthy: gives a -2 DM penalty to bribery, deception, and streetwise checks

unusual hand structure: gives a -1 DM for using all instruments designed for humans

unusual sleep cycle: race has an unusual sleep cycle (long or short) and cannot adapt physiologically

UV vision: sophont sees into the UV range, including ionization and plasma fields

vacuum survival, limited: can survive up to 15 minutes in total vacuum

vibration sense: sophont can detect shape and location based on sound without light

water dependent: sophont can only survive 30 min per End out of the water

well traveled: gives a +2 DM on Liaison checks due to cultural familiarity

xenoempathy: gives a +2 DM to carouse rolls due to their understanding of other species

Alien Races

Settings can have as many races as a Referee is willing to allow or create. Some referees may consider humans with psionics a separate race, for example, while others may consider them a rare strain of normal humans. Most settings are human dominated, but there is no reason to require that to be the case. Many settings will have a small number of races that are common in the area, and the majority of others will be far fewer and found only in restricted areas or perhaps only a single system. Listed below are 5 races (with some modifications) that are described in the Cluster Variant rules.

Avians

The Avians of (homeworld) are derived from Omnivore/Hunter stock. They breathe air and are small in size, standing 105 + 3d6 cm tall and weighing 30+ 2d6 kg. They are bilaterally symmetric, have two genders, and reproduce by bearing their young. They have 4 limbs, none of which are arms and 2 of which are legs. Using their legs, they are able to move at 4.5 m/sec on land. The race is able to fly at 9 m/sec using 1 set of wings (with manipulatory hands at the ends). The race matures at age 22, has 20 years in its prime, and begins aging with a +0 DM modifier. Their primary characteristic scores are: Str: 1d6, Dex: 3d6, End: 1d6, Int: 2d6, Edu: 2d6, Soc: 2d6. In terms of their senses, their vision is human norm, hearing is human norm, and scent is human norm. These sophonts have the following special traits: flying, low gravity adaptation, natural pilot, slow speed, and small.

Humans

The Humans of (homeworld) are derived from Omnivore/Hunter stock. They breathe air and are average in size, standing 145 + 8d6 cm tall and weighing 45+ 8d6 kg. They are bilaterally symmetric, have 2 genders, and reproduce by bearing their young. They have 4 limbs, 2 of which are arms and 2 of which are legs. Using their limbs, they are able to move at 6 m/sec on land. They reach maturity at age 18, has 16 years in its prime, and begins aging with a +0 DM modifier. Their primary characteristic scores are: Str: 2d6, Dex: 2d6, End: 2d6, Int: 2d6, Edu: 2d6, Soc: 2d6. In terms of their senses, their vision is human norm, hearing is human norm, and scent is human norm. These sophonts have no special traits and are the norm.

Insectans

The Insectans of (homeworld) are derived from Carnivore/Chaser stock. They breathe tainted air and are average in size, standing 180 + 4d6 cm tall and weighing 80+4d6 kg. They are bilaterally symmetric, have 2 genders, and reproduce by laying eggs. They have 4 limbs, 2 of which are arms and 2 of which are legs. Using their limbs, they are able to move at 9 m/sec on land. They reach maturity at age 18, has 16 years in its prime, and begins aging with a +0 DM modifier. Their primary characteristic scores are: Str: 2d6, Dex: 2d6+2, End: 2d6, Int: 2d6, Edu: 2d6, Soc: 2d6. They possess 1 point of natural armor. In terms of their senses, their vision is human norm, hearing is human norm, and scent is human norm. These sophonts have the following special traits: armored, bad first impression, cold blooded, fast speed, great leaper, hive mentality, and taint breather.

Instead of social standing, Insectans use a different stat called Caste. Caste refers to their standing within their gender (sterile male/female or fertile male/female) and determines who might be a respectable mate for a particular individual. Insectans who do not place society higher than the individual are Outcaste (Caste=0) and are not considered part of Insectan society or permitted to mate. Outcaste individuals are exiled as dangerous deviants by other Insectans and are typically forced to live with other sophonts or are driven insane by the level of racial rejection. Caste otherwise denotes social ranking as usual, and lower caste individuals defer to the higher castes.

Merfolk

The Merfolk of of (homeworld) are derived from Omnivore/Hunter stock. They breathe air and are average in size, standing 150 + 6d6 cm tall and weighing 50+ 6d6 kg. They are bilaterally symmetric, have 2 genders, and reproduce by bearing their young. They have 4 limbs, 2 of which are arms and 2 of which are legs. Using their limbs, they are able to move at 6 m/sec on land. The race is at home in the water and able to swim at 9 m/sec. They reach maturity at age 18, has 16 years in its prime, and begins aging with a +0 DM modifier. Their primary characteristic scores are: Str: 2d6+1, Dex: 2d6-1, End: 2d6, Int: 2d6, Edu: 2d6, Soc: 2d6. In terms of their senses, their vision is human norm, hearing is human norm, and scent is human norm. These sophonts have the following special traits: amphibious, aquatic, natural swimmer, and water dependent.

Reptilians

The Reptilians of (homeworld) are derived from Carnivore/Chaser stock. They breathe air and are average in size, standing 165 + 6d6 cm tall and weighing 70+ 4d6 kg. They are bilaterally symmetric, have 2 genders, and reproduce by bearing their young. They have 4 limbs, 2 of which are arms and 2 of which are legs. Using their limbs, they are able to move at 9 m/sec on land. The races reaches maturity at age 22, has 20 years in its prime, and begins aging with a +0 DM modifier. Their primary characteristic scores are: Str: 2d6+1, Dex: 2d6+1, End: 2d6-2, Int: 2d6, Edu: 2d6, Soc: 2d6. They have teeth which cause 1-6 points plus Str modifier of damage per hit. In terms of their senses, their vision is better than human, hearing is human norm, and scent is human norm. These sophonts have the following special traits: anti-psionic, fast speed, heat endurance, low light vision, natural weapon, and low gravity adaptation.

Uplifted Races

Several races have been manipulated by gengineering in the distant past and have formed many separate breeding groups over centuries. They have traditionally been based on modified Terran stock for historical reasons, although gengineering of non-Terran creatures is certainly possible. The following uplifted races are fairly common in human dominated regions of the galaxy. They are not typically as abundant as the major races, but in certain systems they play a pivotal role in many areas of life. Uplifted races are possible to create using current technology, but recent new species will not have had time to reproduce to a great extent.

Uplifted apes

Uplifted apes were originally developed as enforcers or soldiers, but their limited skill sets prevent them from ever becoming highly skilled professionals. They breathe air and are average in size. Ape genders have different sizes, where males stand 130 +10d6 cm tall and mass 130+10d6 kg while females are 1/2 that size. They are bilaterally symmetric, have 2 genders, and reproduce by bearing their young. They have 4 limbs, 2 of which are arms and 2 of which are legs. Using their limbs, they are able to move at 6 m/sec on land. The races reaches maturity at age 18, has 16 years in its prime, and begins aging with a +0 DM modifier. Their primary characteristic scores are: Str: 2d6+2, Dex: 2d6-2, End: 2d6+2, Int: 2d6-2, Edu: 2d6, Soc: 2d6-2. In terms of their senses, their vision is human norm, hearing is human norm, and scent is human norm. These sophonts have the following special traits: improved reach, resistant to fear, armored +1 (thick fur).

Uplifted dolphins

Uplifted dolphins are aquatic, air breathing mammals who are powerful in the water but lack the manual dexterity and fine manipulation skills that would allow them to thrive in a technological society. They are highly social creatures but depend upon others for technology. They breathe air and are average in size, with a mass of 22+4d6 kg and are 100+4d6 cm long. They are bilaterally symmetric, have 2 genders, and reproduce by bearing their young. They have 4 limbs, none of which are arms and none of which are legs. They have no land movement, but swim through water at 12 m/sec. The race reaches maturity at age 14, has 12 years in its prime, and begins aging with a -1 DM modifier. Their primary characteristic scores are: Str: 2d6+2, Dex: 2d6-2, End: 2d6+2, Int: 2d6-2, Edu: 2d6, Soc: 2d6. In terms of their senses, their vision is human norm, hearing is better than human, and scent is worse than human. These sophonts have the following special traits: aquatic, deep diver, natural swimmer, no fine manipulators, burst of speed, racial phobia of fire (average Int roll to overcome or be at -2 for all actions near or involving flame).

Uplifted felines

Uplifted felines are one of the more attractive uplifted species. They have short and pointy upturned ears, a layer of short, soft fur which covers their entire bodies, and a movable but very weak and non-prehensile tail. Felines tend to be very independent creatures and difficult to impress, but they can make close friendships with people who treat them well. They are often aloof, but they are rarely surprised and do not like being manipulated. They breathe air and are average in size, with a height of 110 + 6d6 cm and weigh 40+3d6 kg. They are bilaterally symmetric, have 2 genders, and reproduce by bearing their young. They have 4 limbs, 2 of which are arms and 2 of which are legs. They move at 6 m/sec on land. The race reaches maturity at 14 years, has 12 years in its prime, and begins aging with a 0 DM modifier. Their primary characteristic scores are: Str: 2d6, Dex: 2d6+1, End: 2d6, Int: 2d6-1, Edu: 2d6-1, Soc: 2d6. In terms of their senses, their vision is human norm, hearing is better than human, and scent is worse than human. These sophonts have the following special traits: Alertness, Athletic, low light vision, and a Racial Phobia about Open Water (average Int check or -2 on rolls when functioning near, above, or under a large quantity of water).

Uplifted mongoose

Uplifted mongoose are one of the more aggressive species in known space and very insecure about their stature. They are natural bullies, and despite their diminutive size they won't back down from a fight. They breathe air and are tiny in size, with a height of 42+ 1d6 cm and weigh 7+1d6 kg. They are bilaterally symmetric, have 2 genders, and reproduce by bearing their young. They have 4 limbs, 2 of which are arms and 2 of which are legs. They move at 4.5 m/sec on land. The race reaches maturity at 10 years, has 8 years in its prime, and begins aging with a -1 DM modifier. Their primary characteristic scores are: Str: 1d6, Dex: 3d6-1, End: 1d6, Int: 2d6+1, Edu: 2d6, Soc: 2d6-1. In terms of their senses, their vision is human norm, hearing is human norm, and scent is better than human. They have a natural weapon (teeth, 1d6). These sophonts have the following special traits: overly aggressive, intolerant, resistant to fear, small, and natural weapon.

Chapter 2: Skills

Skills and Tasks Resolution

Tasks are things that characters wish to get done. When they attempt to bribe a judge, shoot a smuggler, or write a poem, characters are trying to perform a task. Some tasks are more difficult than others- it is easier (and far cheaper) to bribe a fence than a Chief Magistrate. Difficulties range from formidable (-6 DM), very difficult (-4 DM), difficult (-2 DM), average (0 DM), routine (+2 DM), easy (+4 DM), and simple (+6 DM). The challenge level is meant to consider a skilled individual as baseline condition such that even someone who knows what they are doing have a real chance of failure. A sophont without basic training in the skill receives a -3 DM. A person probably should not try using a space suit without training, for example.

Skills and Characteristics work together to determine how good a character is at different types of activities. For example, shooting a guard with an energy rifle might require the gun combat (energy rifle) skill and the dexterity characteristic. A skill of 0 in a field means basic familiarity with techniques associated with the field, whereas expert skill is denoted as 1, 2, etc. A person with minimal gun combat skill would have no benefit or penalty toward shooting the guard, while an expert marksman may have a skill of 2 or 3. An untrained person who has never held a gun before would have a penalty of -3 toward their success roll. The Dexterity characteristic can also add to one's likelihood of hitting the intended target due to steady hands, etc.

To succeed at a task, all modifiers are added up and 2d6 are rolled, with an 8 or better indicating success and anything less than 8 indicating failure. In many cases the degree of success or failure matters, and so the difference between success and failure is known as the effect. Returning to the energy rifle example, if a skilled shooter (skill 1) with good Dex (+1) rolls a 4 and a 3 on 2 dice, their total is 4+3 +1 (skill) + 1 (Dex) =9, which hits! If, however, the shooter had never fired an energy rifle before (-3) but still had good Dex (+1), then that same

roll would have missed with a 4 + 3 -3 (unskilled) +1 = 5. A skill of 1 may not sound like much, but it makes a HUGE difference in this game!

There are ways to help others perform tasks. For example, arranging assistance in a task generally provides a bonus toward completing that task. Buying a copy of the repair guide for a particular probe model, for example, can give a +1 DM. Trying to perform multiple activities at once makes each one more difficult. For each additional significant task attempted, each task receives a -2 DM, so that someone attempting to drive around obstacles, operate the meson communicator, and shoot back receives a -4 DM on each of the 3 tasks.

Effect Table

Effect		Task Chain DM
<-5	Exceptional failure. Anything that can go wrong, does. Disaster.	-3
-3 to-5	Failure. The task failed and the undesirable has happened.	-2
-1 to -2	Marginal Failure. The task almost or partially succeeded.	-1
0	Marginal Success. The task succeeded, but only barely. May have consequences later.	0
+1 to +2	Success. The task was completed as desired.	+1
+3 to +5	Success. The task went well and no problems are apparent	+2
>+5	Exceptional Success. Outstanding outcome and best possible result.	+3

Characters can also help each other to perform some given task. For other characters helping the primary person, each assistant attempts to complete the task and depending upon how successful they are, the primary person is either aided or hindered. (Anyone who has had a child 'help' them cook dinner understands what this means.) This form of assistance is referred to as a task chain. Depending upon the circumstances, a referee may decide that there are limits to the number of assistants. 8 people would have a hard time assisting one person repairing a defective communicator, for example.

The amount of time taken to perform a task will also affect how likely it is to succeed. Hacking into a computer to change flight plans is far easier if a week is taken as opposed to 10 minutes. Each action has a typical length of time to perform it, and shifting the time 1 step gives a +/-1 DM per step. For example, shooting a guard may normally take only a few seconds, but if a shot is aimed for a few extra seconds it can improve the odds of success by +1 DM.

Time Steps
1-6 seconds
10-60 seconds
1-6 minutes
10-60 minutes
1-6 hours
4-24 hours
10-60 hours
1-6 days
2-12 days
1-6 weeks

Skill List

Skills are intended to be broadly applicable and potentially overlapping sets of learned techniques which would be useful in a space setting. They represent months of training or years of experience and so even a couple of points represent serious expertise. Some skills, known as cascade skills, share general characteristics but have different specialties. An engineering skill of 0, for example, applies to all specialties such as Jump Engines, Power Plants, etc. Higher levels of skill must be applied to those specialized skills individually. Skills and their cascade skills (indented) are listed in the table below. These Cluster Variant skills differ somewhat from other 2d6 and related systems. Note that referees should feel free to expand these skills into whatever area their campaign takes them. Please keep in mind, however, that the skills are meant to be very broadly applicable and the more specialized the skills become the less generally useful they are. Skills with an * are most different from the Cepheus Engine skills on which the 2d6 Cluster Variant is based. Click on the skill name to link to their descriptions.

Admin	Power Plants	*Interrogate	Science
Advocate	Vehicles	Jack-of-all-Trades	Life Science
Animals	Weapons	Leadership	Physical Science
Art	*Flying	Linguistics	Social Science
Athletics	Airship	Liaison	Space Science
Broker	Grav	Mechanic	Recon
Carouse	Personal	Medicine	*Sensors
Comms	Rotor	Melee	*Instrumentation
Computer	Wing	Blunt Weapons	*Remote Operations
*Programming	Gambling	Natural Weapons	*Spacecraft
*Repair	Gun Combat	*Sharp Weapons	Steward
*Security	*Archaic Weapons	Navigation	Streetwise
*Deception	Energy Pistol	Pilot	Survival
Demolitions	Energy Rifle/Carbine	*Capital Ships	Tactics
Electronics	Flechette/Shotgun	Small Craft	*Vacc Suit
*Devices	Slug Pistol	Spacecraft	Vehicle
*Robotics	Slug Rifle/Carbine	Psionics	*Boats/Ships
*Spacecraft	Gunnery	Awareness	*Hovercraft
Engineering	Bay Weapons	Clairvoyance	Mole
*Construction	Heavy Weapons	Telekinesis	Submarine
Jump Drives	Screens	Telepathy	Ground
Maneuver Drives	Turrets	Teleportation	Zero-G

Skill Descriptions

Admin is skill at dealing with bureaucracies. gives knowledge of what forms to fill out, what department to contact, and what is considered essential paperwork. Very useful in high law areas.

Advocate is skill at dealing with the law. More specifically, it deals with the judicial system, legal tenets, courts and court cases, etc. It covers multiple types of judicial systems and who is responsible for what types of rules.

Animals is the skill for dealing with all forms of native and domesticated animals. It includes farming, care of, training, and riding different types of beasts.

Art is the skill that represents creative endeavors intended to evoke feelings in others. It includes physical expression such as dance, instrumental music, writing, singing, as well as visual arts such as photography, holography, and sculpture. Art could combine with Dexterity when doing an intricate dance, Education to recognize a musical derivative, or Intelligence to write a literary critique.

Athletics covers body control and body function. Influences how far or how fast one runs, how accurately one throws a grenade, or how effectively a person dives under a closing blast door.

Broker skill deals with buying and selling merchandise. Essential for traders, this skill determines the price paid for various cargoes and negotiating the best deal.

Carouse skill refers to how well one interacts socially. It addresses how likable someone appears, but includes things such as helping others to have fun or extracting information from someone in a social situation. It is more about directing the conversation to a particular topic and seems to be more of a casual inquiry.

Comms skill is a communication/information processing skill. It includes things like jamming other people's signals, but also accessing data repositories, developing search strategies for world data nets, tapping discreetly into other people's conversations, etc.

Computers is a cascade skill that involves manipulating programmable machinery. **Computer Security** is about protecting/breaking into programmable machines using exploits and/or hardware assistance. **Computer Programming** is about making a programmable machine do what is desired while not causing obvious errors. **Computer Repair** is about putting pieces of a computer (both hardware and software) back together again so it will function and takes place at the board level- ie. not chips, wires, soldering, etc.

Deception is a skill designed to fool others or to detect someone else's lies. It can include anything from fast talking, to sleight of hand to impersonation. Undercover officers pretending to be a smuggler would be a legal use of such a skill. Uniformed agents might depend more upon their ability to sense a lie.

Demolitions skill deals with using or defusing explosive devices. It combines with Dexterity for defusing a bomb planted on an airliner, education for identifying the type or source of a particular explosive, or intelligence for identifying the best place to plant a device.

Electronics is a cascade skill dealing with smaller, less programmable machines that use wires, soldering, or even individual chips on a circuit board. To replace a defective board or assemble a computer, use the **Computer Repair** skill. When the problem involves moving parts, use the **Mechanic** instead. **Devices** repairs, modifies, or creates new everyday specialized function units such as toasters, door locks, or video screens. **Robotics** focuses on the mechanics of intelligent self motivating systems or remote operated units (not programming, which is a computer cascade skill). **Spacecraft** includes all of the specialized electronic space systems not covered under engineering such as communications, sensors, etc.

Engineering is a cascade skill centered around building and designing mostly unpowered or dirty things like engines. **Construction** would be buildings, bridges, towers, etc. **Jump Drives** and **Maneuver (gravitic) Drives** involve large systems designed to push vehicles through space. **Power systems** include everything from steam through fusion. **Vehicles** include all forms of smaller land, sea, and aircraft operating in planetary environments. **Weapons** includes everything from the servos controlling laser turrets to the auto feed mechanism of a submachine gun.

Flying is a cascade skill to cover movement through an atmosphere. Airships, winged craft, rotor craft, grav craft, and personal flying devices/natural abilities are all varieties of travel which deal with the same conditions such as air currents, wind, etc. Each type of flying has its own specialty concerns and limitations which require special training to effectively utilize. Gliding, for example is a technique grav vehicles generally do not have.

Gambling is a skill at calculating odds and taking advantage of those odds to maximize profitability. It includes knowing the rules (gambling + Edu) of a game but also card counting (gambling + Int) or manipulating a dice roll (gambling + Dex).

Gun Combat is a skill encompassing all forms of handheld projectile weapons. **Archaic weapons** are devices which use physical energy to power the projectile such as a bow or slingshot. **Slug** weapons (one handed small **pistol**s or longer, more accurate **carbines/rifles**) use chemical energy to push a single small metallic object very

quickly. **Flechette/Shotgun** weapons rely on spreading many small projectiles to likely hit their target. **Energy weapons** using electromagnetic or plasma energy to cause damage.

Gunnery is a cascade skill which uses mounted heavier weapons to cause massive damage. **Bay weapons** deal with the largest spacecraft mounted systems. **Heavy weapons** are used primarily on vehicles or immobile mounts, includes indirect fire weapons but can include backpack sized personal weapons that cause massive damage. **Screens** are starship scale devices which block particular attack forms. **Turrets** are the most common starship scale weapon and includes barbettes.

Interrogate is a skill designed to extract information from a subject. It may be relatively passive such as questioning a bartender, or be much more active, such as threatening to mutilate a captive if they don't reveal the location of the kidnappers. Unlike carouse, people know they are giving information when interrogated.

Jack of all Trades (JoaT) skill is a generalist adaptability skill. Unlike other skills it always starts at 1 and may only ever go up to 3. It reduces the unskilled penalty by 1 DM per point for any attempted action. Thus a person with JoaT of 1 who has never seen a starship bay weapon in her life would only be at a -2 DM penalty to fire it. JoaT does not help anyone with at least a 0 in that skill and can never give a bonus to a skill, only reduce a penalty.

Leadership skill inspires loyalty and passion in followers or subordinates. Important in the military and any other large organization for executing a unified strategy.

Linguistics skill is the ability to parse and understand different languages. It includes both spoken and written words of both living and dead cultures as well as semantic and cultural meaning of the words.

Liaison skill deals with organization and logistics. It involves making arrangements for transporting necessary equipment to the right place, communication between organizations, and keeping everything on time.

Mechanic skill involves fixing broken objects with moving parts. It does not allow designing or modification, only diagnosing and repairing broken equipment. If it doesn't have moving parts (ie. electronics), mechanics are not trained to fix those problems.

Medicine skill involves diagnosing and treating diseases and injuries in sophonts. May be used to improve and/or replace natural sophont functions using genetic engineering (gengineering) techniques.

Melee is a cascade skill using physical objects and body parts to cause damage. **Sharp weapon**s include all forms of blades to cause injury while **Blunt weapons** rely on physical power and Newton's laws of momentum for causing damage. **Natural weapons** involve using body parts to cause injury or to immobilize an opponent during combat. Some aliens and many dangerous animals have natural weapons or melee advantages due to body construction.

Navigation skill allows direction finding from one location to another. Particularly vital for jump travel, it may also be used for terrestrial movement as well as plotting Newtonian courses within solar systems.

Pilot is a cascade skill which involves making any type of space faring vessel go. Subskills are based upon vessel size, with **small craft** covering less than 100 tons (such as fighters and shuttles), **spacecraft** up to 1500 tons (both sublight and jump capable craft), and **capital ships** greater than 1500+ tons (usually larger than players can afford, but does include large freighters as well as major warships).

Psionic Awareness skill may only be used when trained. It allows control and enhancing one's body for periods of time.

Psionic Clairvoyance skill may only be used when trained and is for observing other areas at a distance for visual, auditory or thought signals.

Psionic Telekinesis skill may only be used when trained and deals with remotely moving objects by will alone.

Psionic Telepathy may only be used when trained and involves mind to mind contact. Includes both willing and unwilling subjects.

Psionic Teleportation may only be used when trained and may move a psion's body and sometimes a small amount of additional mass instantaneously from one point to another without passing through the intervening space.

Recon skill allows identifying out of place and/or particular features in a location. Good for identifying individuals attempting to hide as well as recognizing what others are attempting to obscure.

Science skill deals with the major branches of knowledge that rely on experimentation as opposed to practice. **Life sciences** such as biology or psionicology deal with all forms of living organisms and how they function. **Physical sciences** such as chemistry and physics deal with the nature of matter and energy including how they interact. **Social sciences** such as sociology or psychology deal with how sophonts interact with one another and cultural rules or behaviors. **Space sciences** such as astronomy or terraforming deal with the nature of the universe and the many bodies which make it up. Note that these fields often overlap; neurobiology affects both biology and psychology, while geology may be a space or a physical science.

Sensors is a cascade skill for gaining information or performing operations remotely. **Instrumentation** is about interpreting data from various types of personal or vehicle sensors, whether it be ground penetrating radar, meson scanning, or a neural activity scanner. **Remote Operations** deals with drones of all sorts, including probes and repair drones. **Spacecraft** deals with all types of ship detection technology as well as counter counter-measures. It is all about extracting the vital information from the mass of irrelevant readings.

Steward skill is the ability to care for the physical needs of others. Useful for passengers on starships as well as many service industry jobs.

Streetwise skill allows a character to quickly recognize urban environments and power dynamics. It includes cultural knowledge about gaining information without offense as well as dealing with fringe or illegal groups or activities.

Survival skill is about living in a natural, wild environment such as jungle or desert. It includes hunting, trapping, finding water, plant identification (particularly edible plants), orienteering, avoiding being seen in a natural environment, etc.

Tactics skill relates to planning and decision making, particularly in regards to accomplishing a specific mission. Typically used to improve the success of military operations but may also include political manipulation.

Vacc Suit is a skill using a full body suit or exoskeleton with protective amenities that might be needed underwater, in a vacuum, or a hazardous environment. They often provide a certain amount of armor to the wearer and includes exoskeletons which increase Str and/or Dex, combat armor, and battle dress. The vacc suit skill sets a maximum skill level of 1 greater than the level in Vacc Suit for any activity performed wearing a suit.

If a Vacc Suit is used unskilled, it provides a -2 DM penalty on all skills attempted while wearing the suit. The penalty may be reduced to -1 DM if an additional time step is taken to reflect the extra coordination needed.

Vehicle is a skill cascade related to moving on or through the surface of a planet. **Hovercraft** are ground effect vehicles that float over a solid or liquid the surface and are very restricted by the height at which they travel. **Boats/Ships** cover any watercraft which travel on the surface of liquids, while **Submarines** are vehicles which travel under a liquid surface. **Ground** vehicles move along solid surfaces with different capabilities and include wheeled vehicles, tracked vehicles as well as walkers. **Moles** are used to travel under and through solid surfaces, particularly for mining but also for hollowing out celestial bodies for bases.

Zero-G skill is the capacity to function under no gravity conditions. Like vacc suit, it places an upper limit of 1 greater than the Zero-G skill for using any skills in the absence of gravity. It deals mostly with leverage and maneuvering oneself or objects with a lack of weight but the presence of momentum.

For readers familiar with Cepheus Engine, a number of skills listed in the System Reference Document have been deleted or changed. Archery has been included in Archaic Weapons. Battle Dress is now part of Vacc Suit. Bribery has been removed- Streetwise is adequate. Comms has been split into 2 different skill sets: Comms and Sensors. Comms is for running communications equipment, jamming other communications, translators, data repositories, searching libraries, etc. Sensors is a skill aimed at extracting information using radar, sonar, neutrino scanners, NAS, etc. and is broken down into shipboard sensors, remote ops, and handheld instrumentation. Computers are now a cascade skill broken down into programming, security and repair. All 3 are important in any high tech society. Electronics are now a cascade skill broken down into handheld devices, robotics, and spacecraft systems. Engineering is now a cascade skill, breaking it down into a variety of specializations that are often important aboard spacecraft. Flying is now a cascade skill dealing with all sorts of atmospheric travel, from personal grav belts, natural wings, or large airships. Piercing and Slashing weapon skills are now combined into a single Sharp weapon skill. Piloting is now a cascade skill based on the size of the ship being piloted. Spinal mounts do not exist on ships in the Cluster Variant rules- 100 ton bay weapons are the largest available. Watercraft specialties have been moved to Vehicles.

Stealth

Stealth is a common skill in many gaming systems. In some ways this does not make sense, as going unnoticed in a city is different than going unnoticed in a farm or wilderness environment. Therefore instead of a general stealth skill, a skill related to the environment which is being traversed can be used instead. Dexterity or Social Standing would be two characteristics that might be used to modify the skill depending upon the location. Thus Streetwise in a city, Medicine in a hospital, Survival in the wilderness, or even Animals on a farm could be used to try and fit in or move unremarkably in the different environments. The Recon skill is typically the same- the ability to notice someone who is out of place in their environment.

CHAPTER 3: PSIONICS

For characters in Cluster Variant campaigns, psionics covers a broad category of mental disciplines and paranormal abilities originating from the mind. Psionics are divided into five different categories, called talents. These talents are: Awareness, Clairvoyance, Telekinesis, Telepathy, and Teleportation. Note that some referees do not like 'magic talents' interfering with their science fiction world. It is up to the individual Referee if psionics are even available, much less how a character may acquire these talents.

Psionic Strength

Psionics are powered by the Psionic Strength characteristic (abbreviation Psi). This characteristic cannot be bought during character creation without the Referee's permission. If allowed, it may be purchased for 4 character points to a base of 5 which may then be increased either using character points or through psionic training. Using a psionic talent costs a number of Psionic Strength points, temporarily reducing the character's total. Characters who reach 0 psionic strength either through overuse or psionic attacks suffer psionic damage, reducing their maximum psionic strength by 1 point per excess damage. Expended Psionic Strength points are normally recovered at the rate of one point per hour, beginning three hours after the character last used a psionic talent or when a character regains consciousness. Psionic Strength lost to psionic damage heals at 1 point per day of complete rest. No mentally taxing job, particularly psionic activity, may be performed while recovering from psionic damage or no damage is healed. Psionic powers may be used while healing, but doing so prevents any strength gain for that day.

Psionic Training

Psionic talents may only be learned from those who already have the appropriate talent. During training, characters must choose or roll for their initial talents as with other skills. Some talents are particularly difficult to learn, however, and they receive die modifiers as given in the Talent Learning Table. Talents may be attempted in any order, but suffer a –1 DM per check attempted. If a character learns a talent, he gains that talent at level 0. Once learned, talents may be increased normally as any other skill.

Talent Learning Table

Talent	DM
Awareness	+1
Clairvoyance	+3
Telekinesis	+2
Telepathy	+4
Teleportation	0

Psionic Talents

There are several psionic talents, each of which works like a skill for the powers in question. A character trained in the use of psionics may develop her talents over time just as if they were normal skills. Unlike many other skills, psionic talents cannot be used untrained. The most common talents are:

- **Awareness** – control over one's own mind and body.
- **Clairvoyance** – perceiving at a distance.
- **Telekinesis** – mind over matter.
- **Telepathy** – reading minds and mental communication.
- **Teleportation** – moving from one point to another instantly.

To activate a talent, the psion must make a skill check using the appropriate talent (Telepathy, Telekinesis, etc), adding her Psionic Strength characteristic DM and any other DMs. Each talent grants access to all of its powers – a character with Telepathy 0 can use life detection, read surface thoughts or assault as the situation demands. She must also spend the listed number of Psionic Strength points if she succeeds, or one point if she fails. Note that using a psionic talent in combat is a significant action.

Many abilities are ranged. The Psionic Range table lists the number of points to project psionic abilities out to a given range – these must be paid as well as any points to activate the ability. Each talent has a different set of

costs other than Awareness – all Awareness abilities apply to the Psion only. Psionic range costs are paid based on range bands based on those used in personal combat or communication devices. These are defined in the Psionic Range Costs table.

Range	Distance	Clairvoyance	Telekinesis	Telepathy	Teleportation
personal	0- 1.5m	0	0	0	1
close	1.5- 3m	0	2	1	1
short	3- 12m	1	4	1	2
medium	12- 50m	1	5	2	2
long	51- 250m	2	7	2	3
very long	250-500m	2	9	3	3
distant	501m-5km	3	-	3	4
very distant	5- 50 km	3	-	4	4
regional	50-500 km	4	-	4	5
continental	500-5,000	4	-	5	5

Awareness

Awareness is the psionic talent which allows control of one's own body. Awareness powers never have a range – they are used only on yourself.

Ability	DM	Timing	Cost
suspended animation	0	1d6 sec	1/point
enhanced strength	0	1d6 sec	1/point
enhanced endurance	0	1d6 sec	1/point
regeneration	-4	1d6 rnd	1/point

Suspended Animation

Personal body activity may be suspended for varying periods of time. A character with Awareness may enter a suspended animation state (similar to cold sleep but without the intrinsic danger of death) by willing himself into it. Such a state continues for 7 days without need for food or water and with minimal air needs. Such a person could effectively travel in a low passage berth without actually undergoing cold sleep and its dangers. Suspended animation may be stopped at any time previous to its duration expiring, provided external stimulus is given to awaken the sleeper (such as a friend or a mechanical alarm). Awakening is not immediate, however.

Psionically Enhanced Strength

Psionic Strength points may be converted to normal Strength points on a temporary basis. The character makes the commitment, reduces his Psionic Strength by a specific number of points, and increases his physical Strength characteristic by 1+that number. In no case may the number of Strength points gained exceed twice the character's current level in Awareness+1, and Strength may not be increased beyond the character's racial maximum. Thus a psion with a 1 in Awareness could increase Strength by up to 4 points. Psionically enhanced strength reaches its new level immediately, remains at that peak for ten minutes, and then declines at the rate of 1 Strength point per minute until the normal Strength level is reached. This power works as normal on wounded characters but their Strength returns to the wounded level rather than the normal value. It cannot be used as a ‘quick heal'.

Psionically Enhanced Endurance
Psionically enhanced endurance works in exactly the same way as psionically enhanced strength except the characteristic boosted is Endurance rather than Strength, including its lack of healing ability.

Regeneration
Wounds and injuries may be healed rapidly. Strength, Dexterity and Endurance lost to injury, disease, poison or other trauma may be healed by the application of this ability, exchanging one Psionic Strength point to regenerate one characteristic point. Any amount of Psionic Strength may be expended with a single use of regeneration but it may not be used again until all expended Psionic Strength is recovered. Regeneration may also be applied to the growing of new limbs or organs to replace lost ones or to heal unrecovered old wounds suffered prior to psionic training. Regeneration may not be used to counteract aging. Awareness is not capable of affecting others and may not be used for healing or enhancing other characters.

Clairvoyance
Clairvoyance is the general talent which allows a person to sense events at some location displaced from the viewer. There are several levels of clairvoyant ability. Clairvoyance abilities allow eavesdropping activities as well as spying and detection-free exploration of situations. While telepathic life detection will determine the presence of living minds in a closed room, for example, sense will determine if a room is occupied or empty. Clairvoyant activity cannot be sensed by others, including by other psionic individuals.

Ability	DM	Timing	Cost
sense	+2	1d6 round	1+range
clairvoyance	0	1d6 round	2+range
clairaudience	0	1d6 round	2+range
clairsentience	-2	1d6 round	3+range

Sense
This is the basic ability to sense things at some point in the distance. A character will become aware of the most rudimentary characteristics of a location when applying this ability. For example, the Referee will give a basic description, without detail: ‘a room containing four dogs' or ‘an open plain with a tree, and no animals or men present'. The clairvoyant character must state the range at which he is applying his talent, and will generally sense the most interesting or important feature at that range. The Effect of the check determines the level of accuracy and clarity.

Clairvoyance
This specific ability allows actual remote viewing of a situation at some displaced point. Rather than the ‘snapshot' that sense gives, clairvoyance allows the psion to observe as if he was there in person. The clairvoyant character must state the range at which he is applying his talent. The Effect of the check determines the level of detail perceived and the duration in rounds of the vision.

Clairaudience
This ability is identical to clairvoyance, with the exception that it allows hearing instead of seeing.

Clairsentience
This power combines the effects of clairvoyance and clairaudience. The character is capable of both seeing and hearing a specific situation.

Telekinesis

Telekinesis is the talent which allows objects to be manipulated without physically touching them. Any manipulation is treated as if the person was physically handling the item but physical danger, pain, or other stimuli are not present. Telekinesis includes a limited amount of sensory awareness, sufficient to allow actual intelligent manipulation. The Effect of the check determines the duration of the telekinesis in rounds. Items may be thrown using telekinesis. Such items use the Ranged (thrown) category when attacking, using the higher of the distance between either the psion and the target or the object's starting location and the target. The amount of damage inflicted by such an object is given in the Telekinesis object; the psion can add the Effect of the attack's skill check to the damage inflicted. If a creature is the thrown object, both the creature and the target take the same damage on a successful hit.

Ability	DM	Timing	Cost	damage
lift 10g	+4	1d6 sec	2+range	none
lift 100g	+2	1d6 sec	3+range	1
lift 1 kg	0	1d6 sec	4+range	1-3
lift 10 kg	-2	1d6 sec	5+range	1d6
lift 100 kg	-4	1d6 sec	6+range	2d6
lift 1000 kg	-6	1d6 sec	8+range	8d6

Telepathy

Telepathy is the talent of mind-to-mind contact. It is subtle by nature but can also be used to bluntly crush the wills of those who oppose the telepath.

Ability	DM	Timing	Cost
life detection	+4	1d6 round	1+range
telempathy	+2	1d6 round	1+range
read surface thoughts	0	1d6 round	2+range
send thoughts	-2	1d6 round	2+range
probe	-4	1d6 min	4+range
assault	-6	1d6 sec	8+range
shield	-	-	-

Life Detection

The most elementary form of telepathy is the ability to detect the presence of other minds. Life detection enables a character to sense the presence of other minds, the number of minds present, the general type of minds (animal, human, and so on) and their approximate location. Life detection is reasonably sophisticated, and can distinguish intelligent beings from bacteria or unimportant animals in the area. It functions best at detecting intelligent minds. Shielded minds are undetectable (whether the shield is natural or artificial in origin). If an individual whom the telepath knows is 'life detected' they will be recognized.

Telempathy

The communication of emotions and basic feelings is accomplished by telempathy. This ability serves well in the handling of animals and beasts of burden but may also be applied as a psychological weapon against humans. Sending of emotions such as love, hate, fear, and others may influence other beings (although not necessarily in the manner desired). Telempathy also allows the emotions and feelings of others to be read by a character. The Effect of the check determines the strength of the projected emotion. Telepaths will always recognize when someone is using telempathy to bend their emotions but others will not. The change in mood may be dramatic

and inexplicable but most people will simply ascribe it to the mercurial nature of human emotions. Shielded individuals are immune to telempathy as they are all other Telepathy powers.

Read Surface Thoughts

The most widely known feature of Telepathy is the ability to read the thoughts of other individuals. Only active, current thoughts are read by this ability, with the subject (if herself not a telepath) unaware of the activity. Individuals with telepathic ability cannot be read due to the presence of their natural shields, unless they willingly lower their shielding. The Effect of the check determines the clarity of the telepath's perceptions.

Send Thoughts

Complementary to the ability to read surface thoughts is the ability to send thoughts to others. Such individuals need not themselves be telepathic to receive such thoughts. Telepathic individuals are normally open to such transmissions, but may close their shields against them if they become bothersome or threatening.

Probe

The application of great psionic strength will enable a telepath to delve deep into the mind of a subject and to then read his innermost thoughts. Questioning can be used in the procedure to force the subject to divulge specific information. The prober can easily determine deliberate untruths told (thought) by the subject. Probe cannot be used against a shielded mind. Again, the Effect of the check determines the clarity of the telepath's perceptions.

Assault

Violence may be dealt by a telepath. An unshielded mind, when assaulted telepathically, is rendered unconscious immediately and the character suffers 2D6 + Effect damage. Unlike normal damage, assault damage is applied to Psionic Strength (if the victim has it), then Intelligence, then Endurance. Psionic Strength and Endurance return as normal. Intelligence returns at the rate of one point per day. When a shielded mind is assaulted the two telepaths make opposed Telepathy checks. If the attacker wins, the victim suffers damage as normal.

Shield

All telepathically able characters learn how to create a mental shield which protects the mind against unwanted telepathic interference. Shield is automatically in force at all times and requires no Psionic Strength point expenditure to maintain. However, while a telepath has his shield up he cannot use any telepathic powers either. Shield can be lowered to allow telepathic contact or to use telepathic powers – this takes a mere thought (a free action in combat).

Teleportation

Teleportation is a talent which allows effectively instantaneous movement from one point to another point without regard to intervening matter. Psionic teleportation is limited to the movement of the teleported character's body and (for highly skilled teleporters) his or her clothing and other possessions. Teleportation always involves the movement of one's body to another location and additional load based on a character's strength becomes quite difficult to achieve. Teleportation involves certain requirements in order to be accurate, and to insure obedience of the laws of physics.

Ability	DM	Timing	Cost
unclothed	0	1d6 sec	0+range
light load	-2	1d6 sec	2+range
moderate load	-4	1d6 sec	3+range
heavy load	-4	1d6 sec	4+range

Pre-Knowledge of Destination: A character must always have a mental image of his or her destination before teleporting. This mental image is acquired by personally visiting the location first (or viewing it from a distance), having the mental image implanted in one's mind (by telepathy) by another person who has visited the destination, or by viewing the location through clairvoyance. The key to remember is that someone has to actually view the location – recorded images are not recent enough.

Energy and Momentum: Teleportation involves serious restrictions on movement in order to assure the conservation of energy and momentum. On planetary surfaces, teleportation is restricted to jumps of Very Distant range or less. Jumps at Very Distant range involve disorientation for a period of 20 to 120 seconds (2D6×10) after arrival. This restriction results from the law of conservation of momentum: on a rotating planet, two locations will have different rotational speeds and directions. A jump from a point on the Earth's equator to one of its poles would result in a total velocity difference between the character and his surroundings of over 3300 kph, which would lead to a messy death in short order.

Teleporting to or from vehicles traveling at high speed can also result in energy gains or losses. When teleporting into, onto or out of a fast-moving vehicle the psion takes damage as if the vehicle had rammed him at its relative speed. Changes in altitude (actually all movement to locations of differing gravitational potential) will result in potential energy changes causing changes in body temperature. A jump of one kilometer straight down will result in a temperature increase of 2.5 degrees Celsius per gravity; this is sufficient to cause extreme fever, brain damage, and even death. A jump up will cool the body by the same amount, with equally serious results. To be safe, a jump may not involve an elevation change of more than 400 meters, and multiple jumps should not involve a cumulative elevation change or more than 600 meters in one hour. These problems may be gotten around through the use of technological devices: energy compensators, heated suits, and other means. Characters may feel driven to invent such materials, commission their invention, or seek them out from others.

Psionic Technology

In a technological universe where psionic abilities are possible, the will be psionic related technology available, either legally or on the black market. There will also be devices which inhibit or even injure psionics if they are common enough. Depending upon the race, alien technology may be more psionically adapted than human equipment if psionics are more common among them.

Inhibitor Drug (TL 9): Psionic inhibitors dampen the brain's ability to generate psychic effects. A character who takes (or, more often, is forcibly injected with) an inhibitor drug suffers a –4 DM to all Psionic Strength checks and cannot regain Psionic Strength points. Each hour the character may make an Endurance check to throw off the effects of the drug with a +1 DM for every previous check. Inhibitor drugs have no effect on non-psionic individuals. The drugs cost Cr500 per dose.

Psi-Drug Table

Drug	TL	strength restored	strength boosted	cost (MCr)
standard	8	3	2	1000
double	9	6	4	4000
special	10	9	6	10,000

Psi-Drugs (TL 8+): These drugs restore Psionic Strength if taken when the character has already spent Psionic Strength points, or temporarily increase the character's Psionic Strength if taken when he is at full Psionic Strength, as given in the Psi-Drug Effects and Cost table. A character who takes more than one dose of Standard or Double Psi-Drug, or a single dose of the Special drug must make an Endurance check, with a –1 DM per dose of psi-drug taken in the last week (not including the one just taken). If the check is failed the character falls ill with a serious fever, suffering 3D6 damage and temporarily reducing his Psionic Strength by the effect.

Psionic Shield (TL 12): Any armor incorporating a helmet or hood can be outfitted with a psionic shield, blocking Telepathy. Unlike the Telepathy power shield, a technological shield is invulnerable to assault and blocks send

thoughts. It cannot be lowered without removing the helmet or hood containing the shield. Cr40,000. Buildings and vehicles can also be psionically shielded, but this is much more costly.

Teleportation Suit (TL 12): This device can be integrated into a suit of armor or worn as a form-hugging bodysuit. It rapidly cools or warms the body after a teleport, minimizing the damage from sudden energy gains or losses. The suit costs Cr50,000 and allows a character to jump up to 600 meters up or down in a single teleport, or up to ten kilometers in a single hour when using successive jumps.

Psionic Interface (TL 14): Any weapon or technological device can be outfitted with a psionic interface. A character using a device with a psionic interface can use his Psionic Strength DM instead of his Dexterity DM when using the weapon or device; a character without psionic ability cannot use the device. The character must either touch the device or use telekinesis to interact with it at range. Adding a psionic interface increases the cost of the device by 20%.

Psionics in Society

There are generally three different mindsets in which a society might view psionics. In generic terms, these categories are called Psi-Hostile, Psi-Neutral and Psi-Friendly. Naturally there are gradations within these categories, and not all psi-Hostile societies make telepathy a capital crime.

Psi-Hostile Societies

Humanity fears what it doesn't understand. In Psi-Hostile societies, some precipitating event has brought that fear into the court of public opinion, and as a result, psionics became banned. In the least offensive case, the use of psionics is forbidden and violations are punished as a serious crime. In the worst cases, governments and angry mobs often go on witch hunts, looking for psions and generally lynching, lobotomizing, imprisoning or exiling the offenders. Individuals may even be informants or potential informants, ready to call the local authorities at the slightest hint of psionic abilities in use. Governments in psi-hostile societies will publicly denounce the use of psionics, but it is likely that they might maintain a secret training facility due to the usefulness of such powers in espionage and warfare. In a Psi-Hostile society, even having sympathy for the plight of psionic people can cause an individual to be ostracized.

Psi-Neutral Societies

In Psi-Neutral societies, psionics does not have the stigma that they do in Psi-Hostile societies. The general populace recognizes the existence of psions, and considers it just another set of talents one can possess, much like athletic prowess or superior marksmanship. The use of psionics is fairly regulated by law level, as the public is aware that psionics have great potential for abuse, but such a culture generally holds a stronger view of personal responsibility and punishes abusers accordingly. Training in such a culture is easier to come by, but is treated much like a vocational school, in that only those who can pay for it are tested and trained. Psionic technology is more likely to be available in such a society, at the discretion of the Referee. Telepaths figure prominently in major corporate and government negotiations. Teleporters are used for quick and sometimes clandestine courier work. Corporate and foreign espionage require another layer of security to address psionic abilities. The accepted use of psionics in such a culture may see some dramatic changes in privacy and security.

Psi-Friendly Societies

In Psi-Friendly societies, psions are revered and psionic abilities are often considered a mark of the socially elite. It is likely that children are tested at various points during their childhood, and those with potential are taught to use their gifts from a very young age. Psionics are integrated at every level of society, and may even lead to a highly structured or caste-like culture where the upper classes are comprised of psionically gifted individuals. These classes may be further stratified based on an individual's psionic strength and/or mastery of psionic skills. Non-psions may even be persecuted as second-class citizens without voting or personal rights, in extreme cases. The actual culture of such a society, like anything else, is ultimately up to the Referee to determine and present.

Chapter 4: Equipment

Equipment is what separates the intrepid explorer from the forgotten corpse. The starship, the air raft, the hazardous environment suit, the portashelter, all of the goodies that separate technological societies from their bronze age past come down to equipment. Much equipment is common, everyday material: a teapot or robot vacuum. Others are more exotic, but all of it has a place in the stellar economy. The information in this chapter is meant as a guide to the referee regarding what is available and approximately what price things are. No book could possibly list all of the different things people may want to buy for their adventures. Players are going to want to buy materials that are not on the lists, and that is expected and normal. The referee should first decide if the item is available (laser pistols probably won't be available at any price on a TL5 world), then make up a price based on similar or related items found in these pages. In general, a higher tech, more powerful device should cost more than the base model. A TL15 mobile insect with full audio and visual transmitting capability should cost more than a basic TL5 listening bug. High tech societies also typically have more wealth available.

The universal currency across systems is the Credit (Cr). There very well may be a local currency whether it be gold, shells on a string, or totems representing cows, but to be part of the stellar economy there must be an exchange rate beyond barter. One of the biggest data items sent between systems is financial information, and for interstellar traders that system is essential and trusted throughout known space. For larger transactions there are thousand (kCr) and million (MCr) credit units which take a few weeks to clear, if the purchasers are unknown to the system banks. There is trust, and then there's foolishness.

Several types of possessions have their own special headings due to their complexity but are essential for exploration and survival. Chapter 4a covers general equipment and armor, Chapter 4b covers Personal Weapons and Explosives, while Chapter 4c covers Augments, Robots, and Drones. Vehicles construction and design rules are covered in Book 2, Chapter 5, while Spacecraft and Stations are even more complex and are covered in Book 2, Chapter 6.

Armor

Armor is designed to protect an individual from damage during combat. Combat is deadly, and advanced technology only makes it deadlier. Technology can also provide better defenses for sophonts. Weapon damage tends to increase faster than protective efforts, unfortunately, so that a good hit from a weapon on armor of equal tech level will usually penetrate the armor. There may be different manufacturers or different names, but most armor is very similar to one of the types below. Higher tech armor also provides some protection against radiation, an uncommon threat on a low tech battlefield. TL9 and above armor reduces radiation exposure by the same amount of protection it gives against other energy attacks (not including lasers or reflec armor). Those wearing armor requiring the vacc suit skill or greater than 10 kg require 2 standard seats.

Jack: short for jacket, it is a natural or synthetic fiber such as leather that has some resistance to penetration.

Shield: a traditional opaque wooden or relatively thin metal barrier which can be used on one arm to deflect incoming attacks. A Shield stacks with armor that is worn but incurs a -1 initiative penalty and a -1 penalty to all Dex related checks.

Mesh: A partial body suit or jacket lined with plastic or metal mesh to make it more resistant to penetration. It is obvious and somewhat bulky.

Cloth: A tear resistant, flexible material that spreads out an impact and can be worn as regular clothing.

Tower Shield: an oversized shield which provides more protection but has a -2 Dex and initiative penalty.

Flack Jacket: A heavy vest made of tear resistant cloth and mesh armor, it has minimal flexibility but still spreads out the impact over a larger area. Flack jackets provide better protection than cloth but are obvious like mesh armor.

Riot Shield: Similar to a tower shield but made of a lighter, transparent material, riot shields provide the same amount of protection as a tower shield but incurs only a -1 Dex and initiative penalty.

Porcupine Armor: This provides the same level of personal protection as mesh armor, but adds spikes to the outside of the armor. These spikes cause 1d6 damage against any attacker making physical contact with the target.

Vacc Suit: Not originally intended as armor, it is a full body suit with vacuum environment protection and 6 hr air supply and integrated dist radio. It provides significant protection but is blatantly obvious and not commonly worn on a planet or even aboard stations.

Exoskeleton: Not usually intended as armor, it primarily increases the wearer's functional Str and Dex but also provides some protection against weapons. For every 2D of damage done by a weapon, however, it loses 1 point of Str + Dex bonus (armor value is constant) due to being damaged. TL9-11 suits use 1 unit of power per hour, while TL 13+ use 2 units per hour using standard power cells.

TL	armor	bonus to STR and DEX	cost	extra power supply cost
9	1	+1	2,000	400
10	2	+2	8,000	600
11	3	+3	18,000	800
13	4	+4	32,000	1,200
15	5	+5	50,000	2,000

Ablat: ablative armor, it spreads the energy from energy weapons out over a larger area and protects the wearer. It loses some of its protective effect for every hit, though, and it cannot be easily repaired. It has a base value of 2, with a maximum of 8 against energy weapons when new. 1 point of armor is lost per hit by an energy weapon. Ablat protects against radiation at its current armor rating and is not further degraded.

Reflec: reflective armor, it reduces laser weapon damage by bouncing and diffusing the energy. It does not degrade per hit, but it is as obvious as wearing a mirror suit down a street. It has only a minimal armor rating against non-laser weapons and does not protect against more general radiation sources.

Hostile Environment Suit: provides corrosive environment protection. Useful aboard ships or in dangerous environments, but also available for protection when needed. Uses standard 6 hour air supply bottles.

Ballistic: a more advanced version of cloth armor that better spreads both energy and impact weapons. It is stiffer than regular clothing but is not nearly as obvious as other armors (requires a recon check to spot it).

Ceramic: Ballistic armor with gel-ceramic plates inside. Very obvious, but more effective than other forms of flack type protection. Often used by security forces and sometimes restricted by law level to military forces. It does not include environmental protection.

Co-Polymer: uses radiating fabric with non-conducting plates to block energy weapons and kinetic hazards, but is obvious. Includes vacuum environment protection, dist radio, 6 hr air supply, and drug injection port.

Combat Armor: Obvious like other enclosed suits, but very solid and thick with stacked metal plates and energy absorbing gel in between. Includes vacuum environment protection, integrated dist radio, 6 hr air supply, and drug injection port. Military use only, although sometimes available on the black market.

Full Polymer: maximizes protection against energy weapons. Designed to take advantage of advanced of gel-ceramic plates, it provides vacuum environment protection, v dist radio, 6 hr air supply, and drug injection port.

Battle Dress: A powered military suit with corrosive environment protection, it includes built in weapon stabilization to allow the wearer to use heavy weapons that normally require additional support. It also gives a +2 DM to Str and Dex as if wearing an exoskeleton and which is reduced by 1 point only when damage penetrates the battle dress. It has a v dist radio, drug injection port, 6 hr air supply and a built in computer for tactical advice (Tactics-1). Uses 2 units of power per hour.

Improved Battle Dress: State of the art military grade combat armor. It has insidious environment protection, built in stabilization, +4 DM to Str and Dex as if wearing an exoskeleton and which is reduced by 1 point only when damage penetrates the battle dress. It has a long range radio, drug injection port, 6 hr air supply, integrated grav belt, and a built-in computer for tactical advice (Tactics-2). Uses 3 units of power per hour.

Armor Type	TL	val*	cost (Cr)	weight (kg)	restriction	skill (if any)
jack	1	2	50	1	none	
shield	1	2	50	3	none	-1 Dex, -1 init
mesh	4	4	150	2	none	
cloth	7	5	250	2	none	
tower shield	3	4	600	5	none	-2 Dex, -2 init
flack jacket	7	6	500	3	none	
riot shield	7	4	400	1	none	-1 Dex, -1 init
porcupine armor	8	4	1000	4	none	
vaccuum suit	8	6	9,000	8	none	vacc suit 0
exoskeleton	9+	1-5	2-50,000	15(0)	none	vacc suit 0
Ablat	9	2/8	75	2	none	
Reflec	10	4/12	1,500	1	none	
plate mail	4	8	1,500	20	none	-1 Dex skills
hostile env suit	10	8	18,000	25	none	vacc suit 1
ballistic	11	8	2,500	2	none	
ceramic	12	12	6,000	5	sometimes	
co-polymer	12	9/18	12,000	10	sometimes	vacc suit 0
combat armor	11	14	20,000	18	always	vacc suit 1
full polymer	14	14/28	75,000	7	always	vacc suit 0
battle dress	13	22	200,000	25(4)	always	vacc suit 2
improved battle dress	15	26	500,000	30(0)	always	vacc suit 1, fly 0

* value before the slash is the amount of general protection. After the slash is protection against energy forms.

Clothing

Clothing comes in all forms, shapes, and sizes. In general, characters can buy whatever kind of clothing they want based on the planet they are on. No matter how fancy, a primitive dress won't be made out of ballistic cloth. The table gives a rough cost of work, quality, and fancy clothes at primitive, industrial, stellar, and high stellar tech levels. Note that in pre-industrial times clothing was a major expense for the poorer elements in society. Clothing costs drop and stabilize some, before rising again at later tech stages. Clothing also becomes more functional and more comfortable as tech levels progress. Some quality or fancy clothing such as leather or furs may provide some armor value at the referee's discretion. Other special types of clothing described below provide benefits beyond armor or appearance.

Camouflage Suits were developed by at least TL4 and reduces the chances of visual or aural detection (-2 DM recon). It is environment specific, so forest camouflage would not be effective in the desert. weighs 2 kg and costs 150 Cr.

Camouflage, Digital suits use an adaptive material which can provide soft cover and substantially reduce detection chances using visual or aural methods (-4 DM recon). TL11, weighs 3 kg, costs 5,000 Cr.

Cold weather gear is designed to protect sophonts from cold weather down to about -20 °C. Extreme cold weather gear protects down to -60 °C and is much heavier. High tech gear is as effective as other extreme weather gear but much lighter.

Clothing Table

period	work	quality	fancy
primitive	25	75	150
industrial	15	50	250
stellar	15	40	400
high stellar	20	60	600

Cooling suits were developed much later than cold weather gear and incorporate a refrigeration unit into the design and allows humans to function in temperatures up to 60 °C. It uses 2 units of power per hour. The extreme version functions up to 90 °C but requires 4 units of power per hour from standard power cells.

Exoskeletons are made of metal/copolymer and are worn on the outside of the body to increase STR and DEX physical characteristics. Commonly used to move heavier loads, they are often used by emergency personnel where robots lack the breadth of function needed for various situations. They also provide some protection to the wearer as they are found outside the body. If used in combat, for each 2D damage done by the weapon, a hit reduces the effectiveness of the exoskeleton by 1. All exoskeletons weigh 15 kg when unpowered, but this is normally accounted for by the exoskeleton itself. An exoskeleton power supply uses 1 unit of power per hour up to +3, and 2 units of power per hour above +3.

Gecko Suits are a combination of boots and gloves which use nanomaterials to improve the grip of hands and feet to provide normal traction on even sheer surfaces. They allow rapid climbing at normal movement rates. If the surface of the boots or gloves is damaged by extreme temperatures or hazardous materials such as strong acids, they may fail at the most inconvenient time. These articles are available at TL 11 and cost 1500 Cr.

Glide Suits are heavy jackets fitted with arm extensions and a durable membrane connecting the arms to the torso of the jacket itself. When used properly with flying (personal) skill, a sophont is able to glide and control the angle and direction of their flight. Landing and speed of descent are similar to that of a parachute but with more control. Serious and critical failures cause hard landings which can be fatal if control is not regained.

Grav Belts are harnesses designed to allow a sophont to fly under normal gravity conditions. It uses the flying (personal) skill and can move at up to 100 kph. Avians have adapted the technology to make a lower power version which allows them to fly under high gravity conditions up to 1.6g. It is a TL12 device, costs 25,000 Cr. If used by a human, the low power version is sufficient to allow flight in up to 1/2 gravity (0.5g). The full power version uses 4 units of power per hour for average sized sophonts and doubles for each size class larger (ie.

huge creatures use 4x as much power) or half as much per size class smaller (ie. small creatures use 2 units of power per hour). The lower power device uses half as much power as the full version.

Hydration Suit: This is a complete body suit designed for Merfolk so that they can operate safely outside of water. Able to be produced at TL5, it costs 150 Cr and weighs 1 kg while keeping the wearer safely hydrated for 1 week.

Mag boots: These boots are designed to stabilize a sophont in low or zero gravity conditions. Equipped with both magnets and velcro, most ships and low gravity planets are set up for their use.

Parachutes are cloth devices designed to slow the rate of descent of the wearer. They provide minimal control of direction and landing location.

Psionic Shield (TL 12): Any armor incorporating a helmet or hood can be outfitted with a psionic shield, blocking Telepathy. Unlike the Telepathy skill Shield, a technological shield is invulnerable to assault and blocks all related communication skills. It cannot be lowered without removing the helmet or hood containing the shield. Cr40,000. Buildings and vehicles may also be psionically shielded at TL14 or above, but this increases the cost by 25%.

Radiation Suit: this heavy clothing lined with thin, flexible metal sheets is designed to resist up to 100 rads of radiation per dose. It is quite bulky but does its job. It is not combat worthy and provides no armor protection.

Stealth Suit: The most advanced anti-detection technology available, the stealth suit gives soft cover and -4DM to all detection mechanisms and uses 3 power units per hour. TL15, weighs 5 kg, costs 30,000 Cr.

Teleportation Suit (TL 12): This device can be integrated into a suit of armor or worn as a form-hugging bodysuit. It rapidly cools or warms the body after a teleport, minimizing the damage from sudden energy gains or losses. The suit uses 1 power unit per hour, costs Cr50,000. It allows a character to jump up to 600 meters up or down in a single teleport, or up to ten kilometers in a single hour when using successive jumps.

Thruster pack (TL6): this is a chemical pack designed to move individuals in very low gravity (0.05g or less). It provides enough thrust to move a sophont for 6 hours. At TL10, the duration increases to 9 hours and at TL13 the duration increases to 12 hours. The thruster pack does not have enough strength to lift individuals in any conditions greater than 0.05g. Thruster packs may be built into some suits designed for space.

Clothing Type	TL	cost (Cr)	weight (kg)	skill (if any)
camouflage suit (specific)	4	150	2	survival 0
camouflage, digital	11	5000	3	
cold weather gear	4	200	3	
cold weather, extreme	5	600	6	survival 0
cold weather, techie	11	1500	2	
cooling suit	8	500	7	survival 0
cooling suit, extreme	11	1000	8	survival 0
Exoskeleton +1	9	2,000	15 (0)	vacc suit 0
Exoskeleton +2	10	8,000	15 (0)	vacc suit 0
Exoskeleton +3	11	18,000	15 (0)	vacc suit 0
Exoskeleton +4	13	32,000	15 (0)	vacc suit 0

Exoskeleton +5	15	50,000	15 (0)	vacc suit 0
gecko suit	11	1,500	1	
glide jacket	10	1000	1	flying 0
grav belt	12	100,000	5 (0)	flying 0
grav belt, low power	12	25,000	5 (0)	flying 0
hydration suit	5	150	1	
mag boots	6	100	.5	
parachute	5	250	2	
psionic shield	12	40,000	.5	
radiation suit	9	1,500	10	
stealth suit	15	30,000	5	
teleportation suit	12	50,000	2	
thruster pack	6	1000	4	zero-G

Communications Gear

Communications, networking, and information are even more critical in the future than they are today. Staying in touch with others and exchanging information is essential for everything from finding the best cargo to avoiding the obnoxious gate guard. Many devices such as hand computers, helmets, and suits come equipped with one or more types of communications. While most signals are encrypted, law enforcement everywhere want to be able to eavesdrop when they so desire.

Projectors are able to display an image against a solid surfaces from a computer screen or other device.

Holographic projectors excite atmospheric molecules to emit color in a 3D moving image without the need for a projection surface.

Hand voders are useful for communicating with organisms that do not share a common language or who are physically unable to pronounce words. Uplifted dolphins, for example, use voders for speaking.

Communications Devices Table

Device	TL	weight (kg)	cost (Cr)	effects
projector	6	.3	100	
holographic projector	11	1	1,000	
hand voder	7	.2	40	
loudspeaker	5	1	100	
laser microphone	7	1	750	
laser designator	6	2	1500	guides weapons
meson designator	12	5	5,000	guides weapons
local radio	5	.25	250	5 km
v. distant range radio	5	1	500	50 km
extreme range radio	6	2	1000	500 km
continental radio	7	4	2000	5000 km
extreme range meson	11	8	20,000	500 km
continental meson	11	16	40,000	5000 km
emergency beacon	5	.5	200	
EM tap	8	.2	500	50 km
meson tap	14	.2	3000	500 km
digital scrambler	10	,5	1500	
radio bug	5	.1	200	5 km, 10 hr
meson bug	14	.1	1000	500 km, 10 hr
radio jammer	7	1	2000	5 km radius
radio direction finder	8	2	1000	

Laser microphones are designed to pick up vibrations on rigid objects caused by sounds striking that object. Can pick up human speech up to 500m away.

Laser designators are military targeting computers that use pulse lasers to illuminate a target. They may be blocked by smoke, aerosols, or bad weather. Gives a guided munition an additional +1 DM to hit a target.

Meson designators are high tech targeting compters that use meson pulses to illuminate a target. They are not affected by smoke, stealth, aerosols, or other defensive technologies. Gives advanced guided munitions an additional +1 DM to hit a target. Weapons lower than TL12 are not designed to use this technology.

A **loudspeaker** is simply a sound amplifier allowing a voice to be heard over an extended area.

Radio communicators are designed to work at different ranges to allow two-way information exchange between systems. They are subject to EMP effects and are relatively easy to jam using electronic countermeasures. Radios with encryption included are 3x as expensive and become available 1 tech level higher. Weight and price are reduced by 80% at 3 tech levels higher. All radios have 100x the range in open space than they do on planets.

Radio headsets are headphones and microphones that do not have to be carried by hand but are otherwise like regular radios. They cost 50% more than handsets.

Meson communicators use sophisticated and nearly unjammable connections to exchange data similar to radios. Weight and price are reduced by 50% at 2 tech levels higher. Like radios, meson communications work 100x better in free space than when planet bound.

Emergency beacons are simple transmitters which allow a receiver to follow a particular signal.

EM taps are electronic devices that can hook a designated computer into a computer network at a distance and make the commands appear to be coming from within a local network. They communicate by encrypted radio signals and are jammable.

Meson taps are similar to EM taps except they are nearly impossible to detect or jam short of physically breaking the device.

Digital scrambler: used to confuse and open a digital locking device. A computer security or streetwise roll is required to use the device. A failure does not open the lock, and a failure by 2 or more causes an alarm.

Radio bugs are small, concealable listening devices which broadcast whatever sounds they pick up from a given location. They have a range of 50 miles and enough battery power for 10 hours of broadcasting.

Meson bugs are advanced, nearly undetectable concealable listening devices. They have a -2 DM to be detected using normal detection equipment. They can transmit up to 500 km for up to 10 hours.

Radio jammers broadcast a stream of random gibberish on whatever frequency desired to disrupt radio based communications within a modest 5 km area. The source of a jamming signal is usually easy to detect.

Radio direction finders are passive systems which use integrated antennas to determine the direction a signal is coming from, although distance to the transmitter requires to separated units unless the strength of the source is known. These may never be shielded from EMP as that would defeat their purpose.

Computer Table

model	TL	cost (Cr)
0	7	100
1	9	400
2	10	800
3	11	1600
4	12	3000
5	13	5000
6	14	12,000
7	15	25,000

Computers

The power of a computer is dependent upon the complexity of the programs it can run. Simple terminals may be good for looking up a cargo broker, but they are probably less than ideal for breaking into the bank account of a local crime lord. A computer can run a number of programs up to its rating. Computers are assumed to be laptop sized (1 kg) and have a keyboard for input with a display screen for output. A handheld computer weighs 0.1 kg, costs 50% more and is available one tech level higher than the equal powered laptop version.

Computers may be built specialized for one particular type of program. This increases the price of the computer by 25% but allows the computer to run the desired program at 1 level higher and not count that program against its running total. Computers at TL10 and above may be shielded from EMP for a 50% price premium. Computers with a datajack connection for stealthy computer input cost 10% more but gives a +1 skill when a user has a datajack augment.

Database programs are used to search and access large amounts of information. Many databases are available on the planetary web and may be searched using a comm skill check. For offline viewing or studying information when a connection is not easily available (say in jump space), information must be preloaded and intentionally brought into storage before it can be searched. Planning ahead is key. The cost for these varies, but it is the cost of the information itself rather than what is being done with it. Out of date information is worth less than timely information.

Security programs are designed to limit access to particular systems and protect systems from unauthorized use. More powerful defensive programs are sometimes self aware and are much harder to defeat than simple systems. At rating 0 (all computers), the security program has an average chance of being hacked. When purchased at level 1 for 500 Cr at TL 9 or above, the task becomes difficult (-2 DM). At level 2 for 2000 Cr and TL11 or above the task becomes very difficult (-4 DM), and at rank 3 for 15,000 Cr and TL 13, the task becomes formidable (-6 DM). There are rumors of rank 4 security programs which protect the most sensitive and restricted information of TL15 systems, but no reliable information about their capabilities is available.

Intrusion programs are designed to confuse or avoid security programs. Illegal on many worlds, intrusion programs give + DM modifiers equal to the rank of the program for attempts to circumvent security programs and access restricted data. Available at TL10, rank 1 intrusion programs cost 1000 Cr, TL12 rank 2 programs cost 4000 Cr, and TL14 rank 3 intrusion programs cost 30,000 Cr. Rumors of higher level programs have not been confirmed.

Intelligent Interface programs speed and are required to access to expert programs. They are artificial intelligence programs designed to display and translate pertinent information and voice commands to the computer. Rank 1 programs become available at TL10 for 250 Cr. Rank 2 programs become available at TL12 for 1500 Cr which can act independently on general commands and reason through consequences. Robots have the equivalent of an intelligent interface that may or may not be easily programmable.

Expert programs allow a computer user access to Int and Edu based skills at the computer's Expert rank -1. If a user already has that skill at a level above the computer, the computer gives the user a +1 DM instead. Expert

programs at rank 1 are available at TL9 for 2000 Cr, rank 2 at TL11 for 10,000 Cr, and rank 3 at TL13 for 30,000 Cr. These correspond to the availability of skill ranks to robots at the different tech levels.

Agent programs are AI constructs which have a computer programming and comms skill equal to the Agent program rank. It is limited to computer and comm checks, so while it may search databases and correlate similarities it may not aid a person carrying out a task. Rank 0 agent programs are available at TL11 for 500 Cr, Rank 1 at TL12 for 2000 Cr, and Rank 2 at TL13 for 20,000 Cr. Note that Agent programs are the same cost as intellect programs but are limited to computer programming and comms skills while Intellect programs also require separate Expert programs to be effective.

Intellect programs are more sophisticated Agent programs that can use Expert programs on computers. Intellect programs are true AI and are often found on automated stations or ships. Intellect programs may use a number of expert programs simultaneously equal to their rank, so an Intellect program operating a fighter might use piloting and gunnery at the same time. Intellect programs of rank 1 appear at TL12 with the advent of synaptic computing for 2000 Cr. Rank 2 programs are available at TL13 for 20,000 Cr and rank 3 at TL14 for 60,000 Cr. The high price is a consequence of their flexibility- they may operate any expert program based on Int or Edu, so a properly programmed Intellect with a large bank account can have a huge variety of skills.

Skillsofts are interactive databanks coded into datacrystals for use by expert programs and those with datajack augments. These provide improved skills up to level 4 for Int and Edu based skills only. Level 0 skillsofts cost 1000 Cr and are used only by robots or AI constructs, while Level 1 skillsofts cost 4000 Cr, Level 2 costs 15,000, Level 3 costs 40,000 Cr, and state of the art TL15 Level-4 skillsofts cost 75,000 Cr each. Expert programs and datajacks can only access skillsofts up to their own limitations, so at the current time Level 4 skillsofts are restricted to high end robots only. Datajack users require at least level-0 in a skill to benefit from a skillsoft. One must know the basics of a field in order to use the interactive database effectively. Individuals are only able to use one skillsoft at a time, and they cannot augment Str or Dex checks. While a skillsoft can provide the theory on how to do a double back handspring, the flesh hasn't practiced and the results would be ugly.

Drugs, Legal

Anagathics: Slow the user's aging process. Synthetic anagathics become possible at TL 15, but there are natural spices and other rare compounds that have similar effects on a number of worlds. Anagathics are illegal or heavily controlled on most worlds and expensive everywhere. One dose must be taken each month to maintain the anti-aging effect – if the character taking anagathics misses a dose they must make an immediate roll on the aging table as their body reacts badly to the interrupted supply.

Combat Drug: This drug increases reaction time and improves the body's ability to cope with trauma, aiding the user in combat. A character using a combat drug gives a -4 to the initiative total at the start of combat. They also allow reactions to have only a +1 initiative penalty instead of +2 and one extra minor action (but not a significant action). The drug also reduces all damage suffered by two points independent of armor. The drug kicks in twenty seconds after injection, and lasts 6+ 1-3 minutes. When the drug wears off, the user is automatically fatigued.

Fast Drug: Also known as 'Hibernation', this drug puts the user into a deep sleep, slowing their metabolic rate down to a ratio of 30 to 1 – a subjective day for the user is actually one month. Fast drug is normally used to prolong life support reserves or as a cheap substitute for a low berth.

Legal Drug Table

description	TL	cost (Cr)
anagathic	15	2000
combat drug	10	500
fast drug	10	200
met. accelerator	13	1000
psi-inhibitor	9	500
stim drug	8	50
truthtell	12	750

Metabolic Accelerator: This drug boosts the user's reaction time to superhuman levels. A character using slow drug in combat receives -4 to his initiative roll at the start of combat and reactions have a +1 initiative penalty instead of +2. The user receives 2 additional minor actions or one additional significant action, and all damage taken is reduced by 2 points independent of armor. The drug kicks in 45 seconds after ingestion or injection and lasts for 6+ 1d3 minutes. When the drug wears off, however, the user's system crashes; they take 2D6 points of damage and are exhausted.

Psi-Drugs (TL 8+): These drugs restore Psionic Strength if taken when the character has already spent Psionic Strength points, or temporarily increase the character's Psionic Strength if taken when he is at full Psionic Strength, as given in the Psi-Drug Effects and Cost table. A character who takes more than one dose of Standard or Double Psi-Drug, or a single dose of the Special drug must make an Endurance check, with a –1 DM per dose of psi-drug taken in the last week (not including the one just taken). If the check is failed the character falls ill with a serious fever, suffering 3D6 damage and temporarily reducing his Psionic Strength by the effect. A non-psionic who takes a psi drug hallucinates for 24 hours per point of boost strength.

Psi Drug Table

Drug	TL	strength restored	strength boosted	cost (Cr)
standard	8	3	2	1000
double	9	6	4	4000
special	10	9	6	10,000

Psi-Inhibitor Drug (TL 9): Psionic inhibitors dampen the brain's ability to generate psychic effects. A character who takes (or, more often, is forcibly injected with) an inhibitor drug suffers a –4 DM to all Psionic Strength checks and cannot regain Psionic Strength points. Each hour the character may make an Endurance check to throw off the effects of the drug with a +1 DM for every previous check. Inhibitor drugs have no effect on non-psionic individuals. The drugs cost Cr500 per dose.

Stim Drugs: Removes fatigue, at a cost. A character who uses stim may remove the effects of fatigue but suffers one point of damage. If stims are used to remove fatigue again without an intervening period of sleep, the character suffers two points of damage the second time, three points the third time, and so on. Stim drugs do not work against fatigue or exhaustion caused by combat drug or metabolic accelerator and cause 1d6 of additional damage if attempted.

Truthtell: TL12 drug which blocks the neural impulses required to censor thoughts and tell a lie. By removing inhibititions it makes the sophont tell an accurate representation of their thoughts, often in stream of consciousness. It does not compel speech, but it does prevent substituting one thought for another.

Drugs, Medicinal

Medicinal drugs generally require the Medicine skill to use properly – using the wrong drug can be worse than doing nothing. With a successful Medic check the correct drug can counteract most poisons or diseases, or at the very least give a positive DM towards resisting them. If the wrong drug is administered, treat it as a Difficult (–2 DM) poison with a damage of 1D6 in addition to the effects of the original condition.

Medicinal Drug Table

description	TL	cost(Cr)
antibiotic	7	10
antibiotic +1	10	50
antibiotic +2	13	200
anti-rad 100	8	1000
anti-rad 200	11	2500
anti-rad 300	14	6000
antivenom	8	100
antivenom +1	11	500
antivenom +2	14	2000
antiviral	9	100
antiviral +1	12	500
antiviral +2	15	2000
medicinal slow	11	500
panceas	8	200
panceas +1	12	1000
plastiflesh	13	800
raducer	13	2500
regenergel	12	250
regenergel +2	15	1000
vaccine	7	20
vaccine +1	10	100
vaccine +2	13	300

Antibiotics are drugs designed to kill off bacteria that have invaded the host's body. Initially developed around TL 7, they become more effective as technology advances. Note that some bacteria are resistant to antibiotics and biological weapons are particularly resistant (and incredibly illegal).

Anti-Radiation Drugs must be administered before or immediately after (within 1 hour) radiation exposure and will neutralize a set amount of radiation per dose. A character may only use anti-rad drugs once per day – taking any more causes immediate Endurance damage of 2D6 per additional dose.

Antivenom is a class of drugs that neutralize poisons and toxins in a person's system. It can be used most effectively when the specific poison is known (+1 DM) and is more potent at higher tech levels.

Antivirals are drugs designed to kill viruses that are living and reproducing in a host's cells. Coming into their own around TL9, they become more effective at higher technology levels and some viruses, particularly gengineered plague viruses, need advanced antivirals to be effective.

Medicinal Slow is a variant of the slow drug. It can only be applied safely in a sickbay where life-support and cryo-technology is available as it increases the metabolism to around thirty times normal, allowing a patient to undergo a month of healing in a single day. Note that this drug cannot accelerate adaptation time to augments because of a poor reaction between drug and gengineering or technological stimulants.

Panaceas are wide-spectrum medicinal drugs that are specifically designed not to interact harmfully. They can therefore be used on any wound or illness and are guaranteed not to make things worse. A character without medical training who uses panaceas may make a Medic check as if he had Medic 0 when treating an infection or disease. Panaceas are less effective than more specific treatments but are easier to apply and more general.

Plastiflesh is an artificial flesh that can be used to heal 1d6 physical characteristic points (Str, Dex, or End) if used within 10 minutes of injury. It may also be used to change one's appearance by adding flesh to cheeks, breasts, etc that looks natural. Requires at least Medicine 0 to be effective. Gives +1 DM for disguises.

Raducer is an advanced anti-radiation drug that can absorb and flush several common radioactive isotopes from a user to bring a sophont's current rad dosage back into an acceptable range. Upon a successful medicine skill check, the drug reduces rad dosage by 50 x effect of the roll. Raducer may only be taken safely once per week; it will cause 2d6 damage (but will still flush radiation from the system) for every excess dose taken.

Regenergel must be applied by a trained medic and restores 2x effect damage points to any physical characteristic over 6 hours even with normal activity. It may take the place of surgery for seriously wounded sophonts. TL12 regenergel may be used once per week. TL15 regenergel may be used every 3rd day and restores 3x effect points with a +2 DM for the skill check.

Vaccines are drugs which protect against viral or bacterial infection prophylactically. These can prevent many diseases from taking hold initially and are given to military or medical personnel who may be going into a dangerous situation. They do not protect a person once they are infected with a disease. Vaccines, particularly general purpose ones, must be boosted every so often to maintain their effectiveness.

Drugs, Illegal

Illegal drugs exist as long as there are willing buyers. Even though many drugs are addictive and destructive when taken over longer periods of time, they still have sophonts willing to take them for the feelings and benefits they offer. In several cases, the drugs provide an attractive benefit for a short period of time... but

then the physical price must be paid. Several of the more common drugs of choice are described below, but many worlds have their own favorites and/or local variants.

Dustspice: an addictive euphoric, a dose of dust can increase Int by +2 for 10-60 minutes and allows sophonts to concentrate to an extreme degree (give 1 free shift down in time frames). When it wears off, however, users receive -1 int, -1 dex, -1 end for 3d6 hours after the crash. Each dose costs 200 credits. If used more than once in any 1 week period, make an endurance check or become addicted. Addiction causes 1d6 End damage per week for 1d6 weeks if dustspice is not used at least twice per week (maintaining the addiction). Dustspice is the processed root of the duriska plant that only grows under tainted atmospheres and cool temperatures.

> People use drugs, legal and illegal, because their lives are intolerably painful or dull. They hate their work and find no rest in their leisure. They are estranged from their families and their neighbors. It should tell us something that in healthy societies drug use is celebrative, convivial and occasional, whereas among us it is lonely, shameful, and addictive. We need drugs, apparently, because we have lost each other.
>
> *Wendell Berry*

Hyperdexamine: (hydex) only works on humans and gives +2 Str, +2 End for 10 minutes (takes 30 seconds to activate). When hydex wears off, it causes 1d6 End damage. For each 5 uses of the drug, an extra pill is required to generate the effect; ie. on the 6th dose, 2 pills are required to gain the bonus, but causes 2d6 End damage afterwards. The drug is also addictive, so that if a character fails an Int check they HAVE to take the pill if available, otherwise be at -2 DM on all checks for a week. If under the supervision of a medic or doctor, users get +1 DM on their Int check, but tolerance to the drug gives a negative DM. ie. if it takes 3 pills to produce the effect the Int check is at -2. 4 weeks of not taking the drug or suffering the penalty will kick the addiction. Pills cost 100 Cr per law level of the planet, making it more expensive (and a better smuggling target) on high law worlds but where penalties for smuggling are higher as well. Some worlds without humans do not penalize hydex manufacture or use.

Dyno: a drug specifically engineered to affect Reptilians, it is a feared and hated by their race. It was developed as a means of psychological control, and a single dose will provide euphoric feelings for an entire day. When the reptilian is coming down from the drug, they must make an Int check at -2 DM or suffer an overwhelming desire for the drug, doing almost anything for it. Lack of the drug after even a single exposure causes excessive violence and despondency, a sort of extreme manic/depressive condition that lasts 1 day for every day spent using the drug. For every day spent using the drug, an additional Int check is required to wean oneself off of it. Medical care provides a +2 DM modifier for success, but it is a horrible, long process to break the addiction.

Sylvain: Not quite a drug, but rather a genetically engineered virus which integrates into a psion's DNA and will kill the individual unless the antidote is provided. The antidote costs 100 Cr/dose and is usually difficult to find. The infection takes 2 weeks to establish itself, but after that the infected individual dies 1 week after infection unless the antidote is taken every week. After the initial 3 days but before they die, the psion cannot use any psionic ability and is at -2 DM on all rolls due to their deteriorating condition. Espers have no mercy on the developers and purveyors of sylvain as it was developed specifically to enslave and control psionic individuals. Individuals may be cured during the initial 2 weeks before the virus is estabilished by taking TL12 or better medicinal antiviral. There is no known way to remove the virus once it becomes established.

Methamphetamine: Meth for short, provides +1 Str, +1 Dex, and +1 End for 1d6x5 minutes per dose. It is fairly inexpensive at only 100 Cr/dose, but as with other addictive drugs, the more it is taken the more it takes to get the same effect. For every 4 doses of meth taken, a sophont must take 2 pills to get the same effect. When the drug wears off, the user must make a Str or End check (user choice) or take 1d6 damage to that characteristic

every hour until the check is made or the individual falls unconscious. For every extra pill taken, the check is made at -1 DM. It takes 3 weeks per pill to break the addiction cycle.

Silver Bullet: This is one of the most expensive drugs at 1500 Cr/dose and requires TL 14 facilities to produce, but it speeds up the body's metabolism, particularly it's healing rate. It will basically heal d6+2 each of End, Str, or Dex in only d6 hours. If any of a particular attribute is replaced, though, the user must make a check against that attribute after 12 hours or lose 1d6 points every hour until a check succeeds. Seriously wounded individuals taking silver have been known to die from it. It is considered by most doctors to be too dangerous to use on injured patients due to the serious risk of death that can result.

Jain: is a distillate made from the pollen of the hivisk flower which only grows on hot worlds with at least 70% water on the surface. The pill costs 50 Cr per law level and it works on ectotherms (warm blooded) sophonts. Jain causes an uncontrollable lust to overwhelm a person. The compulsion is so powerful that an individual loses 1 End and 1 Str every hour until either they fall unconscious or have sex. Unconsciousness lasts 4-24 hours. Fortunately Jain is not addictive. Because the lust induced by Jain is generally pleasurable, the seedier side of towns often have establishments that will provide both the drug and the means to fullfill their lust.

Ecstasy: costs 150 Cr/dose and is a potent narcotic that lasts 2d6 hours. It is an empathic drug that lowers telepathic barriers and gives the user a +1 DM on any carouse, gambling, or liason check. It also gives the user a -2 DM on all checks to resist any psionic discipline. If taken by a psionic, ecstacy gives them uncontrolled telempathy where they cannot block out the feelings or emotions within range. This adds a +2 DM to their telempathy skill (or temporarily gives them the skill at level 0 even if they do not normally have that skill), but gives a -2 DM any other psionic discipline used due to emotional interference. When the drug wears off, all users suffer a -2 Int penalty until they succeed at an intelligence check, rolling once every 6 hours to throw off the side effects of the drug. Note that the -2 Int penalty may change their normal DM modifier for their Int characteristic. Doubling the dose doubles the effects, but tripling the dose knocks the character unconscious for the 2d6 hours instead. Throwing off the effect of the drug now has a -6 int penalty, however.

Personal Devices

backpack: wearable storage device which keeps hands free while allowing restricted access to what is in the pack. Typically holds a 40 L volume, although a 60 L version is available for 75 Cr.

boots: footwear for the discerning adventurer. At TL4 and below, typically made of leather with rubber insoles. By TL9 higher tech fabrics and soles make footwear more comfortable and more supportive. Fancy footwear is 100% more expensive. Double the price again to include magnets in the boots to ease walking in low gravity space conditions. Note that all vacc suit designs include electromagnets.

canteen: useful anywhere and found in various shapes, holds 1 liter of water or other liquid.

Personal Device Table

device	cost	effect
backpack	50	40L storage
boots	50	
canteen	20	
comcard	15	
disguise kit	150	+1 deception
fire extinguisher	200	
flare	10	
flashseal	200	
grapple	50	
hand calculator	15	
HUD	200	
identichip	30	
lighter	5	
loudspeaker	75	5x volume
map	varies	
mirror 10x10cm	20	
morphochip	350	
rope, filament	150	100m, 300kg
rope, normal	50	25m, 300kg
rope, cord	50	100m, 100kg
shackles	75	
starlight drops	250	6 application
wristwatch	25	

comcard: TL7 identity card with a magnetic strip for storing small amounts of data. Generally includes a photo ID plus key information, bank codes, rank, clearance, etc. Often encrypted.

disguise kit: includes makeup, latex, colored lenses, hair dye, etc to alter one's appearance to a modest degree. Provides +1 DM for deception checks and is additive to any bonus using plastiflesh.

fire extinguisher: used in rescue or repair robots, it uses chemicals to put out smallish fires.

flare: available in several colors, burns for 5 minutes and used to provide light or as a signal.

flashseal: TL11 welding agent which comes in a string form. When activated, it welds 2 nearby metal pieces together into an airtight seal. Originally designed to seal leaks in spacecraft, it is very good at sealing any portals or surfaces that someone doesn't want opening easily.

grapple: launched rope attached to multi-pronged hook used to secure a connection to something else.

hand calculator: A sure sign of low tech thinking, these are largely replaced by computers and watches.

HUD: TL11 heads up display, is a transparent screen that can fit onto any set of glasses or goggles and provide a private personal computer screen for wirelessly receiving a transmission from a nearby computer device.

identichip: TL9 implanted ID used by some organizations to store important information such as rank, clearance, etc to limit access for certain devices or areas in a less obvious way than a comcard.

lighter: small flame able to ignite flammable material.

loudspeaker: used to create high intensity sound. May be informative or distracting.

map: guide for traveling in a defined area. At TL2, usually handwritten on paper or vellum. By TL5, maps are larger and either fold out or arranged in books. At TL7 or greater, usually stored in a computer.

mirror: a small, reflective metallic surface (often glass coated) that bounces back visible light. May be either 10cm x 10 cm OR 1cm x 1cm angled mirror on a 30 cm rod. Useful for signaling, seeing around corners, etc

morphochip: TL9 device that is a programmable, clonable identichip. Highly illegal, it is used for counterfeiting an identity to fool surveillance software..

rope, monofilament: very thin, high strength rope for many purposes. Tensile strength 300 kg

rope, normal: low tech fiber rope for many purposes. Tensile strength 300 kg.

rope, cord: low tech fiber rope for some purposes, but not strong enough to support most sophonts. Tensile strength 50 kg.

shackles: variously designed restraints for different sophonts or other organisms. They are meant to restrain and prevent movement, not cause damage.

starlight drops: liquid drops which amplify available light and function as light intensifying goggles for 1d6 hours per dose. Causes a silvery sheen to appear over the eyes while functional.

wrist watch: At low tech levels it works as a personal chronograph. By TL9 it incorporates a low end model 0 computer and short range radio communicator. At higher tech levels it can add computer power 2 ranks lower than that available at the current tech level (along with the short range radio communicator) for 25% more cost.

Sensory Aids

ballistic goggles are used to project where a target will be at some point in the future. TL10 Gives a +1 DM when using a ranged weapon on a moving target.

binoculars: enhances the distance at which things may be seen. TL5 Adjustable magnification from 5x to 15x. TL9 version costs 2x and magnifies 5x-50x.

bioscanner: The bioscanner 'sniffs' for organic molecules and tests chemical samples, analysing the make-up of whatever it is focused on. It can be used to detect poisons or bacteria, analyse organic matter, search for life signs and classify unfamiliar organisms. The data from a bioscanner can be interpreted using the Sensors skill or the appropriate Science skill.

camera: device for capturing images. At TL4 they are restricted to still images on photosensitive film. Images are digital and moving by TL7 (with sound), and holographic at TL10.

chemical sensor: a sophisticated elemental/molecular analyzer that can calculate the makeup or concentration of a particular substance. TL12, 2 kg

densitometer: TL14 The remote densitometer uses an object's specific gravity to measure its density, building up a three-dimensional image of the inside and outside of an object. It requires the Sensors skill to interpret data.

electromagnetic probe: TL10 This handy device detects the electromagnetic emissions of unshielded technological devices, and can be used as a diagnostic tool when examining equipment (+1 DM to work out what's wrong with it) or when searching for hidden bugs or devices such as concealed lasers. The Sensors skill can be used to sweep a room for bugs.

Sensors Table

Sensor	cost	weight
ballistic goggles	2,500	.2 kg
binoculars	25	.2 kg
bioscanner	350,000	3.5 kg
camera	200	.2 kg
chemical sensor	7,500	2 kg
densitometer	20,000	5 kg
electro probe	1000	.1 kg
flashlight	10	.1 kg
infrared goggles	200	.2 kg
intensify goggle	750	.2 kg
medical scanner	15,000	2 kg
metal detector	300	1 kg
motion detect	500	1 kg
NAS	35,000	10 kg
neural recorder	100,000	4 kg
oil lamp	10	.5 kg
perim. alarm	4,000	6 kg
radar/lidar	10,000	3 kg
radiation count	300	1 kg
rangefinder	200	.5 kg
sonar	3000	5 kg
torch	10	.5 kg

flashlight: also known as an electric torch, this device projects a beam of cool light directed by the user. Note that the light is visible from farther away than the light allows a sophont to see. A diffuser allows the light to be spread over an area instead of only in a beam. May be powered by a battery or fuel cell and uses 1 unit of power per 12 hours.

infrared goggles: extends vision into the IR spectrum to identify heat sources. TL6 May be combined with binoculars to extend visual range for double the price.

light intensifying goggles: electronically amplifies a light signal to make even dim light bright. May be combined with binoculars for double the price. TL7 User is blinded for 3d6 seconds if a bright light is seen through the goggles. The blinding effect may be removed with overload protection for double the price.

medical scanner: analyzes the health and physical characteristics of living organisms by touching them and compares them to a database of known information. TL13

metal detector: The TL6 version finds metals based upon their ability to detect changes in electromagnetic fields, while high tech devices use a simplified densitometry reading and can detect non-conducting metals.

motion detector: device used to identify moving objects or organisms within its field of view. May be preprogrammed for basic functions, to connect with other devices, or, with a successful sensors check, be used to gain information about the moving object.

neural activity sensor (NAS): This device consists of a backpack and detachable handheld unit, and can detect neural activity up to 500 meters away. TL 15 The device can also give a rough estimation of the intelligence level of the organism based on brainwave patterns including artificial intelligences. The data from a neural activity scanner can be interpreted using the Sensors skill.

neural recorder: TL14 headset which, when plugged into a hand computer, is used to visualize what a person is thinking about. Useful for communications with a handicapped individual or to make a record of what a person is thinking. It does not compel truth, only shows what the person wishes others to see.

oil lamp: low tech light/heat source that uses hydrocarbon fuel. Burns for 8 hours and costs 5 Cr to refuel.

perimeter alarm: set of thermal, motion, electromagnetic detectors which sound an alarm if any organism or device larger than 10 kg approaches without a coded transmitter.

radar/lidar: TL7 detector that uses lasers and/or radio waves to locate objects in the environment.

radiation counter: a TL5 version simply measures radiation exposure at the detector and reports the result. The TL9 version requires the Sensors skill to make maximum use of it but will identify the type and often the source of the radiation based on its energy signature. The TL9 version costs 3x more than the early version.

radio direction finder: localizes the emission of electromagnetic radiation by intensity and direction. TL8

rangefinder: used for surveying, determines accurate distance using active signals and parallax.

sonar: detector using sound waves to localize objects in the environment. Particularly useful underwater.

torch: low tech light/heat source which burns for 1 hour. TL2

Shelters

advanced base: a prefabricated set of 16 modules 1.5m x 1.5m x 2m tall that may be organized into any layout desired. Available at TL8, it comes with life support and supplies for 6 people for 7 days. Each pressurized module takes 45 minutes to assemble or 12 hours total. Able to withstand anything from vacuum to hurricane force winds, including precipitation and all but the most extreme temperatures. Modules may serve as temporary airlocks.

Shelter Table

Shelter	Cost	Weight
advanced base	50,000	6000 kg
prefab cabin	10,000	2000 kg
pressure tent	2000	25 kg
Tarp	10	1 kg
Tent	200	3 kg

prefabricated cabin: a set of 16 1.5m x 1.5m x 2m tall unpressurized modules that assemble into any layout required and provides excellent protection from precipitation, storms, severe winds, and temperatures down to -10 °C. Developed at TL6, it takes 6 hours to assemble or disassemble and provides basic supplies for 6 people for 7 days. Does not provide a breathable atmosphere or airlock.

pressure tent: a TL8 device, pressure tents are enclosed shelter for 2 people that provides standard atmosphere and temperatures for up to 24 hours. Good protection from precipitation, storms, and up to strong winds. Opening the tent causes it to depressurize. May be recharged/repressurized using standard air bottles

tarp: a heavy duty, hard wearing, waterproof covering 4m x 2m for outdoor use as a protection against water.

tent: basic TL2 shelter from precipitation, moderate winds, and temperatures down to 0 °C. Listed cost is for 4 people, but may be scaled up in price to shelter at least 20 human sized sophonts.

Survival Equipment

air bottle: provides an average sized sophont 6 hours of breathable air supply. Bottles containing tainted atmosphere are colored red, while standard atmosphere mix is colored blue. Yellow bottles are unusual gas mixtures for particular species. Extended bottles last 24 hours, cost 4x as much, and bulge out from a unit.

Survival Equipment Table

Equipment	cost	weight
air bottle	5	0.2 kg
artificial gill	4000	4 kg
basic life support	100	2 kg
combination mask	150	--
filter mask	10	--
heater	300	3 kg
inertial locator	200	.5 kg
magnetic compass	10	--
MRE	10	1 kg
oxygen regulator	200	5 kg
purification tabs	25	--
rescue bubble	600	3 kg
respirator	100	--
solidfoam	100	2 kg
still	750	5 kg
swimming equip	200	1 kg
vaporator	2500	10 kg

artificial gill: developed at TL8, it allows oxygen to be extracted from the water in atmosphere types 4-9.

basic life support supplies: contains food, water, CO_2 scrubbers, etc to support 1 person for 1 day in an enclosed, pressurized shelter.

combination mask: a TL6 device it mixes the functions of a filter mask and a respirator allowing breathing in most noncorrosive atmospheres containing oxygen.

filter mask: a TL4 device, it allows breathing of tainted atmospheres and protects against dust and smoke. Nose filters at TL7 perform the same function at twice the price but are less obvious and harder to remove.

heater: TL4 device converting hydrogen or hydrocarbon fuel into heat to protect 6 sophonts from even very cold temperatures for 6 hours.

inertial locator: a TL9 device which measures a location offset from some known starting point given basic world information. It does not require any external signals to determine location so is useful anywhere.

magnetic compass: developed at TL3, it is device used in navigation to identify 'north'. Note that 'north' may not corellate with the axis of rotation for a world but only provide a defined offset based upon the magnetic field of a planet which is still vital for navigation.

MRE: meal, ready to eat. Provides food for 1 average size sophont for 1 day. Comes in many varieties to satisfy dietary preferences and needs. Autoheat packaging costs 50% more. Shelf life measured in decades.

oxygen regulator: a TL5 system, it uses standard air bottles and a mask for environments without oxygen such as exotic atmospheres or underwater. Works in any unbreatheable atmosphere.

purification tabs: small chemical packets which kill all bacteria and viruses and which bind to and neutralize most simple pollutants and toxins. It is not effective against complex toxins. One tablet purifies 4 liters, and comes in a set of 10 tabs.

rescue bubble: TL9 emergency shelter for up to 3 people that is autoinflating. Includes a 24 hour emergency beacon, survival toolkit, flashlight with diffuser, and oxygen for 24 person-hours of survival. Often carried on watercraft and spacecraft as emergency lifeboats. May be recharged using standard power cells and air bottles.

respirator: TL5 small compressor with mask which allows breathing in very thin or (when operating in reverse) very dense atmospheres.

solidfoam: TL10 material used to seal leaks in spacecraft and other airtight containers. It is similar in strength to styrofoam, but is capable of plugging leaks until more permanent repairs can be made. It expands to fill 50x its volume. If extruded into air, the low density of solidfoam easily floats on water.

still: TL5 device using hydrogen or hydrcarbon fuel to boil water or other liquid and collect the condensed, purified material. Removes almost all contaminants. Purifies 5 L per hour of operation.

swimming equipment: provides a wetsuit, fins, mask, etc to enhance maneuverability in the water. TL3 Adds +1 DM to Athletics skill checks in the water. Oxygen must be provided separately.

vaporator: TL9 device used to collect purified water from humid air or contaminated water supply. Can produce 20L per hour from contaminated water, 10L per hour from humid air, or 1L per hour from arid air.

Tools

atmospheric sampler: portable device used to perform basic analysis on gases/particulates in atmosphere. Requires containers (5 Cr each, 0.1 kg) to bring material back for further analysis. Basic analysis at TL8 and listed cost, advanced analysis at TL11 and costing 100% more.

cargo hoist: portable lift for moving heavy objects up to 4 tons. At TL3, uses animal or human power with pulleys and cables but 1/3 the price. At TL6, it uses motors and a small vehicle. At TL9, grav plates reduce the weight and allow easy manipulation but at 3x the price.

cooler: device built starting at TL4 used to chill food or specimens to between 0 and 4 ^{o}C.

drill: TL5 device which uses a replaceable bit (3 Cr each) to make a hole in solid material. Replaced at high tech with plasma or fusion cutters.

forensic autolab: gives a rapid and detailed report on recent activity in an area, with the amount of data dependent upon a successful sensors check. Failure gives inaccurate information, while the amount of detail in the information depends upon the effect of the sensors check. Basic analysis unit is available at TL11 and listed cost, with an advanced unit at TL14 which gives more information at +1 DM and costing 100% more.

freezer: TL5 device used to preserve food or organic samples for long periods of time. Cools to -20 °C.

geologic sampler: used to perform basic soil/ground analysis within 1 meter of surface. Developed originally at TL9, an advanced TL12 device gives a +1 DM but costs 100% more. Requires containers (5 Cr each, 0.1 kg) to bring material back for further analysis.

hydrology sampler: used to perform basic analysis on liquids. Basic analysis at TL8 and listed cost, advanced analysis at TL11 and costing 100% more. Requires containers (5 Cr each, 0.1 kg) to bring material back for further analysis.

fusion cutter: 5x faster than a plasma cutter, this TL14 cutter uses fusing hydrogen to cut even very hard material.

lockpicks: comes in mechanical (TL4) and digital (TL10) versions for the two types of locks. Provides +2 DM to open the appropriate type of lock on a Streetwise skill check. Digital version is 5x more expensive. Analog picks do not aid on digital locks and vice versa.

plasma cutter: at TL12 uses a plasma beam to slowly cut through even hard material. Works as a drill if left in one location.

Tools Table

Aid	cost	weight
atmo sampler	5,000	20 kg
cargo hoist	600	10 kg
cooler	200	8 kg
drill	100	2 kg
forensic autolab	15,000	20 kg
freezer	500	10 kg
geologic sampler	10,000	20 kg
hydro sampler	2,500	20 kg
fusion cutter	75000	8 kg
lockpicks	20	--
plasma cutter	10,000	10 kg
port. generator	2500	50 kg
radio scanner	500	4 kg
recip. saw	300	4 kg
shovel	25	3 kg
spare parts	250	10 kg
toolkit	1000	10 kg

portable generator: device used to provide a temporary power source for personal scale equipment and costs 10 Cr to refuel. The TL6 version uses hydrocarbon fuel, and can provide energy for 12 hours generating 5 energy units per hour. The TL8 fuel cell version uses hydrogen fuel, generates 10 energy units per hour and carries enough for 3 days of use but costs 3x as much. The TL10 fusion version provides enough hydrogren for 1 week and generates 20 energy units per hour at 10x the cost.

radio scanner: allows the monitoring of electromagnetic frequencies for particular signals. It cannot decode information by itself, but may be fed into a computer using intrusion or security program analysis with a successful comms check.

reciprocal saw: available at TL5, uses a replaceable cutting blade (3 Cr each) to slice through materials.

Shovel: device used to move 10 kg of loose dirt per minute or 3 kg of packed earth in the same time

Spare parts: include bits and pieces of everything, from wiring to levers to gears to integrated circuits. Rather than detail exactly what is available, keep a variety of pieces on hand so when things break the parts are around to replace them. No mechanic or engineer should be without them. Repairs without spare parts are at -2 DM.

toolkit: include a variety of tools related to doing particular types of jobs and are fairly broad and overlapping in scope. Toolkit types include: carpentry, mechanical, electronic, medical, forensic, engineering, scientific, surveying, construction, farming, survival, domestic, artistic. Tools are required to carry out many tasks such as repairing a vehicle or performing first aid; soldering without a soldering iron has serious penalties. Without proper tools, a person with a hammer treats everything like a nail.

4b-Weapons (Personal)

Personal weapons include all forms of weapons which may be carried by an individual for use. This includes everything from daggers to small nuclear devices. Some weapons (particularly supported weapons) require a mechanical support to assist the operator but may be picked up and moved without a vehicle. Most of the weapons are military in origin, but voyagers and adventurers are likely to encounter military and/or ex-military people in many of their day to day activities. Note that just because a weapon is available at a particular tech level does not mean that it is easily obtainable or legal. Law level of the planet or system will play a major role here. Nuclear weapons are a relatively low tech device but are massively illegal in most of known space and likely to draw intense scrutiny (if not immediate lethal force) in any jurisdiction where one is discovered. Even on a relatively lawless asteroid base, walking the corridors toting around a PGMP is usually going to cause either fear or anger (probably both) but will most definitely attract attention.

> I have a very strict gun control policy: if there's a gun around, I want to be in control of it.
>
> *Clint Eastwood*

Armor Piercing Projectiles

Chemically powered or rocket powered ammunition may be made armor piercing by using harder materials for constructing the projectile and increasing the propellant. This increases the armor penetration ability of the weapon. Magazine capacities are unchanged, although AP slugs are more expensive than normal rounds. Flechette ammo and shotgun shells cannot be made armor piercing due to their design. Armor piercing projectiles have a minimum tech level required for their production, although higher tech level ammo is able to be used in older low tech weapons. Advanced AP rounds have turned the tide of more than one combat where a supposedly inferior force proved more effective than anticipated. Armor piercing ammo is illegal for civilian possession on most mid or high law worlds as its sole goal is to make weapons deadlier against protected targets. Note that these AP values are for personal weapons only- vehicular weapons use a different formula.

type	TL	armor ignored	cost
normal (AP)	6	3	+50%
super (sAP)	9	6	+100%
ultra (uAP)	11	9	+200%

Modifying Energy Weapons

Lasers weapons have an inherent tradeoff- the more power used per shot, the fewer number of shots that can be contained in the same capacity battery. Companies makes one set of optimizations, but individuals may decide that a different balance is better for them. It is possible to increase the effects of a given laser by changing optics, power draw capacitors, and internal mechanisms so that it can handle the increased capacity (up to a point). It requires an EDU + engineer (weapons) check to make said modifications in 4-24 hours and costs more than the base weapon. A failed check ruins the weapon; a failed check with an effect of -3 or less and it appears fine until fired at which point it fails spectacularly. Stunners cannot be increased as more intense is not really the intent. Modifying man portable artillery is not possible; fusion weapons and plasma energy are difficult enough to channel that even weapon and energy specialists would need significant backup before adjusting those weapons.

damage modifier	energy use modifier	cost
+1	2x	+25% base
+2	4x	+50% base
+1D	10x	+100% base

Weapon Accessories

Basic weapons may be upgraded by adding various useful things to make them more effective at a particular job. Other weapon options may make it more secure, or be able to be remotely operated. Various combinations are also possible, but just because two weapons have the same damage characteristics does not mean that the two weapons are comparable.

Grenade Launcher (TL8) This device is an underslung grenade launcher that fits below the barrel of a rifle. Carbines are too small to take a grenade launcher upgrade. This launcher has a single grenade magazine and may take any type of rocket propelled grenade. This device costs 1000 Cr and takes 3 minor actions to reload.

Laser Sight (TL8) This optical magnifier and red laser sits atop any direct fire weapon and gives an additional +1DM bonus for any attack that has been aimed. It costs 100 Cr at TL8 and weighs 1 kg. At TL10, an X-ray laser replaces the red laser (making it invisible) and makes it more stealthy for 200 Cr.

Silencer (TL8) This device hides the sound made by firing a slug thrower (-4 DM to detect). It only works on weapons with an Auto rating of 0 and recoil less than 3. It costs 250 Cr.

Gyrostabilizer (TL9) This addition reduces the recoil of any ranged weapon by 2 at a cost of 300 Cr.

Secure Weapon (TL10) This addition is a security feature which requires a security authorization before it can be fired. This could be an iris scan, DNA scan, fingerprint, password, or comm code depending upon the unit. Costs 100 Cr.

Intelligent Weapon (TL12) This adds computer/0 to any weapon for Cr 1000. The TL14 version upgrades this to computer/1 for Cr 5000. Using the specialized computer option to give it an expert skill rating of +1 or +2 to assist the operator is a normal use of this enhancement.

Item	TL	Mass(kg)	Cost(Cr)	Effect
grenade launcher	7	3	1000	under rifle barrel single shot grenade launcher
laser sight	8(10)	1	100 (200)	+1 DM for aimed attacks
silencer	8	1	250	-4 DM to detect the noise of firing
gyrostabilizer	9	2	300	-1 recoil
secure weapon	10	-	100	locks a weapon to restrict who may use it
intelligent weapon	12(14)	-	1000 (5000)	computer/0(1) for an expert skill rating
folding stock	6	0.5	100	allows a rifle or carbine to be stored compactly
shoulder stock	5	1	75	gives a pistol the range of a shotgun
telescopic sight	5	0.5	200	gives +2 DM for aiming at longer ranges
heads-up display goggles	10	0.3	5000	laser+electronic sight, works with any weapon
HUD contacts	13	-	10,000	heads up display in contact lens size

Folding Stock (TL6) Available for carbines, rifles, and shotguns, this will allow long guns to be folded into a smaller, less obvious form. Costs 100 Cr and weighs 0.5 kg.

Shoulder Stock (TL5) This device can be attached to a pistol to create a crude carbine arrangement for better accuracy at longer ranges. This allows the pistol to be treated as a shotgun for range purposes, costs Cr75, weighs 1 kg, and prevents it from being holstered. Attaching or removing the shoulder stock requires 1 minute.

Telescopic Sight (TL5) This is an optical sighting system to increase accuracy at longer ranges. Gives +2 DM when used in the two highest range classes of the weapon only. It costs 200 Cr and weight 0.5 kg

Heads-up Display Goggles (TL10) HUD goggles are the equivalent of laser and telescopic sights with all weapons used by the character. HUDs will work with any hand-held non-melee weapon. This device costs 5000 Cr and weighs 0.3 kg.

HUD Contacts (TL13) These work exactly like HUD goggles and cost Cr 10,000, but are the size and weight of contact lenses.

Melee Weapons

Melee weapons are usually considered hand-to-hand weapons where combat is taking place at close quarters or within extended reach due to the length of the weapon. Close quarters weapons are smaller and far easier to conceal compared to the larger weapons. Stillettos can be carried unobtrusively, but anyone walking around with a 3m halberd will not be surprising anyone with their weapon. Melee weapons typically use the blunt or sharp weapons skills and either strength or dexterity characteristics.

The **heft** of a weapon is an initiative modifier when using that weapon. Small weapons may be used quickly and repeatedly, while larger weapons take more recovery time and are more clumsy than smaller ones.

A **fighting staff** is a stealthy, spring loaded expanding titanium staff that extends to 2m from a 25cm base. Much less obtrusive than a standard staff and may be hidden on a sophont much more easily.

Monoblades and monoknives are extremely sharp weapons that have a monomolecular edge which accounts for their increased damage compared to normal bladed weapons.

Vibroblades and vibroknives have sharp edges but include a high frequency oscillator in their hilts which makes them vibrate back and forth dozens of times a second. They usually produce a high pitched audible whine as they vibrate. Just like sawing back and forth with a knife can make some things easier to cut, the same effect happens automatically with vibroblades. Energy is measured in points per hour of use.

Energy blades and energy knives are the pinnacle of melee weapon development. Instead of a physical edge, energy blades use a cycling confined plasma field to slice through solid matter more effectively than any type of blade. They make a louder, lower pitch whine than vibroknives do. Solid materials such as armor and parrying weapons are still able to blunt the effectiveness of energy blades and knives. These weapons also consume power on every hit, and running out of power in the middle of a fight is not a good idea.

Stun weapons are non-lethal weapons that deliver an energy blow to the target creature. Instead of causing damage, the stun weapon damage + the effect of the attack roll is compared directly to the Endurance of the target. If their Endurance is less, they are immediately knocked unconscious for (2+effect)*10 seconds during which time they are defenseless. Energy is consumed per hit.

Weapon	TL	Range	Damage	Heft	mass (kg)	energy	Cost (Cr)
club	0	close	2d6	0	2	0	5
dagger	1	close	1d6+2	-1	0.2	0	10
stilletto	2	close	1d6+2	-2	0.1	0	50
staff	1	extended	2d6	1	2	0	5
fighting staff	8	extended	2d6	0	1	0	30

spear	1	extended/thrown	2d6+1	2	1.5	0	10
axe	2	extended	2d6+2	2	6	0	60
blade	2	close	2d6+1	0	0.5	0	50
bayonet	3	extended	2d6+1	1	3	0	20
halberd	3	extended	4d6	3	5	0	75
rapier	3	extended	1d6+4	-2	0.5	0	100
cutlass	3	extended	2d+2	0	1	0	100
broadsword	3	extended	4d6	2	6	0	300
mace	3	extended	2d6+2	3	5	0	20
monoblade	8	extended	2d6+5	-1	1	0	1000
monoknife	9	close	2d6+2	-2	0.5	0	750
vibroblade	11	extended	5d6	1	2	2	3500
vibroknife	12	close	3d6+1	0	1	1	2500
energy blade	14	extended	6d6	-1	2	4	7500
energy knife	15	close	4d6	-2	1	2	5000
stunstick	9	close	2d6	0	0.5	1	300
stunstaff	9	extended	2d6+3	1	2	2	800

Thrown Weapons

Thrown weapons are directly powered by a sophont's body to reach their target. The wielder uses their Athletics skill with Dexterity modifier to hit their target and may add their strength modifier to the damage if contact with the weapon itself causes damage. Grenades and nets, for example, do not do damage from contact so their damage is not increased by the strength modifier.

Weapon	TL	Range	Damage	mass(kg)	Cost(Cr)
dagger	1	thrown	1d6+2	0.5	10
spear	1	thrown	2d6+1	1.5	10
net	3	extended	entangles	1	20
net	7	thrown	entangles	1	50
net	10	thrown	entangles	1	150
net	14	thrown	entangles	1	500
throwing star	4	thrown	2d6	0.1	25
grenade	5+	thrown	varies	0.5	varies

Nets: includes both set and thrown versions and are approximately 4 square meters. If a net hits the target, they are entangled and have a -2 DM for all actions other than escaping the net using a dexterity, strength, or athletics (strength) test. Lower tech nets are made of rope/string and are relatively easy to escape (+2 DM). As tech levels go up, netting is made of twisted titanium strands (+0 DM), crystaliron mesh (-2 DM), or bonded superdense webbing (-4 DM). Small blades may be used to help escape from the nets, but anything larger cannot effectively be used. The higher the tech level, the more effective the assistance. Blades give +1 DM, monoknives give +2DM, vibroknives give +3 DM, and energy knives give +4DM to escape.

Throwing stars are small, light, razor edged blades that are easy to hide and are often coated in some type of poison or biotoxin to neutralize their target.

Grenades in this category of weapon are single use offensive devices which affect a small area. They commonly do explosive damage, but grenades may have several other effects as well. See the entries on particular types of grenades for a better description of their effects and what happens when they miss.

Archaic Ranged Weapons

Archaic ranged weapons use their own table under gun combat. They rely upon converting physical energy into propelling a projectile at a target. Modern versions of archaic weapons can combine using physical energy to propel the object with more advanced effects when the projectile reaches its destination.

bow: simple piece of carved, curved wood with a piece of string pulling the ends together. The wood bends when the string is pulled back, allowing the force to be transferred to an arrow containing fins to keep the arrow flying straight. They are easy to produce.

crossbow: similar to a bow, it uses a crank mechanism and piece of wire with heavier materials to increase the amount of force generated. Bolts and arrows are very similar, but different in configuration and not interchangeable. Because the crank mechanism is difficult to operate, it takes 4 minor actions to reload a crossbow.

Weapon	TL	Range	RoF	Damage	Mass(kg)	Recoil	Magazine	Cost(Cr)
bow	1	pistol	1	by arrow	1	2	1	60
crossbow	2	rifle	1	by bolt	3	5	1	100
speargun	5	pistol	1	by arrow	3	1	1	100
slingshot	1	shotgun	1	by slug	0.5	0	1	25
net thrower	7	short	1/4	entangles	8	3	1	250

speargun: uses essentially a bolt that is powered by compressed gas and is particularly useful underwater. It can use any type of bolt typical for a crossbow, but rope bolts are particularly used for fishing.

slingshot: an elastic band is hung between 2 arms of a Y shaped mechanism. The elastic is pulled back, and the force is used to propel a slug or mini grenade forward at substantial velocity.

Net throwers propel a 10 square meter net towards the target (uses the heavy weapon skill). A melee weapon in hand when the net thrower is activated may make a parry attack on the net; if successful against the appropriate tech of the net, the net was successfully cut open as it approached the target.

Archaic Ranged Ammo

Weapon	TL	Damage	Mass(kg)	Cost(Cr)
arrow	1	2d6	0.1	3
rope arrow	4	1d6+1	0.1	25
bolt	2	3d6	0.1	3
rope bolt	4	2d6	0.1	25
sling stone	1	1d6	0.1	0-1
lead bullet	1	1d6+2	0.1	3
net	varies	entangles	4	varies

Modern Ammunition for Archaic Weapons

Technology has obviously improved since the original development of archaic weapons. Minigrenades are approximately the mass of a modern arrow, bolt, or slingshot slug and can be purchased in those form factors. These may be ideal for certain specialized purposes such as low tech planets, high law worlds that limit the use of grenades but not arrows, or for underwater combat using a compressed gas speargun. Minigrenades shaped as bolts or arrows cost 100% more than the standard thrown version of the minigrenade (which may be used by a slingshot directly) and are available at the same tech level. In addition, rope arrows and bolts may be used to snare a target creature or anchor a rope to an inaccessible location. At TL4 rope arrows and bolts may only have 10m of rope attached. This increases to 25m of monofilament line at TL7 and 50m of molecular weave line at TL10.

Slug Pistols

For millennia one of the best ways to kill someone is to hit them with something hard moving fast, and that hasn't changed in the far future. Chemically propelled slug throwers are still effective weapons, although more modern designs boost their effectiveness even further. With advanced projectiles and/or devices designed for zero-G operation, slugthrowers show no sign of losing popularity. These weapons use the gun combat/slug pistol specialization and modified by the user's dexterity score to hit.

Antique pistols are single shot weapons using gunpowder as the propellant. Very low-tech design.

Revolvers are highly reliable, low tech weapons favored for years for their simplicity and effectiveness.

Zip Gun: A one-use pistol made from makeshift materials, the ‘zip gun’ is a catch-all title used to describe any one-shot homemade firearm. Zip guns have a -1 DM to attacks.

Submachine guns are small automatic weapons that can fire multiple round bursts (see personal combat rules). They are usually restricted at their tech level and are typically only carried by people expecting a fight.

Autopistols are the standard sidearm of newly spacefaring civilizations. Effective and reasonable capacity.

Cartridge Pistol: A revolver-style pistol that fires shotgun ammunition at very close range. It comes standard with an attached arm brace to help absorb some of the considerable recoil created by the weapon’s discharge.

Snub pistols are low velocity pistols designed for zero-G environments and no recoil for shipboard use.

Tranq Pistol: Fires a dart containing an anesthetic which will knock a target creature out in d6+2- effect minutes if the target fails an END test. A successful END roll results in no affect. The affect is blocked by armor, so unless the dart is armor piercing even small amounts of armor provide complete protection. AP must be sufficient to completely penetrate the armor to have an affect. Higher tech drugs may affect a target faster.

Body pistols are made of composite compounds and intended to thwart most weapon searches. Receive a -2 DM for attempts to detect them.

Accelerator Pistols use self-propelled ammunition to reduce recoil and kick in zero-G environments. Combines a high rate of fire and reasonable damage with excellence for space combat.

Flechette Pistol: A small and light pistol that uses air pressure to all-but-silently hurl tiny slivers of metal with great accuracy. Often considered to be an assassin’s preferred sidearm due to its silence.

Gauss Pistol: Gauss pistols use electromagnetic coils to accelerate metallic darts to hypersonic speeds. Gauss weapons are lightweight, efficient, and deadly.

Weapon	TL	Range	Damage	Auto	Recoil	Mass(kg)	magazine	Cost(Cr)
antique pistol	4	pistol	3d6-6	no	2	2	1	100
revolver	4	pistol	3d6-3	no	0	1	6	150
zip gun	5	pistol	2d6-1	no	2	0.5	1	80
submachine gun	5	shotgun	2d6	4	2(3)	3	40	500
autopistol	6	pistol	3d6-3	no	0	0.5	15	200
cartridge pistol	7	pistol	3d6+3	no	4	1.5	2	300
tranq pistol	8	thrown	2d6	no	0	1	2	150
snub pistol	8	pistol	3d6-3	no	0	0.2	6	150
body pistol	8	pistol	3d6-3	no	-1	0.3	6	500
accelerator pistol	9	pistol	2d6+1	4	0	2	40	400
flechette pistol	9	pistol	2d6-1	4	-1	1	20	250
gauss pistol	13	pistol	3d6+1	8	-1	1	40	500

Pistol Ammo

Ammo Type	Mass(kg)	Cost(Cr)
accelerator round	0.01	15
cartridge	0.05	10
flechette round	0.01	1
gauss round	0.01	2
tranq round	0.05	10
slug	0.01	2

Long Guns

Long guns are slug throwers that are typically fired with 2 hands. Carbines are a shorter version of certrain guns which use the same ammo as the long version but do less damage because of the way the shorter weapon handles the round. Carbines have the advantage that they may be fired one handed which may be important if someone is hanging on to a rope or trying to drive while returning fire. Recoil numbers in parentheses are for firing one handed; otherwise 2 hands are needed to keep better control of the weapon. Slug rifles are used for hunting on many different worlds, but as long guns become more advanced they are typically used by individuals expecting a fight. Higher law level worlds will typically bar the military style long guns before simpler slug throwers.

Antique Carbine: A breach-loading short rifle-like weapon often used by horsemen or cavalry to fill the role between pistols and rifles. Unless the weapon is especially well made, it will have a -1 DM to attacks. Antique carbines require a successful Slug Carbine check to reload.

Autocarbine: Fast firing slug throwers that only require one hand to fire, but can be terribly inaccurate without a second hand to steady it. Autocarbines are considered to be a good standard firearm for most security forces.

Tranq Rifle: Fires a dart containing an anesthetic which will knock a target creature out in d6+2- effect minutes if the target fails an END test. A successful END roll results in no affect. The affect is blocked by armor, so

unless the dart is armor piercing even small amounts of armor provide complete protection. AP must be sufficient to completely penetrate the armor to have an affect. Higher tech darts may affect a target faster.

Flechette Carbine: A short-barreled weapon capable of shooting metallic slivers at longer ranges than the standard pistol.

Weapon	TL	Range	Damage	Auto	Recoil	Mass(kg)	magazine	Cost(Cr)
antique rifle	3	rifle	3d6-3	no	3	6	1	100
antique carbine	4	pistol	3d6-3	no	2(4)	4	1	80
shotgun	4	shotgun	4d6-1	no	3	4	6	200
rifle	5	rifle	3d6	no	2	5	6	300
autocarbine	5	shotgun	3d6-2	no	2(4)	4	20	200
autorifle	6	rifle	3d6	no	1	5	40	500
tranq rifle	7	pistol	2d6+2	no	0	4	3	200
assault rifle	7	assault	3d6	4	1	4	40	1000
sniper rifle	7	rifle	3d6+3	no	2	5	4	600
accelerator rifle	9	rifle	3d6+1	no	0	2	15	900
accelerator carbine	9	shotgun	2d6+2	4	0(1)	1.5	20	750
flechette carbine	9	shotgun	2d6+2	4	0(1)	3	40	500
flechette rifle	9	rifle	3d6	4	0	5	80	800
gauss carbine	12	assault	3d6+3	8	1(2)	3	40	1200
gauss rifle	12	rifle	4d6+1	8	0	4	80	1500

Accelerator Carbine: Also known as a gyrojet carbine, accelerator carbines are designed for zero-gravity combat. They discharge tiny missile munitions that leave the barrel with minimal velocity and recoil before accelerating to higher impact speeds.

Gauss Carbine: Not as bulky as the gauss rifle, gauss carbines fire high-velocity projectiles using electro-magnetic rails. Gauss carbines are the favored weapon of boarding marines based on size and ease of use.

Sniper Rifle: A high-calibre rifle designed for penetration and visceral damage, not rapid firing. With an integrated silencer and magnification scope, long-distance targets can be killed quietly and efficiently.

Long Gun Ammo

Ammo Type	Mass(kg)	Cost(Cr)	Effect
slug	0.02	5	
shotgun shell	0.05	10	
shotgun slug	0.10	20	+1 damage, -1 DM to hit, +2 recoil
tranq round	0.05	20	roll vs End or fall unconscious 10 minutes
flechette round	0.01	3	
gauss round	0.02	3	
accelerator round	0.02	30	

Energy Weapons

Energy weapons are direct fire weapons that project beams of pure energy; usually light, but can be plasma or even fusing hydrogen. To fire, energy weapons need power packs. Small chemical power packs hold enough energy to fire the weapon several times, but then must be discarded. Rechargeable units may be recharged by any decent generator or vehicle. If a power pack does not have enough energy to fire the weapon, the pack is drained completely and the weapon does not fire. Power pack designs are standardized to work in any device. Other than than the FGMP, listed weapon masses do NOT include the power supply. Weapons may be plugged into a vehicle or generator to have essentially unlimited power. The FGMP fusion generator may be used to power or recharge other powerpacks when not being used to fire the FGMP.

Laser weapons generate a beam of coherent light which is used to heat and damage target tissues. Weapons differ in their energy requirements and amount of damage, but otherwise are very similar. Lasers are interrupted by smoke or aerosols and do less damage in those circumstances. Transparent substances such as windows may reduce laser damage somewhat but do not otherwise interfere with the light beam. Stagger lasers are repeating lasers which can use automatic fire but otherwise behave just like other lasers.

Energy Weapons

Weapon	TL	Range	Damage	Auto	Recoil	Mass(kg)	energy	Cost(Cr)
laser pistol	10	pistol	3d6	no	0	3	1	1500
improved laser pistol	13	pistol	3d6+2	no	0	2	2	2000
stunner	9	shotgun	2d6	no	0	2	2	500
improved stunner	12	shotgun	2d6+2	no	0	2	4	750
advanced stunner	15	shotgun	3d6+1	no	0	2	5	1000
laser carbine	9	assault	4d6	no	0	4	2	2000
improved laser carbine	12	assault	4d6+2	no	0	3	4	3000
advanced laser carbine	15	assault	5d6	no	0	2	5	4000
laser rifle	9	rifle	5d6	no	0	5	4	2500
improved laser rifle	12	rifle	5d6+2	no	0	4	8	4000
advanced laser rifle	15	rifle	6d6	no	0	3	10	6000
stagger laser	12	assault	4d6	4	0	7	6	5000
improved stagger laser	15	assault	4d6+2	4	0	6	8	8000

Stunners are electrical discharge weapons designed to incapacitate a target. A target makes and End check against the stunner damage (after being reduced by armor), with a failure causing the character to fall to the ground and be unable to function effectively for 1+effect effect minutes.

Power packs

Standard power packs weigh 0.5 kg and may be exchanged as a minor action in combat. Backpack units carry 10x more energy than a hand unit, weighs 10x as much and costs 10x as much. Rechargeable cells have the same energy as an equivalent chemical battery and cost 5x as much. Since they can be recharged, however, they are more cost effective over time. Purchasing higher tech power packs on a lower tech world is doable, but the price doubles per point of tech level difference and they will often not be available. For example, a TL 12 chemical power pack on a TL 10 world costs 4x listed amount, or 600 credits (2 TL difference x2). A TL15 portable fusion generator weighs 10 kilos and costs Cr 100,000. When not being used to power a FGMP, it can recharge other batteries for later.

TL	Energy	Cost(Cr)	Rechargeable(Cr)
5	10	60	300
8	20	60	300
10	40	90	450
12	80	120	600
14	120	150	750

Heavy Weapons

Heavy weapons are separated from personal weapons primarily by their damage potential. Heavy weapons require different techniques than slug throwers or energy weapons, but because of their utility are used the galaxy over to cause damage and mayhem. PGMPs and FGMPs fall under the category of heavy weapons despite being energy weapons. Heavy weapons are powerful enough that they will occasionally be mounted on vehicles.

RAM grenade launchers are the same mass (7kg) as a standard grenade launcher but has a 6 grenade magazine that costs 6x the price of the grenade and each magazine weighs 6 kg. Magazines are typically loaded with a single type of grenade and are labeled on the outside. There are a wide variety of grenades described under the vehicular combat rules. Launched grenades weigh 1 kg each and cost 3x the price of a standard grenade.

Mini grenade launchers are smaller (3kg) than standard grenade launchers, cost the same, and hold 10 grenades in a 2 kg magazine. Magazines cost 10x the price of each grenade and each magazine generally comes loaded with one type of minigrenade. There are a wide variety of minigrenades described under the vehicular combat rules. Launched minigrenades are 3x as expensive as standard grenades of each type.

Flamethrowers are devices used to throw flaming, sticky liquid at an opponent. Flammable material will be ignited. Anything that suffers damage from a flamethrower will suffer half damage, rounded down, for the following round, 1/4 for the second round, etc, until the liquid is removed using a significant action (rolling on the ground works) or damage is reduced to 0. Armor reduces the amount of damage done each round. Refueling a flamethrower costs 500 Cr (Cr20/use).

Small, Short Range Rockets are single shot heavy weapons designed to take out vehicle scale targets or above. Individuals up to 3m behind the person firing a shoulder launched rocket take up to 3d6 damage due to rocket backblast. These are man portable and described more fully in vehicles and vehicular weapons.

Mortars are parabolic arc indirect fire weapons designed to hit targets some distance away. Mortar shells are basically modified grenades 4x the mass and costing 3x the base price. Mortars have the same types of ordinance available at the same tech levels as standard grenades. Mortars use the gunnery/heavy weapons skill to hit because they are indirect fire weapons, but are small enough to be easily deployed by a person. Reloading/redirecting fire takes 6 minor actions or 2 minor actions if a dedicated reloader is present.

PGMP (plasma gun, man portable) is a heavy, bulky weapon that is typically used by a trooper wearing some sort of mechanical assist such as battle dress. For each point of STR less than 12, a -1 DM attack penalty is assessed. The weapon fires a beam of plasma energy at the target and carries extreme destructive potential. Energy is provided by a backpack power unit of the appropriate tech level. Treat normal cover as soft cover which reduces damage but does not block this weapon's force. PGMPs are heavily restricted on most worlds.

FGMPs (fusion gun, man portable) is the state of the art in energy weapon technology. It fires essentially a directed nuclear explosion at a target. As such, both the target and everyone within 6m of the FGMP when fired receives a radiation exposure equal to the damage. It requires a minimum STR of 9 to handle or a -1 DM

to hit penalty per point lacking is assessed. The shooter typically wears some sort of radiation protection so they can survive using this weapon. It has a backpack fusion generator as its power source and may fire a virtually unlimited number of times. Treat normal cover as soft cover which reduces damage but does not block this weapon's force. FGMPs are heavily restricted even on very permissive worlds.

Heavy Weapon Launchers

Weapon	TL	Range	Damage	Auto	Recoil	Mass(kg)	magazine	Cost(Cr)
grenade launcher	6	shotgun	by ordinance	no	1	7	1	400
RAM launcher	8	assault	by ordinance	4	2	7+6	6	800
mini grenade launcher	8	shotgun	by ordinance	no	0	3	1	400
mini RAM launcher	10	assault	by ordinance	4	1	3+2	20	800
flamethrower	5	shotgun	4d6 fire	no	0	20	25	2000
small short range rocket	5	rocket	by ordinance	no	3	20	1	by specifics
mortar	4	catapault	by ordinance	no	6	15	1	3000
PGMP	12	rifle	10d6	no	3	20+10	40	65,000
improved PGMP	14	rifle	12d6	no	3	10+10	50	100,000
FGMP	15	rifle	16d6	no	2	35	-	250,000

Supported Weapons

Supported weapons are infantry weapons which require mechanical assistance to fire. Assists may include specialized mounts or stands, or mechanical assistance from battle dress. These weapons may NOT be operated unsupported. Weapons requiring ammunition that operate in automatic mode typically have a drum or belt feed that will allow many rounds to be fired sequentially (ie. magazine). Supported weapons generally use the Gunnery/Heavy Weapons skill with the exception of the light assault gun which uses Slug Rifle/Carbine.

Light Machine Guns (LMG) are belt supported version of the automatic rifle. It typically fires standard rifle rounds in belts of 100 at a very high fire rate. Reloading requires 6 minor actions, or 2 minor actions if a dedicated reloader is assisting. A reloader may link a new belt to the weapon before it runs out of ammo.

Light assault guns use a larger caliber bullet and comes with a manual tripod and sling. While heavy and bulky, they are able to take out many lightly armored vehicles.

Heavy Machine guns (HMG) is an automatic version of a light assault gun. Ammo comes in belts of 100 and sustained automatic firing uses ammo very quickly. Reloading requires 6 minor actions or 2 minor actions if a dedicated reloader is assisting. A reloader may link a new belt to the weapon before it runs out of ammo.

Grenade Throwers use standard launched grenades as a typically found in man-portable launchers. These weapons have a larger magazine which weighs 30 kg and have no recoil due to their larger size and support.

ARMPs (armor rifle, man portable) fire an autocannon round in manual mode. Each round must be loaded individually as 2 minor actions. It comes standard with a pivoting bipod, rear stabilizer and is designed to give a lone soldier significant firepower. It takes 3 significant actions to set up. Use of the rifle without the rear support causes -2DM to hit and 1d6 bludgeoning damage to the shooter (reduced by armor) even with a bipod.

VRF Gauss guns are essentially the gauss version of a machine guns. They require a powerpack or stationary power source as well as drum fed ammunition and uses 2 points of power per round of full auto fire.

Weapon	TL	Range	Damage	Auto	Recoil	Mass(kg)	magazine	Cost(Cr)
light machine gun	5	assault	3d6	8	2	23	100	3000
light assault gun	5	rifle	4d6	no	4	21	5	3500
heavy machine gun	5	rifle	4d6	8	2	40	100	5000
grenade thrower	6	assault	by ordinance	4	0	40	24	5000
ARMP	7	rifle	5d6	no	6	25	1	7500
VRF Gauss gun	12	rocket	6d6	12	1	25	200	12,000
heavy VRF Gauss gun	12	rocket	8d6	12	2	40	400	20,000

Heavy and Supported Weapon Ammo

Ammo Type	Mass(kg)	Cost(Cr)
light machine gun	0.02	5
light assault/heavy machine gun	0.05	8
ARMP	0.2	45
VRF gauss gun	0.02	3
heavy VRF gauss gun	.05	5
flamethrower	0.2	90

Grenades

There are a wide variety of grenades available depending upon the tech level as described under vehicles and vehicular combat. When thrown, grenades use STR + Athletics to determine the accuracy of the weapon. Because grenades have a blast radius, sometimes close is close enough. If a grenade is used at close range (out to 3m), the thrower may be within the blast radius and this is therefore a very dangerous proposition. Grenades are specific for the type of launcher used, and thus come in mini thrown, mini launched, standard thrown, standard launched, and standard mortar configurations along with the more specialized arrow/bolt/speargun forms. Launched grenades and mortar grenades are self-propelled and must contain a propellant as well as explosive. Launched grenades cost 100% more than the standard grenade of that type and weigh twice as much, while mortar variants are 3x as expensive and 4x larger due to the extra propellant. Slingshot fired mini grenades count as thrown but use Dex+ Archaic Weapons instead of Str+ Athletics skill and the slingshot range table. Mini-grenades for arrows and bolts cost 100% more than standard grenades and use the appropriate range modifier of the weapon and archaic weapons skill + Dex. Mini-grenades are available 2 tech levels after the standard grenade and do less damage and/or damage in a smaller area. Reduce all grenade effects by 1.5m, making mini grenades less dangerous to nearby individuals while a direct hit can still cause significant damage.

For grenades fired from a grenade launcher or grenade thrower, use DEX+ heavy weapons skill to hit. When using AP grenades of any type, the armor piercing qualities require a hit upon the target. Thrown grenades and mini-grenades launched from a slingshot may not have any armor piercing capability. Only grenades from a specialized launcher may be armor piercing. If a grenade misses, roll two d6 and use the scatter tables under vehicles and vehicular weapons to determine where the grenade goes (Hit means desired location). Because explosives have blast radii it is possible to miss the target and still cause it damage.

Explosives

Players like to blow things up. Sometimes explosives may be planted for later detonation or as a distraction, and so they do not necessarily require a weapon to discharge them. There are even non-military uses for explosives in mining and construction. Explosives are sold and measured in 100g quantities as a base amount

for convenience, but they may be used in any desired amount. Explosive force does not scale linearly, particularly regarding nuclear weapons. They advance using the partial sum of the amount of explosive, where 3x the amount doubles the damage, 6x trebles it, 10x the amount does 4x damage, etc. When an explosive is set off, the destructive potential spreads out from the site of the explosion and loses 1d per meter distant from the source.

Each individual explosion must have its own detonator in order to set it off reliably. Old fashioned wired detonators need to be physically connected to the explosive, while more modern wireless detonators are sold with a radio transmitter and a unique code so that only someone knowing the code is able to set it off. A typical range is 1 km, but a stronger transmitter could be used. Meson detonators are also uniquely coded but have a limit of a thousand km and cannot be jammed the way radio detonators can be.

Explosive	TL	damage/100g	cost/100g (Cr)	notes
black powder	3	1d6	50	
prima-cord	4	1d6	100/meter	comes in a spool for easy appilcation; cuttable
Demex	5	1d6	75	semi- liquid explosive in a tube
bangalore torpedo	5	2d6	200/meter	assembles in 1 m segments, weighs 20 kg/m
thermite	5	1d6	75	burns very hot to melt metals and fuse them
plastic	6	2d6	100	
personal line charge	6	1d6	2000	30m explosive filled woven hose weighs 60 kg
vehicle line charge	7	2d6	7000	100m explosive filled woven hose weighs 250 kg
compound H	8	3d6	200	
oxy-plas	10	2d6	150	self oxidizes- works underwater or in vacuum
TDX	12	4d6	400	only explodes on horizontal axis
pocket nuke	12	30d6	20,000	separate self contained device
oxy-H	13	3d6	400	self oxidizes- works underwater or in vacuum
fuse	3		2	
wire detonator	5		15	
wireless detonator	7		35	
meson detonator	12		200	

Both the Demolition and Engineering (Weapon) skills are applicable to using and modifying explosives. Demolitions focus on safely creating a particular effect in the practical use of all types of explosives. The Engineering (Weapons) skill covers safely modifying weapons to behave in a desired way. It does not train sophonts to use the weapons. For example, shaped charges cost twice as much as regular explosives and concentrate their force in one direction (50% more power in 1 facing, 50% less in all others). Weapon Engineers can make the shaped charge safely; the demolitions skill is used for the shaped charge to effectively cause the bridge to fail.

Radiation from a nuclear explosion spreads 10x farther than the explosive potential, so a pocket nuke would spread at least 10d of rads 400 meters from the explosion in every direction. Note that nuclear weapons are incredibly destructive and available at relatively low tech levels. Nukes are incredibly dirty devices, and can leave substantial areas uninhabitable for years afterwards. Use of nuclear devices near populated areas (including in orbit around habitable planets) generally receives universal condemnation. Political and military fallout after intentional use is almost guaranteed; people using nukes pretty much always try to blame someone else.

Most explosives discharge their energy equally in all directions. TDX, however, is a Thermally Directed eXplosive which produces a much more confined force. It is an advanced development of the shaped charge explosives that were used in the early 21st century to penetrate military grade armor. By confining the explosive force, more damage is directed against the desired target than being allowed to spread out in the environment. Clever adventurers can use this characteristic to their advantage.

4c- Augments, Robots, and Drones

Augments

Increasing a person's characteristics is one of the sure signs of advancement for many role playing games. In higher tech societies, both genetically engineered vat grown tissue and electromechanical augments are available in various systems depending upon their societal preferences. Each have advantages and disadvantages, and both are capable of substantial characteristic boosts at the highest tech levels. Because these methods are not natural, augments may boost characteristics above their racial maximums. Any augment that increases a characteristic or bodily function, however, carries a penalty in terms of medical issues. Any medical treatment provided using materials below the augment TL have a chance of failing due to poor interaction with the available medicines. Once such an allergy or interaction takes place it becomes a regular feature for all related treatments. For augmented individuals, the cure can be worse than the original injury.

Augments are limited in what they can achieve. Four characteristics may be improved with augmentation: Str, End, Dex, and Int. Soc is a characteristic dependent upon birth, personality, and culture which is not easily subject to augmentation. Edu is a matter of training and experience which may not be directly augmented but may be indirectly increased using a datajack. Datajacks (described below) can increase a skill tied to Edu but does not increase Edu itself. The datajack functions exactly like a computer running an expert system but does so with an implanted set of connections as opposed to exterior interactions. Many implants use tech augments similar to the electro-organic connections found in cyborgs (discussed under robots) and first appear at TL12, the same time true cyborgs appear. Cyborgs differ from mechanical augments primarily by degree: cyborgs have an almost complete replacement of the organic body by machinery, while augments keep a mostly organic body supplemented with machinery.

Gengineering

Gengineering is the use of modified cultured cells to impart new abilities into an adult organism without making heritable changes to the target. The first gengineered tissue is typically available starting around TL9 and usually involves regenerating damaged tissues, appendages or organs. Because regeneration uses the same tissue as the host without any modifications, it is one of the least expensive and most reliable augmentation technologies available and typically the first developed. Enhancing the natural capabilities of a sophont using gengineering is more challenging and requires more manipulation to create something that will be fully compatible with the original tissue. Enhancement is time consuming and requires spending extended time on a high tech world. Because genetically engineered tissue originates with the host and is designed with the host's body in mind, it is compatible with psionics and is really the only way to enhance a psionicist without permanently reducing their psionic strength.

Gengineering allows sophonts to essentially upgrade their bodies into a more effective configuration. It provides natural abilities that can exceed those of normal sophonts of that species and can give the augmented individuals that critical edge in a tight situation. Augmented individuals still have their own DNA, however; a human augmented with echolocation, for example, will have normal offspring. These augments take time to graft into a host, and then the host must learn to use the new abilities using advanced biofeedback methods until it is as natural to them as breathing. Some augments, such as nictitating membranes, require little to learning to employ. Other augments, such as infrared vision, present an entirely new category of sensory information which literally could not be perceived before. Interpreting these new signals requires training. Changes to the DNA of a developing fetus can also be made, but those only show up as that organism grows and have no additional training time beyond normal skill training.

enhanced hearing range: low frequency limit down to ~5 Hz while increasing the high frequency to 20 kHz.

sound localization: ability to locate sounds accurately in 3 dimensions without improving hearing range.

echolocation: use of high frequency (~18 kHz) sound broadcasts to map out space in 3D. makes individuals more susceptible to becoming stunned by loud noises (-2 DM).

camouflage skin: conscious control of chromophores in the skin to blend into surrounding colors. Gives a -1 DM to spot a sophont when hiding naked.

chameleon skin: more accurate control of chromophores to blend into surrounding colors. Gives a -2 DM to spot a sophont when hiding naked.

neuromorphic skin: extensive change in skin shape and coloring to provide the equivalent of a disguise kit for an individual. It does not change height, but can change apparent weight +/- 20%. Takes 10 minutes to implement a change.

gecko pads: fine hairs and sacks on the surface of hands and feet that improve climbing ability and traction by +2 DM. Gloves or footwear can block this effect.

porcupine skin: fine keratin spines that normally lie flat on the surface but can be forced to stick out 1 cm. If deployed BEFORE contact, grabbing or striking a protected individual caused 1d6 damage. May be blocked by armor.

natural armor: provides additional protection from damage that stacks with other armor.

fangs: extended canines give a sophont a 1d6 bite attack. **Venomous fangs** add a poison component to give 2d6 additional damage. Vampire clothing and behavior is optional.

retractable claws: give a sophont an additional d6 on an unarmed attack. ie. an average human's punch would now do 2d6 damage.

Gengineering Augments

body part	TL	time (weeks)	cost (Cr)
replacement per point	9	4/point	5,000/point
appendage (not head)	9	8	20,000
eyes/nose/tongue/ears	9	8	10,000
single internal organ	9	8	25,000
multiple internal organs	10	12	45,000
enhanced hearing range	11	4	10,000
sound localization	12	8	25,000
echolocation	14	12	50,000
camouflage skin	11	8	20,000
chameleon skin	13	12	50,000
neuromorphic skin	15	24	100,000
gecko pads	12	12	35,000
porcupine skin	14	20	300,000
natural armor +1	13	8	150,000
natural armor +2	15	16	450,000
fangs	10	8	20,000
venomous fangs	12	16	75,000
retractable claws	11	12	40,000
prehensile feet	11	16	30,000
bloodhound scent	12	16	45,000
nictating membrane	10	4	15,000
anti-flare membrane	10	4	10,000
IR vision	10	12	15,000
UV vision	10	12	15,000
magnetovision	12	16	25,000
two vision augments	13	16	40,000
three vision augments	15	20	60,000
characteristic +1	11	12	100,000
characteristic +2	13	20	250,000
characteristic +3	15	32	750,000
blood filtering	11	12	50,000

prehensile feet: allow a sophont to use their feet as an additional set of hands. Standard footwear blocks this ability.

bloodhound scent: allows a sophont to identify odors much more effectively than can naturally occur. Allows tracking and identification based on scent.

nictating membrane: natural eye covering which protects eyes from chemicals (+2 DM) and clears underwater vision.

anti-flare membrane: protects eyes from the stunning effects of bright lights (+1 DM).

IR, UV, magnetovision: allows an individual to see in the indicated extended spectrum. Makes sophonts more vulnerable to stunning effects of bright lights (-1 DM).

characteristics increases: these may only be applied to Str, Dex, End, or Int. These increase the maximum score of the sophont and can allow superhuman stats if applied to individuals with already high ability characteristics.

blood filtering: this augment enhances the removal of poisons and biological toxins from the body. It provides a +2 DM against most poisons and toxins from natural and artificial sources. It does not protect against disease.

Xenogeneering

Xenogineering is adapting living parts of one organism to become part of the genetic makeup of another organism. This is only available at TL 11 and above and requires regular access to both the donor and the host tissue during the development process. At TL11 it is only able to affect developing organisms, but by TL13 it can be applied to some adult organisms and at TL15 essentially any organic ability other than psionics may be grafted into another organism to create a unique breed of organism. Adapting adults is slow however, and it is relatively uncommon to have obvious xenogineered augments even though it is possible. When taken to its highest levels, exceptional abilities such as heat resistance or acid spit may be engineered from one sophont into an otherwise normal appearing human. Psionics are an exceptional ability that, so far, has proven resistant to manipulation using even TL15 resources. Many races would like to be able to create their own psionics or psionically resistant operatives, however, and research is still ongoing in this direction.

When a xenogineered race is being developed, it is typically intended as a long term project being supported by a megacorp or system with deep pockets and a time frame of decades. Each trait must be engineered in separately and at full price for the first individual, although several identical clones could be initiated from that one successful organism for no additional cost. When the same organization is making the second and subsequent organisms, costs are halved as less novel work is required. Xenogineered organisms are typically carefully chosen to have few or no dangerous recessive traits so that perhaps two dozen individuals would be sufficient to start a new race (with carefully controlled breeding for the first few generations). While expensive, organisms adapted to valuable worlds are a great asset when exploiting that world's resources. Note that there is no limit to what organism might be xenogeneered-weaponizing small animals might destabilize an entire planetary ecosystem for example.

Xenogineering Table

body part	TL	time (weeks)	cost (Cr)
characteristic +1	11	12	500,000
characteristic +2	13	20	1,000,000
characteristic +3	15	32	2,500,000
natural armor +1	13	16	500,000
natural armor +2	15	40	1,500,000
natural weapon (normal)	13	16	250,000
xenogeneered wings	15	40	500,000
poison gland	15	52	1,000,000
superior related sense	13	16	250,000
extrasensory sense	15	52	2,500,000
related breathing type	13	26	200,000
novel breathing type	15	52	600,000
exceptional ability	15	32	2,500,000+

Certain races have exceptional abilities based upon their physiology and evolutionary history. Different races may breathe tainted air safely, hear radio communications, resist poisons, cold, or heat, spit acid, etc. These organic abilities may be engineered into other organisms, although the more complex capabilities may require even longer and more expensive development (referee's discretion). At high tech levels, organic beings are simply another type of machine that sophonts can manipulate for their own purposes. Uplifted races and merfolk are common examples of how it is possible to alter the nature of organic beings in the future, and if a suitable organic model for an ability exists it could potentially be added to other organisms. It is far more difficult to create unique abilities using gengineering. No currently existing race has an organic jump drive, for example, so there is no way to xenogineer such an ability into humans.

Replacing damaged tissue with a newly regenerated healthy one is a widely accepted practice. Minor genetic manipulation that increases characteristics is also mostly accepted. More extreme xenogineering, however, does not receive the same support and is usually tightly regulated. People recognize the dangers of engineered plagues and most responsible organizations will try to avoid any hint of such activity. Any religious or political group that is committed to racial purity will typically regard any enhancements or xenogineering experiments as reprehensible and may even resort to violence to prevent the spread of species corrupted by such immoral technology. They will certainly act to try and prevent the development of a whole sub-race of xenogineered sophonts.

Technological Augments

Although primitive prosthetics that are more lifelike than just a stick start appearing around TL6, true controllable augments only become available around TL8. By TL 11 it is possible to enhance an organic body characteristic by +1, although it requires much more integration than a simple replacement augment. These technological enhancements may be a true fusion of technology and nature and may appear natural or artificial depending upon desires when the augment is added. Characteristics may be increased by +2 at TL13 or by up to +3 at TL15.

Minor technological augments are widespread and in some cultures are a mark of status or membership in a particular organization. Extensive augments are less commonly seen, but augments do not have to be visible and the true frequency of augmented people may be higher than many believe. All technological augments suffer from 2 clear drawbacks compared to organic augments. First, electromagnetic interference from EMP devices can disrupt augments if successfully targeted. Augments may be shielded from EMP, but such shielding increases the price by 50%. Secondly, technological augments of any kind interfere with the psionic strength of a body. Each augment cumulatively reduces the psionic strength of an individual by -1 characteristic point.

> We can rebuild him. We have the technology . . . We can make him better than he was before. Better, stronger, faster.
>
> *The Six Million Dollar Man*

Electomechanical augmentation comes in a variety of forms. It may be used to provide a replacement limb or organ that functions roughly equivalently to the organism's original capability. This is relatively inexpensive because it only involves the single appendage or organ and no changes elsewhere are needed. Enhanced body functions often depend upon more than one organ. While a robotic arm may be stronger than a normal arm, that does not mean the sophont's legs or torso are strong enough to leverage that strength! Even for constrained senses such as vision, infrared or UV signals would not be something an organic human brain recognizes naturally because it was not part of them

during their development. While it can be learned, learning takes training and time. Implanted devices that function without conscious thought or interact with few organ systems take less time to implement.

Implantable versions of other devices are certainly possible and are regularly used as stealthy devices because they are hard to detect. Small devices generally cost at least 10x more when implanted and take at least a week to be integrated. Larger devices may also be implanted. One of the worst disasters ever to take place involved a 75 year old grandmother who had a pocket nuke implanted into her womb. She detonated the device at the 200th anniversary of Lapipan independence and killed well over a million people with the blast and radiation poisoning.

Organ/Sensory Augments

Biomonitors collect and analyze health information so that hazards can be identified more quickly and easily. Also used in dangerous occupations where injuries are common occurrences.

Biokits are more advanced monitors that can supply doses of drugs to counteract what the monitor detects or even inject on demand. May only supply 2 doses of 3 drugs, and each drug is purchases separately.

Nanohealing involves the use of nanites that have been programmed to repair damaged cells and tissues in an individual's body. Allows fast healing similar to the natural fast healing trait of some alien races that heal d6 per day instead of 1 per day. It does not heal damage or characteristic loss caused by aging.

Air filters are implanted in the lungs and serve to remove atmospheric toxins or poisons before entering the lungs and thus blocking their function. Works very well in tainted atmospheres.

voice synthesizers allow a previously heard voice to be reproduced accurately. Generally illegal, these are often used to fool voiceprint analysis and voice recognition.

Blood filters remove poisons and toxins from the blood giving a +2DM to resisting their effects.

Organ/Sensory Augments

Augment	TL	weeks	cost (Cr)
replacement per point	9	2/point	5,000/point
appendage (not head)	9	4	20,000
characteristic +1	11	4	100,000
characteristic +2	13	8	250,000
characteristic +3	15	12	750,000
biomonitor	10	1	500
biokit	14	8	30,000
nanohealing	15	36	2,500,000
air filter	11	6	15,000
voice synthesis	11	8	10,000
blood filter	12	12	60,000
vibrasense	13	12	35,000
enhanced audio freq.	10	4	10,000
sel. enhanced audio	12	8	15,000
sound localization	12	8	25,000
echolocation	13	12	45,000
psionic shield	12	2	40,000
anti-flare membrane	10	4	10,000
nictating membrane	10	4	15,000
micro/telescopic vision	11	8	15,000 each
IR/UV/magnetovision	11	8	20,000 each
Ballistic Lens	13	8	40,000

Vibrasense is a vibration sensing system that may be passive and using environmental noise and vibration to locate a moving object. In active mode, it uses ultrasonics to create essentially a sonar map locating mobile and immobile objects. Active mode can be overloaded by too much environmental noise.

Selectively Enhanced Audio allows selective amplification, better sound localization and frequency filters to enhance particular sounds or voices by concentrating on them.

enhanced audio frequency: low frequency limit down to ~5 Hz while increasing the high frequency to 20 kHz.

sound localization: ability to locate sounds accurately in 3 dimensions without improving hearing range.

echolocation: use of high frequency (~20 kHz) sound broadcasts to map out space in 3D. makes individuals more susceptable to becoming stunned by loud noises (-2 DM).

Psionic shields block all sensing and telepathic contact between a psionic and the wearer.

Anti-Flare membranes protect the eyes from the damaging effects of rapid changes in brightness caused by emerging into bright sunlight, laser dazzling, flashbang grenades, etc.

Nictating membranes protect the eyes from dehydration and improves underwater vision. They are usually available as a conscious action and work similarly to a second set of eyelids.

Micro/telescopic vision gives the eqivalent of up to 200x magnification for very small structures or up to 50x magnification for distant objects. Each mode must be added separately. Note that these modes take time to enter or exit from normal vision. Rapid switching between modes is disorienting (-1 DM for 1 minute).

IR/UV/magnetovision eyes allow expanded imaging to new frequencies. Each upgrade is applied separately.

Ballistic lenses are used to project where a target will be at some point in the future. Gives a +1 DM when using a ranged weapon on a moving target.

Implantable Armor and Weapons

The various stabbing weapons (claws, daggers, vibroblades, etc) are generally not visible unless being used and may only be spotted with a -2 DM. Each is retractable at will but are functionally equivalent to their normal counterparts. Because space is limited, cybermods of normal sophonts cannot both function and hide heavier weapons. This may not be true for large or huge sophonts who are massively larger.

Subdermal Armor is implanted material under the skin that protects organs and critical body parts from damage. It is additive with external armor and can provide a significant boost for survivability in violent conflicts. Any bonus above +2 is easily observed.

Stunsticks function like the non-augment version but the built in version is harder to spot with a -2 DM.

Autopistols are single shot weapons that take a full action to reload but are difficult to spot with a -2 DM for being identified.

Implantable Armor and Weapons

Augment	TL	weeks	cost (Cr)
subdermal armor +1	10	2	50,000
subdermal armor +2	11	3	100,000
subdermal armor +3	12	4	150,000
subdermal armor +4	13	6	250,000
subdermal armor +5	15	9	500,000
retractable claw (2d6)	10	2	4,000
internal dagger (d6+2)	10	2	5,000
internal vibroknife (3d+1)	13	3	20,000
stunstick	11	3	10,000
autopistol (3d6-3)	11	3	12,000
laser pistol (3d6)	12	6	25,000
smartlink	10	1	750
shocking grasp (1d6)	11	3	1,000
fangs	9	2	3,500
venomous fangs	11	8	15,000
gasser	10	1	1,000

Laser pistols function exactly like their typical counterpart in terms of battery requirements and require a separate power source from the rest of the enhancement.

Smartlink is a uniquely keyed device that limits access to another device, often a vehicle or weapon. It provides an electronic signature that is required for function. Without the smartlink the keyed device won't fire, the vehicle won't start, etc. Only works with appropriate devices. Implanted links are nearly impossible to detect.

Shocking grasp gives a 1d6 jolt of electrical energy into whatever is touched. Requires 2 contacts on different fingers and a mental command to spark and may only be used three times before the rechargeable battery is depleted. It may be used as a weapon, but is perhaps more commonly employed to overload electronics.

fangs: extended canines give a sophont a 1d6 bite attack. **Venomous fangs** add a poison component to give typically +2d6 damage. Unlike biological fangs, these fangs must have their poison renewed from outside and may only carry 2 doses. More deadly poison could be used, but a botched attack (failure by more than 2) results in self-administering the given poison.

Gasser is a cyberdevice designed to deliver a dose of gas (whatever is loaded) to someone being grasped. Very difficult to spot (-2DM) and commonly used in kidnappings and the like. Failure by more than 2 results in gassing oneself accidentally.

Implanted Electrical Equipment

DataJacks are programmable computers that can act as a hand computer of the appropriate type. It always runs an Intellect Program and may run 1 expert program to enhance one skill. The quality of the datajack determines the maximum enhancement and at TL15 can provide up to a +3 DM skill modifier. A datajack user must already have at least skill level 0 in a skill to benefit from the expert system. Datajack systems are only able to influence Edu and Int based skills, so while a datajack could improve a medical diagnosis it would not improve a dexterity based surgical skill check. Datajacks require additional skillsofts to be useful, but skillsofts may be changed by using a minor action. Misprogrammed skillsofts have been known to cause migranes (or worse!) and can be very dangerous to the user.

Implanted Electrical Equipment

Augment	TL	weeks	cost (Cr)
DataJack (up to skill 1)	12	8	15,000
improved DataJack (2)	13	8	30,000
advanced DataJack (3)	15	16	60,000
skillsoft-0	7	-	1000
skillsoft-1	9	-	4000
skillsoft-2	11	-	15,000
skillsoft-3	13	-	40,000
skillsoft-4	15	-	75,000
transponder	9	1	1500
radio jammer	7	1	2000
2-way radio comlink	9	2	1000/5000/ 20,000
radio direction finder	8	2	10,000

Skillsofts are software products used by expert programs to provide Int and Edu based skills for computers, robots, and datajacks. Note that skillsofts appear earlier than a datajack able to implement that skillsoft. It is easier to program databases for a computer than to integrate that information with an organic brain.

Transponder is a radiolocation beacon to identify where the signal is coming from. May be blocked by devices/shielding that inhibits radio.

Radio jammers broadcast a stream of random jibberish on whatever frequency desired to disrupt radio based communications within a modest 5 km area. The source of a jamming signal is usually easy to detect.

2-way radio comlinks are used to receive and transmit data. Audio only links are relatively inexpensive, while video data and digital computer data get progressively more expensive.

Radio direction finders are passive systems which use integrated antennas to determine the direction a signal is coming from, although distance cannot be identified as the strength of the source is not known. These may never be shielded from EMP as that would defeat their purpose.

Other Cybermods

A **smuggling pouch** is a 1 L (1000 cm^3) pouch openable using a disguised pressure sensitive switch. Soft sided and difficult to spot, it takes a successful recon or life science roll to detect with a -2 DM.

camouflage skin: conscious control of chromophores in the skin to blend into surrounding colors. Gives a -1 DM to spot a sophont when hiding (but does not cover clothes).

chameleon skin: more accurate control of chromophores to blend into surrounding colors. Gives a -2 DM to spot a sophont when hiding (but does not cover clothes).

neuromorphic skin: extensive change in skin shape and coloring to provide the equivalent of a disguise kit for an individual. It does not change height, but can change apparent weight +/- 20%. Changes take 5 minutes and must be programmed in by a computer/3 or better.

oxygenators take small oxygen bottles implanted in the torso to directly oxygenate the blood. They only carry enough oxgen for 30 minutes, but are very useful underwater or in very thin atmospheres.

prehensile feet provide a replacement foot which can grab as effectively as a human hand.

detachable hand is a cybernetic hand with full normal functions plus the ability to lock on to an appropriate surface and unattach from the rest of the body. There is a small winch with a 25m monofilament line within the wrist which can support 200 kg.

Other Cybermods

Item	TL	weeks	Cr
smuggling pouch	9	2	15,000
camoflage skin	11	5	7,500
chameleon skin	12	16	30,000
neuromorphic skin	15	24	150,000
oxygenator	10	4	7,500
prehensile feet	10	16	10,000
detachable hand	12	8	15,000
photo. memory	12	4	10,000
audio/video recorder	12	4	15,000
eidetic memory	15	8	45,000
gas spectrometer	15	12	65,000

photographic memory allows a cybernetic eye to snap a high resolution picture that may be recalled or downloaded via datajack or neural link. A radiotransmitter version is 1 TL higher and costs 5000 Cr additional.

audio/video recorders are sensory augments which can store what a sophont directly observes into permanent memory accessible by datajack for later download or recall. A radio uplink is available at TL13 and an additional 5000 Cr.

eidetic memory is the ability to recall data and facts once learned nearly instantaneously. The data must have been learned (ie. not downloaded via datajack) and may or may not be factual. Note also that while the information is there the interpretation must be handled independently.

gas spectrometers replace the normal nasal organ with a portable gas chromatograph to analzye molecules in the atmosphere. Note that the person must breathe the atmosphere in order to analyze it which could produce severe complications.

Robots

Robots are a staple of science fiction, but the concept of an artificial organism has been around centuries longer. The simplest robots start to appear in research and high tech industrial settings around the time of spaceflight (TL7). As robot sophistication and power generation technologies advance, robots become mobile and begin to fulfill more of their potential. Industrial-shaped robots that can understand and respond to simple verbal commands are common around TL9-10, although robots modeled after living organisms are not realistic before TL12. Around the same time biological styled robots arrived it becomes possible to embed and support a living brain inside of mechanized hardware creating true cyborgs. Only by TL14 do robots become so advanced that they are difficult to distinguish from natural organisms on a casual inspection. Using even modest equipment, however, it is quite easy to separate any robot from a living being. Power supplies, electronic circuits, NAS scanners, psionic signatures, etc are all ways that current robots are distinct from organic lifeforms. Sensors can be expensive, though, and there have been numerous cases where a high end robot has successfully imitated an organic life form long enough to cause major issues.

> Hephaestus left his forge and hobbled on. Handmaids ran to attend their master, all cast in gold but a match for living, breathing girls. Intelligence fills their hearts, voice and strength their frames, from the deathless gods they've learned their works of hand.
>
> *Homer, The Illiad, Book 18*
> *translated by Robert Fagles*

Many different types of robots exist in the various settled systems. A large number of terms can be used to describe the functions of robots, and several of them are listed here. Drones and cyborgs, despite having certain design requirements, are constructed as robots under the same general rules.

Android: Sometimes abbreviated as 'droids, androids are sophisticated robots that are able to apparently reason as well or better than a sophont. They may be biologically shaped or completely functional, but they are capable of reasoning at least within their appropriate domains of knowledge.

Biolog: type of robot designed to mimic a living organism. These can be as simple as mechanical animal companions meant to comfort and monitor a sophont or as sophisticated as a human appearing robot with full emotional and logic abilities.

Cyborg: an organic brain that has been connected to machinery which keeps the brain functioning and which, in turn, is controlled by the organic brain. These are typically larger than an all-electronic robotic brain due to the necessary tubes and feeding reservoirs, but they offer some advantages not available to standard robots. Reprogramming a cyborg is not possible, while even the most sophisticated electronic brains may be hacked. Interestingly, even if a psionic brain is transplanted into a mechanical construct the cyborg is no longer psionically active. Some take this as a challenge to develop the correct interface that will allow a brain to express its psionic powers, while others argue that psionics must require the cooperation between organic body and brain. This is being intensively researched at a number of institutes as it relates directly to what makes psionics possible.

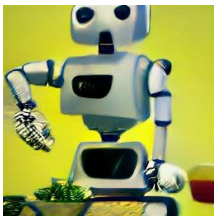
Drone: a mobile unit without the logic capabilities of a robot. Drones require regular input from a user with the Remote Operations skill, while a true robot can operate autonomously. Drones have substantial cost benefits but are restricted to speed of light communications with the operator. Drones are commonly used by robots as slave units operating under a single master brain unit.

Dumbot: a robot with minimal int/edu, these are typically reserved for menial tasks or repetitive industrial activity. Typical dumbots include things such as factory automation, janitorial robots, and landscaping robots.

Master/Slave: a master robot is in direct communication with several different simpler robots that are designed to follow commands from a master system. This is usually set up for reasons of cost, where a high degree of sophistication is needed in a few circumstances but for much of the time a unit is in standby or minimal function mode. Drones are the most common slave units for reasons of cost, and are used for things like starship repair, expendable defensive units and long duration missions in space where solar power is available and the duty stations are unappealing. Communication is still limited by the speed of light, so the master unit is always relatively close to the slave units.

Nanobot: also known as nanites, they are a class of particularly small, advanced machines that are built from the atomic level on up to carry out particular functions. Nanotechnology is a distinct set of techniques that do not follow the rules presented in this chapter for robots. They are small enough that swarm behavior and complex interactions between individual nanobots are required for them to express intelligence or reasoning.

Pleasure Bot: a humanoid shaped robot that is designed to give pleasure and comfort to its owner. Often programmed with Steward and high Emotion skill, advanced pleasure bots are said by some to be superior to living companions due to their complete commitment to their owner.



Robot: a catch-all term for a mechanical construct designed to operate without direct sophont oversight. Nearly every race that has achieved adequate technology has developed these types of devices (sometimes to their regret). They have a large number of high-use cases where robots are the most practical choice for a particular application. Other situations may be on a race by race case, where cultural or societal factors may disfavor or encourage robot usage.

Security Bot: a robot designed primarily for observation, warning, and non-lethal subdual of particular individuals. They tend not to have the same armor and weapons load that a warbot has, but instead will try to protect an area or individual initially by warning off a possible enemy and then by calling for reinforcements and trying to drive them off physically. Weapons will tend to be non-lethal items such as tear gas, stunners, stunsticks and the like.

Warbot: a military robot designed for killing. They often use high tech weapons and serve as elite assault forces spearheading a major assault. Casualty rates of the spearheading units are typically high, and commanders interested in reducing the loss of life will often want their mechanical forces to take the worst of the losses. Warbots usually lack emotion and certainly have maximum security built in.

Laws of Robotics

1. A robot may not injure a human being or, through inaction, allow a human to come to harm.
2. A robot must obey orders given it by human beings except where such orders would conflict with the First Law.
3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Isaac Asimov, "Runaround," collected in "I, Robot"

Robot 'Laws'

The laws of robotics as promoted in idealized fiction would be a wonderful utopia where everyone got along perfectly and conflict was a burden of the distant past. Sorry, not happening. Warbots or assassin droids aside, conflict is a part of existence and there are limited resources available. Robot designers who fail to take adequate security precautions can have hackers controlling their unit, perhaps subtly subverting the programming to allow an intrusion, or more overtly acting to create a catastrophe itself. Robots, even those with high synaptic brains, are controlled by their fundamental programming to carry out actions. The intent of the programmer defines what an AI considers ethical. Just as people and religions differ in how they define morality, AI

would have the same minimal diversity, if not more extreme given their machine natures. Expecting all sophonts or AI to think alike and follow the same set of 'laws' is not reasonable.

In addition, the laws of robotics fall apart for cyborg operations. Cyborg brains are organic and are based on the skills and personality of the original individual. They are not programmable directly, although they may be vulnerable to psionic intrusion (if not protected). A racist Reptilian brain would create a racist cyborg with the same skills and mental characteristics (Int and Edu) as the original Reptilian. A mechanical body may give them new physical capabilities, but it would not necessarily change the nature of their personality.

General Approach to Robots

In most ways, robots are a cross between characters and vehicles and these rules are designed to accommodate this. For skills, characteristics, combat, personalities, and the like, robots typically follow character rules. In combat, for example, they use personal instead of vehicle combat rules (with the exception of damage). In terms of movement, they tend to behave more like vehicles with a small maximum capacity. Robot sizes overlap with the smallest vehicles at the quarter and half ton sizes. A large robot or small vehicle controlled by an AI are nearly indistinguishable. Because robots don't feel pain, they take damage more like a vehicle where particular systems or appendages are damaged and unavailable. Repairs generally use the Robotics subskill under electronics, although specific devices might be repairable using other skills (sensors, mechanic, etc) at the referee's discretion. Typically small vehicles are cheaper than their robot equivalents, although they do not have the same design flexibility.

In terms of intelligence, robots create a somewhat unique set of issues for the referee. Artificial intelligences are by definition intelligent, yet are not generally considered life forms. Neural Activity Scanners (NAS) or psionic 'life' detection abilities that can distinguish living organisms based on their thought patterns offer a hybrid that is difficult to integrate. Under the Cluster RPG rules, since NAS and life sensing are able to determine different levels of consciousness it makes sense that they could detect an upper end AI as such and distinguish it from a cat or a child. Because of its quantum electro-mechanical nature, however, AIs are not susceptible to psionic manipulation such as project thoughts. They are also not affected by weapons which affect the mind, although they are susceptible to EMP attacks unless properly shielded. These limitations seem to be related to the inability of AIs or cyborgs to use psionics of any sort, although a complete understanding of the phenomena is not known. Using a similar logic, cyborgs cannot be reprogrammed but they have an organic brain and therefore can receive telepathic thoughts and be influenced telepathically. Cyborg brains are not affected by EMP pulses, but cyborg bodies are vulnerable there. Perhaps artificial intelligence is simply alien in ways that organic scientists cannot fully comprehend (and robot scientists aren't telling).

Robot Characteristics

Robots use 4 of the same characteristics used to define sophonts- Str, Dex, Int, and Edu. These are determined during the construction and design of the robot and will be greatly affected by the tech level and price point of the unit. Psionics have never been incorporated into any artificial machinery directly even at the highest achieved tech levels. Technology has been able to interfere with or enhance psionics, but not duplicate its effects. Endurance is based entirely upon the power available to the robot and unlike sophonts robots simply shut down without sufficient power. Finally, robots are generally considered property and therefore have a social standing of 0. Any society that awards

C-3PO: I do believe they think I am some kind of god.

Han Solo: Well, why don't you use your divine influence and get us out of this?

C-3PO: I beg your pardon General Solo, but that just wouldn't be proper.

Han Solo: Proper?

C-3PO: It's against my programming to impersonate a deity.

Star Wars: Return of the Jedi

'human' rights to artificial intelligences or cyborgs, however, could allow robots social and legal standing, perhaps even high standing.

Purchased robot characteristics are limited by the tech level of the robot. Int and Edu have a maximum score of the tech level, and thus at TL12 may not have an Edu or Int score over 12. Str and Dex may also be purchased up to the tech level, but have several other considerations. Robots receive bonus Str due to chassis size at a rate of 1 point per 50 kg up to 500kg. Wrestling a vehicle sized robot is a fool's game. Bonus Dex due to tech level accrues at 1 point per TL above 10. Int and Edu are limited by the capabilities of the computer and the credstick of the purchaser.

Robot Skills

Robots perform actions analogous to skills of player characters. Skills are purchased at the time of robot construction and the total skill points of a robot is limited to their Int and Edu. Skills may be bought for the same number of points used during the character creation process and cost the same amount as a skillsoft and require the same minimum tech level. Level-0 skills cost 1 point and 1 kCr available at TL7, Level-1 skills cost 3 points and 4 kCr available at TL9, Level-2 skills cost 6 points and 12 kCr available at TL11, and Level-3 skills cost 10 points and 40 kCr available at TL 13. Only TL15 robots may have a single Level-4 skill which costs 15 points (100 kCr) total and is essentially an idiot-savant. Robots through at least TL15 may not purchase the Jack-of-all-Trade skills, but a more sophisticated brain may be able to handle that level of flexibility. In general, robots tend to have a few specialized skills that they were built to perform very well. Skills may be changed and upgraded later, but it is usually cheaper to simply buy a new robot than to substantially change the hardware and software needed to perform different tasks. Hacked robots that appear normal but perform differently are another matter.

DAVE: Open the pod bay doors, Hal.
HAL: I'm sorry, Dave. I'm afraid I can't do that.
DAVE: What's the problem?
HAL: l know that you and Frank were planning to disconnect me, and I'm afraid that's something I can't allow to happen.
DAVE: Where the hell'd you get that idea, Hal?
HAL: Although you took very thorough precautions in the pod against my hearing you, I could see your lips move.

2001: A Space Odyssey

Robots have two additional 'skills' that are not included in the general skills list and relate to how they interact with sophonts. They are chosen separately from other skills of the robot and have the same number of available points, although not all points need to be used to reduce the cost. The Interaction skill defines how robots communicate with others whether human or robot. The Emotion skill defines how well they can respond to or demonstrate emotion. If no interaction skills are present, robot functions are only able to be altered through direct programming changes (Robotics subskill under Electronics) through a required hardware interface which can affect all robots (although the port might be difficult to access). Cyborgs, as they are essentially mechanical bodies slaved to an organic brain, have the same skill sets and personality that the brain had before it became fused to the technology. Cyborgs do not have Interaction or Emotion skills. Note that the less sophisticated a robot's brain is the lower its ability to interact with others. Drones have no brains since they depend upon remote commands and therefore have no need for emotion or interaction skills. Interaction and Emotion Skills are purchased at the same price as other skills.

Interaction Skill

The Interaction 'skill' refers to how well a robot can understand verbal commands. If commands are not able to be input without direct access to the hardware, there is very little outside interaction can do to change a robot's behavior. Robots such as warbots tend to be isolated from outside access to prevent hacking attempts. Skill level 0 in interaction allows a unit to follow a small list of verbal commands it understands and gives it

access to 3 subskills. Command subskill level 1 gives a more complete list of commands that may be followed, while command subskill level 2 allows full interpretation of complicated verbal commands that require logical connections to be made. The Hierarchy subskill determines who may give a robot orders. A skill of 0 in interaction allows anyone to command the robot. Skill 1 allows only a restricted set of users to issue the robot orders, and Skill 2 gives the robot a higher level of security against unauthorized commands (-4 DM to override commands without authorization). The Master subskill under Interaction allows an AI to control multiple slave robots. Each skill level of Master allows a robot to control 5 separate slave robots at a time although any number of robots may be on automatic.

Emotion Skill

The Emotion skill is what allows a robot to act more alive and understand or mimic sophont emotions. Robots without this skill are automatons and are very boring to interact with and take even obvious commands literally. A skill level of 0 allows a basic recognition of emotion based on interactions and respond to them, but do not allow the robot to express an emotion. It is very easy to fool low level AIs emotionally (+4 DM to deception related to emotions). Skill 1 allows a robot to recognize even complex emotions and express their own set of basic emotions, although not in a completely realistic way (+2 DM for deception skills against the robot- the robot has no ability to emotionally deceive). Emotion-2 allows a sophont-level of emotional recognition and expression, making it very difficult to distinguish from a living organism at this level. This level allows robots to deceive sophonts and other robots emotionally as well as recognize deceptions with no modifiers. Emotion-2 with a deception skill would allow a robot to lie very convincingly (a useful skill for certain specialized robots). Note that to use the emotion skill well a robot must also be able to understand complex spoken words (command-2) and this combination requires 12 points, so emotionally convincing robots only appear around the tech level cyborgs become possible.

They drive me crazy with their 'Marvin close the door'
Well isn't it enough to make you 'tidy up the floor'
You know it spoils a robot's day
'Marvin when you're finished you can put yourself away'
I'm going to flip my lid
They treat me like a kid
Robot naughty, robot bad
Robot happy, robot sad
Who's a clever robot lad?
It would drive a human mad

"Reasons to be Miserable" (His Name is Marvin) by Stephen Fry

Created by Douglas Adams, Hitchhikers Guide to the Galaxy

Why Do Drones Exist?

Given the extensive advantages of robots over drones, why do drones even exist? One reason is cost. Robotic skills can substantially increase the cost of units over a simpler remote unit. For many applications, a remote brain is simply unnecessary to carry out the primary function of the unit. A probe drone, for example, is controlled by software and personnel running on the ship which launched the unit. It will often be sent into a dangerous area. An artificial intelligence programmed to protect its own survival might object to being sent into a hostile location. Probes are more expendable when they are cheaper.

A second use for drones is when an AI may be detected based on thought patterns. NAS and psionics both can find thoughts in areas or register an anomalous 'mind'. Stealth shielded drones without true intelligence may be more able to sneak through such detection methods (although they may be detected by other devices). No technology comes without a possible way to identify or circumvent it.

Robots in Combat

Most robots are not designed for combat and will use their vast computer intellect and human-level intelligence to get out of the line of fire. Other robots carry heavier armor than a marine in full battle dress and charge relentlessly into battle. As robots are in many ways a cross between a sophont and a vehicle, their rules for combat are also a hybrid. Robots act in personal combat and their weapons are always on the personal scale rather than vehicular scale. Robots do not have a heading, and armor protects all directions equally. They operate in the personal combat time frame, where a round is about 6 seconds long. They act on a personal initiative modified by the robot's dexterity, and may take reactions at the standard penalties according to their understanding of the situation.

Robots also have a stability score which depends primarily upon their chassis structure. Failing a stability check causes the robot to topple over or be out of control for a round if toppling does not make sense. Every time a robot is damaged beyond its armor it makes a stability check. If the stability check is failed, the robot topples over or ceases functioning for 1 combat round. It may then make another stability check to regain control and start operating again. Once it recovers its stability the robot functions normally using any surviving systems. Unlike sophonts, robots do not feel pain when their arm gets blown off.

When a robot is struck in combat or takes damage for any reason, damage is first reduced by armor. If the armor is tough enough, damage may be reduced to 0. If some damage gets through, half of the time it will destroy the armor of the unit on a point for point basis. If armor is not chewed away, the robot takes damage to its structure on a point for point basis. When structure is reduced to 0, the robot is non-functional. The referee is encouraged to make robot damage as cinematic as possible (ie. sparking wires, gaping holes with internals visible, etc), but individual system losses are not detailed individually. Unlike vehicles or spacecraft, robots are more singular units and often small enough that any hit which penetrates armor can be lethal.

In the case of cyborgs, when the structure reaches 0 there is a 50% chance that the organic brain was killed when the robot was terminated. If the brain is rescued within 6 hours it can survive to be re-embodied, otherwise the brain dies.

Robot Construction

As with all machines, robots require time to build. In general, robots take 1 day per 3000 credits to build. They are usually manufactured in a system with the appropriate infrastructure, although engineers can assemble parts and pieces into simple robots and many drones. Systems may construct robots one tech level higher than that of the system by using imported parts. Thus it is possible (but not common!) for experimental robots to be built using state of the art techniques one level above those generally available. Such robots typically cost 10x their normal price due to their experimental nature and hand built equipment. Note that TL16 robots would only be found in experimental situations and not available for most purposes.

Steps to Build a Robot

1) Chassis Selection
2) Appendages (if desired)
3) Locomotion (if desired)
    choices here will force a minimum required power plant
4) Power Plant (if desired) and fuel
5) Armor (if desired)
6) 'Brain' and skills
7) Sensors

8) Weapons
9) Other Devices and Cargo

Chassis

Chassis come in 3 major size categories, but these categories are more bookkeeping than functional. Category A begins at 5 kg and increases by 5 kg up to 50 kg. This category represents the robots smaller than typical adult humans (although the upper size limit does overlap with small adults). Category B starts at 60kg and increase by 10 kg up to 250 kg. These cover the average to large sized sophonts and are perhaps the most common models. Category C covers 275 kg up to 500 kg by 25 kg and includes more industrial scale robots. These overlap with small vehicles in size and could perform many of the same functions as vehicles. Robots, however, allow a much higher degree of specialization (particularly in programming) that cannot be equaled by vehicles.

Robots come in a variety of basic shapes that will influence future design options. Most industrial robots can have whatever shape is appropriate, often a box, cylinder, or dome. Wedge and cone robots have the advantage that they may be streamlined to increase their speed (at the space expense of requiring appendages and other equipment to be retractable). Biologically shaped robots are inefficient and quite expensive relative to other types of chassis. They do, however, allow the use of additional equipment not included in the basic design of the robot that is intended for use by sophonts of a similar shape. Naturally the appropriate skill must already be programmed into the robot to use the additional equipment. Chassis costs for biological robots that have natural texture and behavior (ie. bleeding, flexibility, etc) cost 3x as much and only appear at TL12, but are challenging to distinguish from the real thing by appearance. They are, however, very constrained as to armor or the like. Each shape has a base stability that serves as a target for a 2d6 check each time the robot is damaged. Stability is checked each time the unit is seriously impacted, either through combat damage, collision, or other forceful interaction.

Robot Shape Modifier Table

Robot Shape	Streamlined	Price Mod	TL	Stability	notes
biological	no	x10	9	6	able to use equipment, 10% less armor
box	no	x1	5	7	
cone	maybe	x1	5	8	lose 10% of volume due to shape
cylinder	no	x1	5	7	
dome	no	x1.5	5	9	
sphere	no	x2	7	10	
wedge	maybe	x1.5	5	8	

Chassis Modifications

Robots have a number of features in common with vehicles beyond how they interact with the world. Protective measures such as environmental sealing are invaluable to a machine underwater or exploring a corrosive atmosphere, for example. Note that vacuum sealing, by itself, is not essential- robots other than cyborgs do not need oxygen, but there are hazards in space which vacuum sealing helps to mitigate. Chassis modifications are usually protective features or enhance the capabilities of other components.

amphibious drive: ground robots may have a second drive added to their basic design which allows them to move at 1/3 speed through the water. This addition doubles the size and cost of the drive due to complexity.

corrosive environment protection: protects unit against heat, cold, radiation, submersion, EMP and corrosives and requires at least a standard hull.

hostile environment protection: protects unit against heat, cold, water submersion and radiation

insidious environment protection: protects against heat, cold, EMP, radiation, corrosives, submersion, and insidious environments. Requires at least a heavy hull and is the best environmental shielding available.

hydrofoils: may be applied to any aquatic surface robot and provide pylons for lifting most of the chassis out of the water to reduce friction. Hydrofoils increase the chassis price by 300%, and multiply the base speed of the vehicle by 2 but decrease stability by -2. Hydrofoils may not be combined with streamlining, submersible or wave piercing hulls.

offroad: Ground transport robots may be enhanced to travel over difficult terrain more easily. This costs 50% of the base value of the drive unit and gives a +2DM to all movement on all non-easy terrain. It does not add weight to the robot, but it does reduce the maximum speed by 10%.

pontoons: This allows an aircraft to land and take-off from water. It costs Cr10 per kg of pontoon, 8% of the robot's chassis space, reduces the Base Speed by 10%, gives -1 DM Stability and breaks streamlining. Water movement is at 1/2 the rate of an equal screw propeller.

streamlined: This requires the chassis to have no external appendages or weapons and either a wedge or cone shape. It uses an aerodynamic or hydrodynamic hull to increase the maximum speed 3x normal, but increases chassis cost by 300% as well. May be combined with environmental protection.

stability: weight is kept lower down in the body and extra gyros are available to maintain orientation

Submersible: Submersible may be applied to any grav or screw propeller unit to allow travel underwater. Screw propellers move at full speed underwater, while grav drives move at 1/5 of their maximum airspeed. The Submersible configuration option increases the chassis price by 500% and may not be combined with streamlining. Submersibles are rated by their Safe Dive Depth and Crush Depth, as determined by the robot's Tech Level and chassis. These values are calculated for a Size 8 world and standard chassis. For every point of world size difference, up or down, add or subtract (respectively) 10% from the Safe Dive and Crush Depth values. Light Chassis reduces both depths by 20%, while heavy chassis increases them by 10% and extra heavy increases them by 25%. All submersibles require at least Hostile Environment Protection. Self sealing may be purchased separately (but is recommended). May not be combined with wave piercing hull, hydrofoils or pontoons.

Table: Submersible Safe Dive Depth and Crush Depth by Tech Level

Tech Level	Safe Dive Depth (m)	Crush Depth (m)
5	50	150
6-8	200	600
9-11	600	1800
12-14	2000	6000
15+	4000	12,000

wave-piercing hull: the shape of the hull causes the robot to skim more along the surface. Interface friction is much reduced, allowing the robot to be more efficient, increasing its base speed by 50%. The wave-piercing hull uses 3% of a robot's space and costs 50% of the chassis price. Wave-Piercing hulls may not be combined with hydrofoils, submersible or streamlining.

vacuum environmental protection: provides similar benefits to hostile environment protection, but adds the capability to work in trace or vacuum atmospheres. Requires at least a standard hull and is particularly useful for space based robots.

Chassis Modification Table

modification	TL	weight (kg)	Cost (Cr)	Effect
amphibious drive	6	100% drive	100% drive	allows water movement at 1/3 ground
corrosive env prot	9	6% chassis	30/kg chassis	protects against corrosive environments
hostile env. prot	5	2% chassis	10/kg chassis	protects against hostile environments
hydrofoil	7	0	300% chassis	+100% speed, -2 stability
insidious env prot	10	8% chassis	40/kg chassis	protects against insidious environments
offroad	4	0	50% chassis	+2DM for non-easy terrain, -10% max speed
streamlined	6	0	300% chassis	3x faster for some shapes w/ thrust drives
stability +1	9	3% chassis	50% chassis	+1 stability
stability +2	11	6% chassis	100% chassis	+2 stability
stability +3	13	9% chassis	200% chassis	+3 stability
submersible	5	6% chassis	500% chassis	allows underwater travel
wave piercing hull	6	3% chassis	50% chassis	+50% speed
vacuum env prot	6	4% chassis	20/kg chassis	protects against vacuum environments

Chassis may be constructed in different strengths to provide more or less protection to the robot. Light construction is least expensive and is relatively weak, and cannot have any chassis modifications or armor added to it. Standard construction may have up to 5% added armor and any environmental protection except insidious. A heavy chassis may have up to 15% additional armor included, and extra heavy chassis may have up to 25% additional armor. To appear normal, biologs may only have a light or standard chassis. Heavy and Extra Heavy chassis appear clearly artificial. Armored biologs do not benefit from wearing armor- only their strongest armor counts although every robot has 'inherent' armor based on its tech level. Inherent armor DOES stack with outside armor, whether added or worn.

chassis type	Cr/kg	max armor	kg/pt structure	chassis space used
light	4 Cr	no added	25	0
standard	6 Cr	5% added	20	0
heavy	8 Cr	15% added	17	5%
extra heavy	10 Cr	25% added	14	10%

Robotic 'Brains'

Every robot requires synaptic circuitry to carry out the essential processing and storage for it to function. More primitive brains have only minimal capacity and therefore can only obtain minimal skill levels. As processors become more sophisticated they can store more skills and function at higher levels. Linear processors function sequentially which sets an upper limit on their speed. Adding more processors help, but the number of processors speeds things up linearly. Quantum computers provide a level of parallel processing, where a given processor can make more than one calculation at the same time. Synaptic processors speed things up yet again, by increasing the interconnections between the various processors. High synaptic is a modification of synaptic processing where the number of connections increases exponentially, allowing many more inputs and

outputs into equations and allowing multiple solutions to be tested simultaneously. At all of these levels the storage available to the robot for data is massive enough that storage is not a major limitation for the 'brain'- the processing capacity is what prevents early robots from going beyond skill level 1. Note that by skill level 3 robots are as good as an excellent sophont at what they do, and given that they will also have a high Int and Edu it is quite likely that they will be able to outperform their living counterparts within their area of expertise. Robots have fewer skills available than most starting characters, though, which makes them particularly good at a restricted set of options.

Int and Edu are determined by the tech level of the computer used to run the robot. A hand computer weighs 1 kg at all tech levels and requires only a power level of 1 no matter what model is purchased. Skills are programmed into the robot's computer and cost the same as a skillsoft designed for a datajack. Companies that provide skillsofts are the same as those that write programs for robots, so it makes sense that prices are similar. The same computer handles normal character skills as well as the robot specific Interaction and Emotion skills. A robot with a lot of high level skills tends to be quite expensive, and often the computer and skills cost more than the rest of the robot hardware combined. Drones and cyborgs make a lot of sense as radio comms or even brain housings are far less expensive than a high end computer with expensive skills.

Computer Table

model	TL	cost (Cr)
0	7	100
1	9	400
2	10	800
3	11	1600
4	12	3000
5	13	5000
6	14	12,000
7	15	25,000

Cyborgs are fundamentally different than computerized robots in that they use an existing brain to become part of the machine and drive its functions. The intelligence, education, and skills of the brain used to make the cyborg determines its capability when the machine is built. Some societies will actually train a potential future cyborg from birth to have a particular set of skills. A cyborg brain support system takes up 10 kg, costs 25,000 Cr, and requires refreshment of the nutrient broth it lives on every month. Each extra kg of storage costs 50 Cr and can hold enough nutrient broth for 1 month. Nutrient broth costs 300 Cr per month and may be manufactured by any TL8 food processing facility. Note that a cyborg which is not environmentally sealed is still dependent upon oxygen for the brain to survive and is subject to suffocation just as any other sophont. Environmental sealing of any type is assumed to provide oxygen for a cyborg. If provided sufficient nutrients and oxygen, cyborg brains may be maintained nearly indefinitely and are considered a form of partial immortality by some.

Locomotion

Note that some robots such as Autodocs cannot move; locomotion is not a requirement. This reduces the cost of the robot but is a design choice made at the time of construction. Terrestrial movement include legs, spheres, wheels, tracks, and air cushions. Appendages are less stable than wheels or tracks but

Robot Locomotion Table

Locomotion Type	min TL	type	space mod	price mod	stability	surface
wheels	2	contact	x1	x1	+1	ground
tracks	4	contact	x1	x2	+2	ground
mole	6	contact	x2	x8	+4	
sphere	8	contact	x2	x2	+4	ground
appendages	8	contact	x2	x4	-1	ground/water
screw propeller	3	thrust	x1	x0.1	+1	water
air cushion	7	thrust	x1	x0.5	-1	ground/water
rotor	4	thrust	x2	x.5	-1	air
jet	5	thrust	x2	x2	0	air
hypersonic	8	thrust	x1.5	x4	-1	air
grav	9	thrust	x1	x1	0	air/water
advanced grav	12	thrust	x0.75	x2	+1	air/water
extreme grav	15	thrust	x0.5	x4	+2	air/water

are required for biologs and may be used for swimming (if the appropriate skill is purchased and hostile environmental protection is supplied). Note that robot speeds are substantially less than vehicle speeds in several cases; robot units are often less powerful and smaller than the similar vehicle forms.

Wheels are the cheapest option for movement, but they do not do as well in rougher terrain. 4 wheels are assumed, but additional wheels may be added to increase stability by +1 per pair. Each additional pair of wheels adds 25% to both the drive price and space. **Tracks** provide better stability and offroad movement than wheels but are more expensive, require 30% more power and have a lower top speed. **Spheres** may roll as wheels do, but must have all appendages fully retractable in order to move in this fashion. Space for sphere locomotion must still be purchased to allow the rolling to take place.

Screw Propellers are only relevant for aquatic robots and so are rather restricted in their use. They are far less expensive that gravitic propulsion, however, and are appropriate for robots that operate in water. Water worlds, for example, often have screw driven robots.

Underground movement for robots use a **Mole** type drive. Mining robots, rescue bots, or certain types of construction robots all have very good reasons for wanting to travel through solid material. Such movement is particularly slow, however, compared to any other method.

Flying robots come in several varieties, including **appendages, jets, rotors,** and **gravitic** units. Gravitic movement allows underwater use if the appropriate environmental sealing is applied. Jets and rotors function in an atmosphere, while gravitic flight works fine in a vacuum.

Robot Travel Speeds (kph)

Drive Type	1	2	3	4	5	6
wheels	25	50	75	100	125	150
tracks	15	30	45	60	75	90
mole	.005	.010	.015	.020	.025	.030
sphere	15	30	45	60	75	90
appendages (ground)	7	14	21	28	35	42
appendages (air)	10.5	21	31.5	42	52.5	63
legs (swim) tentacles/tail+fins (swim)	3.5 7	7 14	10.5 21	14 28	17.5 35	21 42
screw propeller	10	20	30	40	50	60
air cushion	25	50	75	100	125	150
rotor	50	100	150	200	250	300
vertical rotor (helicopter)	25	50	75	100	125	150
jet	100	200	300	400	500	600
hypersonic	150	300	450	600	750	900
grav	50	100	150	200	250	300
advanced grav	100	200	300	400	500	600
extreme grav	150	300	450	600	750	900

Moving robots may sometimes be grappled (using the natural weapons skill, a net, or some other means) by sophonts to restrict their mobility. In these cases, simply add the mass of the sophont(s) to the robot and recalculate movement accordingly. If the robot is powerful enough to move both (ie. movement score greater than 1), speed is reduced but the sophont(s) moves with the robot. Fair warning: grappling flying robots may be hazardous to one's health.

Drive unit cost and size varies depending upon whether it is a thrust or contact based drive. Contact drives such as wheels or tracks are 1.3% of the chassis size per speed level and cost Cr 100 per kg. Thrust based drives are slightly smaller at 1% of the chassis size per speed level but are much more expensive, costing Cr 5000 per kg. Lower tech thrust drives such as rotors and screw propellers make up for this high cost somewhat by having a small cost modifier. Drive units for thrust based robots and drones, however, are often a significant fraction of the total cost of the unit.

Power Plant

All robots require a source of power. As only higher tech societies can build robots, only higher tech power plants are considered here. Power plants must be able to provide energy for the regular needs of the robot (with the exception of energy weapons which require their own power packs). Biological robots may use the equipment normally usable by that race if the appropriate skill is purchased. As smaller engines are generally less efficient than larger ones, robots use twice as much fuel (10%/ day base) as their vehicle equivalents. Locomotion also takes up a substantial percentage of the overall output of the power plant. If a robot is stationary, it may use the power grid of the planet or system to which it is attached, or it may have its own backup power system which operates when the main power source is interrupted. Robots that require mobility but never move too far from their base may use a rechargeable battery instead of an independent power plant. A battery of the given size and power level will power a unit for 6 hours. Batteries may be scaled up or down in size to lengthen or shorten their endurance, and units have the opportunity to power down systems to extend battery life. Recharging takes 1/2 the time the robot was active.

In order to calculate the power needs of the robot, the desired travel speed and type of movement are first determined. Power plants scale up in size based upon the size of the robot and the amount of power they are expected to deliver. Note that fusion power plants have significant size limits on how small they can be even at high tech levels. Early fusion plants are too large for the majority of robots and are not an option. While fission power at first glance would have major size disadvantages, radioactive decay can be scaled down to extremely small amounts and is very cost efficient. The space programs of Earth use atomic batteries because of their long life and fuel efficiency. The base size of the power plant is determined according to the power plant table as modified by the modifier table above and the power level (see below). Power plants have a base cost of Cr35 per kg.

Robot Power Plant Modifiers

Plant Type	TL	Space mod	Min size	Price mod	Fuel mod	Fuel price/kg	Fuel type
Internal Combust	4	x3	none	x.25	x3	20	hydrocarbon
Gas Turbine	6	x2	none	x0.5	x3	20	hydrocarbon
Fission	6	x2	none	x2	x0.04	1000	radioactives
Closed Fuel Cell	7	x1.5	none	x2	x25	1	hydrogen
Open Fuel Cell	7	x1	none	x1	x4	1	hydrogen
Fusion	12	x0.75	80 kg	x1	x0.75	1	hydrogen
Advanced Fusion	15	x0.5	20 kg	x2	x0.5	1	hydrogen
Battery-5	5	x6	none	x2	0	0	n/a
Battery-8	8	x3	none	x2	0	0	n/a
Battery-10	10	x1.5	none	x3	0	0	n/a
Battery-12	12	x0.75	none	x4	0	0	n/a
Battery-14	14	x0.5	none	x5	0	0	n/a

Table: Power Plant Size per Power Level

Power Level	Base Percentage of Chassis
1	2%
2	3%
3	4%
4	5%
5	6%
6	8%

How long a robot may stay active is determined by the amount of energy they have available, specifically the amount of fuel or the size of their battery. Keep in mind that mechanical power plants (internal combustion and gas turbine) are somewhat noisy. While they are clearly effective at delivering enough power to move robots and drones even today, a humanoid emitting clouds of smelly exhaust will not be very realistic.

The means of locomotion also take up a certain amount of a robot's body. For all types of locomotion, those systems take up a base 1.5% of the robot's chassis size per speed class and a base cost of 25 Cr per kg for contact based drives and 800 Cr per kg for thrust based drives.

Appendages

Appendages are also optional for robots as some designs (recon robots, for example) do not need manipulators. Appendages come in 5 different types: heads/turrets, arms, wings, tentacles/tails, and legs. Non biologs will usually have manipulator arms or turrets that do not appear natural but may function in appropriate ways. Biologically inspired robots will have whatever combination of legs, arms, etc which are appropriate for that organism. Wings are available for any biolog, but they must mass at least 40% of the entire robot. Flight doubles the size of the appendage drive and costs 4x as much (legs would be in addition to this price). Adding a tail to a swimming robot costs the same in credits and size as legs, and both can be taken. Note that a prehensile tail not used for moving through water would be better considered a tentacle. Limbs that may be used as either arms or legs and are counted as legs for movement but the drive costs 100% more due to the increased functional requirements. Streamlined robots require retractable appendages or popup turrets in order not to break streamlining. Note that appendages do not add costs to the chassis directly- these costs are included in the base chassis, strength, and dex features purchased. The drive price assumes standard legs are moving the robot, but other types of movement are possible at increased cost.

Strength and Dexterity are characteristics that must be purchased separately for each robot. Robots have a base Str of 1 per 50 kg and a base Dex of 1 per TL greater than 9 (ie. +1 at TL10, etc). Each point above base may be purchased up to the tech level of the robot. Small class A units have a maximum strength of 5 + 1 per 5 kg of size, so that at 25kg a robot may have a Str of 10 and by 50kg their strength is entirely limited by their tech level. Additional Strength and Dexterity each cost 1% of the chassis size per point added up to the maximum of the robot's TL. Costs increase as chassis cost * 5% * the partial sum of the number of points (calculated separately), where the partial sum is 1+2+3+...n and can be calculated as n*(n+1)/2. So for a robot with an added Str of 9 and Dex of 12, Str costs 9*10/2 = 45, so 225% of the chassis cost, and Dex costs 12*13/2 = 91, so 455% of the chassis cost. Together, the Str and Dex would use 9+12=21% of the chassis size. High a bility scores get expensive, particularly for biologs and their already costly chassis. Both added strength and dexterity take up chassis space, and whether the space is found in a limb or within the torso to drive a nearby limb is immaterial.

In all cases, strength is distributed proportionately to the body plan while dexterity is treated essentially the same for each limb. Some body plans (an octopus, for example) will have most of their mass in their limbs. In terms of the game, 'torso' hits still affect structure while 'appendage' hits damage or destroy extremities. The referee is encouraged to make the effects of the damage cinematic (ie. sparks are flying from the severed arm of the octobot) and potentially functional restrictions as well.

Great strength does not mean that a robot has great leverage. Cargo robots need to accommodate leverage and strength (as well as locomotion) when attempting to move heavy loads. Winches and arms/tentacles may be used to provide the robot with leverage when moving things heavier than the robot itself. A light crane is able to move a standard 1 ton palette, but the center of mass must be kept very near that of the robot.

Wings pose a significant problem for any robot. Two special conditions apply: 1) the robot may have no more than a standard build- even non-biological wings cannot support a heavy robot; 2) a minimum of 40% of the mass must be found in the wings and will thus make up a large percentage of a robot's mass. Most self-powered flight is on the slow end for flying organisms, and therefore requires a larger surface area per kg than a fast moving object. Man-sized fliers are scientifically very challenging to design and would require huge wings. Fortunately science fiction is less demanding. For non-biologs, grav power is so much simpler and more efficient that wings become doubly unnecessary.

Legs must be stronger than arms in most sophonts because legs generally support the body and must move the mass of the robot. Appendages used for movement must use at least 20% of the chassis mass as part of the drive components which allow them to be used for walking and/or swimming. Additional legs beyond 2 may increase the stability of a biolog by +1 per pair of legs, rounded up; ie. a 3 legged robot would gain +1 stability. Note that like other appendages, this mass refers to the distribution of mass for the robot and does not actually use the limited chassis size. 1 leg or 1 tentacle may not be used for movement.

Biologs intended for swimming require either legs, tentacles or fins/tail. Fins and tail increase the maximum speed x3 compared to leg swimming but do not provide movement on land. Tentacles are twice as efficient at swimming as legs and also move fine on land as well. Prehensile legs may work as arms or legs and work for swimming just like other legs do. Swimming biologs also require hostile environment protection or better to withstand extended submersion in water. Normal robots have a general protection against water that lasts for a short dunking or rain, but swimming places more stress on the robot.

Human biologs require very specific ratios of body parts to look 'normal'. While there is always a certain amount of variation between individuals, those with proportions outside of these ranges look odd or deformed. Healthy adult humans mass anywhere from about 40 kg (very small woman) to 180 kg (large man), although children can be smaller and hugely obese individuals can be larger. Heads take up ~ 7-10% of a body's mass, arms mass ~ 10-16%, legs use ~22-30% of the total mass, with the torso or trunk making up 45-55%. Note that if one part of the body is proportionately larger, other parts must be proportionately smaller to make up 100% of the total mass. Non-human biologs have very different ratios, numbers of limbs, etc. and each must be chosen according to the body plan of the organism. Horses, for example, have forelegs of 6-8% each, hindlegs 7-9% each, and the head+neck masses 8-12%. Body segment information is somewhat difficult to obtain for many organisms, so designers should take care to keep biologs within reasonable limits.

Heads may vary somewhat in size, although large heads will usually be too large to be retractable. Heads work as an independently directed appendage which can face a different direction than the rest of the unit (acting in most ways like a vehicle turret). It is an excellent location for a small weapon or directional sensors as they can be turned without reorienting the whole unit. As most sophont brains are located in the head, some designers will not place the robot brain there as it is a common target for aimed shots. Other designers will intentionally put the brain in the head as it is the least likely place to be hit on the hit distribution table.

Armor

For security droids or warbots armor is a critical feature, while for other robots it is an afterthought. All robots have an outer covering made of some material which adds an inherent 5% 'armor' material depending upon the tech level of the robot. Biological robot forms may only have a light or standard chassis if they are intended to appear indistinguishable from the natural biological form. This will limit them to having a total of 10% of their chassis weight as armor. Humanoid shaped robots without a natural appearing outer skin may be constructed with a heavy or extra heavy chassis, and as such can have the full amount of armor but lose any resemblance to the natural organism. When calculating price, 'base' refers to the base chassis cost (build modifier, size, and shape).

Applique Armor (TL4): This armor is essentially plates of ceramics, sand, metals, and other fibers added to the outside of a drone or robot which disperses incoming damage. Each time the robot is hit, one charge of applique armor is used and damage is reduced by 5 points before it reaches the armor. Applique armor may be applied to any robot with standard or better build and at least 1 point of added armor and takes 6d6 minutes per charge to replace. Each charge takes up 0.5 kg per 10 kg of robot, costs Cr20 per kg and breaks streamlining.

Reactive Armor (TL 7): This armor uses explosive charges to reduce the armor penetrating ability of kinetic weapons. It is not effective against beams or energy weapons. When activated by a kinetic strike sufficient to penetrate the armor, the damage from the incoming projectile is reduced by 10 points to a minimum of zero. This uses 1 charge. A vehicle may have any number of reactive armor charges, but only 1 charge may be used per hit. Each charge takes up 0.25 kg per 10 kg of robot. Reactive armor costs Cr50 per space and it takes 2d6 minutes to replace a charge. If all charges are expended, reactive armor provides no additional benefit. Reactive armor breaks streamlining.

Robot Armor Types

Armor Type	TL	Protection	Price	Max
iron (early drone only)	4	2 per 5% of chassis	100% of base	12
titanium composite	7	3 per 5% of chassis	100% of base	18
crystaliron	10	4 per 5% of chassis	200% of base	24
superdense	12	5 per 5% of chassis	350% of base	30
bonded superdense	14	6 per 5% of chassis	500% of base	36

Sensors

Sensors are what allow a robot to detect the outside world. Sensors cover all 5 of the human senses but may include everything from radar to neutrino detectors to neural activity scanners. As robots operate in many different environments they may need specialized equipment that can be easily adapted from personal equipment available to any sophont (with enough credits). Robots also tend to mix in smaller forms of sensors found on certain vehicles, such as sonar, that is not supported by any personal equipment. This ability to mix personal and vehicular equipment is one of the features which give robots a unique place in the universe. All sensors record the information- this is how the robot knows things, after all.

The 5 major types of sensors detailed below have 5 levels of sensitivity and increase with increasing tech level and cost. All of the sensors other than haptic sensors (which take up 2% of the chassis size) take up 0.1 kg. Coarse sensors cost the base amount, basic sensors cost 3x base, standard sensors 6x base, fine sensors 10x base, and extra fine sensors 15x base cost. Depending on the sensor type, they become available at different tech levels and at different base costs. Not every robot requires high end sensors- cargo robots have little need to taste or smell anything, but basic haptic sensors to determine how tightly a cargo is held would be useful. The primary functions of the robot, the tech level, and naturally the cost will determine which sensors are present.

Audio sensors cost a base 100 credits and measure vibrations in the air produced by various measures. Coarse (TL4) sensors are minimal fidelity, basic (TL5) is higher quality, standard (TL6) refers to approximately human norm, fine (TL8) is superior to human, and extra fine (TL10) allows discrimination well beyond human abilities.

Directional microphones improve fidelity and volume in one direction at the expense of other directions. TL6

Echolocation uses time differences for a sound hitting 2 different receptors to determine the direction and distance of an object. Passive echolocation requires that a sound be produced for it to be heard, so silent

objects are effectively invisible. Speakers combined with echolocation can be used as an inaccurate form of sonar in air. TL6

Laser microphones are able to pick up vibrations from surfaces instead of air, allowing detection of otherwise impossible to hear sounds. TL7

Sonar is a variant of echolocation optimized for underwater use. Passive sonar uses sound produced in the environment, while active sonar uses a sound pulse to detect objects. TL5

Subsonic and **Ultrasonic** detectors extend the frequency to well below or well above human hearing, respectively. The finer the base detector, the more discrimination these sensors provide. TL5

Haptic sensors are used to sense touch and related sensations at many locations. They cost a base 500 Cr and take up 2% of the chassis size. Coarse (TL7) sensors provide minimal touch, basic (TL9) gives more sensitivity and discrimination, standard (TL11) is approximately human equivalent, fine (TL13) allows more sensation and information than humans generally gain, and extra fine (TL15) provides the most information and discrimination possible.

Thermometers (TL4) allow the temperature of an object to be known by touch. Infrared vision can make the same basic determination as well.

Medical Scanner: analyzes the health and physical characteristics of living organisms and compares them to a database of known information. It provides extensive information about the organism being touched but is limited to macroscopic plants and animals. TL12

Olfactory sensors refer to smell, or the detection of chemicals in a gaseous state that interact with the robot at a base cost of 300 Cr. Coarse sensors (TL7) identify strong or key odors, basic (TL9) expands those options, standard (TL11) sensors are roughly human equivalent, fine (TL13) would be equal to a bloodhound, and extra fine (TL15) allows distinctions no biological organism would need to make.

Specialty Robot Sensors

Sensor Type	TL	weight (kg)	cost (Cr)
bioscanner	15	3.5	350,000
chemosensor	12	2	7,500
densitometer	11	5	20,000
directional microphone	6	0.5	200
echolocation	7	0.5	1,000
electromagnetic probe	10	.1	1,000
elemental analysis	7	5	2,500
hydrosampler	7	5	3,000
infrared sensor	5	.1	100
laser microphone	7	1	750
lidar	7	2	1,500
magnetometer	7	2	750
mass spectrometer	7	15	25,000
medical scanner	12	2	15,000
metal detector	6	1	300
microscopic vision	6	1	1200
neural activity sensor	14	10	35,000
neutrino detector	11	10	75,000
radar	7	10	10,000
radiation counter	5	1	300
radio direction finder	6	2	1000
sonar	6	10	10,000
subsonic hearing	5	.1	200
telescopic vision	7	2	1,500
thermometer	4	.1	50
ultrasonic hearing	5	.1	200
ultraviolet vision	6	.1	200

Bioscanner: The bioscanner 'sniffs' for organic molecules and tests chemical samples, analyzing the make-up of whatever it is focused on. It can be used to detect poisons or bacteria, analyze organic matter, search for life signs and classify unfamiliar organisms. It is not limited to macro scale observations and can collect information for microorganisms.

Mass spectrometers (TL7) ionize a sample and can give very accurate molecular weights of intact molecules as well as fragments of molecules. It does not work on substances which it cannot ionize.

Neutrino detectors (TL13) analyze subatomic particles resulting from radioactive decay and other natural and unnatural phenomena. They are very specialized and very sensitive for certain types of situations.

Taste Sensors analyze dissolved molecules in a particular liquid at a base cost of 200 credits. Coarse (TL6) allows simple ion or pH detection, basic (TL7) expands that range, standard (TL9) gives approximately human equivalent, fine (TL11) gives much broader sensitivity than humans, and extra fine (TL13) allows extensive identification and quantitation beyond human abilities.

Chemical Sensors are sophisticated elemental/molecular analyzers available at TL13 that can calculate the makeup or concentration of even partially broken down material. (Exploration robots have been heard to chew rock, a rather disturbing sound coming from a robot.)

Elemental Analysis (TL6) is a technique used to identify the elements in a sample as well as their approximate concentration. It does not identify how those elements are interconnected.

Hydrosamplers (TL8) expand upon the basic chemical composition of water and include information about microbes and viruses within it.

Visual sensors use reflected light to identify distance and location of bodies in the environment and cost a base 200 credits. Coarse sensors (TL4) give poor discrimination of color and intensity, basic (TL5) is more complete, standard (TL6) is approximately human recognition, fine (TL8) gives extensive spectral and intensity discrimination, and extra fine (TL10) allows detailed analysis of the visual spectrum.

Infrared detectors (TL5) expand the spectrum of detection to wavelengths longer than visible light. It may be used for heat determination or, with fine or better sensors, some chemical analyses.

Ultraviolet detectors (TL6) analyze wavelengths shorter than visible light.

Lidar (TL6) uses a reflected laser beam to locate objects in the environment and their distance. The sensing laser will give away its origin for any detectors of the correct wavelength.

Microscopic vision (TL5) allows examination of very tiny details down to a minimum of 0.2 microns, about 1/2 the size of a small bacteria. It cannot visualize viruses. Fine or better sensors allow spectral distinctions to be made for phenomena such as fluorescence and luminescence.

Telescopic vision (TL5) allows finer details of distant objects to be obtained. More details and higher magnifications are possible with higher quality visual sensors.

Some detectors do not fall within the 5 human senses, even broadly defined. These include radio waves and other electromagnetic detectors, but also densitometers and neural activity sensors.

Densitometer: The remote densitometer uses an object's natural gravity to measure its density, building up a three-dimensional image of the inside and outside of an object. Note that this device has a much shorter range than the vehicle mounted (or spacecraft mounted) form.

Electromagnetic Probe: This device detects the electromagnetic emissions of technological devices, and can be used as a diagnostic tool when examining equipment (+1 DM to work out the problem with it) or searching for hidden bugs or devices.

Magnetometers (TL7) are more sophisticated than compasses and can measure the strength and direction of magnetic fields.

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

Neural Activity Sensor (NAS): This TL14 device detects neural activity up to 500 meters away and gives a rough estimation of the intelligence level of organisms based on brainwave patterns. The data from a neural activity scanner can be interpreted using the Sensors-Instrumentation skill. This device has a much shorter range than the vehicle version.

Radar (TL6) uses radio waves to locate objects in the environment. This requires a broadcast signal and it is relatively easy to locate the source.

Radiation Counter: (TL5) indicates the presence and intensity of radioactivity within an area. The indicating signal will grow stronger as it gets closer to the source, so the range at which a source will be detected varies depending upon the base intensity.

Radio Direction Finder: (TL6) localizes the emission of electromagnetic radiation by intensity and direction.

Communications and ECM

Communications range from simple, local radios to continental scale meson communicators. All drones require a communication system to allow them to be controlled, but radios are commonly found on robots and cyborgs as well. The simplest, earliest devices are based on radio waves, and are gradually supplemented with satellite dishes, laser receivers, masers, and finally meson communications. Each improvement costs additional credits and takes up additional space. When used in space, ranges are at least 100x longer than on a planet. All radios include a transponder that may be programmed or silenced as appropriate.

Radio Equipment

range	TL	kg	cost (Cr)
5km	5	0.25	250
50km	5	1	500
500 km	6	2	1000
5000 km	7	4	2000

Improved Communications

type	TL	kg	cost (Cr)
satellite	7	20	500
laser	8	radio	3*radio
maser	10	2*radio	6*radio
meson	11	4*radio	20*radio

The ability to trace signals, selectively block unwanted signals, and securely communicate with allies becomes essential as communication becomes more ubiquitous. In the case of drones, an opponent with knowledge of the drone and its basic method of communication may attempt to take control of the device away from its operator. In the case of a security drone, this could have deadly consequences. Electronic countermeasures (ECM) are intended to protect ones own communications or to interfere with smart weapons targeting a robot. ECM

ECM Table

type	TL	weight (kg)	cost (Cr)
Class A (-1 DM)	7	1	500
Class B (-2 DM)	10	2	1500
Class C (-3 DM)	12	3	5000
Class D (-4 DM)	15	5	15,000

requires a separate comms action to use and a failed roll provides an additional signal for enemies to target. Active use of ECM negates stealth coatings.

Devices

Robots often carry built-in devices which add functionality to the unit. The most common device is some sort of communication equipment required to receive instructions. If the master unit cannot contact or control the slave unit, the slave must rely on its own processing power and previous instructions to determine its actions. Comms are also critical for performing any type of programming for a robot. Every robot has a communications port with links directly to the brain of the robot. In some cases it might be deeply hidden and protected (as for a warbot), but it is built into every brain ever constructed. Cyborgs are the only artificial being without this feature, and while it prevents any sort of tampering with the brain, a cyborg which develops personality 'quirks' cannot simply have its memory wiped and reprogrammed.

Other devices tend to be linked to the primary functions of the robot. Repair droids have mechanical and electrical toolkits, construction droids have welders, etc. These devices usually come standard as part of the robot, but some flexible droid chassis have a variety of optional equipment which can be included depending upon the needs of the buyer. Novel devices for experimental or prototype robots could also be developed by various megacorps or organizations for their own (perhaps nefarious) purposes. Costs for most devices built into the robot should be consistent with prices for similar devices used by sophonts if they are obvious on the robot, whereas internal or hidden devices should cost at least 3x as much due to their concealed nature. Augmented individuals may also have unique or advanced prosthetic devices that are not generally available. Referees have the final say about what appears in their game, and unexpected tech is a useful tool to surprise and challenge players.

Digital scrambler: used to confuse and open a digital locking device. A computer security or streetwise roll is attempted to use the device. A failure does not open the lock, and a failure by 2 or more causes an alarm.

Display screen: used to communicate to nearby sophonts visually and aurally.

Financial Package: Set of inputs and connections which allow the robot to conduct business transactions. Most often used to rent a robot's services.

Communication Devices Table

Device	TL	weight (kg)	cost (Cr)
digital scrambler	10	.5	1500
display screen	4	.3	50
financial package	7	.3	200
holographic projector	11	1	1000
inertial locator	6	0.5	200
loudspeaker	5	1	100
projector	6	.3	100
voder	7	.2	20

Holographic Projector: This is a toaster-sized box that, when activated, creates a three dimensional image in the space around it or nearby – the range is approximately three meters in all directions. The image can be given pre-programmed animations within a limited range and the projector includes speakers for making sound. The projected holograms are obviously not real so this device is mostly used for communication. The TL 13 version can produce holograms real enough to fool anyone who fails an Intelligence check (made upon first seeing the hologram), at triple the cost, and the TL 15 version can produce holograms that are true-to-life images, at ten times the cost.

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

Loudspeaker: used to create high intensity sound. May be informative or distracting.

Projector: Uses a simple light source and transparent screen to produce a moving 2D image appearing on a solid surface.

Voder: speaker system used to produce audible communication

General Devices

Fire Extinguisher: used in rescue or repair robots, it uses chemicals to put out smallish fires

Gas Emitter: hooks into a compressed gas tank that can emit any type of gas: smoke, tear gas, tranq gas, nerve gas, etc that will not damage electronic components and can flood 10 square meters per turn.

Geologic Sampler: used to perform basic soil/ground analysis within 5 meters of surface. Requires cargo space to bring material back for further analysis.

Lighter: equivalent to a small welding torch, it is able to ignite flammable material.

Lockpicks: allows robots with Streetwise skill to open locks

Puff Emitter: device that delivers a small burst of gas to a sophont immediately adjacent to the robot or drone. One puff emitter may have up to 5 doses of a single type of gas.

Rangefinder: used for surveying, determines accurate distance using parallax

Spotlight: provides illumination for a modest area in whatever wavelengths designed.

General Device Table

Device	TL	weight (kg)	cost (Cr)
fire extinguisher	4	2	200
gas emitter	7	2+gas vol	1,000+50
geology sampler	7	48	15,000
lighter	4	.2	50
lockpicks	5	--	20
puff emitter	7	1	500
rangefinder	5	.5	200
spotlight	3	.5	20
toolkits		10	1000
syringe	3	0.1	20
winch	4	10	250

Toolkits: include a variety of tools related to doing particular types of jobs and are very broad in scope. More than 1 toolkit may be carried and may be switched as needed if the skills are present. Robots with external appendages may use regular toolkits if they are present and the appropriate skills are available. Toolkits include: appraisal, artistic, carpentry, computers, construction, demolitions, disguise, domestic, electronic, engineering, farming, forensic, landscaping, life science, masonry, mechanical, medical, metalworking, physical science, space science, surveying, survival, weaponry.

Syringe: used to administer drug dose to a sophont. Often used by rescue, medical and assassin robots.
More than 1 syringe may be present with different drugs, but any individual syringe may only administer a single drug. Syringes contain 5 doses.

Winch: designed to pull heavy loads up to 5 tons. will require stabilization or a load with wheels for it to move. Note that a winch may move the robot if it is not strong enough to move the object on the other end.

Shielding and Protective Devices

Camouflage: environment specific, reduces the chance of visual or aural detection with a -1 DM

Digital Camouflage: uses advanced outer coatings to give a -2 DM on recon rolls to detect

EMP shielding: conducting material lines the entirety of the robot blocking EMP like a faraday cage.

Laser designators are military targeting computers that use pulse lasers to illuminate a target. They may be blocked by smoke, aerosols, or bad weather. Gives a guided munition an additional +1 DM to hit a target.

Meson designators are high tech targeting computers that use meson pulses to illuminate a target. They are not affected by smoke, stealth, aerosols, or other defensive technologies. Gives advanced guided munitions an additional +1 DM to hit a target. Weapons lower than TL12 are not designed to use this technology.

Psionic Shield: protects a cyborg from telepathy or any unit from direct telekinetic interference.

Stealth: reduces the electronic signature of the robot, giving a -2 DM for sensor rolls to detect or lock onto the protected robot. It does not affect visual cues (see camouflage and digital camouflage above). **Improved Stealth** available at TL14 gives a -4 DM for sensor rolls.

Shielding and Protective Devices Table

Device	TL	weight (kg)	cost (Cr)
camouflage	4	2% chassis	10/kg cha
digital camouflage	10	6% chassis	25/kg cha
EMP shielding	10	2% chassis	20/kg cha
laser designator	6	2	1,500
meson designator	12	5	5,000
psionic shielding	12	.5	40,000
stealth	11	4% chassis	60/kg cha
improved stealth	14	7% chassis	180/kg cha

Weapons

Weapons are a dangerous addition to any robot design. Hacking is as common in the future as it is currently, so an armed, independently controlled robot is a deadly danger to anyone unaware of that robot's nature. A compromised robot can relatively easily be modified to carry a bomb (even a small nuclear device) which will only be triggered under the right circumstances (which may be generated by the robot). Most robots have a physical tampering identifier constructed into their chassis at the factory which is very difficult to replicate or avoid damaging. While it is not foolproof, it can at least provide some warning that a robot may have been corrupted. Hacked robots, however, provide no warning as there are no physical changes to the robot.

Some robots such as warbots may be nothing more than independently motivated weapons platforms. Certain races prefer to use warbots for various physical or cultural reasons, while others eschew them for their own personal preferences. Some of these designs are notorious for their destructive capability which may rival that of a pre- spaceflight tank (or worse!). Advanced weaponry is deadly, and unless an opponent is similarly equipped the technologically inferior side usually suffers in any confrontation. Warbots are highly restricted or forbidden on many worlds and anyone found using or importing such weapons had best be prepared for a fight. (Then again, they are bringing in warbots so fighting is probably their goal.) Because of scale and leverage, all robots are limited to 2 melee weapons and 2 main weapons. Even warbots are restricted to weapons sophonts may carry and use although appropriate design and mass will allow them to use a supported weapon without a tripod or other aid. Robot powerplants are unable to power energy weapons so standard powerpacks devoted to each weapon must be included. Vehicular scale weapons require a robot vehicle constructed under the vehicle rules to provide an adequate base for the heavier weapon.

Robot weapons come in two broad categories: internally mounted/stored or externally mounted. A biological robot of the appropriate race can use any of the weapons or armor systems designed for that race and therefore would never need an externally mounted weapon. Externally mounted weapons are easily observable and break streamlining but cost less and take up less space. Internally mounted weapons may only be observed using more sophisticated techniques such as X-rays or densitometry but take up double the space. Robots programmed as bodyguards often include hidden weaponry that can be used to turn the tables on their attackers. One drawback of internally mounted weapons, however, is the volume of chassis that the weapon

takes up. This typically limits the size of internal weapons. As with all devices, there are required tradeoffs and no design can have the best of everything. Assume that any internally or externally mounted weapon includes whatever extensions are needed to use the weapon appropriately; ie. an armless cylinder can still swing a blade. The extension, however, is single purpose and may not be used to do anything that the weapon wielded by a sophont could not do.

Larger robots provide a more stable firing platform than smaller robots. Class A robots (50kg and less) may not use weapons massing more than 3 kg, and Class B robots are restricted to weapons 20 kg or less. Recoil values listed are true for size classes A and B (ie. up to 250 kg). For class C robots less than 375 kg reduce the recoil by 1 and for those 400 kg and larger reduce recoil by 2. Note that recoil values do not go negative, but a big heavy robot has no trouble firing a big heavy weapon. For melee weapons, positive heft penalties are reduced by high strength so pretty much any large robot will have free choice of melee weapon.

Thrown/ Slug Weapons

Weapon	TL	Range	Damage	Auto	Recoil	Mass	Magazine	Cost (Cr)
net	3-14	thrown	entangles	no	0	1	1	20-500
revolver	4	pistol	3d6-3	no	0	1	6	150
tranq pistol	8	thrown	2d6	no	0	1	2	150
flechette pistol	9	pistol	2d6-1	4	-1	1	40	250
snub pistol	8	pistol	3d6-3	no	0	0.2	6	150
body pistol	8	pistol	3d6-3	no	-1	0.3	6	500
cartridge pistol	7	pistol	3d6+3	no	4	1.5	2	300
accelerator pistol	9	pistol	2d6+1	4	0	2	40	400
submachine gun	5	shotgun	2d6	4	2(3)	3	40	500
gauss pistol	13	pistol	3d6+1	4	-1	1	40	500
autopistol	6	pistol	3d6-3	no	0	.5	15	200
tranq rifle	7	pistol	2d6+2	no	0	4	3	200
autorifle	6	rifle	3d6	no	1	5	40	500
sniper rifle	7	rifle	3d6+3	no	2	5	4	600
assault rifle	7	assault	3d6	4	1	4	40	1000
accelerator rifle	9	rifle	3d6	no	0	2	15	900
flechette rifle	9	rifle	3d6	4	0	5	80	800
gauss rifle	12	rifle	4d6	8	0	4	80	1500
shotgun	4	shotgun	4d6-1	no	3	4	6	200
autocarbine	5	shotgun	3d6-2	4	2(4)	4	20	200
flechette carbine	9	shotgun	2d6+2	4	0(1)	3	40	500
accelerator carbine	9	shotgun	2d6+2	4	0(0)	1.5	20	750
gauss carbine	12	assault	3d6+2	8	1(2)	3	40	1200

Personal weapons often have limits on how often a weapon can fire. All mounted energy weapons draw their power from separate energy cells dedicated to that weapon. If damage or extended use reduce the power availability below its minimum, that weapon becomes inoperable. Ammunition space for weapons must be allocated when the robot is designed. Damage to a weapon or ammo storage may prevent firing until repaired.

A destroyed weapon cannot fire until it is replaced. If an ammo storage space is destroyed, the referee may decide that the remaining ammo present explodes, likely ending the combat.

Melee Weapons

Weapon	TL	Range	Damage	Heft	mass (kg)	energy	Cost (Cr)
club	0	close	2d6	0	2	0	5
dagger	1	close	1d6+2	-1	0.2	0	10
stilletto	2	close	1d6+2	-2	0.1	0	50
staff	1	extended	2d6	1	2	0	5
fighting staff	8	extended	2d6	0	1	0	30
spear	1	extended/thrown	2d6+1	2	1.5	0	10
axe	2	extended	2d6+2	2	6	0	60
blade	2	close	2d6+1	0	0.5	0	50
bayonet	3	extended	2d6+1	1	3	0	20
halberd	3	extended	4d6	3	5	0	75
rapier	3	extended	1d6+4	-2	0.5	0	100
cutlass	3	extended	2d+2	0	1	0	100
broadsword	3	extended	4d6	2	6	0	300
mace	3	extended	2d6+2	3	5	0	20
monoblade	8	extended	2d6+5	-1	1	0	1000
monoknife	9	close	2d6+2	-2	0.5	0	750
vibroblade	11	extended	5d6	1	2	2	3500
vibroknife	12	close	3d6+1	0	1	1	2500
energy blade	14	extended	6d6	-1	2	4	7500
energy knife	15	close	4d6	-2	1	2	5000
stunstick	9	close	2d6	0	0.5	1	300
stunstaff	9	extended	2d6+3	1	2	2	800

Energy Weapons

Weapon	TL	Range	Damage	Auto	Recoil	Mass (kg)	Power	Cost
laser pistol	10	pistol	3d6	no	-	3	1	1500
improved laser pistol	13	pistol	3d6+2	no	-	2	2	2000
stunner	9	shotgun	2d6	no	-	2	2	500
improved stunner	12	shotgun	2d6+2	no	-	2	3	750
advanced stunner	15	shotgun	3d6+1	no	-	2	4	1000
laser carbine	9	assault	4d6	no	-	4	2	2000
improved laser carbine	12	assault	4d6+2	no	-	3	3	3000
advanced laser carbine	15	assault	5d6	no	-	2	4	4000
laser rifle	9	rifle	5d6	no	-	5	4	2500
improved laser rifle	12	rifle	5d6+2	no	-	4	5	4000
advanced laser rifle	15	rifle	6d6	no	-	3	6	6000

stagger laser	12	assault	4d6	4	-	7	6	5000
improved stagger laser	15	assault	4d6+2	4	-	6	8	8000
PGMP	12	rifle	10d6	no	8	20+10	10	65,000
improved PGMP	14	rifle	12d6	no	4	10+10	16	100,000
FGMP	15	rifle	16d6	no	6	35	-	250,000

Heavy Weapon Launchers

Weapon	TL	Range	Damage	Auto	Recoil	Mass (kg)	magazine	Cost
grenade launcher	6	shotgun	by grenade	no	1	6	6	400
RAM launcher	8	assault	by grenade	4	1	7+6	6	800
mini grenade launcher	8	shotgun	by grenade	no	0	3	1	400
mini RAM launcher	10	assault	by grenade	4	0	3+4	20	800
flamethrower	6	shotgun	4d6 fire	no	0	20	25	2000
small, short range rocket	7	rocket	by payload	no	3	20	1	varies
mortar	4	rocket	by grenade	no	6	15	1	3000

Supported Weapons

Weapon	TL	Range	Damage	Auto	Recoil	Mass (kg)	magazine	Cost
Light Machine Gun	5	assault	3d6	8	2	21	100	3000
Light Assault Gun	5	rifle	4d6	no	4	21	5	3500
Heavy Machine Gun	5	rifle	4d6	8	2	40	100	5000
grenade launcher	6	assault	by grenade	4	0	40	24	5000
ARMP	7	rifle	5d6	no	6	25	1	7500
VRF gauss gun	12	rocket	6d6	12	1	25	200	12,000
heavy VRF gauss gun	12	rocket	8d6	12	2	40	800	20,000

Ammunition

Many weapons come with a magazine attached, but some drones may want a larger supply of ammo than is typically present. Autoloaders may be used to reload ammo from an extended magazine, but requires 50% more spaces than just the ammo alone. For example, a combat bot might be essentially a self-propelled mortar unit. For it to carry 20 mortar rounds (total weight 20 kg), 10 kg of loading machinery (50% of the ammo weight) would be required. Ammunition costs and weights are listed with the personal weapons.

Cargo

Cargo space in a robot is typically very limited given the small size of robots compared to nearly any vehicle. Smugglers and couriers, however, value even small compartments that may be secreted inside of a unit. In one famous escape sequence, a droid carried an energy sword for its owner and threw it to him at the dramatic moment (source redacted to avoid copyright infringement). Drugs or weapons smuggled into a prison inside of a corrupted janitorial robot has facilitated the escape of more than one criminal (or hero depending upon one's point of view). While costing no credits, cargo space reduces the number of other systems that a robot may have and is thus very expensive in terms of options removed from that design.

Robot Design Descriptor

For consistency, it is best to design and record robots with a consistent interface. Frequently referees or players would like to modify the capabilities of a robot in sometimes minor ways, and an accurate description of how they were designed makes this task somewhat easier.

TL: [tech level] Robot name

Using a [mass] kilogram class [class] [modifier] [shape] chassis (structure [struct], stability [stability]) with [added stability] added stability and [environmental protection], the [name] designed by [designer] is intended to [description]. The [type] uses a [drive type] drive [modifiers] to move at speed level [speed level] ([movement types]) [submarine info]. It has a [efficiency] [powerplant] powerplant and power level [power level], which has an endurance of [endurance] using [fuel mass] kg of [fuel type] fuel at [fuel consumption] kg per hour. [backup power] The unit has a dexterity of [dex], strength of [str], [appendages and masses] a torso ([torso %] mass). There are [armor] [armor additions] with [stealth] stealth, [camo] camouflage and [EMP protection]. [weapons]. The command and control systems of this [unit type] consist of a [radio] radio, [ECM] countermeasures and [advanced comms]. Sensor capabilities include [audio] audio sensors, [touch] touch sensors, [olfactory] olfactory sensors, [taste] taste sensors, and [visual] visual sensors, with the following additions: [additional sensors]. [miscellaneous equipment]. The [robot name] costs [cost] credits and takes [build time] to build.

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