Fudge Space Opera

Version 0.3.0

2006-August-11

by Omar

`http://www.pobox.com/~rknop/Omar/fudge/spop`

Coprights, Trademarks, and Licences

Open Gaming Content

Designation of Product Identity: Nothing herein is designated as Product Identity as outlined in section 1(e) of the Open Gaming License.

Designation of Open Gaming Content: Everything herein is designated as Open Game Content as outlined in seciton 1(d) of the Open Gaming License.

Contents

1 Introduction **1**

1.1 Why "Space Opera"? 1

1.2 What is Here 2

1.3 The Most Important Thing 2

2 Character Creation **3**

2.1 General Notes 3

2.2 5-Point Fudge 3

3 Combat **7**

3.1 Default Combat Options 7

3.2 Basic Armor and Weapon Mechanics 7

3.3 Cross-Weapon Scale Attacks 8

3.4 Suggested Weapon Scales 9

3.5 Damage to Passengers 9

3.6 Giant Space Beasts 9

3.7 When To Use ***Fudge*** Scale 10

3.8 Ranged Weapons 11

3.9 Explosions 12

3.10 Missiles and Point Defense 12

3.11 Doing Too Many Things at Once . . . 13

3.12 Offensive/Defensive Tactics . . . 13

3.13 Special Effects . . . 14

4 Sensors and Detection **15**

4.1 Sensor Statistics . . . 15

4.2 Sensor Mechanics . . . 17

4.3 Finding Things Far Away . . . 17

4.4 Finding Big Things or Lots of Things . . . 17

4.5 (Optional) Mass/Volume Sensors . . . 18

4.6 Finding Moving Things . . . 18

4.7 Cost and Size of Sensors . . . 19

4.8 Stealth . . . 20

5 Starships **21**

5.1 Overview . . . 21

5.2 Starship Attributes . . . 21

5.3 Starship Skills . . . 23

5.4 Starship Gifts/Faults . . . 23

5.5 Starship Damage Tracks . . . 23

5.6 Building Starships . . . 25

6 Gadgets and Weapons **31**

6.1 Go Shopping . . . 31

6.2 Battery Packs . . . 31

6.3 Computers . . . 31

6.4 Data Storage . . . 32

6.5 Sensors 32

6.6 Armor 35

6.7 Weapons 37

6.8 Spy Gear 40

6.9 Miscellaneous Gadgets 41

7 Sample Starships **43**

7.1 Numerical Assumptions 43

7.2 Standard Weapons 43

7.3 Standard Sensors 45

7.4 Bullet Class Light Fighter 47

7.5 Pulsar Class Warp Fighter 48

7.6 Flechette Class Corvette 49

A OPEN GAME LICENSE Version 1.0a **51**

Chapter 1

Introduction

I like ***Fudge***(`http://www.fudgerpg.com`; I like the simple resolution mechanic, I like its intuitiveness, I like that it's free, but above all I like the natural flexibility. I'm coming to think that ***Fudge*** is a natural system for the "space operal" genre. In particular, one problem with high-tech games is that the high-tech weapons lend to difficulties in simulating heoric individuals moving through a world of extremely damaging wepaons. The amount of damage needed to penetrate ultra-tech armor means that only a little bit of spillover can devastate the person inside. While this may be realistic, it's not great for certain kinds of roleplaying games. Any linear damage system (where more damaging weapons do proportionately more dice or hits of damage) will have this problem. ***Fudge***, in contrast, is intrinsically a logarithmic system (although you don't need to know that to play it!), and that together with the Scale mechanic lets you elegantly renormalize yourself to any range of sizes.

Although ***Fudge*** is flexible enough to be able to conform to many styles of play, by its nature it tends to be less "simulationist" than some other games. ***GURPS***, for example has numbers and modifiers and systems and reality checks for everything; ***Fudge*** encourages you to make your best guess on a relatively coarse and simple seven-level scale and get on with playing. This does *not* mean that Fudge is less *realistic*! The difference between a more simulationist game and ***Fudge*** is more of a difference in precision than an intrinsic difference in realism or accuracy. (Of course, ***Fudge*** is so flexible that you can easily play as unrealistic a game as you wish.)

1.1 Why "Space Opera"?

Why not just "space" or even "science fiction? Space opera means different things to different people. To some, "space" is only barely substituted for "soap"... . To me, however, space opera at its core simply means a science fictional story where the characters can and often do travel through space, usually traversing interstellar distances. By this definition, a game can be completely hard science and grittily realistic, or swashbuckling and borderline fantasy, and still be space opera.

What I'm trying to do here is one step more specific than that, however. Spaceships and starhopping is only one half of my own personal definition of the term "Space Opera." The second, and perhaps more important, component of the definition is that it is a genre in which individual people (player characters, in an RPG) can interact with and move through all the fun high-energy weapons, gadgets, and toys of a science fictional universe while still standing a chance both to survive and to make a difference. I would say that all of the following are, by my definition, space opera:

- Star Wars
- Star Trek
- Babylon 5
- Catherine Asaro's "Skolian" series
- Isaac Asimov's "Foundation" stories
- Joe Haldeman's *Forever War*
- Robert Heinlein's *Starship Troopers*
- Wil McCarthy's *Flies From the Amber*
- Robert J. Sawyer's *Starplex*
- Timothy Zahn's "Conquerors" series
- Timothy Zahn's *The Icarus Hunt*
- The *Traveller* RPG

Given my definition, this means that I would *not* claim that I've written the final word on ***Fudge*** space games! While these rules will be useful in a wide variety of games, and there remains a fair amount of leeway, I have set limits on the tone of the game I'm trying to support here. My target audience has a size of one: me. I'm writing the ***Fudge*** science fiction rules that I want for this sort of game.

If you're looking for a very simulationist ***Fudge*** science fiction game, this probably isn't it. Some of these rules may be useful to you, but in the name of what I perceive as playability I may have swept too many things together under a single umbrella. On the other hand, you may find that my rules are already too fiddly, complicated, and simulationist! (In that case, you are probably comfortable making judgment calls about and/or fudging almost everything.) Either way, that's fine; I won't be offended if you don't like these rules and want to use your own! One of the greatest things about ***Fudge*** is that there is no single right way to do anything.

1.2 What is Here

There are two things here. Primarily, I am trying to provide a set of rules which provide a framework for building and playing in a science fictional world with ***Fudge***. At this level, I don't specify the range of a tricorder for detecting the life signs of a single person, nor do I give the speed, size, and firepower of a standard space fighter. However, once you've chosen those things yourself, I do provide rules and systems for determining how other things will scale to that. How hard is it to detect ten people, or that same person at ten times the base range? See Chapter 4.

The second thing is what I said in the last paragraph that I didn't do.... Mostly as examples to illuminate the general systems (and to illustrate that the general systems don't cover everything, and that GM creativity and good sense is still required), I do develop a set of weapons, sensors, spacecraft, and gadgets. These examples may be directly useful to you, but my choice of gadget capabilities has already started to create a background science fictional world. I've chosen these things to be at a level for what I would want. Even if you don't like the example statistics, you can use the more general rules as you develop your own background.

This is *not* intended to be a document which tells you how to build and run a space opera setting. Other than what is faintly implied by lists of gadgets, starships, and weapons, there is no background or setting information whatsoever. As far as I'm concerned, there's no point in my trying to write how one would build a space opera campaign: that's done very well already in Steve Jackson Games' *GURPS Space*. If you want a great book on creating systems and planets and societies for a space opera RPG setting, see *GURPS Traveller: First In* from the same publisher.

1.3 The Most Important Thing

Don't let lots of rules and numbers and tables get in the way of keeping play moving. When it comes down to it, the GM should just make a quick judgment as to how hard something is, how far away or how hidden something is, assign a Difficulty level, and roll. There are more tables and numbers and systems in this document than you are going to want to think about in any given game. They are provided as a framework on which to hang your intuition. They give a system whereby you can have things behave consistently if you wish not to be too arbitrary, or you want to do something other than always wave your hands and pull a fudged judgment out of the vacuum. They give you things to use and think about outside of a game while preparing for play. But if any of them feel like they're getting to be too much, if even these rules start to feel to fiddly and simulationist than you want despite my attempts to keep them in line with the spirit of ***Fudge***, simplify or ignore them. Ignore range modifiers, ignore scale modifiers, ignore whatever additional complication is gumming you up. Your game will survive, and indeed may be all the stronger.

Chapter 2

Character Creation

2.1 General Notes

Character creation for a space opera or science fiction game in ***Fudge*** can be done using whichever standard system you prefer. Of course, some of these sorts of games are overrun with aliens with strange abilities, augmented humans, and robots. Each of these can be treated as a package of Gifts, Faults, and Supernormal Powers as appropriate. For example, in a game where humans are the norm, a robot who is intelligent and sentient probably ought to be charged at least one Supernormal Power for its robot brain. It gives it a perfect memory, it allows it to store huge databases of information, perform calculations quickly, and temporarily learn new skills just by downloading the right programs. If the robot has more than normal human strength, that might be yet another Supernormal Power. On the flip side, if the robot is obviously a robot, the social implications might be worth a fault or two.

2.2 5-Point Fudge

Tables 2.1 and 2.2 list a set of skills and skill groups useful with Steffan O'Sullivan's Five Point Fudge. These skills should be appropriate for most spacefaring sorts of science fiction games. The basic rules for Five Point Fudge, with Fantasy skills and groups, are online at `http://www.io.com/~sos/rpg/fudfive.html`, and are also available in *Fudge Expanded Edition* from Grey Ghost Press, Inc. This work is based on that work, and on Steffan's version of Five-Point Fudge for a Musketeers genre game.

Table 2.1: 5pt Fudge Skill Groups

Athletic/Manual Dexterity Skills	**Combat Skills**	**Scouting/Outdoor Skills**
Acrobatics Balance Break Fall Climbing High-G Maneuvering Juggling Jumping Move Quietly Running Sleight of Hand Swimming Throwing Tumbling Zero-G Maneuvering Various Sports	Archaic Melee Weapons[1] Archaic Missile Weapons[1] Battlesuit Brawling Force Sword Grenade Launcher Guns[2] Gunnery[3] Martial Arts[1] Missile Launcher Read Opponent Strategy Tactics[4]	Camouflage Camping Climbing Gathering Hunting Meteorology Mimicry Move Quietly Navigation Observation Surveying Survival Tracking
Covert/Urban Skills		
Barroom Savvy Climbing Computer Hacking/Cracking Concealment Detect Lies Detect Traps Disarm Traps Disguise Find Hidden Forgery Infiltrate	Lip Reading Lockpicking Move Quietly Remote Surveillance Scrounging Security Systems Shady Contacts Streetwise Tailing Urban Survival	

Table 2.2: 5pt Fudge Skill Groups (continued)

Knowledge/Scientific Skills	**Professional/Technical Skills**	**Social/Manipulative Skills**
Area Knowledge (many skills on many scales)	Agriculture/Hydroponics	Barroom Savvy
Anthropology	Artist[1]	Barter/Haggle
Astrocartography	Biosculpting	Bluff
Astrogation	Computers	Bureaucracy
Astronomy	Computer Programming	Camaraderie
Biology	Construction[4]	Con
Chemistry	Cooking	Etiquette
Computer Science	Counseling/Priest	Fast-Talk
Cryptography	Courtesan	Flatter
Ecology	Cybernetics	Flirt/Vamp
Economics	Dancing	Gambling
First Aid	Demolitions	Haggle
Geology/Planetology	Driving[1]	Interrogate
History	Electronics	Intimidate
Hyperspace/Warp Physics	Engineer[1]	Leadership
Interstellar Politics	Forensics	Lie/Pretense
Language[1]	Gambling	Oratory
Legal Process	Genetic Engineer	Parley/Negotiate
Linguistics	Heavy Machinery[5]	Persuade
Local Politics	Innkeeping	Repartee
Medicine	Mechanic	Salesmanship
Physics	Merchant	Savoir-Faire
Research	Musician[1]	Seduction
Surgery	Performing	Storytelling
Theology	Piloting Fighter Spacecraft	Wit
Xenobiology	Piloting Large Spacecraft[6]	
Xenoanthropology	Security Systems	
	Sensors	
	Teaching	
	Theater	
	Vacc Suit	

1: multiple separate skills (or possibly so)
2: possibly separated into Slugthrowers and Beam Weapons, possibly further subdivided into rifles and pistols
3: use of heavy tripod, vehicle, or similarly mounted weapons
4: separate skills for Ground and Space
5: would include exoskeleton
6: other Pilot specializations possible

Chapter 3

Combat

Combat in a science fiction game presents a problem for roleplayers: specifically, the escalation with increasing technology in the amount of damage that both realistic and cinematic weapons do. Somebody stabbed through the heart with a sword is just as dead as somebody fried with a blaster, but it's difficult to be "nicked" by a tactical nuclear bomb, and a "graze" from a high-energy particle beam capable of penetrating high-tech armor is likely to burn off an arm.

This is unsatisfying for roleplaying purposes; on the other hand, even if you have very little combat in your games, much of the flavor of a science fictional setting is lost if there isn't even the possibility of these superweapons. For *Fudge Space Opera* we'll make the assumption that weapons and armor of the future are both commensurately better, but only against each other: when it comes to attacking people with a personal weapon, hurt is hurt and dead is dead as surely it would be from a sword thrust, but no more surely. An extension of the ***Fudge*** Scale mechanic, together with a little fudging, makes this relatively elegant.

3.1 Default Combat Options

For all of the following discussion, I shall be assuming that combat is proceeding using Alternating Combat Turns (***Fudge*** section 4.23). Whether or not a hit occurs depends on an Opposed Action between the attacker's skill and the defender's skill. For personal combat, the defender's will usually be Dodge (or perhaps some sort of Dexterity attribute). Since much science fictional combat are with lasers and blasters and such, but characters might still want to be able to defend themselves, this document breaks the standard assumption in ***Fudge*** (and many other games) and assumes that you *can* dodge a high-speed missile weapon. (In dodging, you are *anticipating* the shot, rather than dodging the shot after you see it coming; the latter would be theoretically impossible with a laser beam!) For vehicle combat (such as fighter dogfighting), it will usually be a Piloting skill, assuming the pilot is flying evasively or otherwise attempting to dodge incoming fire; in some cases it might be a gunner's (or a ship computer's) skill with a point defense weapon. (See Chapter 5 for more details on vehicular combat.) If a pilot is using his Piloting skill to dodge an attack, the Opposed Action may optionally be made slightly more complicated by requiring a *second* roll against the ship's Acceleration attribute; see Section 5.2.2.

For the vast majority of science fictional weapons, Strength should not affect the damage at all. However, good old fistfights can use whatever rules you normally use for Fudge personal combat.

Because this document provides rules for Weapon Scales, *do not* add a difference in standard ***Fudge*** Scale to damages from attacks with high-tech weapons. The Weapon Scale rules are used to take care of things which are of substantially different sizes and damaging abilities. (Section 3.6 has some hints on comparing equipment of different Weapon Scales to creatures and other things of large standard ***Fudge*** Scale.)

3.2 Basic Armor and Weapon Mechanics

In addition to the standard ***Fudge*** statistics (Defensive Factor for armor, Offensive Factor for weapons), each

piece of armor and each weapon is on a Weapon Scale (section 3.4). The Weapon Scale is what is used to keep track of gross differences between weapons of vastly different technologies (ancient versus high tech) and vastly different sizes (personal vs. vehicular vs. starship). Weapon Scales are *qualitative* categories, not numerical vlaues. The Weapon Scale is not to be confused with standard ***Fudge*** scale; the latter tells you something about the mass of an object, the former tells you how relatively damaging a weapon is and what armor can protect against it. All Offensive and Defensive Factors are assumed as being *on this scale*. As such, at all times, these values should remain "reasonable." There is no need to have Offensive Factors of +15 or more to represent heavy military blaster rifles; simply put them on the Military Personal scale and give them a (still hefty) damage bonus of +5.

Here's the "fudging" part of the mechanic: when resolving damage, assume that *people are on the Weapon Scale of the armor that they're wearing.* "Realistically," a high-end ultra-tech battlesuit similar to those described in Heinlein's *Starship Troopers* or Haldeman's *Forever War* would have very strong armor using highly advanced materials. It would take a commensurately strong weapon (perhaps even a tactical nuke) to pierce that battlesuit. Even if that weapon only breaches the battlesuit by the tiniest fraction, that small amount of spillover fire could well be enough to completely devastate the person inside, since people are so much more fragile than this ultra-tech battlesuit. This is, however, unplayable. If your battlesuit has a Defensive Factor of 40, and you roll damage of 50 for your ultra-tech weapon, then the person inside is going to be immediately Near Death even though the weapon was only 25% more damaging than what the armor could stop. Consider the best low-tech weapons and armor: field plate armor has a defense factor of +4; a rolled total damage of +5 is 25% stronger than what the armor could stop, and it merely scratches the wearer.

To maintain playability, put armor and weapons on different Weapon Scales, but only have the Weapon Scales matter for the armor and the weapons themselves. Keep the actual damage numbers modest, and apply the damage numbers directly to the characters without consideration of the character's own personal standard ***Fudge*** Scale or Weapon Scale. This is not necessarily realistic, but it should hopefully lead to more adventuring and less personal vaporizing.

Dealing with damage to starships is covered in Section 5.5.1, in the chapter on Starships (Chapter 5).

3.3 Cross-Weapon Scale Attacks

It may come to pass that a tank or strafing fighter fires upon people wearing only normal personal battle armor, or civilian insurgents attack armored military troops, or other similar "cross-scale" battles occur. For standard ***Fudge*** Scale, the difference in scale simply adds to, as appropriate, the Offensive or Defensive Factors. For Weapon Scales, however, the scales are qualitative divisions representing bigger jumps. What's more, Weapon Scale, according to the rules of the previous section, only compare weapons and armor with each other. In situations where a weapon of one Weapon Scale attacks something protected by armor of a different Weapon Scale, use the following guidelines:

Armor three or more Weapon Scales too low: The armor does not protect at all against the attack; treat the target as if it were unarmored.

Armor two Weapon Scales too low: Reduce the Defensive Factor of the target's armor by 4, to a minimum of 0. (For example, any armor with DF of 4 or less is ineffectual.)

Armor one Weapon Scale too low: Reduce the DF of the target's armor by 2.

Armor one Weapon Scale too high: Add +2 to the armor's Defensive Factor. This should apply even for unarmored targets, so a target with no armor will still get +2 to its total DF.

Armor two Weapon Scales too high: Add +4 to the armor's DF.

Armor three or more Weapon Scales too high: The attack is ineffectual.

Note that you should *not* add the difference in standard ***Fudge*** Scale to the Wound Factor when considering offensive and defensive factors! This is what you normally do with Fudge, but when using Weapon Scales, these rules take precedence. Most science fictional weapons are *not* strength-based, which is the implicit assumption behind the adding of standard ***Fudge***

Scale to a Wound Factor. (Moreover, adding Scale would return us to the problem of the battlesuited warrior taking too much damage to survive in a "space opera" game as I've defined it, and the problem of a simple soldier having no hope of touching a battlesuited warrior.)

3.4 Suggested Weapon Scales

Table 3.1 is a suggested list of Weapon Scales, presented in increasing order. If these levels do not suit your world or game, feel free to insert, remove, or completely change entries on the list. These levels are chosen together with the rules in Section 3.3 to make basic sense. A target three steps down is treated as unarmored: civilian armor is irrelevant to military tanks, whereas military personal armor only helps a little bit. (Note that battlesuits would probably be on the Tank Weapon Scale, even though one suit is armor for just a single person.) However, you still have a hope of damaging something even two steps above you. A fighter is at a severe disadvantage against the armor mounted on a battleship, but a very well-placed shot could damage it. An individual soldier with a personal weapon stands a chance of damaging a fighter, but cannot do anything useful against a starship. Once again, these rules aim more for playability than any sense of "realism".

When it comes to large warships, the main distinction between them will probably not be the sheer quantity of armor, but the number of things they can do at once. A military dreadnought may have a single planet-busting weapon (or, perhaps, just a single weapon on the "Warship" scale), but it will also have a fighter bay and associated fighters, and enough crew to man a few weapons on the "Starship" scale and several more on the "Fighter" scale. Large spacecraft will also take many more "hits" to disable than will smaller spacecraft, due to backup systems, larger systems with more redundancy, and the effects of internal armor around key components such as power plants, drives, etc. (See Chapter 5.) Adding additional tolerance to hits is also the primary way to distinguish between different sizes of ships within a Weapon scale.

3.5 Damage to Passengers

With personal armor, it's pretty obvious that the amount of damage that penetrates the armor is applied to the person inside the armor. With vehicles (including space ships), it's less obvious what happens to the crews and passengers. There are a few possibilities for handling the damage which penetrates vehicular armor:

Only Vehicle Damaged: None of the crew or passengers of the vehicle suffer any damage; the damage is applied only against the vehicle's damage track, and the crew and passengers are in no danger until the vehicle becomes Incapacitated.

All Crew Damaged: In addition to the vehicle being damaged, everybody aboard the ship stands a chance of being damaged. The justification for people far from the hit being damaged is that there may be explosions and/or sudden movements of the ship that throw people to the ground. Optionally, allow each PC to make some sort of defense roll to reduce or eliminate taking the damage.

Hit Location: The GM decides, based on how the attack was described and how the dice fell, which part of the vehicle was hit. In addition to applying the damage to the vehicle's damage track, anybody in that location must make a defense roll or suffer the same amount of damage. (A failure by one level on the defense roll could be interpreted to mean that the person takes a smaller amount of damage.)

In any case where a person takes damage, allow any intrinsic toughness or damage resistance to reduce the amount of damage (as would be normal for a defense factor); in addition, unless the damage is overwhelming (e.g. a person on an exposed cycle seat is hit by a corvette's main gun, or a person is in a portion of a ship breached by a nuclear explosion), allow the defense factor of any personal armor worn to reduce the amount of damage as well.

3.6 Giant Space Beasts

The set of scales in Section 3.4 is fine when everybody involved in a combat is using high-tech weapons. However,

Table 3.1: (Armor and) Weapon Scales

Scale	Includes	Examples
Archaic	archaic personal armor/weapons	medieval armor, Kevlar, swords without ultra-tech enhancements
Civilian	civilian personal weapons/armor	standard civilian sidearms
Military	military personal weapons and light armor, civilian small vehicles	military blasters, combat armor, civilian car, shuttle
Vehicle	small military vehicles, heavy combat armor	armored car, personnel transport, lifepod, heavy military weapons
Tank/Fighter	tanks and space fighters, civilian spacecraft	tank, fighter, battlesuit, freighter, passenger liner
Starship	modest sized military spacecraft	corvette, destroyer
Warship	large military spacecraft	battleship, dreadnought

how useful is a tank's guns against a genetically recreated dinosaur, and how might a battleship fare against a giant killer space goat? Assuming that you've created the beasts using the standard ***Fudge*** scales, use Table 3.2 to figure out the correspondence to Weapon scales. These scales were chosen with reference to Steffan O'Sullivan's ***Fudge*** *Scale Examples*:

`http://www.io.com/~sos/rpg/fscale.html`

Table 3.2: ***Fudge*** scale correspondence
(Subject to change)

Fudge Scale Range	Weapon Scale
-1–1	Civilian or Archaic
2–8	Military
9–15	Vehicle
16–22	Tank/Fighter
23–30	Starship
31+	Warship

As a vague rule of thumb, you can assume that starting with the "Military" scale and moving up, a single step is roughly a factor of 25 in mass and volume; roughly a factor of 10 in cross-sectional area ; and roughly a factor of 3 in linear size. This corresponds to 8 steps of standard ***Fudge*** (mass) Scale. (All of this implicitly assumes that the objects under comparison have the same composition and density.) So, if a humanoid robot is approximately 2m tall and masses 75kg, then a typical military Vehicle might be more or less 6m in size, mass 1900kg; a typical fighter might be 18m across and mass 50,000kg; a typical starship might be 50m across and a million kg.

These are of course rules of thumb; Weapon Scale has more to do with offensive and defensive strength than actual mass, so a much smaller and/or larger space fighter (for example) is entirely possible. Indeed, civilian freighters, which are on the Tank/Fighter Weapon Scale, will probably be quite a bit bigger than a military fighter. A fighter, however, is already more than a match for a civilian freighter, never mind a military starship of the same physical size as that freighter. These rules of thumb and Table 3.2 are intended primarily when a high-tech weapon covered by these rules goes up against something large with hide that uses strength-based attacks that would normally benefit from high standard ***Fudge*** Scale.

3.7 When To Use *Fudge* Scale

By and large, these combat rules entirely replace ***Fudge*** scale with Weapon Scale for combat purposes. However, you should still use ***Fudge*** scale when handling a *strength-based* attack. Consider a battlefield gravtank (Weapon Scale Fighter/Tank, Scale 18) going up against a Giant Mutant Space Ferret (Scale 20). When the tank

fires its main guns at the Space Ferret, treat both of them as being on the same Weapon Scale (according to Table 3.2); no scale difference is considered when determining the total Wound Factor. However, when the Space Ferret attempts to crush the tank, *do* add the Scale difference of +2 to the ferret's attack. The tank is tough, but the ferret is more than twice the mass of the tank. As that difference gets larger, it doesn't matter how thick the tank thinks it's armor is: it's just one more tin can to the beast.

This may sound unfair; the tank has an advantage during its attacks, because it doesn't have to subtract its smaller scale. But, hey, tanks are designed for destroying things anyway, and standard scale isn't really relevant since it's not remotely a strength-based attack. Even a sci-fi battlesuited warrior (Weapon Scale Tank/Fighter, Scale 5 or so) has massive weapons which give him a hope of taking out a Giant Mutant Space Ferret... if he doesn't get squished first!

3.8 Ranged Weapons

Each ranged weapon (be it a personal weapon, or a weapon on a vehicle such as a space fighter) has a "Base Range." This is the range at which it takes a Fair shot to hit a target in its Weapon Scale. At longer ranges, a better minimum rolled degree is necessary. Optionally, if your target is attempting to dodge, he *also* gets a bonus to his roll in the Opposed Action that resolves your attack at larger ranges. (At shorter ranges, the minimum rolled degree goes down, but there are no penalties to the defender's roll.) Table 3.3 lists these values. For values that fall between the values listed on the table round up. In order to hit a target, you must both roll a result higher than the Difficulty for the target at its range, *and* win the Opposed Action if the target is dodging.

For targets which are more distant than five times the weapon's Base Range, reduce the weapon's offensive factor by -2. (Optionally, you can also reduce it by -1 for targets which are more than two times but less than or equal to five times the base range.)

If you don't want to deal with numbers, then the GM can simply declare what range the target is at: Fair, Good, Mediocre, etc. Or, even simpler, always assume the target is at Fair range.

Table 3.3: Ranged Weapon Table

Multiple of Base Range	Difficulty	Defender's Bonus
≤0.1	Terrible	0
0.2	Poor	0
0.5	Mediocre	0
1	Fair	0
2	Good	+1
5	Great	+2
10	Superb	+3
>10	(Impossible)	-

Bigger targets are easier to hit, and smaller targets are harder to hit. Since objects on the Military Weapon scale and below tend to be the same size, only apply this for things on the Military scale and up; things on lower Weapon Scales should be considered to be on the Military Scale for purposes of determining range difficulties.

Here are four possible ways to handle this:

1. For each Weapon Scale your target is *above* yours, treat it as one step *closer* on the Ranged Weapon Table (3.3). For each Weapon Scale your target is *below* yours, treat it as one step *further* on the Ranged Weapon Table (3.3).

2. For each Weapon Scale your target is *above* your scale, decrease the Difficulty by one step, and penalize the defender's roll by -1. For each Weapon Scale your target is *below* your scale, increase the Difficulty by one step, and give the defender a bonus of +1.

3. If you want greater granularity in size, and don't mind additional complication, then use the target's standard ***Fudge*** scale rather than its Weapon scale to determine a modified Base Range. Each weapon should have designated a "Target Scale" which is the Scale of a target that it takes a Fair shot to hit at the weapon's Base Range. Refer to Table 4.2, the table describing the range of sensors, and use it also for ranged weapons. Subtract the target's actual Scale from the weapon's Target Scale, and find the difference in the first column. Use the last column to adjust the Base Range of the weapon. Use this *modified* Base Range in Table 3.3 to decide how hard it is to hit the target. Note that if you are trying to hit a specific part of a target ("target

engines only"), the piece of the target will have a smaller ***Fudge*** Scale than the entire target.

4. Just fudge it and do what seems reasonable. If one ship is a lot smaller than another, but they have weapons of comparable range, let the smaller ship get a shot in first, or just assert that when the larger ship is at Fair range for the smaller ship, the smaller ship is still at Great range for larger ship– or whatever other difference seems to make sense at the time.

The first option is slightly simpler, in that it reuses the Range Table, and there is less to keep track of. The second option will give penalties to large objects trying to dodge shots from small objects. (This makes sense: a large warship is "like the broadside of a barn" to a fighter.) The third option helps give a greater advantage to those who make the extra effort to avoid putting excessive bulk on their starships during the construction phase. Of course, if any of this is too much complexity, ignore the issue altogether and use option 4! That requires players who are willing to trust their GM's judgment, but may lead to the smoothest play.

As always, even once you've chosen the system you're going to use, feel free to be flexible and fudge these rules if it makes sense to do so. For instance, a tripod-mounted anti-tank gun may only be as large as a single person, even though it fires on the Fighter/Tank Weapon Scale. You may not think that it makes sense that it would be as easy to hit as a whole tank, and want to treat it as on the Military scale for determining size penalties; feel free to do so if you are so moved. Indeed, you should always feel free to arbitrarily assign reasonable additional combat bonuses and penalties if the situation warrants.

3.9 Explosions

Explosives (grenades, bombs, nuclear missiles, overloaded impulse drives) all have two statistics: the "Base Damage" is the amount of damage they do within their "Base Burst Radius". If a target is further away, divide its distance by the Base Burst Radius, round down, and subtract that many points of damage from the damage done by the explosion. For example, a grenade on the Military Weapon Scale might have a Base Damage of 5 points and a Base Burst Radius of 1 meter. People who are two meters away from the explosion will take 4 points of damage; three meters away, 3 points; four meters away, 2 points; five meters away, 1 point; and further, no damage.

Do not add the Relative Degree of an attack. (Optional: to represent "shaped charges" or other armor-piercing munitions, for such types of warheads *do* in fact add the Relative Degree to the damage *only for direct hits*, but not for other people or objects in the burst radius. Additionally, if you want to keep track of this, only use this additional damage to overcome armor, as shaped charges are generally designed more for penetrating armor than for depositing energy in targets.)

Unless an explosion is supposed to detonate on contact, a miss might still do damage to the target. Choose the Relative Degree of the opposed action (if your target attempted to dodge the missile, grenade, or what-not) or the difference between your rolled degree and the Difficulty (see section 3.8), whichever is lower, and look up the result on the Missed Explosion Table (3.4). (The GM should choose where there is a range specified; she may use a Situational Roll to guide her if she doesn't want to risk bias.)

Table 3.4: Missed Explosion Table

Missed By...	**Result**
0	Graze– explodes within Base Range
-1	explodes within 2-3×Base Range
-2	explodes within 4-5×Base Range
≤-3	clean miss

Of course, an explosion will damage other things nearby. If a swarm of fighters is attacking a larger ship, and the larger ship launches a missile at the swarm of fighters, you might want to make the fighter pilots make Tactics rolls to avoid having been within range of the same explosion. If you aren't using a mapboard and figures, fudge it and do what seems reasonable to decide if multiple people or ships are damaged by the same explosion.

3.10 Missiles and Point Defense

It is simplest to treat Missile attacks like any other; with unguided missiles, this is generally the best way to han-

dle it, although rather than a dodge, the defender may roll against a point defense gunnery skill.

If you want something more complicated, then treat the launching of a *guided* missile as an Unopposed action; to successfully target and launch the missile, the gunner must only meet the minimum Difficulty (as described in Section 3.8) to successfully send the missile after the right target. Then, that round or in later combat rounds (as the GM judges the range and the missile's speed), resolve the attack between the missile and the target. The missile should be assigned a Targeting skill; it might be Poor for missiles built by a low-bidding military contractor, or as good as Great for the amazing new technology that nobody has yet to counter. Against this is the defender's roll. If the defender is dodging (through piloting rolls, etc.), assess a size penalty on the defender as discussed in Section 3.8. For size purposes, most missiles will be on the "Military" Weapon Scale (for purposes of size and armor), will have Scale in the range 0-2, and will be designed to target things on the "Fighter" Weapon Scale (at about standard ***Fudge*** Scale of 18)– getting bonuses to hit if targeting a larger ship. Of course, if the missile is designed for something else, that will be indicated in its description.

Alternatively, the defender may use a point defense weapon, which is a small weapon designed specifically for shooting down missiles. In this case, for simplicity the point defense weapon is assumed to be on the missile's Weapon Scale (even if the same weapon is used against Missiles with different enough explosive yields to be on different Weapon Scales). The missile's Targeting skill (or the attacker's Gunner skill, if using the more simple system) is the attack; the point defense gunner's roll is the defense. Electronic countermeasures and so forth are all folded into "point defense" (and may be represented by a small +1 or perhaps +2 bonus to the point defense gunner's skill roll). Any dodging capabilities of the missile are folded into its Targeting skill. (Thus, a missile with Great targeting may just be far better at detecting and avoiding point defense fire than a missile with Medicore targeting.) If the defender wins the Opposed Action, the missile is destroyed harmlessly. In this case, do *not* use the Missed Explosion Table (3.4); that should only be used for the case where the defender is dodging, or not defending at all. (You should use the "graze" results from that table in the event of a successful attack with a 0 relative degree, however.)

Point defense may not be used against beam weapons, or against simple slugthrowers. For this reason, it may help the flavor the game and the variety of weapons used if the most damaging weapons are missile weapons. (Nukes make great space weapons if you like big explosions.)

3.11 Doing Too Many Things at Once

On large spaceships (or tanks), you will probably have separate pilots, sensor operators, and gunners, so that each can concentrate on his own task. A fighter pilot, however, is expected to do everything himself. Naturally, you don't expect him to do as well at everything at once.

For each task (represented by a separate skill roll) that an individual does beyond the first, assess a net -2 penalty. The individual can choose how to spread this -2 amongst his rolls. So, for instance, a fighter pilot who is concentrating on fancy flying might apply the -2 penalty to his Gunner roll, while another who is trying to aim well will apply it to his Piloting roll. A third might try to do both at once and assess a -1 penalty to each. If the pilot also tries to use his sensors to scan for stealthed ships, or (heavens) play chess on his ship computer at the same time, there will be a net -4 worth of penalty to spread around.

You may want to make available to players a "Multitasking" gift that lets characters reduce this penalty. You could justify this by stating that a character is intrinsically quick and good at doing multiple things at once (making him a natural candidate for fighter pilot!), or that he has cybernetic enhancements that allow him to communicate with his fighter via some sort of neural interface that greatly increases his reaction times. One gift should be worth one extra action, so a pilot could fly and fire his weapons simultaneously without penalty, but would still take a -2 penalty for each additional simultaneous action beyond that.

3.12 Offensive/Defensive Tactics

Feel free to use the rules of ***Fudge*** section 4.32 even for vehicular and space combat. In the case of a single driver

or pilot, it is obvious what this means. In the case of a larger ship where the pilot and the gunner are separate people, a defensive posture means that the gunner's accuracy suffers due to the extreme motions of the pilot's fancy flying; an offensive posture mean that the pilot is deliberately trying to avoid excessive acceleration so as to give the gunner a cleaner shot. Feel free to ignore this if it is too complicated. (You may, for instance, decide to ignore it in the case of Unopposed attacks on the basis that that would be grossly unfair.)

3.13 Special Effects

Some weapons have special effects, which are best handled by just adding them to the weapon's description. For instance, some rare super-weapon may be able to penetrate armor: add to the weapon's description that an opponent defending against this weapon does not get to add any Defensive Factors due to armor. (I would recommend, however, that you always let defenders add Toughness or anything else intrinsic to the character.) Perhaps a certain type of armor is cheap, but is good against only certain types of weapons. Perhaps you've got a blaster shield, but it can't stop bullets fired by slugthrowers; if so, add to the description that the Defensive Factor is only good against energy weapons. And so on. There is no need for special rules for each conceivable special effect, just add them if and when you want them. If it starts to seem like too much to keep track of, then stop adding so many special effects to things, and only differentiate between weapons and armor by their Offensive and Defensive Factors. This can be just as complicated and flexible or as simple as you want.

One thing to bear in mind: although you need not know it to play the game, ***Fudge*** is logarithmic in nature. This has two implications. First, numbers should never get out of hand. If you're talking game statistics, and you find yourself dealing with three and four digit numbers, you probably aren't doing things in the way which is most natural for ***Fudge***. The use of Weapon Scales lets you keep the typical damage and armor ratings less than a reasonable value such as +5 or +6. (Of course, if you're talking in-game real-world values such as meters or kilograms, things will be just as big as they are. Then again, eventually you start talking about kilometers rather than meters, and the numbers get reasonable again.)

The second implication of the logarithmic nature of Fudge is that where you might instinctively think you should multiply, you usually just want to add and subtract. Something is 25 times as big as something else? Don't multiply anything by 25 anywhere! Just *add* eight to the Scale, or one step to the Weapon Scale. A weapon is pretty good at piercing armor? Don't give it an armor divisor, give it either a bonus to the Offensive Factor only against armor, or state that it reduces the Defensive Factor of armor it is used against by a certain fixed number.

Chapter 4

Sensors and Detection

In science fiction, everybody is always scanning for this and detecting that. These are some rules— starting straightforward and simple, but going on for more detail if you want to worry about sizes, ranges, and so forth— which will, even at the basic level, help preserve some of the flavor and uncertainty of detection in a space opera sort of game.

As with all of the rules in this document, don't let them bog down the game. There are a bunch of rules and heuristics and numbers for handing different ranges and quantities of things being detected, which are provided in case you want to make a judgment call based on a consistent system, and in case you aren't comfortable completely fudging it. But if they are too much, just take the simplest essence of the rules, or even ignore them altogether and assign a Difficulty based on what "seems right" or what the story demands.

4.1 Sensor Statistics

A sensor is described by its its *Sensor Mode* (Active, Passive, or Sampling), its *Sensor Type* (Imaging, Directional, or Simple Detection), its *Sensativity* (what it detects), its *Detection Scale*, and finally, for everything but Sampling sensors, by its *Base Range*. Usually (though not always) an active sensor emits whatever it is sensitive to; active radar emits radio waves, and an active X-ray sensor emits X-rays. (An active life sensor, however, may emit some sort of "scanning radiation".)

The *Sensor Mode* describes how a sensor operates. A *passive* sensor sits quietly and watches or listens. A video camera is a passive sensor. An *active* sensor sends out some sort of scanning beam to detect what it's looking for. An example would be a search radar. Use of active sensors can be risky, because in general it will be easier for the thing you're looking for to detect you than it will be for you to detect them. A *Sampling* sensor doesn't detect at range at all, but requires direct access to a sample of what it's looking for. An example of a sampling sensor would be an atmospheric analyzer that must either be sitting in the atmopshere, or have a small quantity of an it, to tell you its the chemical composition.

The *Sensor Type* applies only for active and passive sensors. A *Simple Detection* sensor only tells you about the presence and strength of a signal; a *Directional* sensor also gives a bearing to the signal. For example, a directional passive particle sensor will tell you how much of a certain sort of radioactivity is nearby, and maybe in what direction it is strongest. An *imaging* sensor gives you a picture of what it detects. A video camera is a passive imaging sensor.

The *Sensativity* of a sensor describes what it detects. You can make this as specific or as general as you want. If you don't want to muck about with a lot of detail, you can just have "radiation" sensors (that detect light, particles, and any other made up science fictional radiation such as hyperspace signatures) and "life" sensors (that detect "life signs", whatever that is). Alternatively, if you like more detail, each sensor can be sensitive to specific things. Different objects may be more or less prone to being detected via different kinds of radiation, and there may be different kinds of Stealth (section 4.8) which are effective against each kind of sensor.

Here is a sample list of possible Sensativities:

Radar This sensor is sensitive to radar and radio waves. Passive radar sensors will detect electronic devices, and active radar sensors (which bounce radio waves

off of things) are good for detecting anything metal or "hard".

Infrared Light (IR) This sensor is sensitive to light longward of the visual range. They are sometimes called "heat" sensors, since objects that we think of as "hot" radiate primarily in the infrared. (Note that things even hotter radiate primarily in visible or even shorter wavelenths.) For instance, people glow in the infrared; the exhaust of a jet engine glows a whole lot more.

Visible This sensor detects the same things your eyes see. An active Visible sensor might be a laser sensor, good at detecting range and speed of things.

X- and Gamma Ray This sensor detects high energy electromagnetic radiation, such as will come from nuclear reactions, radioactivity, antimatter anhilliations, accretion disks around black holes, etc.

Particle This detects particle radiation. You can break this down if you want more detail and know anything about what sort of particles are out there (alpha vs. beta rays, neutrons, etc.); alternatively, you can leave it fairly abstract. A Geiger counter is a passive particle sensor.

Neutrino Although neutrinos are particles, they are harder to detect than most other particles. Today, to detect neutrinos it requires gigantic tanks of chlorine or heavy water, or perhaps an Antarctic ice sheet, and even then the count rate is relatively low. Superscience neutrino detectors may be more tractable, but in general neutrino detectors will probably be more expensive, bulkier, less sensitive, and harder to deal with than other particle detectors. The advantage of neutrino sensors is that neutrinos will penetrate where other particles and radiation do not. (Isaac Asimov once said that to a neutrino, matter is just a high grade of vacuum.) A ship hiding on the other side of a planet emitting a lot of neutrinos will be detectable *through* the planet. (If the ship wished to avoid this, it would have to have some sort of superscience neutrino sheilding or stealthing....)

Warp/Hyperspace/Foo-on This is a sensor that detects something germane to your science fictional world. If you have faster than light (FTL) travel, there maybe some radiation or signature specific to that travel which could give away the presence or approach of a ship moving at FTL speeds. These would be called "warp sensors", "tachyon sensors", or whatever else you want to call them. Alternatively, it may be that FTL travel uses exotic foo-on reactors– but so do UltraBlaster beam weapons, InstaMed limb cloning machines, and ZapUrThere teleport projectors. A foo-on detector would detect the use of any of these devices. Substite better sounding names, but the principle is the same.

Gravity This sensor detects massive things. In general, it requires either a comparison scan, or for the object it's looking for to be moving. If you're standing on a planet, a gravity detector won't detect a mountain; the planet is much more significant, and the mountain is just part of it. However, if the mountain wasn't there earlier, and you performed a scan then, the gravity sensor may well be able to tell difference the mountain makes. Or, if something very massive inside the mountain is moving (lava? small black hole?), the gravity sensor may be able to detect that.

Life These sensors detect "life signs" from "life as we know it". How does this work? It's not really clear to me, especially in the case of ranged sensors, but these are a staple of space opera. It only detects creatures which are alive, or (at the GM's option) recently dead. If used well (either yielding a Great sensors result, or a result two steps better than what is necessary to just detect life, whichever condition is more difficult) these sensors can provide an identification, or at least clues to the identification, of the species it detects. Optionally, you can declare that only active life sensors exist. If there are both active and passive life sensors, the active ones should have a much larger range per cost and size of sensor.

Chemical These sensors can tell you the chemcial composition of an object, or are senstive to specific elements and compounds. Sampling chemical sensors are most realistic. There are ways today to determine the chemical composition of a remote object, but that does generally involve some interpretation, and requires that the remote object either be warm and emitting, or lit up by something else. Of course, in your space opera game, you can have long range chemcial sensors work as well as you want them to. You could call a mass spectrometer a sampling chemical sensor.

The sensor's *Base Range* is the range at which it takes a Fair use of a Sensors skill to detect something whose scale is the sensor's *Detection Scale*. The Base Range is expressed in meters, kilometer, astronomical units, parsecs, or another length unit. The Detection Scale is usualy expresed as a standard ***Fudge*** scale, although this will depend on the type of sensor. In general, this scale should be the scale of a "normal" object that the sensor is designed to detect. Sensors mounted on spaceships will be designed to detect things which are the size of spaceships. Dealing with things smaller or bigger is described below. In general, it's easiest if you just directly use the scale of any object being scanned for. You might want to take into consideration what that object is, however. An infrared sensor designed to detect humans will find it much easier to detect a hot soldering iron than the difference in scale between a human and the iron would suggest, for example! In cases like this, make a ruling that you judge reasonable and Just Fudge It.

4.2 Sensor Mechanics

If a PC is using a sensor to search for something that he does not know for sure is there, then the GM should perform the PC's Sensors role in secret; if the roll fails, the character will not know if there is nothing there, or if simply his sensor isn't sensitive enough to find it. Of course, if she doesn't want to deal with all the rolling, the GM can always declare that something whose difficulty of detection matches the character's Sensors skill will always be found, and something more difficult to detect will never be found. (Or, if she wants a little variance, she can roll fewer than 4dF.)

For getting better readings on something that the PC already knows is there, the PC can make the roll; the GM may then tell him how much more he learns. Optionally, a bad roll does not mean that the PC's detection of the object gets *worse*, unless the roll is bad enough (e.g. Poor or worse, a roll -4, or whatever else the GM deems appropriate).

The quality of a sensor roll tells you how much information you get from the sensor. For example, consider a passive imaging visual sensor looking for an object at its Base Range whose size is the standard size for that sensor. The object is detected with a Fair result– but the sensor operator would only see a blur, perhaps getting a rough idea of the size of the object. With a Good result, the sensor operator will get very basic information about its shape (elongated, round, with big fins on the back, etc.). A Superb result will allow the sensor operator to start to make out markings on the object.

4.3 Finding Things Far Away

If you don't want to mess with numbers, then the GM can simply decide how far inside or outside the Base Range of a sensor an object is, and set the difficulty according to her qualitative judgment. If you do wish to deal with numbers, or to guide your judgment, consult the Sensor Range Table (4.1) to determine the difficulty of detecting an object at a range other than the Base Range. For ranges that fall between the values listed on the table, round up.

Table 4.1: Sensor Range Table

Multiple of Base Range	**Detection Difficulty**
≤0.1	Terrible
0.2	Poor
0.5	Mediocre
1	Fair
2	Good
5	Great
10	Superb
>10	(Impossible)

4.4 Finding Big Things or Lots of Things

If a sensor is searching for something larger or smaller than the "normal" size (i.e. scale equal to the Detection Scale) for that sensor, it will be (respectively) easier or more difficult to find it. Use the object's standard ***Fudge*** Scale to decide how much great or shorter the sensor's range should be. A difference in scale of 8 corresponds to a factor of 8 in range. So, if a sensor is designed to detect objects of Scale 8 (e.g. a large individual civilian vehicle), it will have only 1/8 the range to detect something of Scale 0 (e.g. a humanoid robot). It will only

have 1/64 ($1/8^2$) the range to detect something of Scale -8 (the hand of that robot). If you are not math-phobic, you can use this to determine the difference in range for an arbitrary scale difference:

$$R = 8^{\Delta s/8}$$

where R is the range ratio and Δs is the difference between the scale of the object being detected and the Detection Scale of the sensor. If you don't like this, just use Table 4.2 and fudge things that aren't on there.

Eight steps in Scale (or a factor of 10 in range) corresponds to three steps in difficulty (see Table 4.1). It also corresponds to approximately one step in Weapon Scale; see Table 3.1 in Chapter 3.

If, rather than size, you're talking about numbers, a difference of 8 in Scale is a factor of 25 in mass. If one person is Scale 0, a group of 25 people is a single "biomass" of Scale 8. Life sensors whose Base Range is calibrated to a single person would be able to detect a group of 25 people out to 10 times their base range.

Table 4.2 summaries these numbers; "Difference in Scale" is the target's scale minus the Detection Scale for the sensor. Again, in the heat of play, the GM should wing it and make a quick reasonable estimate of the range based on her conception of the size of an object, rather than slow down play. Or, just use the coarser gradations of Weapon Scale and figure out the sensor's range within a factor of 10. Table 4.2 is intended to help you build intuition, and for planning ahead before the game session.

Note that for some kinds of sensors, rather than standard mass scale the Detction Scale may be a fiducial amount of some other property. For instance, passive sonar would detect a "normally noisy" object. You can ignore this and pretend that larger objects are more noisy, and just use the normal sensor range, perhaps using the suggestions in Section 4.8 to model objects whose detectable property is out of proportion to their size. Or, you can fudge it and make a value judgment in each case.

4.5 (Optional) Mass/Volume Sensors

Section 4.4 makes the implicit assumption that sensors are *cross-sectional* detectors. This is true for things like telescopes and radar, where how easy something is to detect is proportional to how big it looks to you. Some sensors might more reasonably be modeled as mass or volume sensors, however. Sensors which detect an object's gravitational field, for instance, or perhaps some kinds of superscience "life signs" detectors. If you decide that certain sensors are mass or volume detectors rather than cross-sectional detectors, then use the relative mass or number (the third column of Table 4.2) as the multiplier on the Base Range. So, for instance, a mass detector normally calibrated to detect objects of Scale 0 out to its Base Range would be able to detect objects of Scale 8 out to 25 times its Base Range.

There are, in fact, some methods of detection which are sensitive to linear size rather than mass or cross-sectional area. For instance, by measuring the lightcurve of a star with a planet moving across its face, one gets a measurement of the width of a planet. (Of course, planets are all assumed to be pretty close to spherical, so that may be directly turned into a volume measurement.) This will almost certainly never be important for game purposes, but just in case you are that perverse, you've got the second column of Table 4.2.

4.6 Finding Moving Things

Although it may be harder to hit something when it's moving, it's almost always easier to spot moving things. Grant a +1 to a sensors roll to detect something if it is moving at a "normal" rate. (That is: walking or jogging for a sensor designed to detect a person, moving at 50km/h for a sensor designed to detect a ground vehicle, etc.) Grant a +2 to a sensors roll to detect something if it is moving "fast" (e.g. running for a person, 100km/h for a ground vehicle), and +3 to detect something moving "very fast". Use common sense when applying this bonus. For example, one person running in a crowd of people running about will be no easier to pick out than a person standing still in a crowd standing still.

For spacecraft, this rule should still apply; motion

Table 4.2: ***Fudge*** Scale vs. Sensor Range

Difference in Scale	Relative Linear Size	Relative Mass or Number	Range
-16[a]	1/8	1/625	0.02×Base Range
-12	1/5	1/125	0.04×Base Range
-8[b]	1/3	1/25	0.12×Base Range
-6	1/2	1/10	0.2×Base Range
-4	1/1.7	1/5	0.3×Base Range
-3	2/3	1/3	0.5×Base Range
-2	4/5	1/2	0.6×Base Range
-1	1/1.1	2/3	0.75×Base Range
0	1	1	Base Range
1	1.1	1.5	1.3×Base Range
2	1.25	2	1.7×Base Range
3	1.5	3	2×Base Range
4	1.7	5	3×Base Range
6	2	10	5×Base Range
8[c]	3	25	8×Base Range
12	5	125	25×Base Range
16[d]	8	625	64×Base Range

a: Two Weapon Scale steps down
b: One Weapon Scale step down
c: One Weapon Scale step up
d: Two Weapon Scale steps up

should be relative to "the background stars", or the frame of reference of the stellar system, or in whatever reference frame seems appropriate. You may wish to limit the bonus for detecting moving spacecraft to +1, and grant another +1 or (in extreme cases) +2 based on whether the target spacecraft is *accelerating* (i.e. speeding up or slowing down, or changing direction).

4.7 Cost and Size of Sensors

The best way to pick the cost and size of sensors is to pick a range you know you want a certain sensor to have, and scale from there. Suppose, for instance, that you want a handheld sensor which masses 1kg to cost 1,000 credits, and have a Base Range of 10km for Scale 0 objects. Given that, you can figure out the cost and size of any other sensor based on a few rules of thumb:

1. A sensor's range goes up as roughly the (wait for it) 2/3 power of its mass. Given our example, a sensor which masses 10kg would have a range of about 45km for Scale 0 objects. If the thought of raising numbers to the 2/3 power gives you hives, then just let the range go up proportionately with its mass.

2. The cost of the sensor should be roughly proportional to its size (or mass). You can see how mass compares to standard ***Fudge*** Scale as well as Weapon Scale by referring to Table 4.2.

3. There may be some minimum cost below which a given sort of sensor cannot fall.

4. Charge a premium to have a "high quality" sensor which has a longer range without a commensurate change in mass. For example, double the cost for every 25% increase in range. Similarly, dock the range of cheap, poorly-designed sensors. . . or make them flaky and unreliable.

Remember again that no actual number crunching is really necessary for any ***Fudge*** game. Spaceships are going to have sensors that can detect other spaceships at the sorts of ranges that spaceships tend to find each other at. . . so say it's at Good sensor range and roll away. However, these rules of thumb are useful as food for thought,

perhaps to decide how a fighter's sensors might compare to a cruiser's, and who's likely to see the other guy first. They are also useful if you want to try creating a table of available sensors which are internally consistent, at least to the level of realism of these rules of thumb.

4.8 Stealth

Stealth is a generic term for anything that makes something harder to detect. It may be camouflage clothing; it may be a radar-absorbing skin; it may be a particularly quiet submarine drive; or it may be a full-on cloaking device. There are three basic ways to handle Stealth. The first is as a special effect. An excellent cloaking device, for example, may make a starship completely undetectable to normal electromagnetic sensors (such as telescopes that use visible light). However, for game balance purposes, you may state that such a cloaking device creates a very small ripple in hyperspace, which is detectable if somebody looks for the right thing.

The second way is to assign a Stealth attribute to a ship or vehicle (see Section 5.2). Whenever somebody tries to detect a stealthed ship, if they would be successful allow the operator of the ship to roll against his ship's Stealth attribute. If he obtains a result of (say) Good or better; alternatively, treat this as an Opposed Action (in which case the GM is going to be happier if she has multiple sets of ***Fudge*** dice of different colors!).

The third way to handle Stealth is to just assign a stealthed object a Scale modifier *for purposes of sensors and detection only.* You may have heard the USA's stealth bomber described as having the "cross section of a flock of sparrows." Say a stealth bomber is 16 meters across, and a flock of sparrows is equivalent to 2 meters across. Consult Table 4.2, and declare that to the "right kinds" of sensors, the stealth bomber has a Stealth value of -16 (a very respectable value). Whenever somebody is trying to detect this bomber, subtract 16 from the true Scale of the bomber when deciding the effective range of the sensor operator's scanners (which, in this case, would be reduced by a factor of 100 compared to the range at which a bomber of the same size but without the stealth features might be detected).

As always, if you wish in its description you can specify which sorts of sensors any kind of Stealth is effective against (e.g. only electromagnetic, or only infrared, or only passive and/or active sensors).

If this is too detailed, and the full range of numbers in Table 4.2 is too big to deal with, then you can instead use Weapon Scales. A space fighter with good basic Stealth may be on the "Vehicle" Weapon Scale *for purposes of sensors and detection.* A space fighter with amazing basic Stealth may be on the "Military" Weapon scale, at which point it is only as easy to detect as a soldier carrying typical battlefield gear. Other fighters and spaceships with sensors designed to detect things on their scale will almost certainly not see the fighter until it is too late; rather than calculating it out, you can just judge when you think an enemy fighter might detect a single person in a space suit, and make that the point at which our stealthed fighter will be detected.

Chapter 5

Starships

5.1 Overview

At least initially, starships are built like simple characters. Start with the sort of ship you want to build; you start on a given Weapon Scale and standard ***Fudge*** Scale. You can then increase the traits of the starship. The traits consist primarily of a handful of attributes, although there will be cases where you will assign skills (and perhaps even gifts and faults) to a starship. Rather than balancing the attributes against each other or against a number of "free levels" as is the case in the ***Fudge*** subjective and objective character creation steps, bumping up the attributes of your starship costs you money. Each level increase of an attribute raises the cost of the starship by a fixed multiplicative factor. Additionally, as you increase the traits of a starship you must increase its Scale. (This represents the additional size which is going into the engines, power systems, and so forth to implement the improved traits.)

This starship creation system implicitly assumes a certain model of "game physics"; feel free to adjust the attributes and costs to match your game. Specifically, there is an assumption that starships with faster than light (FTL) drives generally do not use those drives for "in-system" maneuvering. FTL drives are some sort of hyperspace or jump drives, and before a ship can interact with other ships and engage in combat it must drop out into "normal space" where it has to move according to the standard laws of Special Relativity. Thus, acceleration and maneuverability are traits which refer to slower than light (STL) performance of the ship, and are what is primarily relevant to combat.

Although the rules here do not address this, you may set some limits on what FTL drives can do. For instance, you may state that they won't work within a certain distance of a star or a planet. (For game purposes, this prevents FTL sneak attacks by coming right up to a planet, and encourages maneuvering at STL speeds.) You may also state that there is a "warm-up" time of (say) an hour between making jumps to FTL speed, to prevent ships from too easily escaping battle. (You may also add a "FTL Transition" attribute, and state that an *attempt* to go to FTL speeds may only be made every (say) fifteen minutes.)

5.2 Starship Attributes

Below are described the attributes that every starship in this system has. Those attributes are: FTL Speed, Acceleration, Reliability, Health. If you think there is another basic attribute which is important to starships, feel free to add them to this list. (For example, optional attributes mentioned earlier are Stealth (Section 4.8) and FTL Transition (above).)

5.2.1 FTL Speed

The exact definition of this term will depend on the setting and background of the game in question. Merely by calling the attribute "FTL Speed", we've already made the assumption that FTL travel does not work like STL space travel, where speed is entirely relative to the frame of reference in which you measure it, and as such wouldn't be a meaningful attribute. The important thing is that ships with a higher FTL Speed should arrive at distant destinations faster than ships with a lower FTL Speed. The "standard" or "default" speed should correspond to a Mediocre FTL Speed attribute. You can

use the standard ***Fudge*** speed scaling of 1.2 between steps of speed if you wish. On the other hand, if you are trying to perform a ***Fudge*** conversion of ***Traveller***, you might state that FTL Speed of Poor corresponds to Jump-1, FTL Speed of Superb corresponds to Jump-6, and the steps in between are set in the obvious manner.

Some ships, such as short-range fighters or shuttles, may have no FTL capability whatsoever. These should have a FTL Speed attribute of Terrible, which indicates that they cannot go faster than light.

5.2.2 Acceleration

This attribute is what primarily defines your starship's flight performance at STL speeds. Given enough time and fuel to accelerate, *any* ship can reach any speed up to the speed of light. (Ignoring details such as the danger of induced radiation from the interstellar medium.) What differentiates them is how fast they accelerate (or decelerate) to different speeds. Unlike in travel in an atmosphere, when a vehicle is generally pointing in the direction it is traveling, a space craft can point in any direction; as such, its acceleration and deceleration are assumed to be identical, since "deceleration" is just turning your ship around and accelerating in the other direction.

When two ships start together and race to an objective, compare the Accelerations to decide who gets there first. (Realistically, if two ship start at rest with respect to each other, the one with the higher Acceleration will always win, but for game purposes you may wish to make it an Opposed Action.) Since a ship's Acceleration tells you its maneuverability, you may wish to use this attribute in spaceship combat when a pilot is attempting to dodge an attack. Here are two options.

1. *Two rolls* are necessary to dodge an attack. First, the pilot must make a successful Piloting roll, to see if his skill is good enough. If and only if that is successful, then the pilot must roll for the ship's Acceleration, to see if the ship is good enough to perform the fancy flying that the pilot is attempting. In the case of a dodge in combat, there is probably an Opposed Action being resolved. In this case, if the pilot's Piloting roll would win the Opposed Action, then he makes a second roll of the starship's Acceleration trait. The *worse* of the two rolled degrees is what is used finally to resolve the Opposed Action. (Optionally, the GM may allow the pilot to trade a fudge point for using the better of the two rather than the worse of the two.) Although it means extra rolling, this seems like a satisfying system: really good starships allow good pilots to show their stuff, but for a bad pilot it won't often matter how good the ship really is.
2. If that seems too complicated, but you still want the ship to make a difference, use this simpler system instead: roll against the *lower* of the pilot's Piloting skill or the ship's Acceleration. It takes a good pilot to effective dodge, but it takes a fast ship for that good pilot to be able to show his stuff.

5.2.3 Reliability

This one is pretty straightforward; what is not is deciding how often to roll it. That's up to the GM. However, it should definitely come into play during high-stress situations, such as combat, or when trying to escape by jumping to hyperspace. If repairs are performed during combat (see Section 5.5.2), then the GM will probably wish to roll against the ship's Reliability for *those repairs* very frequently, such as every other combat round.

5.2.4 Health

This attribute indicates how well the ship can take punishment and still keep functioning. While this attribute may sound similar to Reliability, there is a difference. Reliability tells you how likely the ship is to fail on its own, or how likely field repairs to the ship are to hold; Health tells you how well a ship stands up to damage inflicted upon it. It is analogous to a ***Fudge*** character's "Damage Capacity" attribute, although generally not used in the same way.

One gets Health in a ship by building fully compartmentalized bulkheads, building critical systems deep into the ship, ensuring that there is excess power plant capacity, installing redundant backups for any critical system, etc. As such, increasing Health, as with anything else, adds cost and mass to the ship.

Use Health as follows. Whenever a ship takes enough damage to be Damaged (Section 5.5.1), the ship must

roll a Health result of Good or better to avoid having one system either go offline (for smaller systems such as weapons) or be reduced in performance (e.g. the Acceleration attribute may be temporarily reduced one step). When the ship is Very Damaged, a Health result of Superb or better is necessary.

5.3 Starship Skills

Many starships need none of these. However, you may have a starship computer capable of firing the ship's point defense weapons, in which case a Point Defense skill might be appropriate. Similarly, you may want to attribute skills to the starship to indicate what else the ship's computer is capable of (for instance, knowledge skills to represent a database and "expert system" search engine). Finally, skills can be useful as a way of indicating any number of other special things a starship may be able to do which aren't handled by the basic rules.

As for the monetary cost of adding skills to starships, that will depend very much on the skill in question even within one background or setting. As such, I can only offer this advice: make 'em pay.

5.4 Starship Gifts/Faults

Similarly to skills, starships can have Gifts and Faults, following the analogy to ***Fudge*** character creation. For example, Some settings differentiate between those ships which can and cannot enter an atmosphere. Ships which can might have a "landable" (or "streamlined") gift, causing the cost of the ship to go up by a factor of 1.5. If aesthetics are important to wealthier buyers, perhaps some high-end starships have a Charisma gift. . . .

Stealth (Section 4.8) may be treated as an Attribute or a Gift. If the latter, it should be a fairly expensive one, and may also be legally regulated. If you are using the "reduced cross-section" version of the Stealth rules, raise the cost of the ship by a constant factor (say 1.2 or 1.5, depending on how many sorts of sensors the stealth is effective against) for each step of the stealth scale modifier the ship has.

5.5 Starship Damage Tracks

For keeping track of damage to starships, use Damage Tracks which are analogous to the Wound Tracks used by ***Fudge*** characters (***Fudge*** Section 4.57). Calculate damage (wound) factors as normal, using the Offensive and Defensive factors relevant (see Chapter 3). The Damage Level depends on the amount of damage; see Table 5.1.

Table 5.1: Starship Damage Levels

Damage	Damage Level
1,2	Scratched
3,4	Damaged
5,6	Very Damaged
7,8	Incapacitated
9+	Wrecked

As with characters, starships should have a number of "boxes" at each damage level. Whenever it receives a hit at a given damage level, that box should be crossed off. If all the boxes at that level are filled up, the hit gets promoted to the next damage level. When a starship takes a hit of Damaged or worse, some of its systems may go offline; see Section 5.5.1. Since starships may have a lot of independent systems, you might want to add more boxes to the different levels than you would for a character. (For instance, most starships should have a lot of Scratched boxes, since it takes a lot of small hits to wear them down.)

The damage levels and damage track for a starship are *at its Weapon Scale*. In other words, do not increase the number of hits necessary for a given damage level for a battleship as compared to a fighter, nor should you add additional boxes at each damage level. The difference in scale is taken care of by the comparison of armor and weapons in Chapter 3. Within a Weapon Scale, however, a larger ship should have more boxes at a given damage level on its damage track than should a smaller ship.

When a ship is Incapacitated, it is drifting and unable to fire. Optionally, the GM may allow communications, sensors, and/or weapons to operate in a reduced capacity (or pending a Reliability roll), but the ship should not be able to accelerate or jump to FTL speeds. Field repairs may still be possible; see Section 5.5.2. When a ship is Wrecked, it cannot do anything and is beyond repair. Life support systems are offline, but there may be enough

air in the ship to allow characters aboard to survive long enough to suit up and get to escape pods.

Occasionally a ship may be vaporized, thrown into a hyperspace singularity, or otherwise completely destroyed. It happens... but it's probably better to avoid this, since in that case any characters aboard don't have a hope of getting out. Wrecked should be good enough for most purposes. (And 640K should be enough for anybody.)

5.5.1 Damaging Starships

When a starship takes damage, as with characters, it may be reduced in capabilities. If a starship receives a damage result of Damaged or Very Damaged, then one critical system *might* be taken offline or reduced in capacity, based on the ship's Health (Section 5.2.4). The GM may choose which system is brought offline or damaged, based on whether the attacker was using a called shot and/or her conception of the geometry of the situation and/or what seems like a good idea at the time. If she wishes to seem less arbitrary, she may roll on Table 5.2. Optionally, she may ignore any results which would reduce an attribute beyond some limit (-2, for example). Repeat this procedure each time another box on in the Damaged or Very Damaged section of the ship's damage track is crossed off.

Table 5.2: Damaged System Table

3d6	d%	System
3-5	01-05	hull damage only[1]
6-7	06-16	Acceleration -1
8	17-26	one weapon offline
9	27-38	Reliability -1
10	39-50	other system damaged[2]
11	51-62	power systems damaged[3]
12	63-74	one sensor offline
13	75-84	one point defense gun offline
14-15	85-95	FTL Speed -1
16-18	96-00	hull damage only[1]

1: You're lucky; no other systems damaged.
2: For example, the Defensive Factor of powered shields may be reduced by 1.
3: Not all systems requiring power may be operated at once.

5.5.2 Field Repairs

When a starship is damaged in the heat of combat, it is frequently a convention of the space opera genre that it might be repaired in the nick of time to allow a ship to escape or otherwise defeat its enemies. (Occasionally, this requires the sacrifice of the ship's First Officer.) The GM should decide how feasible "field repairs" are, and alter these rules accordingly to make it easier or harder as necessary.

When a system is damaged or brought offline due to a hit which gives a result of "Damaged" or "Very Damaged", the engineers and mechanics aboard that ship *might* be able to fix it. Assume that one engineer can tend to damage on a ship of a Scale up to 17-20. Above that, double the number of engineers for every scale increment of 4. So, it would take two engineers to work on damage on a ship of Scale 21, four on damage to a ship of scale 25, eight on damage to a ship of scale 29, etc. This minimum team size can attempt to fix *one* damaged system at a time, working on the damage caused when one of the boxes under either "Damaged" or "Very Damaged" on the ship's damage track was crossed off. Of course, larger ships may have more systems they want to try to fix at once, and so many want to carry more than the minimum number of engineering staff necessary to repair one bit of damage at a time.

The GM should set a minimum amount of time it will take to repair the damaged system; for suitably cinematic games, that may be as short as a few combat rounds for damage that caused a ship to become Damaged, and (say) five times that for damage which caused a ship to become Very Damaged. At the end of the time increment, roll against the engineer's appropriate skill. (If there are multiple engineers working on the problem at once, pick the median skill of the team, or something just above the median skill.) For a system taken offline by a Damaged result on the ship's damage track, a result of Good or better patches the system up and gets it going again. For a system which was Very Damaged, a result of Great or better patches the system up.

When a system has been "field repaired", the cross on the Damage or Very Damaged box is *not* removed. Field repairs are simply the duct tape and bailing wire necessary to get a hit system temporarily back online. Repairs back in space dock, or performed over a longer

period of time not during the heat of combat, are necessary to truly remove the damage.

Additionally, when one or more systems have been subject to a field repair, every few combat rounds (at the GM's option) roll a test of the ship's Reliability. A result of Mediocre or worse means that one of the systems patched up has again gone offline; it will take the same number of engineers the same amount of time to try inverse phasing, cross-circuit to B, and patch that system up yet again.

Damage which has caused a ship to become Incapacitated may not be repaired during the heat of battle. Field repairs may be performed on this damage after the battle is over in order to allow the ship to limp back to a port for servicing. In the absence of a port, it will take the engineers many days, weeks, or months to get the ship fully functioning again; it may even be impossible, for there may be parts completely destroyed which cannot be satisfactorily replaced or improvised. During the battle, field repairs may be performed on systems less damaged to bring sensors, weapons, etc. online so that the ship isn't completely helpless.

A ship which is Wrecked needs to be towed... or hauled away *as* garbage.

5.6 Building Starships

This system is simple and straightforward but will hopefully produce starships which are good for "most" ***Fudge*** gaming purposes. When engineering or building anything, there are trade offs. In this system, the monetary cost and Scale of the ship are what get traded off. You can give your starships whatever capabilities you want, but adding capabilities increases the monetary cost, making the ship harder to purchase, and increase the Scale, making the ship easier to detect and hit. (Toward the end of the design sequence, you can trade Scale for yet further increased cost.)

This basic system can be modified to build Vehicles of any sort. (A future edition of *Fudge Space Opera* may address this.)

5.6.1 Choose Starship Type

The GM will need to set base starship types and costs for her campaign. Table 5.3 is an example of these base costs. The most important choices in the basic starship type are the Weapon Scale and base standard ***Fudge*** Scale of the ship. See Section 3.4 for a definition of the Weapon Scales. As more capabilities are added to the ship, the Scale may go up; the Weapon Scale *does not change* during the ship design process, but remains what it was chosen to be in this step.

5.6.2 Set Attributes

All ship attributes (defined and listed in Section 5.2) default to **Mediocre** (with some exceptions). Adding a level to the attribute of a ship must be balanced by either decreasing the level of another attribute, or by increasing the cost. One attribute level raises the cost of the starship by 50%. In other words, each time an attribute is raised one level without balancing it by reducing another attribute, multiply the current working cost of the ship by 1.5. If you reduce an attribute one level, multiply the current working cost of the ship by $\frac{2}{3}$.

Once you are done increasing the ship's attributes, increase the ship's Scale (*not* Weapon Scale) by *one half* of the total number of attributes added. The rationale for this is that things which improve the ship's performance take up space and weight. A ship with a higher FTL Speed or a better Acceleration has more fuel tanks and engines; a ship with better Resiliency has redundant systems; etc.

5.6.3 Add Skills and Other Fun Stuff

Add skills to the ship. Generally, these will not increase the Scale of the ship, although they should if it seems reasonable and appropriate. The cost of ships skills should be set by the GM. See Section 5.3.

Want a particularly studly ship's computer? Want well-stocked scientific labs and survey equipment? Want other gadgets built into the ship? Tanks for dolphin crew members? Add 'em in at this point. Keep track of their cost, but unless it's something extraordinary there

Table 5.3: Starship Base Types/Costs

Ship Type	Weapon Scale	Base Scale	Max Crew[5]	Cost[6]	Notes
Civilian Shuttle	Military	10	10	10 kCr	1
Lifepod	Vehicle	4	1	2 kCr	1,2
Freighter or Liner	Fighter	24	500	100 kCr	4
Squad Transport	Vehicle	10	6	50 kCr	1
Snub Fighter	Fighter	5	1	200 kCr	1
Fighter	Fighter	10	1	500 kCr	1
Long-Range Fighter	Fighter	15	2	2 MCr	3
Corvette	Starship	20	10	10 MCr	
Destroyer	Starship	23	50	50 MCr	
Cruiser	Starship	26	100	200 MCr	
Battleship	Warship	30	500	1 GCr	
Dreadnought	Warship	34	1,000	10 GCr	

1: Default FTL Speed is Terrible (none)
2: A military or "hardened" lifepod
3: FTL-capable fighter
4: Large civilian ships
5: Includes passengers; actual crew/passengers may, of course, be lower.
6: Cr is "Credits"; kCr=1,000 Cr, MCr=1 million Cr, GCr=1 billion Cr

should be no need to increase the Scale of the ship in order to hold these sorts of things.

This is also where you add other special things specific to your campaign. As an example: you've already set the FTL Speed of the ship. However, suppose your background is one where a ship must open a "jump point" to transit to hyperspace, and that the machines necessary to do this are large enough that only large ships can create them. At this point, add the device to the ship's description, and add the cost of the device to the ship's cost. Insist that only a ship of ***Fudge*** Scale 25 or greater may add one of these devices; when adding the device to the ship, increase its Scale by 1.

If your setting requires any special features for a ship to be able to operate in atmosphere in addition to in vacuum, or to land on a planet (and deal with the resulting gravitational stresses), list that here. You may require some Scale and/or cost increase to have these features.

5.6.4 Fighter Bays

Fighter Bays (or, equivalently, Shuttle Bays) are mostly empty space, so they're cheap; feel free to ignore their cost. However, that space does mean an increase in the Scale of your ship. Figure out the total Scale of the fighters (or other ships) you wish to carry. Start with the Scale of one fighter; refer to Table 5.4 to determine how much to increase the total summed Scale of carried ships given the number of ships you want to carry; add this to the Scale of a single fighter. This total Scale must be **no more than the carrier ship's Scale minus 6**. So, for example, a Scale 30 cruiser could have a fighter bay capable of carrying ten Scale 18 fighters. (Ten fighters means a Scale increase of +6 over 18, giving a total Scale of 24 for the carried ships, which is 6 less than the Scale of the cruiser.) If you want to carry more fighters, increase the Scale of your carrier ship accordingly.

Exceptions

These rules for carrying fighters implicitly assumes that the ship intends to do things other than carry fighters. The requirement that the carrier ship be at least six steps

Table 5.4: Increase in Scale with Number

Number	Scale increase
1	+0
2	+2
3	+3
5	+4
10	+6
25	+8
50	+10

of Scale above the total Scale of its carried ships does not make sense for a pure-carrier or tender ship which has a large bay for ferrying smaller vehicles but cannot do much else. As always, in cases where the GM thinks it makes sense, feel free to violate these rules. A carrier ship which ferries other ships, but isn't well armed and cannot move very quickly or do much of anything else may only require a Scale of three above the total Scale of the ships it carries.

5.6.5 Scale Adjustments

Now is time time to make the ship bigger or smaller as you desire. This may be for artistic reasons: you either want a small and svelte ship, or a big honkin' ship. This may also be for pratical , or perhaps because you want your ship to be able to mount larger weapons or sensors, or carry more passengers (see the next few sections). Making the ship bigger is (within reason) free; just add to the Scale. (It will cost you later when you add armor to the ship!) Making the ship smaller, however, means that you're using miniaturized or otherwise high-tech or well made parts in order to get more bang for your... kilogram. A smaller ship means it will cost less to armor, and also means that the ship will be harder to detect on sensors, which tends to be a good thing for military ships. Take the current cost of the ship; for each single step reduction in the Scale of the ship, multiply the cost of the ship by two. So, for example, making your ship three Scale steps smaller will increase the cost of the ship by a factor of eight. If the ship has fighter bays, the rule that the ship must be at least six Scale steps larger than the total Scale of the carried ship still applies, so that gives you the minimum below which you may not reduce the Scale of your ship, however much money you have. (Optionally, at this step the GM may allow ships to be decreased to a Scale of no less than four more than the total Scale of carried ships.)

5.6.6 Add Weapons

A ship can mount certain weapons based on its scale. The GM should compile a list of available ship weapons. An example table is in Section 7.2 of Chapter 7, "Sample Starships." Each available ship weapon system has a "Scale Needed" statistic. A ship can mount *one* weapon which requires a ship of its scale. It can mount up to *four* weapons which require a scale between its scale-8 and its scale-1, up to *eight* weapons which require a scale between its scale-16 and its scale-9, and as many as it wants which require a scale less than the ships scale minus 16. This is summarized in Table 5.5.

Table 5.5: Number of Weapons or Sensors Mountable

Ship Scale − Scale Needed for Weapon	Max. Number of Weapons or Sensors
>16	no limit
9–16	8
1–8	4
0	1
<0	impossible

If a ship wishes to carry additional weapons beyond this number, it must further increase its Scale (*not* its Weapon Scale).

5.6.7 Add Sensors

Choose sensors for the ship as defined in Chapter 4. Some standard sensor systems are listed in Section 7.3 of Chapter 7. Unless the ship is a specially designed "spy ship" which has sensors out of proportion to itself, by and large choose sensors whose "normal" quantity of material to detect is on a Scale close to that of the ship; bear in mind that civilian ships will not tend to have sensors as good as those on military ships. It is safe to assume that sensors scaled appropriately to the ships carrying them will naturally fit aboard such ships, so there is no need to increase the Scale of the ship further so long as "reasonable" sensor ranges and numbers

of sensors are chosen. Do, however, add the cost of the sensors to the total working cost of the ship.

As with weapons, there is a "Needed Scale" to mount a given sensor. You can mount one sensor whose needed scale is up to your ship's scale, up to four sensors whose needed scales are less than 8 less than your ship's scale, up to eight sensors whose needed scales are less than 16 less than your ship's scale, and as many as you want (if you're just that perverse) of smaller sensors. These numbers are summarized in Table 5.5.

5.6.8 Crew and Passengers

When you chose the base type for your ship from Table 5.3 (or whatever equivalent you have developed for your game's background), you were given a maximum number of crew and passengers for the ship. The ship's Scale may have increased since then, but that was to accommodate additional systems: power systems, engines, etc. As such, the maximum crew size has not changed. If you want to have more crew and passengers than the specified maximum, at this point you may increase the capacity of your ship by increasing its scale. For each +1 you add to the ship's scale, you may double the maximum number of crew and passengers. To be reasonable, you should probably set a limit that no more than +4 may be added to the scale (meaning an increase in the maximum crew size by a factor of 16); if you want to increase it more, then you should instead multiply the maximum crew size by 1.5 for each step after the first four. It is probably best to ignore the increase in cost resulting from expanding the maximum crew and passenger capacity of a ship.

Of course, there is no need to have a number of people aboard fully up to that maximum! If the ship can run with fewer people, there's no reason why the ship can't be designed to only support a fewer number of people... perhaps in greater luxury. This is merely a "special effect"; write down the capacity for crew and passengers on the ship. So long as it's less than the specified maximum, do not change the Scale or cost of the ship.

The *minimum* number of crew required to man a ship is entirely up to the GM. Choose the number of people that you want to be necessary for various sizes of ships. It's not unreasonable to suppose, given everything a space opera background *already* supposes, that the shipboard computers on even the largest ships would be fully competent to run the ships themselves, yielding a crew size of zero. This is, however, boring. To really fit the genre, a fighter should have a pilot; a corvette should have a handful of people aboard; a battleship should have a multitude of crew, marines, etc. (Perhaps the entirely automated ships are"berserkers", to borrow a term from Fred Saberhagen; these make excellent villains in certain space opera campaigns. Indeed, one of the author's favorite classic *Star Trek* episodes is "The Doomsday Machine", featuring just such a giant robotic starship.)

It's worth having at least one gunner to man each weapon (with the possible exception of point defense weapons; have one gunner oversee all of those with the computer's help). There should be at least one pilot for each shuttle or fighter that might be launched simultaneously. The ship itself should have a pilot and a navigator; larger ships may require small teams for each (with redundancy to man round-the-clock shifts), while smaller ships (fighters and corvettes) may combine the functions. You'll want one or more sensor operators if you want to be able to do that at the same time as firing weapons; on a smaller ship, it's natural to combine sensor operators and gunners. Of course, you need a Captain, who on smaller ships may also be the pilot or something else. Larger ships will have other executive officers who serve no purpose other than to look important and order others around. See the rules on field repairs (Section 5.5.2) to decide how many engineers and mechanics the ship should carry. You may also want to have marines on board; cram in as many as you think you'll need and as the setting expects. Some ships may have passengers. If it's an exploratory vessel, you'll have scientists and such aboard; these are just a special class of passengers. There's "support personnel"– cooks, doctors, and so forth– who should total some fraction (say 10%) of the other people aboard.

Assume that whatever accoutrements are necessary to support the crew and passengers are included in the base cost of the ship; there is no need to do additional accounting to keep track of this. Additionally, assume that all life support and provisions come with the ship; it is not the nature of the space opera genre to get fiddly and worry about those sorts of details.

5.6.9 Armor and Shields

Armor is additional plating and other material added to the surface of the hull to help it absorb and deflect damage. Shields are energy barriers generated by some sort of implausible superscience device. Both of them have Defensive Factors which behave normally in combat on whatever Weapon Scale your ship is. Armor tends to be heavy and increases the Scale of the ship, whereas Shields tend to be expensive and also require power to run (meaning that they may go offline if onboard power systems are damaged). Depending on the background of your setting, Shields may or may not be available, but most settings should allow for armor. (If you don't like big bulky armored ships, make Shields cheap enough that any ship that wants to defend itself can afford them.)

Table 5.6 lists some example options for armor and shields. Allow armor to be bought up to a Defensive Factor of +5 or (rarely) +6; non-military or smaller ships may naturally be limited to less total armor. A Ship without armor is still assumed to have whatever is necessary to protect itself from routine space dust, entering an atmosphere (if the ship has that capability), etc. Armor and Shields only matter for combat and other situations where the ship takes damage equivalent to an attack. Choose the Defensive Factor of the armor for the ship. For the type of armor in question, add the Scale Increment times the Defensive Factor of the armor to the current working Scale of the ship; drop any remaining fractions to yield an integral Scale. To determine the cost of the armor, start with the Base Cost. For each step of Defensive Factor above 1, multiply the Base Cost by the Cost Multiplier; take that resultant number, and multiply it by the final Scale of the *ship*. ROB WRITE AN EXAMPLE.

Table 5.6: Armor and Shield Mass and Cost
(Subject to change)

Armor Type	Scale Increment	Base Cost[1]	Cost Multiplier
Heavy	1 1/2	10	1.5
Standard	1	100	1.75
Lightweight	1/2	1,000	2
Shield[2]	1/4	10,000	4

1: $\times 1,000$ Cr.
2: Requires power to operate.

5.6.10 Writing Ship Statistics

Record everything above. You should list a name for the ship, the class of the ship, the Weapon Scale of the ship, the Scale of the ship and the Attributes of the ship. List the number of needed crew, the maximum occupancy, and whether or not the ship is intended for long or short term occupancy. (For exampe, shuttles and fighters, generally, are only made for short term occupancy.) For each weapon and sensor system on the ship, list the system name and any relevant statistics. List the capacity of any fighter or shuttle bays, and what ships (if any) are in thoes bays. Finally, list any other features the ship may have.

For visualization purposes (always important for a good rolepaying experinece), it's worth figuring out how big your ship is. You can figure out the mass m of the ship from its scale s with the following equation:

$$m \;=\; (70\,\mathrm{kg}) \times 1.5^{s}.$$

If your calculater doesn't have a y^x button, you can just multiply 70 kg by 1.5 s times. You can estimate the volume in cubic meters roughly by dividing the mass in kg by 1000. You can do a little better with the volume by using the Scale of the ship *before* you increased the Scale for added armer; if that scale is s_0, then:

$$V \;=\; (0.07\,\mathrm{m}^3) \times 1.5^{s_0}.$$

Feel free to adjust the volume number by a small factor: divide it by 2, or more, for a more dense, rugged ship, and multiply it by 2, or more, for a large, airy, space-filled, filimentary ship.

The *length* of your ship, in meters, if it is roughly spherical or boxy, is approximately the cube root of the volume. If your ship is more spindle-shaped, then it's length may be something like:

$$l \;=\; 4\,\sqrt[3]{V}.$$

This will give you a ship whose aspect ratio (height divided by base) is fairly close to that of a person. Use a number larger than 4 for a very long, spindly ship, and a smaller number for a squat, closer-to-spherical ship.

Draw a picture. Or render one in a 3D program if you are just that much of a geek.

Chapter 6

Gadgets and Weapons

6.1 Go Shopping

This chapter is a list of example weapons, gadgets, sensors, and other equipment which may or may not be appropriate for your game. The weapons and sensors are designed (with perhaps some fudging, which after all is part of the recommended design sequence) to work with the rules of the previous two chapters. The other gadgets just seemed like a good idea at the time.

These gadgets are all *samples*. This chapter is not necessary for the other chapters of *Fudge Space Opera* to be useful. You may not like the choices of types of items, weights and costs, statistics, or game physics I've made for this chapter. That's fine: if you want to, throw this chapter out and build your own universe! These are ready-made for those who might happen to like some of them, for my own nefarious purposes, and (hopefully) to serve as examples of things from the other chapters of this document.

This chapter, more so than the rest of this document, is under construction.

6.2 Battery Packs

Unless you have a specific need to limit them, or there is a plot point, most of the time it's not worth worrying about the power cells that keep most devices running. For weapons, however, you might want to count shots and keep track of when a character needs to put in a new powerpack.

For most personal devices that aren't extremely small, assume that they are powered by standard "battery packs". A battery pack is about the size of a pair of modern AA cells, weighs 0.1kg, and can power a handheld flashlight for longer than you would want to use it. For most devices, you won't have to ever worry about power running out, unless the PCs are stranded on a low-tech world or are otherwise away from the standard power of civilization. (In that case, at some point the GM should declare how much time they have left on each device; to be fair, she should do that while there is still ample time left.)

Battery packs may be recharged by plugging it into building or ship power using a standardized interface that every building or ship in the same culture will have. (If only 21st century America were so convenient.)

6.3 Computers

Computers can do pretty much what you want. Assume they're cheap enough that everybody has one to perform "basic" functions such as text editing, communications, database management, and simple calculations. These computers can be handheld. For data entry and display, decide how high tech you want your comptuers to be. Lowest tech would be a small built in screen and a foldable keyboard. Next up would be a foldable/rollable screen, and the option of a smooth and effective voice interface or a folding keyboard. More sophisiticated would be the ability to project a hovering 2d (or even 3d) display over the pocket computer of a size comparable to a late 20th-century computer monitor's screen, and voice and "gesture" interface. (The latter would simulate the function of a mouse, only better, by allowing you to

manipulate information in the holographic display with hand movements.)

Computers to do more complicated calculations (such as crptanalysis or hyperspace astrographic geometrodynamics) will generally be built into starships and/or ground installations. ROB WRITE RULES FOR CRYPTOGRAPHY

6.4 Data Storage

Data storage is assumed to be digital in nature, much as is most data storage of today. The standard transportable unit of data storage is the "disc", a small flat round object about the size of a USA quarter and of negligible mass which uses some implausible quantum mechanical method of storing data. They are made of some sort of polymer, and are lighter in mass than a quarter; for game purposes, ignore their mass unless somebody is carrying around a few hundred of them (in which case their bulk will probably be as important as or more important than their actual mass.)

One disc stores 100GB of data; optionally, it may be encrypted. Computer users of today probably have a good idea what 100GB can store, but some rough examples:

- 2,000 hours of compressed audio
- 20,000 high quality compressed still images
- 50 hours of compressed video
- 100 million pages of text

In other words, most of the time a single disc can store "enough". Generally, if something requires more data storage, it is for plot purposes....

Every computer made by the same culture as the one who made the disks will be equipped with a disk reader/writer.

6.5 Sensors

The general terms and rules for sensors are given in Chapter 4.

6.5.1 Personal Sensors

These are all sensors suitable for being carried around and held by a single individual. If you want larger sensors that somebody might have to "lug" around rather than "carry" around, scale them up according to the rules of Chapter 4. In addition to the standard five statistics of each sensor, a *Mass* (or weight, if you're in standard earth gravity) and *Cost* for each sensor is given.

Image-Enhancing Binoculars

- Sensor Mode: Passive
- Sensor Type: Imaging
- Sensitivity: Visible Light, IR
- Base Range: 10km
- Detection Scale: 0
- Mass: 1kg
- Cost: Cr20

This is a small pair of handheld binoculars capable of imaging in the visible and infrared regions of the spectrum. The latter are useful at night, when there may not be much ambient visible light, as people and warm machines tend to glow in the infrared. They have a slot for a single data disc, so that they may record whatever the viewer looks at. Somebody using a standard pair of image-enhancing binoculars will find it a Fair challenge to spot an unhidden and uncamoflaged person at a range of 10km. This assumes several seconds of scanning the horizon. If the target is moving, the GM might want to give the scanner a +1 bonus, since it's always easier to pick out moving targets than still targets.

In addition to looking through them, these binoculars can be hooked into a computer display which shows what would be seen looking through them. Optionally, if the tech of the campaign background supports this, they can have built in a holodisplay, which is capable of popping up a small display hovering in space above the device.

When scaling this sensor up to longer ranges, be aware that on a planetary surface there is a horizon to deal with! On the surface of the earth, this base range of this sensor is already pretty close to the horizon for somebody standing on level ground. (ROB CHECK THIS.)

Passive EM Sensor

- Sensor Mode: Passive
- Sensor Type: Directional/Imaging
- Sensitivity: Radar, IR, Visible Light, X-rays
- Base Range: 10km
- Detection Scale: 0
- Mass: 2kg
- Cost: CR300

This is a handheld sensor which can detect electromagnetic waves across the spectrum. It can operate just like Image-Enhancing Binoculars (above) in the visible and infrared wavelengths, but it can also detect radio, ultraviolet, X-ray and gamma radiation. It is only capable of imaging at infrared, visible, and ultraviolet wavelengths. For shorter and longer wavelengths, it can give a signal strength and bearing, as well as (for very good results) information about the motion of the target, but it won't produce an image. (A larger device would be required for that.)

Particle Detector

- Sensor Mode: Passive
- Sensor Type: Simple Detection
- Sensitivity: Particle
- Base Range: 3m
- Detection Scale: -6
- Mass: 0.2kg
- Cost: CR15

This detector will detect the existence of particle radiation of all sorts. ROB WRITE RULES FOR RADIATION.

Directional Particle Detector

- Sensor Mode: Passive
- Sensor Type: Directional
- Sensitivity: Particle
- Base Range: 3m
- Detection Scale: -6
- Mass: 0.5kg
- Cost: CR30

Like it says.

Active Imaging Radar

- Sensor Mode: Active
- Sensor Type: Imaging
- Sensitivity: Radar
- Base Range: 100km
- Detection Scale: 10
- Mass: 5kg
- Cost: CR500

This is already luggable rather than handheld. It is what a squad of solders might bring along and set up in order to detect incoming small aircraft and other similar vehicles. This is an imaging radar, and while it won't be possible to read the writing on the side of a vehicle (unless the paint was specifically designed to have radically varying radar reflectivity), you can get some information about the bulk shape of an object. As an active sensor, anything scanned by it will probably be able to detect the sensor itself. Use with caution.

Radar/Ladar Detector

- Sensor Mode: Passive
- Sensor Type: Simple Detection/Directional
- Sensitivity: Radar, IR, Visible light, X-rays
- Base Range: *sp.*
- Detection Scale: *sp.*
- Mass: *sp.*
- Cost: *sp.*

A generic device which lets you detect whether somebody else is trying to scan you with an active radar or another active electromagnetic sensor. In general, the chance for this sensor to detect the scan is *one step easier* than it is for the active sensor to detect the device equipped with the Radar Detector. Thus, if a marine is using an active radar to scan for a tank, and is at such a range that it will take a Good result for the marine to detect that tank, the tank's Radar/Ladar Detector will detect the scan on a Fair result.

A result equal to the difficulty of direction only gives you information that you are being scanned. A better result gives you a bearing (whose quality improves with the quality of the result) to the scanner.

The mass and cost of the sensor depends upon the scale of the item equipped with it. For a scale 0 (normal human), the sensor masses 1kg and costs Cr50. Multiply each number by ˜ 1.5 for each step of scale away from 0, so that a radar/ladar detector for a Scale 10 Vertol will mass 60kg and cost Cr3,000.

Fudge it for other devices such as active laser sights on handheld weapons; in general, if the other device is going to be effective, then this detector should have at least a good a chance at detecting the emissions of the other device.

Scan Detector

- Sensor Mode: Passive
- Sensor Type: Simple Detection/Directional
- Sensitivity: "Scanning Radiation"
- Base Range: *sp.*
- Detection Scale: *sp.*
- Mass: *sp.*
- Cost: *sp.*

Just like the Radar/Ladar Detector, only this detects "scanning radiation" from superscience active sensors such as life sensors, chemical sensors, and foo-on scanners. For a scale 0 object, this sensor masses 1kg and costs Cr100.

X-Ray Scanner

- Sensor Mode: Active
- Sensor Type: Imaging
- Sensitivity: X-rays
- Base Range: 2m
- Detection Scale: -4
- Mass: 2kg
- Cost: Cr500

Not normally used to detect things at a distance, but rather to look through surfaces and take pictures of what is inside. A modest thickness of metal– especially a heavy metal such as lead or gold– will block the signal. (ROB, CHECK THIS.)

If the GM wishes to be realistic, this sensor should have two components: an X-ray emitter and an X-ray detector. They must be set up on either side of the item to be scanned.

The rules in Chapter 4 probably do not apply very well to this sensor. The small detection scale has more to do with a field of view than with the ability to pick out very small objects. This scanner, as written, is more useful for looking inside modest size objects than for looking for very distant objects. Apply common sense when using this sensor, rather than slavish devotion to Chapter 4's rules.

Life Scanner

- Sensor Mode: Active
- Sensor Type: Directional
- Sensitivity: Life, (possibly) Biological Material
- Base Range: 20m
- Detection Scale: 0
- Mass: 1kg
- Cost: Cr150

A basic handheld life sensor capable of detecting nearby "life signs."

Chem Analyzer

- Sensor Mode: Sampling
- Sensor Type: Simple Detection
- Sensitivity: Chemical Elements and Compounds
- Base Range: –
- Detection Scale: -16
- Mass: 1kg
- Cost: Cr50

A small handheld sensor which has a small compartment for samples; it will analyze the chemical composition of any material put into the sample compartment. It can also be switched to the mode of analyzing the chemical composition of ambient gas. (Recognizing what the substance really *is* based on its spectrum of masses and elemental abundances is another matter, and requires either expertise on the part of the sensor operator or a database built into the sensor with information about the right things.) This is also the sensor you would use for DNA fingerprinting.

Remote Chem Analizer

- Sensor Mode: Active
- Sensor Type: Directional
- Sensitivity: Chemical Elements and Compounds
- Base Range: 20m
- Detection Scale: 0
- Mass: 1kg
- Cost: CR150

A Chemical sensor which gives you basic composition information on the material at which you point the sensor. Note that a Chem Analyzer will tell you that a human body is composed of a lot of water and a mess of organic compounds. A Life Scanner will tell you whether or not that human body is alive (or, possibly, recently dead).

Uberscanner

- Sensor Mode: Active/Passive
- Sensor Type: Imaging/Directional
- Base Range: *sp*
- Detection Scale: 0
- Mass: 3kg
- Cost: CR1000

A scanner which combines the properties of Image-enhancing Binoculars, a passive Radar/Ladar detector, a Particle Detector, a Scan Detector, a Life Scanner, and a Remote Chem Analyzer. It can only operate in one mode at once. Base Ranges for each mode are for each of those objects as described above.

6.6 Armor

Pressure suits and space suits are considered part of armor. There are two options for air supplies in pressure suits:

- **Standard Option:** In a hostile environment with an atmosphere that can be converted to a breathable atmosphere, a presure suit requires a rebreather attachment. This is a 0.5kg attachment to the helment of the suit. In more hostile environments (including space), pressure suits (and sealed armor) require a survival module, which includes the power and air tanks necessary to support life. For a Scale 0 person, two kinds of survival modules are available: a 6-hour survival module which masses 5kg, and a 24-hour survival module which masses 10kg.
- **High-Tech Option:** In this option, it is assumed that miniature chemcial processors are available, and no bulky air tanks are required at all. The life system of a suit is able to process the body's wastes to generate oxygen as needed, and power for this reprocessing comes from a combination of the motion of the occupant and waste heat from the occupant's body. No additional mass or complication is necessary to supply air.

Thermal Suit

- Weapon Scale: Civilian
- Defensive Factor: +1
- Weight: 1kg

A full body suit of protective thermal clothing, which allows the wearer to survive in moderate extremes of temperature. ("Moderate extremes?" Sheesh.) It won't protect the wearer from intense fire or from liquid nitrogen cold, but will protect the wearer from the normal environmental conditions found on habitable planets.

Pressure Suit

- Weapon Scale: Civilian
- Defensive Factor: +2
- Weight: 3kg

A lightweight pressure suit, suitable for protecting the wearer in vacuum (when sealed and provided with a helmet).

Civilian Body Armor

- Weapon Scale: Civilian

- Defensive Factor: +3
- Weight: 5kg

A strong though still relatively lightweight weave, this is the heaviest body armor which is normally legal for civilians. This represents a suit which protects torso, arms, and legs. It is not very effectual against military weapons.

Ranger Suit

- Weapon Scale: Military
- Defensive Factor: +2
- Weight: 3kg

A high-tech lightweight suit of sealable military body armor. Equipped with air tanks or a superscience air recycler, this works also as a space suit, and works well for troops who might go off ship or try to board through bulkheads. It is also an ideal suit for light troops which want to move quickly.

Flak Jacket

- Weapon Scale: Military
- Defensive Factor: +3
- Weight: 4kg

A heavy jacket which provides a modicum of protection. Add another 2kg to also protect the legs.

Body Armor

- Weapon Scale: Military
- Defensive Factor: +4
- Weight: 10kg

A heavy suit of articulated body armor, for use by heavy infantry. Includes a helmet. May be sealed for hostile environment or space use.

Shock Armor

- Weapon Scale: Military
- Defensive Factor: +5
- Weight: 15kg

The heaviest armor you'll find beefy infantry wearing before they realize that they're being ridiculous and ought to be in a battlesuit instead.

6.6.1 Battlesuits

Battlesuits are powered armor. Rather than being a protective shell, the are more a sort of human-shaped (or alien-shaped) vehicle which uses the normal motion of the occupant as a cue for its motions. They range from lightweight powered armor that merely cancels out the weight of the armor to massive suits that can stand up to a tank.

Ranger Battlesuit

- Weapon Scale: Vehicle
- Defensive Factor: +2
- Weight: 10kg
- Scale: 0

A form-fitting flexible battlesuit. Tiny servos inside the suit allow the wearer to ignore the weight of the suit and any survival modules (battery packs, air tanks, etc) associated with the suit. This suit has no penalties to Agility or other physical action rolls. If the "high-tech" option for survival modules is being used, in principle normal clothing could be worn over this suit with only a minimum of discomfort. The suit provides good protection against military weapons and moderate protecton against anti-vehicle waepons.

Light Battlesuit

- Weapon Scale: Vehicle
- Defensive Factor: +4
- Weight: 100kg
- Scale: 2

A battle suit for smaller, faster troops such as engineers and rangers. Sealable, and may be used in space or

other hostile environments (with the addition of air tanks or a air recycler). This is a powered suit; the wearer need not worry about carrying the weight of the suit, and his strength is magnified to the Scale of the suit. However, reduce any Agility or similar attribute by one level while wearing the suit, due to the clumsiness of its bulk.

The weight of the suit includes an onboard computer, and one or two weapons. It may mount either one small weapon on the Vehicle weapon scale, or two on the Military weapon scale; the nature of that weapon may be customized to organizational or wearer preference, but will typically be the most standard weapon of the campaign (e.g. a blaster rifle and a grenade launcher).

Standard Battlesuit

- Weapon Scale: Tank
- Defensive Factor: +3
- Weight: 250kg
- Scale: 4

A standard battlesuit used by infantry. Mounts one weapon on the Tank weapon scale, one weapon on the Vehicle weapon scale, and one on the Military weapon scale. Includes an on-board computer. Sealed, and may be equipped with optional air tanks and/or an air recycler. May also be equipped with food and water for a few days of uninterrupted use.

This is a powered suit, so the wearer's strength is on the Scale of the suit while he's inside it. The bulk of the suit means that he must reduce his Agility by one, and also any appropriate physical skill (except for firing the battlesuit's built-in weapons, to which there is no penalty). Operations requiring delicate manual manipulation will be impossible, unless the suit is equipped with special equipment.

Heavy Battlesuit

- Weapon Scale: Tank
- Defensive Factor: +5
- Weight: 550kg
- Scale: 6

A massive and expensive battle suit that only the very heaviest of shock troops would wear, capable of standing up against serious punishment even from armored vehicles or fighters. Mounts one weapon on the Tank weapon scale and three on the Vehicle or Military weapon scales. Otherwise, this works similarly to the Standard Battle Suit.

6.7 Weapons

All weapons below use standard battery packs. Each listing indicates how many battery packs the weapon needs, and how many shots the weapon gets before they need to be replaced. If keeping track of this is bogging you down, don't worry about the details as long as things aren't getting out of hand.

Assume that if a character has a replacement battery pack handy (in a pocket), it takes one round to remove and reload a single battery pack.

Purse Laser

- Weapon Scale: Civilian
- Offensive Factor: +1
- Base Range: 5m
- Battery Packs: 1
- Shots: 20
- Mass: 0.25kg
- Cost: Cr50

Your basic civilian gun, which people carry around in their bag, store under the seat of their flitter, or put under their pillow at night. Not heavy artillary by any means, but as with any weapon it's enough to give somebody pause.

Standard Blaster Pistol

- Weapon Scale: Civilian
- Offensive Factor: +3
- Base Range: 10m
- Battery Packs: 1
- Shots: 10

- Mass: 0.5kg
- Cost: CR200

A heavy civilian weapon. People are likely to think you violent, or the space opera equivalent of an American, if you cary one of these.

Police Blaster

- Weapon Scale: Civilian
- Offensive Factor: +4
- Base Range: 15m
- Battery Packs: 1
- Shots: 10
- Mass: 0.5kg
- Cost: CR200

Much like the standard blaster pistol, only beefier, and it has a "stun" setting which does standard ***Fudge*** Stun damage (***Fudge*** section 4.62).

Hunting Blaster Rifle

- Weapon Scale: Civilian
- Offensive Factor: +4
- Base Range: 50m
- Battery Packs: 1
- Shots: 5
- Mass: 1.5kg
- Cost: CR200

A heavy rifle used for killing innocent animals in the woods, and for defending your country retirement home when bug-eyed monsters unexpectedly invade. This can only be fired every other round, as it takes time to recharge between shots.

Military Blaster Pistol

- Weapon Scale: Military
- Offensive Factor: +2
- Base Range: 20m
- Battery Packs: 1
- Shots: 15
- Mass: 1kg
- Cost: CR400

A standard light military sidearm. (Military weapons get more shots and more effective shots from power packs than do civilian weapons because of high tech and highly regulated military design.) Also has a stun setting like the Police Blaster.

Military Blaster Carbine

- Weapon Scale: Military
- Offensive Factor: +3
- Base Range: 30m
- Battery Packs: 2
- Shots: 30
- Mass: 1.5kg
- Cost: CR800

A heavier military weapon, generally held in two hands but usable with one hand. Also has a stun setting like the Police Blaster.

Heavy Blaster Rilfe

- Weapon Scale: Military
- Offensive Factor: +5
- Base Range: 40m
- Battery Packs: 3
- Shots: 30
- Mass: 2.5kg
- Cost: CR1500

The standard weapon of heavy infantry.

Light Assault Laser

- Weapon Scale: Vehicle
- Offensive Factor: +2
- Base Range: 50m
- Battery Packs: 3
- Shots: 10
- Mass: 10kg
- Cost: CR5,000

A tripod or bipod mounted weapon, used against light battlesuits and military vehicles. An X-ray laser. Can be fired without the bipod or tripod by somebody in any battlesuit other than the Ranger Battlesuit.

Anti-Tank Assault Laser

- Weapon Scale: Tank/Fighter
- Offensive Factor: +3
- Base Range: 100m
- Battery Packs: 5
- Shots: 10
- Mass: 40kg
- Cost: Cr20,000

A tripod mounted weapon which may be carried by a team in parts, used for trying to blast holes in enemy armor. Double the cost and add 10kg to the weight to create a version with OF +4.

Railgun

- Weapon Scale: Tank/Fighter
- Offensive Factor: +3 (*sp.*)
- Base Range: 100m
- Battery Packs: 5
- Shots: 40
- Mass: 40kg
- Cost: Cr40,000

A tripod-mounted weapon similar to the Anti-Tank asasult laser. Fires armor-piercing high-density shells. *The effective Defensive Factor of any armor is halved against fire from a Railgun*, meaning that the gun is effective at penetrating armor. The 40 shots actually indicate 40 rounds of fire; it's an automatic weapon, so each round of fire is a burst of around 10 rounds; this is already accounted for in the Offensive Factor. A replacement cartridge of 400 rounds of ammo costs Cr1,000.

Force Sword

- Weapon Scale: Military
- Offensive Factor: +2
- Mass: 0.5kg
- Cost: Cr1000

A swashbuckling hand-to-hand weapon. Normally a small cylinder, when you thumb a switch a "blade" of glowing colorful energy hums forth. Double the cost for a version with OF +3, double it again for OF +4. As long as characters aren't leaving these on all the time, you probably don't have to worry about power. If they are, say that a force sword can run for 10 minutes continuously on a standard battery pack. Note that these *are* strength-powered weapons, and as such stronger characters can do more damage with them.

Force swords can be used to parry each other. Truly cinematic characters with the right gifts may be able to parry blaster bolts with force swords.

Duelling Force Sword

- Weapon Scale: Civilian
- Offensive Factor: +2
- Mass: 0.5kg
- Cost: Cr500

A lowered-powered version of the standard force sword. Unlike the standard force sword, it has a "Stun" setting, which instead of cutting into those whom it hits, delivers an electric shock that does stun damage. A Cr250 version has *only* the Stun setting. A duelling force sword *can* be used to parry a standard force sword.

Personal Grenade Launcher

- Weapon Scale: (per grenade)
- Offensive Factor: (per grenade)
- Base Range: 15m
- Battery Packs: –
- Shots: –
- Mass: 3kg
- Cost: Cr1,000

A grenade launcher that may be carried and used by a single person. Has a magazine which can hold 5 grenades; reloading takes 1 combat round per two grenades.

Concussion Grenade

- Weapon Scale: Military
- Base Damage: 5
- Base Burst Radius: 1m
- Mass: 0.2kg
- Cost: Cr100

Your basic explosive antipersonnel grenade

Fragmentation Grenade

- Weapon Scale: Military
- Base Damage: 7
- Base Burst Radius: 1m
- Mass: 0.2kg
- Cost: Cr200

A concussion grenade with lots of little sharp bits of metal in it in order to make it very nasty.

Shaped-Charge Grenade

- Weapon Scale: Military
- Base Damage: 5
- Base Burst Radius: 1m
- Mass: 0.2kg
- Cost: Cr500

Like the Fragmentation Grenade, except that on a direct hit, the Relative Degree of the hit is added to the damage done.

Plasma Grenade

- Weapon Scale: Vehicle
- Base Damage: 7
- Base Burst Radius: 2m
- Mass: 0.2kg
- Cost: Cr1,000

A grenade that will only be avaliable in higher-tech games. When it explodes, a wash of plasma splatters out into the burst radius, melting and burning anything nearby. This grenade can also destroy most forms of armor. Keep track of how many points of damage from plasma grenades that armor has been exposed to; after 8 points, reduce the Defensive Factor of the armor by 1 if the armor is on the Vehicle Weapon Scale, by 2 if the armor is on the Military Weapon Scale, and by 4 if it is on the Civilian Weapon Scale. Armor on the Fighter/Tank weapon scale has its Defensive Factor reduced by one after receiving 16 points of plasma grenade damage; armor on higher Weapon Scales isn't significantly affected (but does get lots of cool-looking burns and scars).

6.8 Spy Gear

Tracer A tiny (negigible mass) tracer which can be fitted as a needle, dropped in a drink, or stuck onto the side of a vehicle. It can be programmed to emit an encoded tracing signal at any regular interval. Any standard computer hooked into any standard communicator can be assumed to interpret the signal. A radiation sensor or passive EM sensor will pick up that a signal is being emitted while the tracer is actively scanning; treat this as a Scale -10 emitter. [ROB CHECK THIS.] Cost: Cr20.

Minibug A small bug about the size of a pinhead. It picks up audio (anything that could be heard by a human at the same location). Its internal memory can store about 1 hour of audio; it can set to activate at specific times, or to be activated by sounds. It has a miniature receiver that transmits the contents of its memory. Cost: Cr100.

Bug Detector A 0.5kg device that scans the area for bugs. Takes about 1 second to scan each square meter. Resolve the scan as an Opposed action between the appropriate skill of the scanner and the person who placed the bug, with modifiers as deemed reasonable by the GM. Cost: Cr200.

Ward A small 0.25kg cylindar which sets up a scanning field (detectable as a Scale -2 source by radiation detectors) that will send a coded signal to the designated receiver (which can be any computer attached to

a standard communicator) whenver there is any motion or significant temperature change within a 25-square meter (by 5m high) area.

6.9 Miscellaneous Gadgets

Chapter 7

Sample Starships

7.1 Numerical Assumptions

When assigning any kinds of numbers to starships, you have built in assumptions about the background— what sorts of technolgy is available, how fast ships tend to be, what are the ranges of weapons, what are the ranges of sensors, etc. The sample starships in this chapter are based on the following assumptions:

FTL Speed Attribute	FTL Speed
Terrible	0.3 pc/day
Poor	0.4 pc/day
Mediocre	0.7 pc/day
Fair	1.0 pc/day
Good	1.5 pc/day
Great	2.3 pc/day
Superb	3.4 pc/day

Acceleration Attribute	Acceleration (in g or 10 m/s^2)
Terrible	0.3
Poor	0.5
Mediocre	0.7
Fair	1.0
Good	1.5
Great	2.3
Superb	3.5
Superb+1	5.0

7.2 Standard Weapons

Ship weapons are given a Base Range and Target Scale as per the rules in Section 3.8. In addition, they have a Max Range stat; weapons are ineffective beyond this range. Reduce the weapon's offensive factor by 2 (minimum zero) at *half* of the Max Range. Optionally, you may reduce the weapon's offensive factor by 1 (minimum zero) at one fifth the Max Range. (This is consistent with the rules in Section 3.8 if you chose the Target Scale at which the Base Range is 1/10 the Max Range.) Standard weapons are listed in Table 7.1.

Standard ship weapons come in four forms.

Particle beams are the most basic and least expensive ship weapon; think of them as the unspecified "blaster" type beam weapons you see ships using in science fiction movies. Particle beams tend to have moderate damage factors.

X-ray lasers are more expensive, and are shorter range for a similar weight weapon. (The x-rays, of course, propogate to infinity, but the beam is only focused well enough to do damage to the range specified.) They have a lower damage factor than a particle beam, but they also have armor reduction: they subtract 2 from the armor of any ship they attack. (Minimum armor 0; they don't make a ship's effective armor negative!)

Railguns have the shortest range of all, but also do the most damage. *Some*, but not all, railguns have armor reduction; of course, those that do are more expensive! The damaging range on a Railgun is infinite: the slug doesn't disperse as does a particle beam, and it doesn't defocus as does an X-ray beam. However, targeting railguns is difficult. As such, their Max Range is high, but

Table 7.1: Standard Weapons

Weapon	Weapon Scale	Damage Factor	Base Range	Target Scale	Max Range	Needed Scale	Mass (kg)	Cost (kCr)
Particle Beam	Fighter	+3	1,000	8	25,000	10	200	100
			2,500	12				
			20,000	20				
			55,000	24				
			160,000	28				
Particle Beam	Starship	+3	300	12	50,000	20	5,000	2,500
			2,500	20				
			20,000	28				
			55,000	32				
Particle Beam	Warship	+3	300	16	80,000	30	125,000	62,500
			1,000	20				
			7,000	28				
			20,000	32				
X-Ray Laser[1]	Fighter	+2	500	8	12,000	10	200	500
			1,500	12				
			12,000	20				
			34,000	24				
			96,000	28				
X-Ray Laser[1]	Starship	+2	125	12	24,000	20	5,000	12,500
			1,250	20				
			10,000	28				
			28,000	32				
X-Ray Laser[1]	Warship	+2	125	16	40,000	30	125,000	320,000
			500	20				
			3,500	28				
			10,000	32				
Railgun[2]	Fighter	+5	200	8	—	10	200	200
			500	12				
			4,000	20				
			10,000	24				
			30,000	28				
Railgun[2]	Starship	+5	50	12	—	20	5,000	5,000
			500	20				
			4,000	28				
			10,000	32				
Railgun[2]	Warship	+5	50	16	—	30	125,000	125,000
			200	20				
			1,500	28				
			4,000	32				

1: X-Ray Lasers reduces the defensive factor of any armor they target by 2 (minimum 0).

2: You can purchase an armor-piercing railgun for 10x the cost. An armor-piercing railgun reduces the defensive factor of any armor it attacks by 2 (minimum 0).

their Base Range is quite low. These are the weapons you can pound away with when you manage to get very close to your target.

Missiles are assumed to be antimatter or nuclear missiles. They have a large damage factor, and additionally can be on a Weapon Scale larger than the firing ship. This is how fighters can really hope to damage a capital ship. However, missiles are also subject to point-defense weapons; any hit will harmlessly disable a missile. Optionally, you may treat a missile as a Scale 0, Acceleration Superb+1 ship. Small ships will generally have only a small number of missiles.

If a ship mounts multiple weaopns of *exactly the same type*, they can be fired together: they hit with the same attack roll. However, do *not* sum their offensive Damage Factors. Rather, treat them as two separate attacks that had identical same attack and defense rolls. For example, consider a ship that mounts "quad" particle beams. If, in a given attack, one particle beam would penetrate armor and do two points of damage, then the result is that the target has now suffered *four* succesful attacks, each for two points of damage. The amount of damage that may be done in one shot is increased, but the ability to pentrate defenses is not.

7.2.1 Missiles

Mininuke Missile This is a missile which has Scale 0, Acceleration Superb, Damage Factor +5, Weapon Scale Starship, and a Fair Targeting skill. It masses 70kg and costs 10 kcr.

Advanced Mininuke Missile Like a Mininuke Missile, only with Aceleration Superb+1, a Great Targeting skill, and a cost of 100 kcr.

Antimatter Missile This is a missile which has Scale 1, Acceleration Superb, Damage Factor +5, Weapon Scale Warship, and a Fair Targeting skill. It masses 100kg and costs 100 kcr.

Advanced Antimatter Missile Like a Nuke missile, only with Acceleration Superb+1, a Great Targeting skill, and a cost of 1,000 kcr.

Shaped-Charge Missile Convert any of the above missiles to a shaped-charge mininuke missile (so that you can add the Relative Degree of an attack for direct hits) by multiplying the cost by 5.

7.3 Standard Sensors

Table 7.2 lists standard sensor suites for starships. They are based on and scaled up from the sensors in Chapter 6. The quantites are those used in the rules in Chapter 4.

Fighters and corvettes should have "small" arrays. Larger ships should have "medium" arrays. Some of the largest ships may have "large" arrays, but often only space stations will have those. Some larger space stations may have "planetary" arrays.

A Note on Needed Scale You may object that the masses listed are very small compared to the mass of an object of the Needed Scale. We are assuming that the ship will have other things— power systems, crew space, drive systems, etc.— on board. If you want to create a "sensor probe" type ship, feel free to violate the Needed Scale within reason.

The smallest sensors may be available in a luggable format which can be assembled in the field, at the GM's option.

Passive EM Array

A Passive EM Array (PEMA) can detect electromagnetic waves across the spectrum. It can image in the IR, Visible, Ultraviolet, and X-ray ranges of the spectrum. For Radio (Radar) and Gamma rays, the "Small" and "Medium" versions only give directional information. The "Large" and "Planetary" versions give imaging information at all wavelengths on a good roll. (A roll that just detects the object gives a very fuzzy image, which is effectively only directional information.)

The "Small" sensor suite used by fighters for their "close-in" combat (in space terms). The "Medium" sensor suite can detect Cruiser class ships (around Scale 28) at a range of 2 million km (5 times the distances from the Earth to the Moon). The "Planetary" array can image large ships (Scale 32) at 2 AU, or 300 million km— twice the distance from the Earth to the Sun. It can detect 1m long cylindar in geosynchronous orbit from Earth's surface (about 35,000 km up).

Table 7.2: Standard Sensors

Sensor	Modes	Base Range	Detection Scale	Needed Scale	Mass (kg)	Cost (kCr)
Small Passive EM Array	Dir/Img	50,000 km	20	10	150	25
		6,000 km	12			
		2,000 km	8			
Medium Passive EM Array	Dir/Img	250,000 km	20	20	1,500	250
		30,000 km	12			
		10,000 km	8			
Large Passive EM Array	Img	20,000,000 km	28	30	50,000	8,000
		2,500,000 km	20			
		300,000 km	12			
		100,000 km	8			
Planetary Passive EM Array	Img	2 AU	32	40	600,000	100,000
		0.7 AU	28			
		13,000,000 km	20			
		1,600,000 km	12			
		600,000 km	8			
		70,000 km	0			
Active Imaging Radar/Ladar			*See Text*			
Small Neutrino Detector	Dir	5,000 km	20	14	300	500
		625 km	12			
Medium Neutrino Detector	Dir	25,000 km	20	24	3,000	5,000
		3,000 km	12			
Large Neutrino Detector	Dir	125,000 km	20	34	30,000	50,000
		15,000 km	12			
Small Gravscanner	Dir	10,000 km	20	14	300	150
		1,000 km	12			
Medium Gravscanner	Dir	50,000 km	20	24	3,000	1,500
		6,000 km	12			
Large Gravscanner	Dir	250,000 km	20	34	30,000	15,000
		30,000 km	12			
Warp Scanner		1 AU	20	40	100,000	50,000

Active Imaging Radar/Ladar

An Active Imaging Radar/Ladar (AIRL) with the same mass and cost as a Passive EM Array has four times the range. For example, a Small Active Imaging Radar/Ladar masses 150 kg and costs 25 kCr; it has a range of 200,000 km to detect Scale 20 objects.

It is a Fair sensor ops task to use a PEMA to detect the radiation from an AIRL at *twice* the range that it would be a Fair sensor ops task for the AIRL to detect whatever ship the PEMA is mounted on. (Yes, this doesn't entirely make sense, but it should hopefully be more playable.) Alternatively, for simplicity, you can assume that anybody with sensors within any "reasonable" range automatically detects the use of an AIRL.

Neutrino Detector

Neutrinos are emitted in any kind of nuNeutrinos are very hard to detect in real life, so the very notion of "portableclear reaction. As such, a neutrino detector will detect a spaceship's power plant. In general, it should be much harder to stealth your neutrino emissions than it is to stealth your EM signature, so the smaller range of neutrino detectors may not be the disadvantage that it appears.

The ranges and scales assume a "normal" power plant for a ship of the given scale. If a ship has particularly large or small power plants, feel free to Just Fudge It and declare the scale to be different. Also, allow creative players to reduce their neutrino signature by deliberately running their power plants at a reduced rate– reducing their acceleration or powering down some systems, for example.

Gravscanner

A Gravscanner detects mass. In empty space, it indicates the presence of an object – a ship or something else. If you don't see anything there, then you have found something (probably) stealthed. On a planet, or near a large mass, you need very good maps of what the "background" is to detect mass against it; otherwise, the mass you detect might just be a mountain, or a natural density variation. If something moves, though, you will be able to detect the mass moving.

Warp Sensors

Warp Sensors detect anything moving at warp speed. The one listed is the smallest functional one that may be created. As such, they are only found on planetary arrays, or on the very largest of ships.

Automatically Installed Sensors

Assume that any ship that has any sensor system at all is also equipped with a Scan Detector similar to that described in Section 6.5.

7.4 Bullet Class Light Fighter

Class: Fighter
Scale: 10 (8m long)
Weapon Scale: Fighter

FTL Speed: N/A
Acceleration: Superb (3.5g)
Reliability: Poor
Health: Mediocre

Crew: One pilot, short-term occupancy
Cost:

Damage Track

1-2	3-4	5-6	7-8	9+
Scratched	Damaged	Very Dmg.	Incap.	Wrecked
○○○	○○	○	○	○

Armor

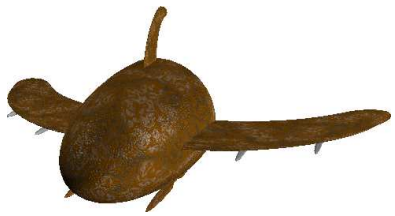
- Standard Armor, Defensive Factor 3

Weapons

- Particle Beam (Weapon Scale: Fighter)
- Four Mininuke Missiles

Sensors

- Small Passive EM Array
- Small Active Imaging Radar/Ladar
- Small Gravscanner



7.5 Pulsar Class Warp Fighter

Class: Long-Range Fighter
Scale: 20 (30m long)
Weapon Scale: Fighter

FTL Speed: Good (1.5 pc/day)
Acceleration: Good (1.5g)
Reliability: Fair
Health: Fair

Crew: One pilot, long-term occupancy
Cost:

Damage Track

1-2	3-4	5-6	7-8	9+
Scratched	Damaged	Very Dmg.	Incap.	Wrecked
○○○ ○○	○○○	○○	○	○

Armor

- Lightweight Armor, Defensive Factor 5

Weapons

- Dual Particle Beam (Weapon Scale: Fighter)
- X-Ray Laser (Weapon Scale: Fighter)
- 5 Advanced Mininuke Missiles

Sensors

- Medium Passive EM Array
- Medium Active Imaging Radar/Ladar
- Small Gravscanner
- Small Neutrino Detector

Features

- Stealth: reduces effective Scale to 8 vs. EM sensors, warp sensors

7.6 Flechette Class Corvette

Class: Corvette
Scale: 23 (45m long)
Weapon Scale: Starship

FTL Speed: Good (1.5 pc/day)
Acceleration: Fair (1g)
Reliability: Fair
Health: Fair

Crew: 3 (Pilot, Weapons, Sensors)
Occupancy: Up to 8 total, long-term
Cost:

Damage Track

1-2	3-4	5-6	7-8	9+
Scratched	Damaged	Very Dmg.	Incap.	Wrecked
○○○ ○○	○○○	○○	○	○

Armor

- Standard Armor, Defensive Factor 4

Weapons

- Dual Particle Beam (Weapon Scale: Starship)
- X-Ray Laser (Weapon Scale: Starship)
- Railgun (Weapon Scale: Fighter)
- 5 Shaped-Charge Mininuke Missiles

Sensors

- Medium Passive EM Array
- Medium Active Imaging Radar/Ladar
- Small Gravscanner
- Small Neutrino Detector

Features

- Stealth: reduces effective Scale to 13 vs. EM sensors, warp sensors
- Fighter Bay : holdes 4 Bullet-class fighters

Appendix A

OPEN GAME LICENSE Version 1.0a

The following text is the property of Wizards of the Coast, Inc. and is Copyright 2000 Wizards of the Coast, Inc ("Wizards"). All Rights Reserved.

1. Definitions: (a)"Contributors" means the copyright and/or trademark owners who have contributed Open Game Content; (b)"Derivative Material" means copyrighted material including derivative works and translations (including into other computer languages), potation, modification, correction, addition, extension, upgrade, improvement, compilation, abridgment or other form in which an existing work may be recast, transformed or adapted; (c) "Distribute" means to reproduce, license, rent, lease, sell, broadcast, publicly display, transmit or otherwise distribute; (d)"Open Game Content" means the game mechanic and includes the methods, procedures, processes and routines to the extent such content does not embody the Product Identity and is an enhancement over the prior art and any additional content clearly identified as Open Game Content by the Contributor, and means any work covered by this License, including translations and derivative works under copyright law, but specifically excludes Product Identity. (e) "Product Identity" means product and product line names, logos and identifying marks including trade dress; artifacts; creatures characters; stories, storylines, plots, thematic elements, dialogue, incidents, language, artwork, symbols, designs, depictions, likenesses, formats, poses, concepts, themes and graphic, photographic and other visual or audio representations; names and descriptions of characters, spells, enchantments, personalities, teams, personas, likenesses and special abilities; places, locations, environments, creatures, equipment, magical or supernatural abilities or effects, logos, symbols, or graphic designs; and any other trademark or registered trademark clearly identified as Product identity by the owner of the Product Identity, and which specifically excludes the Open Game Content; (f) "Trademark" means the logos, names, mark, sign, motto, designs that are used by a Contributor to identify itself or its products or the associated products contributed to the Open Game License by the Contributor (g) "Use", "Used" or "Using" means to use, Distribute, copy, edit, format, modify, translate and otherwise create Derivative Material of Open Game Content. (h) "You" or "Your" means the licensee in terms of this agreement.

2. The License: This License applies to any Open Game Content that contains a notice indicating that the Open Game Content may only be Used under and in terms of this License. You must affix such a notice to any Open Game Content that you Use. No terms may be added to or subtracted from this License except as described by the License itself. No other terms or conditions may be applied to any Open Game Content distributed using this License.

3. Offer and Acceptance: By Using the Open Game Content You indicate Your acceptance of the terms of this License.

4. Grant and Consideration: In consideration for agreeing to use this License, the Contributors grant You a perpetual, worldwide, royalty-free, non-exclusive license with the exact terms of this License to Use, the Open Game Content.

5. Representation of Authority to Contribute: If You are contributing original material as Open Game Content, You represent that Your Contributions are Your original creation and/or You have sufficient rights to grant the rights conveyed by this License.

6. Notice of License Copyright: You must update the COPYRIGHT NOTICE portion of this License to include the exact text of the COPYRIGHT NOTICE of

any Open Game Content You are copying, modifying or distributing, and You must add the title, the copyright date, and the copyright holder's name to the COPYRIGHT NOTICE of any original Open Game Content you Distribute.

7. Use of Product Identity: You agree not to Use any Product Identity, including as an indication as to compatibility, except as expressly licensed in another, independent Agreement with the owner of each element of that Product Identity. You agree not to indicate compatibility or co-adaptability with any Trademark or Registered Trademark in conjunction with a work containing Open Game Content except as expressly licensed in another, independent Agreement with the owner of such Trademark or Registered Trademark. The use of any Product Identity in Open Game Content does not constitute a challenge to the ownership of that Product Identity. The owner of any Product Identity used in Open Game Content shall retain all rights, title and interest in and to that Product Identity.

8. Identification: If you distribute Open Game Content You must clearly indicate which portions of the work that you are distributing are Open Game Content.

9. Updating the License: Wizards or its designated Agents may publish updated versions of this License. You may use any authorized version of this License to copy, modify and distribute any Open Game Content originally distributed under any version of this License.

10. Copy of this License: You MUST include a copy of this License with every copy of the Open Game Content You Distribute.

11. Use of Contributor Credits: You may not market or advertise the Open Game Content using the name of any Contributor unless You have written permission from the Contributor to do so.

12. Inability to Comply: If it is impossible for You to comply with any of the terms of this License with respect to some or all of the Open Game Content due to statute, judicial order, or governmental regulation then You may not Use any Open Game Material so affected.

13. Termination: This License will terminate automatically if You fail to comply with all terms herein and fail to cure such breach within 30 days of becoming aware of the breach. All sublicenses shall survive the termination of this License.

14. Reformation: If any provision of this License is held to be unenforceable, such provision shall be reformed only to the extent necessary to make it enforceable.

15. COPYRIGHT NOTICE

Open Game License v 1.0 Copyright 2000, Wizards of the Coast, Inc.

Fudge System Reference Document Copyright 2005, Grey Ghost Press, Inc.; Authors Steffan O'Sullivan, Ann Dupuis, with additional material by other authors as indicated within the text. Available for use under the Open Game License (see Appendix I)

Fudge Space Opera Copyright 2006, Robert A. Knop Jr.