

THE
ULTIMATE

A sourcebook for the

HERO
SYSTEM
FIFTH EDITION

VEHICLE



BOB GREENWADE & STEVE LONG



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ULTIMATE
VEHICLE

Bob Greenwade & Steve Long

THE ULTIMATE VEHICLE

THE ULTIMATE VEHICLE • A guide to all things that move in *The Hero System*

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A WORD OR TWO OF APPRECIATION

Dedication: Thanks to George MacDonald and Steve Peterson for creating the *Hero System* in the first place; to Steve Long for resurrecting it; to my wife, Colleen, and best friend, Karen McGuire, for all their support; to Dave Mattingly and the rest of the crew at the Haymaker! APAzine; to Jesus Christ, without whose intervention I'd be dead; and to René Zellweger, who has never heard of me and would have no idea why I'd be thanking her but who really did have a significant, if unwitting, impact on my dedication to complete this book.

Special Thanks. Bob writes: In addition to the books, games, movies, and other resources listed in the Bibliography (page 226), the people on the Hero Mailing List were also a great help to me. (As much as they might deserve individual thanks, space does not permit it here.) However, Steven Long, Dave Mattingly, and Damon Griffin were also kind enough to thoroughly evaluate the original manuscript for this book, provide many ideas and bits of additional material, and point out potential problem areas. (Steve's input at this stage was well before DOJ bought Hero Games, so he gets double thanks for that and for giving me a new shot at the manuscript after the takeover.)

To all of these people, I give my sincerest thanks. This book

would have been much less complete without their contributions.

Steve adds: We'd also like to offer our special thanks to the Digital Hero playtesters and testreaders who reviewed the TUV manuscript. Their help was invaluable in fine-tuning the rules, eliminating typos and math errors, and generally making the book as good as it could be. Special thanks also goes to the fans who participated in message board and mailing list discussions of what TUV should contain — as I've said before, it's great to have the help of enthusiastic fans! As always, though, the errors remain my fault.

Last but not least, thanks to Jason Walters for assistance with the motorcycles.



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Produced and distributed by DOJ, Inc. d/b/a Hero Games.

Stock Number: DOJHERO104 • ISBN Number: 1-58366-009-7

<http://www.herogames.com>

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INTRODUCTION



DUPLICATION; HERO GAMES TEXT ONLY (-2)

The Ultimate Vehicle contains some text reprinted from the 5th Edition rulebook and *Star Hero* (with, of course, the necessary changes in points of detail). Normally Hero products simply include cross-references to other relevant products, but there are two reasons for reprinting text in this case.

First, material was reprinted from the *Hero System 5th Edition* to save users of this book the trouble of having to flip back and forth between two volumes. The Vehicle rules in the 5th Edition don't take up too much page space, so it's better for you, the reader, if Hero Games includes them in this book.

Second, material was reprinted from *Star Hero* for the sake of consistency and completeness. *Star Hero* provides a lot of additional ideas and rules for vehicles (mainly space vehicles), all of which are relevant to the subject of *The Ultimate Vehicle*. Since not everyone who has a copy of this book necessarily has a copy of *Star Hero*, making frequent reference to our science fiction genre book would diminish the value of this product — and after all, it wouldn't really be an "Ultimate" book if it didn't have all the Vehicle rules in one place!

Welcome to *The Ultimate Vehicle*, the latest book in Hero Games's Ultimate series. As the title indicates, it looks at the subject of vehicles — everything from the most primitive wagons and chariots to the most advanced starships. It discusses how to build them with the *Hero System* rules (including some new, optional rules where appropriate), and how to use them in your gaming adventures. Whether your characters have to fight on top of a speeding train, conduct a deadly high-speed car chase through the streets of a modern city, or dogfight in the icy depths of space, this is the book that tells you how to do it. While the book emphasizes modern-day and science fiction games, which involve more vehicle use than other genres, it has plenty of useful information for campaigns taking place in any time period or setting.

The use of the optional rules presented here depends on the tone and style of the campaign. After all, there are many possible moods for both fiction and gaming, each calling for a different treatment of vehicles and their operators. Most options aren't mutually exclusive — you might even be able to use all of them in some games — but the GM must determine which options enhance his game, and which spoil the mood or just plain get in the way.

In this book, a "Vehicle" (capital V) refers to something built using the *Hero System* Vehicle construction rules presented here and in the *Hero System 5th Edition, Revised*. A "vehicle" (lower-case v) refers to any machine that functions as a vehicle, independent of whether it was built using the Vehicle construction rules or is intended for use in a game setting at all.

HOW TO USE THIS BOOK

As an Ultimate series book, *The Ultimate Vehicle* focuses primarily on rules. It doesn't include any campaign information or genre review — but it's got comprehensive *Hero System* rules for all sorts of vehicles. Both players and GMs will find a lot inside its covers to interest them.

Roughly speaking, you can think of *The Ultimate Vehicle* as being organized into two broad

sections. The first, including Chapters One through Seven, discusses how to create vehicles. Chapter One, *Under The Hood*, reviews general vehicle creation rules — rules that apply to all vehicles, or to more than one type of vehicle. It includes, among other things, an expanded Vehicle Size Table and other rules regarding Vehicle Characteristics.

Chapters Two through Six feature rules pertaining to specific types of vehicles. In order, they cover ground vehicles, water vehicles, air vehicles, space vehicles, and mecha. If you want to know how to build headlights for a car, how fast a wind- or oar-powered ship can sail, or how to use the *Hero System* rules to simulate a starship's artificial gravity, this is where you should look. Each chapter includes several example Vehicles to show you how it's done and provide a resource for your own games.

Chapter Seven is an adjunct to the previous six chapters. It contains numerous pre-built vehicle gadgets and systems, ready for you to install on whatever vehicle you build. Organizing these devices and systems into a single chapter makes it easier for you to find what you want. It should save you a lot of time during the Vehicle creation process.

The second section of the book discusses using vehicles in the game. Chapter Eight, *Dogfights And Car Chases*, is all about vehicular combat and adventuring. Whether your vehicle battles take place on sunbaked roads, under or on the water, amid the clouds, or in the unending reaches of outer space, this chapter tells you how to fight them.

Chapter Nine, *Wheelmen And Stick-Jockeys*, is all about the characters who use the vehicles you build. It discusses archetypical vehicle-using characters and provides numerous suggestions for building them.

As with any other Ultimate series book, the GM should examine *The Ultimate Vehicle's* rules carefully before determining whether to use them. While most campaigns benefit from having more thorough Vehicle rules in play, not all games require this level of detail; each GM should decide for himself whether he needs advanced Vehicle rules.



1 UNDER THE HOOD: VEHICLE CREATION RULES

Before your character can use a Vehicle in a game, you have to design that Vehicle using the *Hero System* rules. This chapter examines the subject of Vehicle creation generally, covering topics that

could apply to all Vehicles, or multiple types of Vehicles. You can find information associated primarily with a specific type of Vehicle in the chapter devoted to that Vehicle type (for example, information on tires is in Chapter Two, which covers ground vehicles).

VEHICLE BASICS



TECHNOLOGY VERSUS MAGIC

Most of the guidelines in this chapter, and especially the section on Powers, assume Vehicles are technological in nature. However, in many campaigns and settings, it's possible to have a Vehicle whose abilities derive from magic.

Technology is real, so it's relatively easy to define what it can do, or to extrapolate how a device might function based on realistic (or quasi-realistic) scientific principles. Magic, on the other hand, varies wildly from setting to setting, campaign to campaign, and genre to genre, so it's often impossible to generalize about how magic affects or interacts with Vehicles (except to say that anything you can do to or with a Vehicle technologically, you can almost certainly do magically). Each GM should make the necessary decisions and rulings for his own campaign, but don't think that because *The Ultimate Vehicle* doesn't mention magic very often that magic Vehicles aren't possible.

For gaming purposes, you can define vehicles based on their type and their general function.

Vehicle Types

A vehicle's type depends on the medium it's designed to move through or over. Some vehicles can move in more than one medium — planes taxi along the ground before taking to the air, and a James Bond-style sports car might convert into a mini-submarine for underwater adventures — but almost all vehicles have a primary form of movement that defines them. The six types of vehicles are:

Air Vehicles

Air vehicles, or aircraft, are built to fly, glide, or otherwise move through the air. They typically have a streamlined shape to decrease wind resistance, and usually have wings of some sort (or other "control surfaces") to help them stay airborne and maneuver. Examples include:

- Hot air balloons
- Blimps and zeppelins
- Gliders
- Airplanes (both propeller-driven and jet engine)
- Helicopters
- Hover aircraft (in *Star Hero* settings)
- Towed aircraft (in *Fantasy Hero* settings)

Chapter Four discusses air vehicles.

Ground Vehicles

In most *Hero System* campaigns, ground vehicles are the most common types of vehicles encountered. They're built to travel on the ground, typically by means of wheels or some sort of streamlined shape. Some are muscle-powered (sleds, chariots, skateboards), but most have an engine or other source of power that drives them (cars, trucks, snowmobiles). Examples include:

- Bicycles and unicycles
- Skateboards
- Sleds and sledges
- Chariots
- Carts, wagons, and coaches
- Automobiles (including trucks, buses, and the like)
- Motorcycles

Construction and agricultural vehicles

Snowmobiles

Tracked vehicles (tanks and the like)

Railed vehicles (trains, subways, and the like)

Hovercraft (in *Star Hero* settings)

In a few game settings, some ground vehicles can burrow through the ground in addition to running on top of it. "Mole machines" and the like aren't common, but do exist.

Chapter Two discusses ground vehicles.

Mecha

Although technically a type of ground vehicle, mecha are a sufficiently popular aspect of science fiction games, and sufficiently distinct in terms of the rules applicable to them, that they deserve separate coverage. Broadly speaking, a mech is a sort of vehicle-giant robot cross requiring a human pilot. They come in five basic configurations:

- Humanoid (a "standard" mech, with two arms and two legs)
- Bestial (in the shape of some type of animal)
- Ostrich (two-legged, but without arms like a Humanoid)
- Hybrid (a mech combining aspects of two types of mech, or a mech and a vehicle)
- Multiformer (a mech able to transform from one shape to another)

In most games, mecha stick to the ground — one of the reasons for their general shape is to allow them to traverse terrain that ordinary ground vehicles cannot. However, some can assume the shapes and abilities of jetfighters, submarines, or starships.

Chapter Six discusses mecha.

Space Vehicles

Perhaps the largest category of vehicles discussed here, space vehicles run the gamut from tiny, one-man exploration, trading, and scouting vessels to gigantic starships with enough power to destroy (or consume) suns. Depending on configuration, size, and equipment, they can be used for almost anything — entertainment, prospecting and exploration, warfare and defense, industrial purposes, transport of goods and people, scientific research, you name it. The one thing they all have in common is that they can move through space (often at many times the speed of light) and support a living pilot or crew in the process.

Space vehicles are discussed further in Chapter Five.

Water Vehicles

Water vehicles are vessels designed to move on or under the water. They come in three types, based on how the user propels them through the water:

Rowed (biremes and triremes, rowboats, knarrs, fantasy slave galleys, canoes)

Wind-Powered (sailboats, racing yachts, clipper ships, galleons)

Motorized (speedboats, luxury yachts, modern military ships, submarines)

Of course, a given boat or ship may use more than one method of propulsion. Many types of ships, such as Viking longships or Greek biremes, had oars for use in battle or when the wind died down, and sails for times when they could harness the power of the wind to speed their journey. A modern sailboat may have a motor for emergencies.

Chapter Three discusses water vehicles.

Miscellaneous Vehicles

Last but not least, a few vehicles don't fit into any of the categories listed above. Most of these are vehicles from the diverse realms of science fiction, such as time machines and dimensional vehicles, both of which Chapter Five discusses. It also includes some unusual "vehicles" such as powered armor suits (see page 83), and some vehicles equally at home in multiple environments.

When Is A Vehicle Not A Vehicle?

In some campaigns, things exist which look like, and maybe even act like, vehicles. But that doesn't necessarily mean you should build them using the Vehicle rules. When considering how to build a "vehicle," you may want to think about the following issues.

IS IT A FOCUS?

While some Vehicle equipment is built using the Limitation *Focus* (see page 29), Vehicles themselves are not Foci, and typically cannot take that Limitation for things such as their Characteristics or modes of movement. But in some games, it's possible, with the GM's permission, to build things like powered armor (which is often represented as an OIF) using the Vehicle rules.

As a good rule of thumb, a device that moves under its own power, which can be and routinely is attacked separately from the character in combat, and which if attacked combat only takes BODY damage, is a Vehicle, not a Focus. A device that augments or adds to a character's personal movement, and/or which generally cannot be attacked separately from the character using it, is probably a Focus. That's why most powered armor suits are built as OIFs (or using OIHID), not as Vehicles — they're "personal" to the character, usually don't take damage even when the character wearing them does, and generally don't behave the way vehicles do.

IS IT A LIVING BEING?

It's certainly possible to build Vehicles which are self-aware (perhaps because they have a built-in AI Computer), or even actually alive. The text under INT And EGO, below, discusses some of these possibilities. However, in some cases it may make more sense to design such a "vehicle" as an Automaton or a normal character (an NPC), with the full range of Characteristics. By consulting the Expanded Vehicle Size Table and using the rules for large characters (*Hero System Bestiary*, pages 20 and 26; or *Star Hero*, pages 30 and 63), you can build a "living vessel" large enough to carry many other, normal-sized, characters using the normal character creation rules instead of the Vehicle creation rules. This may require the GM to make a few adjustments in combat and other situations, perhaps treating the living vessel more like a mount (*Hero System 5th Edition, Revised*, page 368) than a Vehicle. As a general guideline, if the "vehicle" is sufficiently organic to take STUN damage from attacks, it's probably best built as a character, not a Vehicle.



VEHICLE CHARACTERISTICS



When you create a Vehicle, the first step is to determine what Characteristics it has and buy them to the level you want. Vehicles may, with the GM's permission, sell back Characteristics (to, for example, represent a Vehicle that's weaker or more fragile than normal).

The minimum cost of any Vehicle, no matter what its Characteristics, equipment, or Disadvantages, is 1 Character Point.

Standard Vehicle Characteristics

SIZE

Size represents a Vehicle's dimensions (length and width) and mass. As Size increases, so does the Vehicle's BODY and STR. This means the Vehicle is harder to disable and can carry more weight. Also, since passengers take up space, a larger Vehicle can carry more passengers than a smaller one. On the other hand, the larger a Vehicle, the easier it is to hit in combat.

The accompanying Expanded Vehicle Size Table lists the categories of Size and the attributes of each. For ease of reference, Size is referred to by a category number (0, 1, 2, 3, and so on). Making a Vehicle Size 0 costs no Character Points; each category above that (*i.e.*, each step down the Expanded Vehicle Size Table) costs 5 Character Points.

Dimensions

The dimensions (Length, Width, and Area) in the Expanded Vehicle Size Table are guidelines. Few vehicles fit the listed dimensions exactly. When you're designing a vehicle that doesn't fit all the dimensions of a Size category with reasonable precision, choose the Size category based either on the vehicle's most prominent dimension (typically Length) or its mass.

If appropriate, you can choose a Size category for a vehicle as a "special effect" of its size, configuration, mass, or other aspects, but then redefine some of those attributes to better suit the vehicle you have in mind. As long as you don't change the game effects you're paying for (the DCV modifier, Knockback modifier, STR, and BODY), how you define the Vehicle's Size-related attributes usually doesn't matter (provided you remain relatively "realistic," and you keep the special effect in mind).

For example, many aircraft carriers are Size 22 — about 320 meters (160") long. However, the mass for Size 22, 400 kilotons, is far too high for such a vehicle; most aircraft carriers mass in the 50-90 kiloton range. As long as you retain the modifiers, STR, and BODY for Size 22, you can define your aircraft carrier as only having a mass of, say, 85,000 tons.

In that same spirit, remember that the "Example" vehicles in this book are just that — examples. Many different types of Vehicles fit into each Size category, and many Vehicles come in multiple Sizes. If you want to create a smaller aircraft carrier or a larger Lear jet, go right ahead. Similarly, many real-world vehicles don't fit neatly into the pigeonholes of the *Hero System*; where appropriate, real-world dimensions and performance data are listed for vehicles, and gamers more interested in "realism" can use them instead of the parameters listed on the character sheet.

Height And Volume

For some Vehicles, such as mecha, the Length dimension really equals height. This requires no changes in the rules; it's just a matter of "re-orienting" the Vehicle for game play.

The Expanded Size Table does not list a height or volume for Vehicles in each Size category. In most cases GMs can simply let characters choose the most appropriate height and volume for their Vehicles, provided they choose responsibly and fairly. For GMs desiring stricter accounting, a Vehicle's height (or depth, for vehicles like mecha) equals its Width or 1", whichever is greater. If necessary, from this you can calculate the vehicle's volume.

VEHICLE CHARACTERISTICS

Characteristic	Starting Value	Cost
Size	0	5 (see Expanded Vehicle Size Table)
STR	10	1
DEX	10	3
BODY	10	1
DEF	2	3
SPD	1 + (DEX/10)	10
Movement	6" Ground Movement (12" Noncombat) 2" Swimming (4" Noncombat)	See Vehicle Movement Table
Optional Characteristic	Starting Value	Cost
INT	10	1
EGO	10	2
PRE	0 (see text)	1
COM	0	½

EXPANDED VEHICLE SIZE TABLE

Cost	Size Category	Length (hexes)	Width (hexes)	Area (hexes)	Mass	DCV	STR	KB	BODY	Example
0	0	1 or less	.5 or less	.5 or less	100 kg or less	0	10	0	10	Bicycle
5	1	1.25	.64	.8	200 kg	0	15	-1	11	Motorcycle
10	2	1.6	.8	1.25	400 kg	-1	20	-2	12	Chariot
15	3	2	1	2	800 kg	-2	25	-3	13	Sportscar, stagecoach
20	4	2.5	1.25	3.2	1.6 ton	-2	30	-4	14	Four-door automobile
25	5	3.2	1.6	5	3.2 ton	-3	35	-5	15	Limousine, IFV
30	6	4	2	8	6.4 ton	-4	40	-6	16	Tank
35	7	5	2.5	12.5	12.5 ton	-4	45	-7	17	School bus
40	8	6.4	3.2	20	25 ton	-5	50	-8	18	Attack helicopter, Lear jet
45	9	8	4	32	50 ton	-6	55	-9	19	Locomotive, jet fighter
50	10	10	5	50	100 ton	-6	60	-10	20	Large cargo plane
55	11	12.5	6.4	80	200 ton	-7	65	-11	21	ICBM
60	12	16	8	125	400 ton	-8	70	-12	22	Trawler, trireme
65	13	20	10	200	800 ton	-8	75	-13	23	Cutter, longship
70	14	25	12.5	320	1.6 kton	-9	80	-14	24	Freighter
75	15	32	16	500	3.2 kton	-10	85	-15	25	Jetliner (e.g., Boeing 747)
80	16	40	20	800	6.4 kton	-10	90	-16	26	
85	17	50	25	1,250	12.5 kton	-11	95	-17	27	Cruiser
90	18	64	32	2,000	25 kton	-12	100	-18	28	Frigate, airship
95	19	80	40	3,200	50 kton	-12	105	-19	29	Destroyer
100	20	100	50	5,000	100 kton	-13	110	-20	30	
105	21	125	64	8,000	200 kton	-14	115	-21	31	Cruise ship, the <i>Hindenburg</i>
110	22	160	80	12,500	400 kton	-14	120	-22	32	Aircraft carrier
115	23	200	100	20,000	800 kton	-15	125	-23	33	
120	24	250	125	32,000	1.6 mton	-16	130	-24	34	
125	25	320	160	50,000	3.2 mton	-16	135	-25	35	
130	26	400	200	80,000	6.4 mton	-17	140	-26	36	
135	27	500	250	125,000	12.5 mton	-18	145	-27	37	
140	28	640	320	200,000	25 mton	-18	150	-28	38	
145	29	800	400	320,000	50 mton	-19	155	-29	39	
150	30	1,000	500	500,000	100 mton	-20	160	-30	40	
155	31	1,250	640	800,000	200 mton	-20	165	-31	41	
160	32	1,600	800	1.25 million	400 mton	-20	170	-32	42	
165	33	2,000	1,000	2 million	800 mton	-21	175	-33	43	
170	34	2,500	1,250	3.2 million	1.6 gton	-22	180	-34	44	
175	35	3,200	1,600	5 million	3.2 gton	-22	185	-35	45	
180	36	4,000	2,000	8 million	6.4 gton	-23	190	-36	46	
185	37	5,000	2,500	12.5 million	12.5 gton	-24	195	-37	47	
190	38	6,400	3,200	20 million	25 gton	-24	200	-38	48	
195	39	8,000	4,000	32 million	50 gton	-25	205	-39	49	
200	40	10,000	5,000	50 million	100 gton	-26	210	-40	50	
205	41	12,500	6,400	80 million	200 gton	-26	215	-41	51	
210	42	16,000	8,000	125 million	400 gton	-27	220	-42	52	
215	43	20,000	10,000	200 million	800 gton	-28	225	-43	53	
220	44	25,000	12,500	320 million	1.6 tton	-28	230	-44	54	
225	45	32,000	16,000	500 million	3.2 tton	-29	235	-45	55	
230	46	40,000	20,000	800 million	6.4 tton	-30	240	-46	56	
235	47	50,000	25,000	1.25 billion	12.5 tton	-30	245	-47	57	
240	48	64,000	32,000	2 billion	25 tton	-31	250	-48	58	
245	49	80,000	40,000	3.2 billion	50 tton	-32	255	-49	59	
250	50	100,000	50,000	5 billion	100 tton	-32	260	-50	60	
255	51	125,000	64,000	8 billion	200 tton	-33	265	-51	61	
260	52	160,000	80,000	12.5 billion	400 tton	-34	270	-52	62	
265	53	200,000	100,000	20 billion	800 tton	-34	275	-53	63	
270	54	250,000	125,000	32 billion	1.6 pton	-35	280	-54	64	
275	55	320,000	160,000	50 billion	3.2 pton	-36	285	-55	65	
280	56	400,000	200,000	80 billion	6.4 pton	-36	290	-56	66	
285	57	500,000	250,000	125 billion	12.5 pton	-37	295	-57	67	
290	58	640,000	320,000	200 billion	25 pton	-38	300	-58	68	
295	59	800,000	400,000	320 billion	50 pton	-38	305	-59	69	
300	60	1 million	500,000	500 billion	100 pton	-39	310	-60	70	

...and so on

kton: kiloton (1,000 metric tons)
 gton: gigaton (1 billion metric tons)
 pton: petaton (1 quadrillion metric tons)

mton: megaton (1 million metric tons)
 tton: teraton (1 trillion metric tons)

The Knockback Modifier

The listed Knockback modifier derives from a Vehicle's mass, bulk, and configuration. For ease of game play, most GMs keep it the same whether the Vehicle is empty or fully loaded with cargo and passenger. However, realistically, a loaded vehicle is heavier than an empty one, and therefore should take even less Knockback. At the GM's option, he can compare the weight of a Vehicle's load of people and objects to the masses listed on the Expanded Vehicle Size Table, and then add the appropriate Knockback modifier for that much mass to the Vehicle's existing Knockback modifier.

Size 0

Size 0 covers any Vehicle up to 1" x .5" (normal Human height, for game purposes). A character who wants a particularly small Vehicle — such as a skateboard — just defines the dimensions as whatever's most appropriate within the Size 0 range.

Vehicles smaller than human size (1") must take the *Does Not Protect Occupants* form of the *Limited Coverage* Limitation for their DEF (see below), unless they're built for and used by proportionately smaller beings.

Size As A Power

With the GM's permission, characters can buy Size as a Power using the *Characteristics Power* (*Hero System 5th Edition, Revised*, page 139). For example, if a character wanted to create a dimensionally-engineered vehicle that's bigger on the inside than on the outside, the GM might let him simulate that by purchasing extra Size with the *Invisible Power Effects* Advantage (and possibly the *No Figured Characteristics* Limitation).

Passengers And Cargo

A vehicle's STR allows it to carry passengers and/or cargo in amounts defined by the Strength Table (*Hero System 5th Edition, Revised*, page 34). The rules do not provide for any specific calculation of volume of cargo space (or for the volume occupied by any particular device, system, or vehicle feature). If you want, as a rough guideline, assume half of a Vehicle's interior space is suitable for passengers and/or cargo. The proportion of passengers to cargo is up to the designer.

At the GM's option, a Vehicle can increase its space suitable for passengers and cargo by purchasing extra Size with the Limitations *Only For Passenger/Cargo Space* (-0) and *No Figured Characteristics* (-½). The latter Limitation means the Vehicle gets no extra BODY or STR from its Size (or PRE, if the GM uses that Characteristic for Vehicles), but does gain mass and suffer the DCV and Knockback modifiers for its greater size.

STRENGTH

This represents the lifting STR of the vehicle; it indicates how much the vehicle can carry (in addition to its own mass). The base STR for a vehicle is 10; this increases automatically as the vehicle's Size increases. Vehicles can also buy STR separately, to reflect an especially powerful vehicle

(such as, say, a tugboat). STR bought independently costs 1 Character Point per point of STR.

Vehicles do not pay END for their base STR from Size, or for STR bought as a Characteristic; it automatically costs no END to use. However, if a Vehicle buys extra STR as a Power, it must pay END for the STR, or apply the *Reduced Endurance* Advantage.

Vehicles do not acquire any free inches of Leaping (or other forms of movement) from their STR; they start with the amount of movement indicated on the Vehicle Movement Table (see page 14). Vehicles cannot use their STR to throw things, pick things up by themselves, or the like unless they have appropriate equipment allowing them to do so (such as Extra Limbs). However, a Vehicle can do its STR damage to targets by ramming or sideswiping them (see page 186).

How Much STR Should A Vehicle Have?

Most Vehicles do fine with just the STR provided by their Size — in fact, some may even sell back a little STR because they don't need that much carrying capacity. However, Vehicles designed to move lots of heavy cargo, like dump trucks or star freighters, usually buy at least a little extra STR. The same goes for heavily armored vehicles like tanks; a few additional points of STR represents the sturdiness and power they need for such a load.

Since STR affects damage in HTH Combat, Vehicles that do a lot of ramming and sideswiping sometimes also buy up their STR. However, in many cases you can better represent that sort of vehicle by buying Hand-To-Hand Attack, possibly with Limitations like *Only For Use With Move Throughs* (-1).

Overloading

Vehicle STR can lift exactly as much as character STR (see page 34 of the *Hero System 5th Edition, Revised*). As described on page 185, Encumbrance rules apply and may slow down heavily-laden vehicles. Vehicles cannot Push their STR.

Generally, a vehicle loaded with more weight than its STR can lift cannot move. However, the GM should allow two exceptions to this. First, special rules may apply in the case of bicycles and other Vehicles powered by the operator's muscles (see page ???); otherwise, the weight of the rider himself might make the Vehicle useless. Second, the GM might, in emergency situations, allow a character to overload a vehicle and still move it. In this case, the vehicle can carry 10% extra weight for every point by which the operator makes his Combat Driving/Piloting roll. However, each 10% imposes a -1 penalty to all Control Rolls, and reduces the vehicle's rate of movement by -3" (in addition to the -8" from being fully Encumbered).

DEXTERITY

A Vehicle's DEX represents its intrinsic handling ability and maneuverability — thus, a fighter plane has a higher DEX than a bulldozer. DEX typically comes into play in combat, to determine CV; see Chapter Eight for more information.

How Much DEX Should A Vehicle Have?

Most vehicles aren't designed for truly high degrees of maneuverability, so they stick with DEX 10. However, the sorts of cars, boats, and planes player characters like to operate usually do need lots of agility, grace, and combat ability, so they have increased DEXs. A DEX of 14-18 is pretty good for most souped-up cars, while 19-23 is the realm of advanced sportscars and racing vehicles. Speedboats are about the same. Aircraft and spacecraft are usually a little higher on the DEX scale, but not much.

It's also a good idea to consider a Vehicle's role in combat when buying its DEX. Combat-oriented vehicles, like jetfighters and battlebikes, need high DEXs so they have a better chance of succeeding with (or avoiding) attacks. Since a Vehicle's CV derives from the lower of its or its operator's DEX, a character designing his own Vehicle is probably going to want to make its DEX at least equal to his own.

BODY

BODY indicates the structural integrity of the vehicle — how much damage it can take before it falls apart. A Vehicle's base BODY depends on its Size; it can buy more BODY independently, at the cost of 1 Character Point per point of BODY.

A Vehicle reduced to 0 BODY cannot move or function, but is not yet fully destroyed — it can be repaired. A Vehicle reduced to negative its own BODY is destroyed ("totaled"), and cannot be repaired. However, at the GM's option, characters can salvage a few parts or some scrap metal. A Vehicle reduced to negative twice its BODY (for example, -20 for a Vehicle with 10 BODY) is smashed into so many little pieces it lacks any salvage value. See Chapter Eight for more information about damaging and destroying Vehicles.

A Vehicle's BODY does not apply throughout it with regard to features such as walls. Instead, use the wall rules on page 449 of the *Hero System 5th Edition, Revised*. For example, a metal Vehicle with 25 BODY does not have interior walls with 25 BODY — its interior walls (32mm thick each) have 7 BODY.

If appropriate, characters may apply the *Partial Coverage* Limitation (page 31) to BODY. This would allow characters to, for example, make one room on a large submarine extra-sturdy (a vault, perhaps).

How Much BODY Should A Vehicle Have?

A Vehicle's BODY depends first and foremost on its Size, but there's a lot to consider beyond that. The first is the sturdiness you envision your Vehicle having. A car that's been "ruggedized" for lots of off-road use, or combat duty, has more BODY because it's built to hold together better under stressful conditions.

The second is what the Vehicle's made of, and how much. In order from weakest to strongest types of materials, most vehicles are made of wood, metal, or advanced plastics and polymers. However, you should also consider the thickness and temper of the material, how well the Vehicle is braced internally, and so forth. A dinghy's thin wooden hull is pretty fragile (BODY 10 from Size, at most, and no more), but the thick, solid timbers of a man-o'-war's hull and interior walls make it tougher than most wooden vehicles (BODY 22 — 19 from Size, +3 for its general resistance to damage).

For information on the BODY of various discrete parts of a Vehicle, see page 188.

DEFENSE

DEF is the defense of the vehicle; it functions as both PD and ED and is Resistant. A Vehicle begins with 2 DEF; characters can increase this by +1 DEF for 3 points (the same as buying +1 PD/+1 ED Armor).

A Vehicle's DEF has Force Wall-like properties, in that an attack whose BODY damage does not penetrate the Vehicle's DEF (its frame, hull, or what have you) does not affect the passengers or contents of the Vehicle (collision damage is an exception). See page 188 for more information.

A Vehicle's DEF applies throughout it with regard to features such as walls. For example, if a starship has DEF 10, then all the walls in the interior of the starship have DEF 10, too. If you want a Vehicle's hull or frame to have more DEF than its interior walls, you can buy extra DEF with the *Hull/Frame Only* version of the *Limited Coverage* Limitation (see below).

How Much DEF Should A Vehicle Have?

To determine the appropriate DEF for a Vehicle, you should consider two factors: what it's made of; and what uses it's built for.

First and foremost, look at what the Vehicle's body consists of, and how thick or sturdy those materials are. Wooden vehicles tend to have fairly low DEF (2-3, usually), but a warship of the Age of Sail has a strong hull made of thick, well-seasoned



timber (DEF 4-6, typically). The next step up from wood is metal; vehicles with relatively thin metal frames (like most automobiles and many airplanes) have DEF 2-4. If the vehicle's powerful enough that you can layer on plates of tough metals like steel, titanium, or depleted uranium, DEF can rise into the 20s and 30s. Plastics, polymers, and ceramics are as tough as metal, or even tougher, and usually lighter weight to boot.

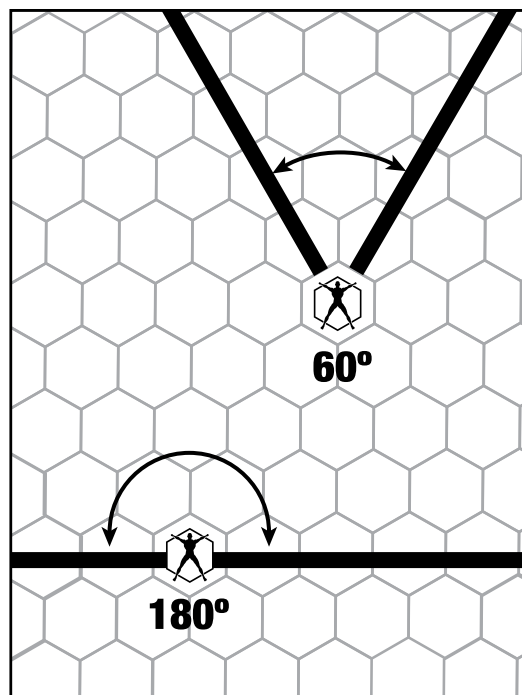
Since vehicular frames and hulls are similar to walls, you may want to take a look at the Wall BODY and Materials Defense Tables on pages 448-89 of the *Hero System 5th Edition, Revised*. Their guidelines can show you what's "plausible" for different materials.

Realistically, applying armor increases a vehicle's weight tremendously, so if you want to at least nod in the direction of "realism," you should take that into account. A Vehicle that needs to fly in an atmosphere or float in water can't have as much armor as a ground vehicle or spacecraft, since all that extra weight makes it hard to remain aloft/afloat. You should consider buying less DEF, or perhaps applying the *Limited Maneuverability* Limitation to the Vehicle's movement to represent the "sluggishness" caused by having to move so much mass around all the time.

Defense Limitations

Characters can apply the following Limitations to a Vehicle's DEF:

Limited Coverage (-0 to -1½): DEF normally protects all parts of the Vehicle, but a character can buy DEF that only protects the Vehicle from attacks from a certain direction. The value of the Limitation, which applies only to the DEF in the limited area, depends on the size of the area protected, whether the DEF protects the



LIMITED COVERAGE TABLE

Coverage Protects	Limitation
0 Degrees (less than one hex worth of space on the Vehicle)	-1½
1-60 Degrees (one hex side)	-1
61-180 Degrees (3 consecutive hex sides)	-½
181-300 Degrees (5 consecutive hex sides)	-¼
Nearly 360 Degrees (all but a small defined section of the Vehicle)	-0
Hull/Frame Only	-¼
Only on the same horizontal Level	¼ more Limitation
Protection For Occupants	Limitation
Coverage does not protect occupants (e.g., motorcycle, skateboard)	½ more Limitation
Coverage does not protect some occupants (e.g., sailing ship)	¼ more Limitation

operator and occupants, and other factors (see accompanying table). You may apply all appropriate aspects of the Limitation; for example, if a Vehicle has DEF that only covers 60 Degrees and also does not protect the occupants, the Limitation is worth (-1 plus -½) -1½.

DEF with the "Does Not Protect Occupants" form of this Limitation does not protect the people riding in the Vehicle. It's commonly applied to vehicles like motorcycles, skateboards, and rafts. If a Vehicle is smaller than a human, it must take this Limitation, unless the GM rules otherwise. Some Vehicles, such as double-decker buses and ships, sometimes protect their occupants, and sometimes not, based on the location of the character in the Vehicle in relation to the attack. To simulate this, take the Limitation at the -¼ level.

Technically, the proper way to buy Limited DEF for all of a Vehicle's DEF would be to sell back a Vehicle's natural DEF and then buy the DEF again as a Power with a Limitation (since Characteristics by themselves generally can't be Limited). However, for ease of reference and game play, the GM can allow Vehicle designers to apply the Limitation to whatever DEF they purchase for a Vehicle, then have it apply to all of the Vehicle's DEF. (The sample Vehicles in this book are built this way.)

Example: *The Star Empire builds some fighters. Overall, Imperial Fighters have DEF 4, but the designers want some extra DEF on the front of the vehicle. They buy +4 DEF (12 Active Points), Limited Coverage (60 Degrees on front of vehicle; -1) (total cost: 6 points).*

Partial Coverage: This Limitation often applies to DEF when Vehicles buy it to protect specific devices or systems; otherwise use Limited Coverage, above. See page 31.

Personal Defense (-¼): This Limitation signifies DEF that is so close to, or interrelated with, a Vehicle's operator and passengers that it loses the "Force Wall-like aspects" discussed above. Instead, it functions like personal defenses — any attack aimed at the passenger(s) adds the Vehicle's DEF to the target's own defenses and applies them to

the damage in the usual fashion. This Limitation is used for powered armor suits built as Vehicles, Vehicles to which the operator is neurologically linked, and the like.

Transparency And Openings

Normally, DEF is opaque; characters can't see through it, but neither can their enemies. With the GM's permission, a character may define some or all of a Vehicle's DEF as transparent. This allows for the creation of things like windshields and windows — Vehicle occupants can see out, outsiders can see in. This may expose the occupants to Sight Group Flash attacks and the like.

Regardless of how it's defined, for game purposes a transparent section of DEF provides the same defense as the rest of the Vehicle's DEF. For some Vehicles, such as ordinary automobiles, this may not make much sense; a car's glass windshield usually isn't as protective as its metal doors. To represent this, apply the *Limited Coverage* Limitation (typically at the $-\frac{1}{4}$ or -0 level, since most of the Vehicle remains protected). Attacks from the unprotected angle can affect the Vehicle — or, more likely, the interior of the Vehicle — without suffering any reduction in effect.

Alternately, a Vehicle may have an overall amount of DEF that applies to the entire Vehicle, with heavier armor for all but one section bought with the *Limited Coverage* Limitation.

Retractable Armor

Some fictional vehicles have sheets of armor they can raise and lower to protect a weak point (such as the windshield, the passenger compartment, or the tires), or which they activate in

combat but ordinarily keep “turned off” so the vehicle looks normal. To simulate this, buy DEF with the *Nonpersistent* and *Visible* Limitations. That means others can see it as it activates and when it's “up,” and that it takes a Zero-Phase Action to activate. The *Extra Time* Limitation is often applied so that it takes a Half Phase or Full Phase to activate. The *Limited Coverage* Limitation (page 12) is appropriate for retractable armor that only protects part of a Vehicle.

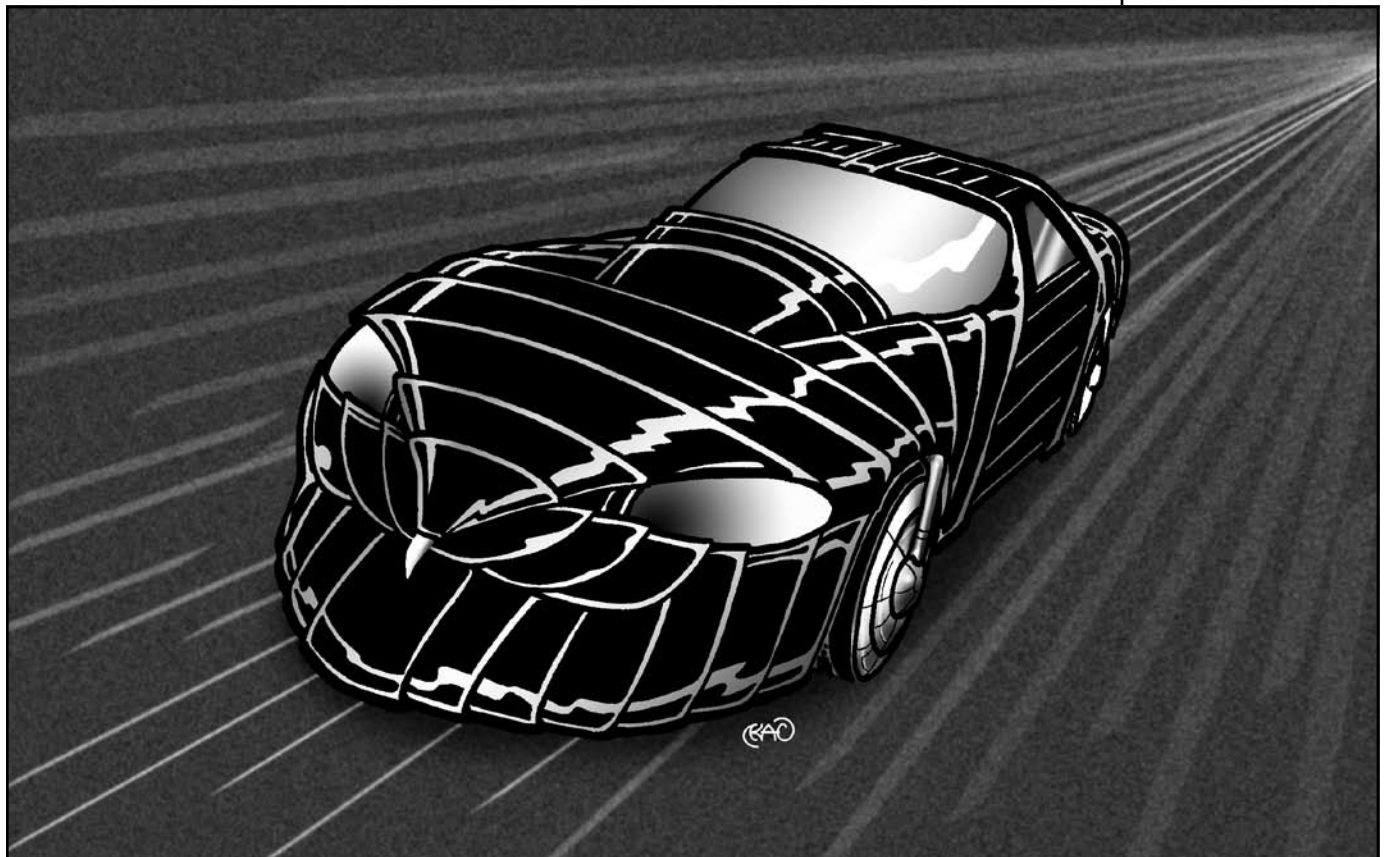
SPEED

Vehicles have SPD, just like characters. A Vehicle's SPD controls how often it moves (not how fast) and how often the driver can adjust its direction. Responsive vehicles, like sportscars, have a higher SPD than vehicles such as dump trucks or station wagons. A Vehicle can have a SPD higher than its driver's SPD; in this case the vehicle is “too responsive,” so the driver can't use it to its fullest potential (see pages 171-72).

How Much SPD Should A Vehicle Have?

When determining the SPD for your Vehicle, you need to consider two things: how fast you want it to move; and how you want it to function in combat.

For Vehicles, SPD primarily determines how fast they can move over the long term. From Phase to Phase and Turn to Turn, what matters is the inches of movement the Vehicle has — but if you want to know how many miles per hour it can go, you have to consider its SPD. If you're converting a real-world vehicle for your game, you can determine how to buy its movement this way:



1. Multiply its miles per hour velocity by 804.5 (the number of inches in a mile).
2. Divide the result by 60 to determine how many inches it has to move per minute to attain that speed.
3. Divide that result by 5 to determine how many inches it has to move per Turn to attain that speed.

Once you know the inches per Turn, you can decide how best to allocate movement and SPD. For example, if a Vehicle can move at 240" per Turn (90 miles an hour), it would need to have 60" movement if it's SPD 4, 80" movement if it's SPD 3, and 120" movement if it's SPD 2. Don't forget to allow for Noncombat movement; a vehicle's top speed indicates its maximum of Noncombat velocity. Thus, a SPD 4 Vehicle that moves 240" per Turn needs 30" of movement with a regular x2 Noncombat multiplier, or 15" with a x4 Noncombat multiplier.

Second, the character should consider whether he intends to use the Vehicle in combat. Everyday Vehicles do fine with a SPD of 2, or 3 at the most. Combat- or speed-oriented Vehicles need higher SPDs so they can act and attack more often, react to the actions of their opponents, and so forth. A SPD of 3 is usually the minimum, and 4 isn't uncommon for high-performance vehicles or combat craft. A SPD of 5-6 is pretty rare, but not unheard of; SPDs beyond 6 are highly unusual for Vehicles.

MOVEMENT

This is the vehicle's actual movement capability. All Vehicles begin with 6" Ground Movement (Running) and 2" Swimming. Vehicles which shouldn't have Ground Movement (such as some watercraft) or Swimming (such as most spacecraft) can sell back those modes of movement. In addition to the normal modes of movement associated with real-world vehicles (such as Ground Movement, Swimming, and Flight), Vehicles can have unusual modes of movement like Extra-Dimensional Movement and FTL Travel, and movement-related Powers such as Clinging.

Vehicles can buy additional inches and/or modes of movement at the costs specified in the accompanying Vehicle Movement Table (which are the same as those in the Powers section of the 5th Edition, Revised rulebook).

VEHICLE MOVEMENT TABLE

Movement Mode	Cost/1"	Base
Ground Movement	2 points	6"
Flight	2 points	0"
Swimming	1 point	2"
Gliding	1 point	0"
Leaping	1 point	0"
Swinging	1 point	0"
Teleportation	2 points	0"
Tunneling	5 points	0"
Extra-Dimensional Movement	N/A — 20 points	
FTL Travel	N/A — 10 points	
Clinging	N/A — 10 points	

All Vehicle movement that can be used at Noncombat velocities has a x2 Noncombat Movement multiplier for free — in other words, a Vehicle can travel twice as fast if it travels at Noncombat velocities. You can double a Vehicle's Noncombat Movement for +5 Character Points.

Example: *Defender builds a gyrocopter. He buys 10" of Flight for 20 points, which means his gyrocopter automatically can move at 20" per Phase Noncombat. He then spends +10 points for an additional x4 Noncombat Movement multiple. The final Noncombat Movement multiple is x8, so the gyrocopter can fly 80" per Phase when flying at Noncombat velocities.*

Vehicles do not pay END for their movement; all Vehicle movement automatically has a 0 END cost. However, many take the *Costs Endurance* Limitation for their movement, to simulate power plants, fuel systems, and the like.

Vehicles typically may not take a *Focus* Limitation for their movement unless the GM specifically gives permission, any more than characters can take such a Limitation because they use legs to walk. However, if the equipment that moves a Vehicle is frequently targeted by attackers, or easily removed from the Vehicle in some way — like tires on a car or sails on a ship — applying *Focus* may be appropriate.

All Vehicles, even those using Ground Movement, have a Turn Mode when turning, just like characters with Flight in personal combat. See page 367 of the *Hero System 5th Edition, Revised* for more information about Turn Modes.

Individual modes of movement are discussed in greater detail in the chapters most appropriate for them: Ground Movement in Chapter Two; Swimming in Chapter Three; Flight in Chapters Four and Five, and so on.

How Much Movement Should A Vehicle Have?

A Vehicle's inches of movement dictate how fast it can go, so the best way to determine how much movement you should buy is to decide what the Vehicle's top speed is. Knowing that and the Vehicle's SPD, you can easily determine how many inches of movement to buy using the formulas discussed under *How Much SPD Should A Vehicle Have*, above.

Most Vehicles do fine with a standard x2 Noncombat multiple. High-performance and combat-oriented Vehicles usually have x4, and sometimes even x8. Vehicles designed primarily with speed in mind may have x8 Noncombat, or more.

In addition to considering the question of Noncombat multiples, a Vehicle designer should also consider whether applying the *MegaScale* Advantage to movement would work better instead. This can allow for tremendous velocities for relatively cheap costs, but does come with some restrictions. Vehicles designed primarily to travel long distances quickly could definitely benefit from *MegaScaling*; Vehicles that need more combat efficiency may prefer to buy more raw inches of movement and apply lots of Noncombat multiples instead.

LIMITED MANEUVERABILITY


Value	Effect
-¼	Only 2 turns per Phase at Combat speed; only 1 turn per Phase at Non-combat speed
-½	Only 1 turn per Phase at Combat speed; only 1 turn per Turn at Non-combat speed
-¾	Only 1 turn per Turn at Combat speed; only 1 turn per Minute at Noncombat speed
-1	Only 1 turn per Minute at Combat speed; only 1 turn per 5 Minutes at Noncombat speed
-1¼	Only 1 turn per 5 Minutes at Combat speed; only 1 turn per 20 Minutes at Noncombat speed
...and so on	

Movement Advantages

The following Advantages apply to Vehicle movement generally; for mode-specific Limitations, see Chapters Two through Six. A Vehicle with the *Limited Maneuverability* Limitation cannot take any of them for the mode(s) of movement that Limitation applies to.

Full Reverse (+¼): Except for flying Vehicles with the *Stall Velocity* Limitation (page 71), all Vehicles can travel backwards (*i.e.*, move in reverse) with all their modes of movement. A Vehicle traveling backwards is at ½ DCV, and cannot use its Non-combat Movement. A Vehicle that applies this +¼ Advantage to a mode of movement can use it to move backwards at Combat Movement velocity at full DCV, or at Noncombat Movement velocity (not both at the same time).

A Vehicle can apply this Advantage to only part of a mode of movement. In that case, the Vehicle is only at full DCV up to the velocity with the Advantage; once it exceeds that velocity with its Combat Movement while moving backwards, it loses the Advantage's benefits.

No Turn Mode (+¼):  Normally, all movement forms on Vehicles (including Running) have a Turn Mode. A Vehicle with this +¼ Advantage on a form of movement does not have a Turn Mode with that form; it can turn and maneuver freely. This simulates Ground Movement based on legs, the agility of certain helicopters and hovercraft, and the like. It's not an appropriate Advantage for most Vehicles or special effects of vehicular movement, so the GM should monitor and regulate its use carefully. He should be even warier of letting characters with innate Movement Powers buy it for their own forms of movement.

Sideways Maneuverability (+¼, +½): Normally, a mode of movement only allows a Vehicle to move in two directions, forward and reverse. (If it's a three-dimensional mode, such as Flight or Swimming, and it doesn't have a Stall Velocity, it also lets the vehicle move straight up and down as well.) To change direction, the vehicle must turn, which involves changing facing as well as considerations

of Turn Mode. But when a Vehicle applies this Advantage to a Movement Power, it can use that mode of movement to move straight sideways as well (without changing its facing).

For a +¼ Advantage, the Vehicle can use its mode of movement to move straight sideways (*i.e.*, at a direct 90-degree angle to its present forward facing without turning). It can only make a Half Move while doing so, and is at ½ DCV. For a +½ Advantage, the Vehicle can make a Full Move when moving straight sideways, and maintains its full DCV while doing so. Regardless of the Advantage's value, sideways movement does not change the Vehicle's facing; it continues to face the direction it was moving before it initiated straight sideways movement. If the Vehicle wants to change its facing, it must turn using the normal Turn Mode rules.

Movement Limitations

The following Limitations apply to Vehicle movement generally; for mode-specific Limitations, see Chapters Two through Six.

Cannot Move Backwards (-¼): A Vehicle cannot use a mode of movement with this Limitation to move backwards at all. If it wants to move in that direction, it has to turn all the way around.

Difficult To Operate (-¼): When a mode of movement has this Limitation, any penalties to any Combat Driving/Piloting rolls are doubled.

Limited Maneuverability: Some vehicles are so unwieldy with one or more modes of movement that, regardless of their Turn Mode, they cannot turn around in a Phase. At its most basic (-¼) level, this Limitation means a Vehicle can only make a maximum of two equally spaced turns (instead of the three or more usually needed to turn around) over the course of a Phase while moving at Combat Movement speeds, and only one turn per Phase when moving at Noncombat Movement speeds. See the accompanying table for other values.

In addition to turning penalties, Vehicles with Limited Maneuverability (of any value) cannot perform Vehicle Maneuvers (page 178) or Dodge (page 185). The effects of Limited Maneuverability do not apply if the Vehicle uses a different mode of movement that lacks this Limitation (though most Vehicles with this Limitation apply it to all their modes of movement).

Vehicles with Limited Maneuverability cannot buy Movement Skill Levels without the GM's permission.

Optional Additional Vehicle Characteristics

In addition to the standard Vehicle Characteristics described above, GMs may allow Vehicles to have four others: INT, EGO, PRE, and COM.

INT AND EGO

Gamemasters may wish to allow Vehicles to have INT and/or EGO for two reasons.

First, Vehicles may be living, or if not living, artificially sentient. It may be easiest, and most



conducive to good game play, to represent this with vehicular INT and EGO rather than building a vehicle as an Automaton or full-fledged character.

Second, a Vehicle's INT (and possibly EGO) may represent a built-in computer or the like, thus saving you the trouble of creating and keeping track of another game element (a Computer). The Vehicle must still buy and run programs (using the rules for Computers), and its Skills (if any) could also constitute a form of "programming." Since this method may cost PCs significantly fewer Character Points than buying a Computer, GMs should only use it after due consideration.

Vehicles start with base INT and EGO of 10 each. INT costs 1 Character Point per 1 point; EGO costs 2 Character Points per 1 point. A Vehicle with INT or EGO is subject to Mental Powers that affect the Machine class of minds (see page 117 of the *Hero System 5th Edition, Revised*).

PRE

There's no question that some vehicles — particularly military ones — are impressive, or designed to elicit certain emotions (fear and/or respect) in those who see them. Gamemasters who want to represent this in game terms can allow Vehicles to have a PRE Characteristic. A Vehicle's PRE starts at 0 for Size 0, and goes up by +5 for every full three Size categories above that (thus, 5 PRE at Size 3, 10 PRE at Size 6, and so forth) (Vehicles do not get partial PRE bonuses for in-between categories, like Size 4 and Size 5). Characters can buy extra PRE for Vehicles, at the cost of 1 Character Point per 1 point of PRE.

Vehicles with PRE are not subject to Presence Attacks, though they may make them. Unlike regular Presence Attacks, this counts as an Attack Action, not an Action that takes no time. When a character uses his Vehicle in a manner designed to impress, startle, intimidate, or otherwise affect other persons, he makes a Presence Attack roll using the Vehicle's PRE. Use the standard Presence Attack tables to determine the targets' reaction.

Alternately, the GM may allow the Vehicle to add some of the effects of its PRE to a Presence Attack made by its operator (or perhaps a passenger). In this case, have the Vehicle make a Presence Roll. If the roll succeeds, the character gets +1d6 for his Presence Attack; for every additional 1 point by which the roll succeeds, the character gets another +1d6 (to the maximum of the Vehicle's PRE divided by 5). If the roll fails, the character adds nothing (at the GM's option, he may even lose a die or two).

COM

If Vehicles' appearance is important in a game, GMs may wish to allow them to have Comeliness. This might make sense in, for example, certain "cyberpunk" settings (where form is often more important than function), or for luxury vehicles. Vehicles start with a base COM of 0, and can buy it for ½ Character Point per point.

Gamemasters who don't want to give Vehicles COM scores can allow them to take "impressive appearance" or the like as a Distinctive Feature, if appropriate.

SKILLS



Vehicles typically have Skills for one or more of four reasons. First, a Skill may be programmed into a Computer that's an integral part of a Vehicle. For Vehicles with INT, Skills would be programmed into the Vehicle itself, so to speak, but the principle is the same. Similarly, if a vehicle is fully sentient or a living being, it might have Skills.

Second, a Skill may represent a dedicated computer, system, spell, or the like which gives a Vehicle an ability. For example, a "Combat Computer" might give a Vehicle several Autofire Skills, or a flying carpet might have Navigation (Air) due to the enchantments placed upon it. A Vehicle with rotating license plates and crystal-matrix paint that can switch colors might have Disguise.

Third, a Skill can represent some innate ability or capability of the Vehicle. For example, a Vehicle that handles really well in some situations might have innate bonuses to Combat Driving/Piloting or Skill Levels with a Limitation.

Fourth, large Vehicles (such as starships) may have laboratories or similar facilities defined with Skills. See page 468 of the *Hero System 5th Edition, Revised* for more information.

Regardless of these special effects and explanations, the GM may rule that some Skills are not appropriate for Vehicles, based on the campaign, common sense, or dramatic sense. For example, it's difficult to imagine buying Breakfall for most (if any) Vehicles. (But see page 106 regarding mecha.)

Here are some notes on possible applications of Skills to Vehicles. For the sake of simplicity, it refers to Vehicles "having" or "using" a Skill, even though it's often more likely that the Skill will be built into a Computer or a particular device than into a Vehicle itself. This section is not exhaustive, since many uses for vehicular Skills are obvious, and creative gamers may devise many other potential uses; it simply provides notes on some of the more unusual or intriguing applications. See also Chapter Seven regarding vehicular equipment generally, and Chapter Nine regarding Skills for Vehicle-oriented characters.

BACKGROUND SKILLS

If a Vehicle buys a Background Skill (typically as part of a laboratory on a large Vehicle), the Vehicle (lab) starts with a base Skill Roll of 11-, not the 9- that's standard for Characteristic-Based Skills (unless the Vehicle only buys an 8-Familiarity with the Skill).

ACROBATICS

With the GM's permission, an agile, fast-moving flying Vehicle could redefine this Skill as Aerobatics, using it to perform barrels rolls and other aerial "stunts" easily. It would serve as a Complementary Skill to Combat Piloting for Vehicle Maneuvers in some cases.

COMBAT DRIVING AND COMBAT PILOTING

It's not unheard of for a vehicle's operator to leave the driving/piloting to an autopilot or onboard computer while he does something else (such as operate a weapons system). A Vehicle with one of these Skills can drive/pilot itself while the operator takes another action. It can also make a Skill Roll as a Complementary Roll to assist the operator with his driving/piloting; this requires a Half Phase Action by the Vehicle.

Vehicles often buy bonuses to Combat Driving/Piloting that are limited to specific situations. For example, a car that handles really well at high speeds might have +4 to Combat Driving, Only For Making Handling Rolls At High Speeds (-1) (total cost: 4 points). This is highly appropriate, provided it's not done to counteract a penalty or negative modifier of some sort. In that case, use Penalty Skill Levels (see below). The GM determines what constitutes "counteracting" a penalty.

COMBAT SKILL LEVELS

Combat-oriented Vehicles often have Combat Skill Levels which they, their operators, passengers, and/or Computers can use in combat.

A 2-point CSL only applies to increase OCV with a single specific weapon or attack. It applies regardless of who makes the attack (the Vehicle itself, an operator, or a passenger). The weapon or attack must be defined when the CSL is bought, and cannot be changed thereafter. Each individual weapon or attack counts separately for these purposes, even if a Vehicle has multiple weapons of the same type. For example, if a Vehicle has both a forward laser cannon and a rear laser cannon, a 2-point CSL with Laser Cannons must be assigned to one or the other, and once assigned cannot be changed. It cannot apply to both, even though both are Laser Cannons.

A 3-point CSL can apply to up to three specific vehicular weapons or attacks. The weapons or attacks to which the Vehicle can apply the CSL must be defined when the CSL is bought, and cannot be changed thereafter. Each individual weapon or attack counts separately for these purposes, even if a Vehicle has multiple weapons of the same type. For example, if a Vehicle has twelve Heavy Machine Guns, and it buys a 3-point CSL, it

SKILL ENHANCERS

Neither Vehicles nor Computers may buy Skill Enhancers.

VEHICLE LOCKS

Worried about someone stealing your car or plane? Try these locks!

Standard Locks: Lockpicking 8-. Total cost: 1 point (Everyvehicle Equipment).

Basic Locks: Lockpicking 11-. Total cost: 7 points.

High Locks: Lockpicking 14-. Total cost: 13 points.

Advanced Locks: Lockpicking 17-. Total cost: 19 points.

Extremely Advanced Locks: Lockpicking 20-. Total cost: 25 points.

Ultra-Advanced Locks: Lockpicking 23-. Total cost: 31 points.

may define the CSL as usable with any three of the twelve Heavy Machine Guns — it cannot apply the CSL to any of the twelve guns, just to those three. A 3-point CSL applies regardless of who makes the attack (the Vehicle itself, an operator, or a passenger). A 3-point CSL may be used to increase OCV or to increase damage, but may not increase the Vehicle's DCV.

A 5-point CSL can apply to any vehicular Ranged weapons and attacks, or any vehicular HTH weapons and attacks. A normal 5-point CSL may be used to increase OCV or to increase damage, but may not increase the Vehicle's DCV. However, Vehicles may buy 5-point CSLs only to increase their DCV.

An 8-point CSL applies to all vehicular weapons, Ranged and HTH. An 8-point CSL may be used to increase OCV, increase DCV, or increase damage. (A 10-point Overall Level, if applied to combat, functions just like an 8-point CSL.)

Five- and 8-point CSLs can apply to any of the relevant attacks a Vehicle, its operator, and/or its passengers make using vehicular equipment. Whereas 2- and 3-point CSLs can only be used with the weapons/attacks they're assigned to when bought, the more expensive CSLs apply to a much broader range of vehicular attacks. Since this can make them extremely effective, the GM may wish to limit how many a Vehicle can have.

Example: *The Sword Of Orion, a powerful starship fielded by the Galactic Empire, mounts fifteen separate beam weapons and missile launchers. One of those weapons is its Plasma Keelcannon. It buys three 2-point CSLs with this weapon. Whenever anyone — the ship itself (via its computer) or any crewmember — fires the weapon, he gets +3 OCV.*

The Sword also has nine Plasma Blasters. It buys six 3-point CSLs with Plasma Blasters, defining two of them as working with each group of three blasters. Thus, every blaster on the ship, whenever used by anyone, could potentially have two CSLs applied to it to increase OCV or improve the damage done by the attack. However, these CSLs do not apply to the Plasma Keelcannon or the Sword's five missile launchers. Furthermore, only two CSLs can apply to each Blaster; the ship may not re-assign all six Levels to apply to a single Blaster — it can only assign the Levels to the weapons defined for them when they were purchased.

The Sword also purchases two 5-point CSLs with all Ranged Attacks. The ship can assign these CSLs to any Ranged attacks it makes.

Five- and 8-point CSLs may be bought with Advantages and Limitations, per the usual rules. Advantages are rarely appropriate, but the following Limitations often are: Activation Roll, Concentration, *Costs Endurance*, *Extra Time*, Focus, Incantations (pilot voice command), *Increased Endurance Cost*, and Requires A Skill Roll.

Because the rules don't allow characters to put Limitations on CSLs costing less than 5 points apiece, a Vehicle may find itself in a situation where it costs more to buy Limited CSLs with a particular attack than it would if it just bought less expensive CSLs — even though the cheaper CSLs are *less* restricted. In that case, the GM may, at his option, allow the Vehicle to buy the less expensive CSLs and treat them as if they were Limited, without actually applying the Limitation to them.

CONCEALMENT

Some Vehicles are designed to blend in well with the terrain they operate in — they're camouflaged, in other words. Vehicles can buy this as Concealment with the Limitations *Self Only* (-½) and *Only In Specific Environments/Situations* (-1; possibly less if terrain occurs frequently). If the Vehicle can change coloration (or the like) to adapt to a wide variety of environments or settings, the latter Limitation doesn't apply, though *Costs Endurance* might.

Hidden Compartments

Some vehicles have concealed compartments where the crew and passengers can hide things. You can buy this as Concealment with the *Self Only* and *Partial Coverage* Limitations. The Partial Coverage defines the size of the space (and thus what can fit within it); designers must take care not to make "hideyholes" too large, for the larger they are, the easier they usually are to detect (the unaccounted-for space tips off searchers). If a character wants multiple compartments for his Vehicle, he can apply the standard "+5 Character Points doubles the number of items of equipment" rule.

Because a hidden compartment is "separate" from the rest of the ship, it's usually best to buy it as a distinct use of Concealment, rather than simply buying bonuses to a ship's overall Concealment. Similarly, GMs may rule that some types of Skill Levels don't apply to the Concealment roll for hidden compartments.

DEFENSE MANEUVER

An agile or highly-maneuverable Vehicle might take this Skill, perhaps with the *Requires A Combat Driving/Piloting Roll* Limitation. Some Vehicles may be designed and built so that they have no clearly definable "back," making this Skill appropriate without any such Limitation.

DISGUISE

A Vehicle may take Disguise to reflect a limited ability to change its appearance — rotating license plates, alterable color scheme, or the like. However, GMs may prefer that Vehicles instead buy Shape Shift with Disguise as a Required Skill Roll (see page 27).

LOCKPICKING

Vehicles buy Lockpicking not to simulate their ability to pick locks, but to represent the difficulty of picking their own locks. Every vehicle has Lockpicking 8- as "Everyvehicle Equipment" to represent standard locks. If a Vehicle wants better locks than that, it buys them using the Power

Skills. When someone tries to pick the lock, he has to overcome the Vehicle's Lockpicking in a Skill Versus Skill Contest. (Alternately, the Vehicle may define its locks by taking Change Environment to impose penalties on thieves' Lockpicking.)

MARTIAL ARTS

Typically, Vehicles are not allowed to buy Martial Arts themselves. However, in some campaigns, characters can buy a Weapon Element (such as Use Art With Mecha) that allows them to use their Martial Arts with a Vehicle. See pages 106, 187.

MIMICRY

While Vehicles might take this Skill to allow their public address systems to mimic other voices, or with the GM's permission to make their engines sound different, typically Vehicles should buy such abilities using Shape Shift (see page 27).

NAVIGATION

It's not uncommon for a Vehicle to have this Skill. It often represents a navigational computer, an autopilot's navigational features, or a link to the Global Positioning System or similar systems. A living vehicle might be "navigationally attuned" in some way, just like birds can find their way along migration paths.

PENALTY SKILL LEVELS

Penalty Skill Levels have several applications for Vehicles.

First, Vehicles can buy them for their standard purpose of cancelling OCV penalties for things like attacking smaller targets (Size Skill Levels), attacking specific Hit Locations (Targeting Skill Levels), or overcoming the Range Modifier (Range Skill Levels). Range Skill Levels are particularly common for many combat-oriented vehicles. The 1½-point, 2-point, and 3-point PSLs correspond to the 2-point, 3-point, and 5-point CSLs, respectively, in terms of how they apply to vehicular combat.

Second, with the GM's permission, Vehicles can buy PSLs not to overcome OCV penalties, but to counteract Combat Driving/Piloting penalties for various conditions. For example, a car with special off-road suspension and tires might buy PSLs to counteract off-road driving penalties. A 2-point PSL applies to a single mode of movement; a 3-point PSL applies to all the vehicle's modes of movement, or allows the application of Limitations.

Because the rules don't allow characters to put Limitations on PSLs costing less than 3 points apiece, a Vehicle may find itself in a situation where it costs more to buy Limited PSLs with a particular attack than it would if it just bought less expensive PSLs — even though the PSLs are less restricted. In that case, the GM may, at his option, allow the Vehicle to buy the less expensive PSLs and treat them

as if they were Limited, without actually applying the Limitation to them.

SECURITY SYSTEMS

Vehicles often buy Security Systems as a *Skills* Power to represent the difficulty of breaking into them; see Lockpicking, above. If the Vehicle has security devices (such as weapons or capturefoam projectors) that function when someone tries to defeat the security, it must buy those separately (see page 142).

SKILL LEVELS

Although they're less common than Combat Skill Levels or Penalty Skill Levels, Vehicles can take Skill Levels, if appropriate. For example, many Vehicles buy Skill Levels with one or more modes of movement (*Hero System 5th Edition, Revised*, page 369) to represent how well they handle or turn; these add to the operator's control Skill Rolls (see sidebar, page 20).

Typically, if a Vehicle buys a 3-point Skill Level, the bonus must come from the same source or device. It cannot define +1 with Disguise, Mimicry, and Security Systems, where the Disguise is a camouflage system, the Mimicry part of a PA system, and Security Systems is an electronic override.

If a Vehicle wants to buy bonuses to all Skills associated with a particular Characteristic, typically it must have the Characteristic in question, even if the Skill Levels are intended to assist the operator rather than the Vehicle itself. The GM is the final arbiter of whether a given type of Skill Level is appropriate for a particular Vehicle.

Because the rules don't allow characters to put Limitations on Skill Levels costing less than 3 points apiece, a Vehicle may find itself in a situation



MOVEMENT SKILL LEVELS

Here's a quick run-down on what a Vehicle can do with Movement Skill Levels, so you don't have to consult the *5th Edition* every time.

One Movement Skill Level costs 2 Character Points for a single mode of movement, or 3 Character Points for all of a Vehicle's modes of movement. It can do any of the following:

—Lower the Vehicle's Turn Mode by 1. However, the Vehicle can still only make a maximum of five turns per Phase.

—Provide a +1 bonus to any roll required to land in a specific hex.

—At the GM's option, provide +1 DCV when the Vehicle uses a Vehicle Maneuver, Combat Maneuver, or Martial Maneuver which provides a DCV bonus.

Vehicles cannot use Movement Skill Levels to improve acceleration or deceleration the way characters can for their own Movement Powers. Instead, they should use the rules on page 22 for altering their standard acceleration or deceleration.

where it costs more to buy Limited Skill Levels with a particular attack than it would if it just bought less expensive Skill Levels — even though the less-expensive Skill Levels are less restricted. In that case, the GM may, at his option, allow the Vehicle to buy the less expensive Skill Levels and treat them as if they were Limited, without actually applying the Limitation to them.

STEALTH

Stealth has several vehicular applications. First, it's fairly common for vehicles in fiction to be able to move particularly quietly; in fact, it's even possible with the technology available in the real world. Second, some vehicles are camouflaged, have low albedos, or are otherwise designed in ways intended to make it difficult for others to perceive them. The *Stealth* Skill can represent these abilities. Even where the designer builds these abilities using Sense-Affecting Powers, Stealth may serve as a Required Skill Roll.

TRANSPORT FAMILIARITY

A Vehicle capable of operating itself must have

this Skill (whether obtained by buying Combat Driving/Piloting or direct purchase). Similarly, this could represent a “user-friendly” vehicle that tells a passenger how to operate itself, or a vehicle that can reconfigure its control systems to resemble ones the operator is familiar with.

A Vehicle with TF that can “link up” with another Vehicle (typically via a Mind Link of some sort) can operate that Vehicle. This represents a way to “slave” multiple vehicles to a single lead vehicle so they can easily fly in formation.

WEAPON FAMILIARITY

If a Vehicle pays Character Points for a weapon, it does not need a WF to use them. However, the Vehicle's operator and Computer do need appropriate WFs (since they're built separately in rules terms) — WF: Vehicle Weapons for a particular Vehicle, typically (see page 223). With the GM's permission, a Vehicle could buy WF: Vehicle Weapons to make its weapons “user-friendly” (anyone in the Vehicle can fire them without suffering an Unfamiliar Weapon penalty).

PERQUISITES



Most Perks are inappropriate for Vehicles. Generally speaking, only the ones discussed below should be bought for Vehicles; the GM should consider any other Perk carefully to ensure it makes sense and doesn't affect game balance.

ANONYMITY

A Vehicle with Anonymity has no official records. It doesn't have a Vehicle Identification Number (VIN) or registry number, its parts cannot be traced (or can be traced only with great difficulty), and organizations like the Department of Motor Vehicles and Federal Aviation Administration know nothing of its existence. Typically this costs 3 Character Points, though the GM may increase the cost if necessary.

FRINGE BENEFIT

Here are notes on Vehicle-specific Fringe Benefits:

Diplomatic Immunity

A Vehicle with Diplomatic Immunity belongs to an embassy or consulate of some sort, or one of its key employees. As such it counts as part of the “home country,” and is not subject to the laws of the country it's in. The operator can ignore parking tickets and traffic regulations with impunity — though he may anger the locals by doing so.

Emergency Services Vehicle (2 Points)

This Perk, suitable for police cars, fire trucks, ambulances, medevac helicopters, and the like,

signifies a vehicle that provides services in times of crisis. When it has sirens and lights active, the law requires other vehicles to get out of the way so it can proceed with maximum speed. In warzones, the laws of war typically forbid combatants to fire on such vehicles (though they also forbid these vehicles to carry ammunition, intelligence, or the like).

REPUTATION

It's possible for a Vehicle to have a positive Reputation. Typical vehicular Reputations include being powerful, being hard to damage (some opponents could give up without a fight), or belonging to an organization known for its good deeds. Of course, this only matters in campaigns where the GM lets Vehicles have PRE.

VEHICLES AND BASES

There are several situations in which a Vehicle might have an associated Vehicle of its own, or even its own Base. As noted on pages 467-68 of the *Hero System 5th Edition, Revised* for related issues, a Vehicle that buys another Vehicle or Base doesn't get to divide its cost by 5, then add that cost to its own cost, so that it's dividing the purchased Vehicle's cost by 25. Instead, buy the “subsidiary” Vehicle or Base separately and add its final cost divided by 5 to the final cost of the purchasing Vehicle.

If a Vehicle needs multiple subsidiary Vehicles, it may apply the usual “+5 Character Points doubles the number of Vehicles” rule, or the cost of the individual Vehicles, whichever is less expensive.

Possible Vehicles-within-a-Vehicle include:

Carriers: Aircraft carriers, starships able to carry dozens of fighters, and the like can all be built as Vehicles that buy other Vehicles. Typically the smaller Vehicles are much slower, or have a limited range based on their fuel capacity, and so need a carrier to ferry them to the battlefield. The *Nimitz*-class aircraft carrier on page 67 is an example.

Escape Craft: Ships, spacecraft, and many other types of vehicles come equipped with “sub-vehicles” for use when the main vehicle can no longer function. These include escape pods, lifeboats, and the like. See page 167 for an example.

Internal Vehicle: Some extremely large vehicles, such as enormous starships, buy “internal” vehicles to help people get around inside them — elevators, or their science fiction equivalents. Typically these are bought as Flight with *Restricted Path* Limitation (page 35) so they can only move along predefined paths. See page 167 for an example.

Missiles: Guided missiles and the like are typically bought as Vehicles. See page 130 for examples.

Shuttles: A large vehicle may have several smaller

vehicles on board for transporting crewmen and passengers from one vehicle to another, from the vehicle to land, and so on.

As for Bases, a Vehicle could have a hangar or garage designed specifically for it. Equipment in the Base might take a Limitation reflecting the fact that it only works with, or on, the Vehicle, since it's been tailor-made to suit that particular craft.

Typically, garages/hangars should have a minimum of two times the hexes necessary to house all Vehicles intended to be within them (based on the Vehicles' area in hexes, per the Expanded Vehicle Size Table); this assumes each has its own separate exit. For garages/hangars where the Vehicles share routes out to common exits, the minimum room should be four times the hexes necessary to house all Vehicles intended to be within them. If the garage/hangar has a repair section, the repair area requires room equivalent to eight times the hexes taken up by the total number of Vehicles to be repaired simultaneously.

TALENTS



Many Talents, typically taken with the *Focus* Limitation to represent equipment or installed systems, are appropriate for Vehicles. Examples include Absolute Time Sense (a clock) and Bump Of Direction (compasses, gyroscopes, and the like). Similarly, a Vehicle's Computer could use Talents to represent many different programmed abilities (such as Lightning Reflexes for a tactical computer). A few Talents, such as Combat Luck and Danger Sense, are usually inappropriate for Vehicles.

AMBIDEXTERITY

For game purposes, Vehicles are considered ambidextrous for free. They do not suffer from an Off Hand penalty, and so do not need this Talent.

EIDETIC MEMORY

Many Vehicles have recording equipment installed, which you can simulate with Eidetic Memory as described on page 89 of the *Hero System 5th Edition, Revised*. In some cases, recording devices are bought with Recoverable Continuing Charges to represent storage media such as tapes, disks, or chips.

A related form of Eidetic Memory is the “black box” (which is actually orange) used in aircraft to record events in an airplane so investigators can analyze what went wrong in the event of a crash. The black box has two separate recorders, one for the pilots' voices and one for their instrument readings. Here's how to build it:

Eidetic Memory (5 Active Points); OIF (-½), Hearing Group Only (-1), Only To Record Voices In The Cockpit (-¼), Only Retains Memory Of The Last Hour (-¼) (total cost: 2 points) **plus** Eidetic Memory (5 Active Points); OIF (-½), Airplane Instrument Readings And Transmissions Only (-1), Only Retains Memory Of The Last Hour (-¼) (total cost: 2 points) **plus** +10 DEF (30 Active Points); OIF (-½), Partial Coverage (-2) (total cost: 9 points) **plus** +20 BODY (20 Active Points); OIF (-½), Partial Coverage (-2) (total cost: 6 points). Total cost: 19 points

ENVIRONMENTAL MOVEMENT

A Vehicle does not have to buy Environmental Movement to cope with the negative modifiers imposed by the environment it was specifically or primarily designed to operate in. For example, boats and ships don't need it to fight in the water, starships don't need it to function freely in zero gravity, and snowmobiles don't need it to move over the ice without slipping. However, if a Vehicle needs to operate in two or more hindering environments, it can buy an Environmental Movement to overcome the Combat Driving/Piloting and other penalties associated with the secondary environment (the cost depends on the extent of the penalties, as usual). For example, a motorcycle is normally designed to operate on the ground; if driven on ice, it may slip or suffer other difficulties.

If it's built with special spikes on its tires to give it full traction on the ice, it could buy Environmental Movement: Icewalking to simulate that — but instead of the normal 1 Character Point cost (for overcoming the normal -1 DCV for fighting on slick surfaces) it costs 6 points (since Vehicles can suffer up to -4 to Combat Driving when on ice).

LIGHTNING REFLEXES

With the GM's permission, a Vehicle might take this Talent at the "single action" level to improve its handling during combat — in other words, to increase its ordinarily low DEX so it can react more quickly in a dangerous situation (or to make its DEX match its operator's). Vehicles that handle well all the time should just buy up their DEX normally instead.

EVERYVEHICLE EQUIPMENT

Most vehicles come equipped with a variety of devices and systems designed to enhance user comfort, improve safety, and provide other benefits. Since these devices have little (if any) effect on game play, they're usually given to Vehicles for free as Everyvehicle Equipment. Chapters Two through Six have lists and descriptions of Everyvehicle Equipment appropriate for the types of vehicles each chapter discusses, complete with point costs for situations when the GM wants to remove the device from the "free" list, or other Vehicles want to have it.

Generally, Vehicles may not sell back their Everyvehicle Equipment. They must get the GM's permission to do so.

Powers are frequently used to build various types of equipment, systems, or abilities for Vehicles. Movement, for example, though listed as a Vehicle "Characteristic," is bought and defined using Movement Powers, and vehicular weapons use Attack Powers to inflict damage on people and other vehicles.

BODY-AFFECTING POWERS

If a Vehicle buys a Body-Affecting Power such as Desolidification or Shrinking, then while the power is in effect, all occupants aboard at that time are automatically affected by the power without need for the *Usable By Others* Advantage. Likewise, they return to their normal state when the Vehicle does so. What happens to a character who leaves a Vehicle while the Vehicle is in an altered state is up to the GM, and should depend on special effects, common sense, and considerations of game balance. Typically the Power immediately ceases to affect the character at that time, but the GM may prefer to have the power remain in effect for dramatic purposes.

The same applies if a Vehicle is attacked with a Body-Affecting Power that's Usable As Attack -- it affects all occupants in the Vehicle.

DEFENSE POWERS

A Defense Power bought for a Vehicle typically protects both the occupants and the Vehicle itself, just like the Vehicle's standard DEF. If appropriate, you may apply a Limitation indicating that the defense only protects one or the other. For example, polarized windshields and windows would take a -1 Limitation, *Only Protects Against Exterior Flashes Against Vehicle Occupants*. That means the Vehicle itself could still be blinded (assuming it had Sight Group Senses), and that if the occupants attack each other with Flashes, they have no protection. (Alternately, since the occupants get the benefit of the defense for free, the GM might prefer to consider it a -0 Limitation.)

If a Defense Power derives in part from a character's Characteristics or other attributes, a vehicular defense providing that Defense Power to

the vehicle's occupants does not supply the derived part. For example, if a starship provides 10 points of Mental Defense to all characters inside its hull, a crewmember with EGO 20 gets 10 points of Mental Defense, not 14.

Vehicular defenses often have the *Ablative* Limitation at the -½ level. Since they don't take STUN, they can't take the -1 level, though the GM may allow the optional -1 variant in which attacks reduce the defense's Active Points.

MOVEMENT POWERS

Obviously, Movement Powers are important for Vehicles; by definition, a vehicle moves. You can find information about specific Movement Powers as they pertain to Vehicles in later chapters (for example, Swimming is discussed in Chapter Three, which provides rules for watercraft).

The *Position Shift* Adder and *Improved Acceleration/Deceleration* Advantage, both described on page 124 of the *Hero System 5th Edition, Revised*, are generally inappropriate for Vehicles. If you want to improve a Vehicle's acceleration or deceleration, use the rules below.

Altering Acceleration And Deceleration

All Vehicles use the normal rules for acceleration and deceleration on page 122 of the *Hero System 5th Edition, Revised*, which specify the following:

1. A Vehicle may accelerate or decelerate up to its full Combat Movement velocity each Phase.
2. A Vehicle can add or subtract 5" of velocity per hex (1") it moves (but again, only up to its full Combat Movement velocity each Phase).
3. Adding or removing velocity is a Zero-Phase Action, but can only be done once per Phase (*i.e.*, a character cannot both accelerate and decelerate in a single Phase).

Therefore, a Vehicle with Ground Movement 30" could accelerate or decelerate up to 30" per Phase, at the rate of 5" per hex. This Vehicle would take six hexes (6") to reach full speed. If the Vehicle were traveling at its full

POWERS



Combat Movement velocity, it would also need 6" in which to stop. If the Vehicle were traveling at its maximum Noncombat Movement velocity of 120" and wanted to stop, it could still only subtract 30" of velocity per Phase. That means it needs four Phases to come to a complete stop, and during that time it will travel (90" + 60" + 30" + 0") 180", or about a fifth of a mile.

Vehicles can improve the rate at which they accelerate by paying Character Points for an Adder, *Increased Acceleration*. For +2 Character Points, a Vehicle may increase its rate of acceleration by +1" per hex. Thus, for 2 points, a Vehicle could accelerate at the rate of 6" per hex; for 4 points, at the rate of 7" per hex, and so on. The GM may impose limits on how much extra acceleration a Vehicle can buy; generally, a Vehicle should not buy its acceleration up to the point where it approaches or equals its Combat Movement velocity (unless perhaps there's some Limitation or other restriction on the ability). This Adder does not affect the Vehicle's Combat Movement for purposes of determining how much total acceleration he can apply in a Phase.

Similarly, for +2 Character Points, a Vehicle may buy *Increased Deceleration* to improve its rate of deceleration by +1" per hex. The same guidelines apply.

Vehicles may buy the *Rapid Noncombat Movement* (+¼) (*Hero System 5th Edition, Revised*, page 124) Advantage for their Movement Powers. However, they may not buy the *Combat Acceleration/Deceleration* or *Noncombat Acceleration/Deceleration* Advantages to improve the number of inches they can accelerate/decelerate per hex; they must use the rules described above.

Fine-Tuning Vehicular Movement

As an optional rule, the GM may allow characters to "fine-tune" how a Vehicle's Movement Power works by "trading off" the various aspects of the Power. For example, a player may declare that the treads on his tank are wider than normal, giving his vehicle better acceleration and deceleration but adding to its Turn Mode. Each set of trade-offs must be self-contained to a particular Movement Power; a submersible car can't trade off part of its Ground Movement to improve its Swimming.

For these purposes, every ±1" per hex of acceleration, ±1" per hex of deceleration, ±1" of Turn Mode, or ±1 to Control Rolls is equivalent. Thus, a character could trade 1" of acceleration per hex to decrease his Turn Mode by 1", increase his deceleration by 1" per hex, or provide a +1 to Combat Driving/Piloting rolls. A Vehicle's trade-offs must balance out. A Vehicle that's fast, but doesn't handle well, could obtain +1" acceleration per hex by accepting a +1" Turn Mode or -1 penalty to Combat Driving/Piloting rolls. The GM must approve all trade-offs.

Realistic Movement Endurance

In some cases, Vehicles apply the *Costs Endurance* Limitation to their Movement Powers and then pay the END via an Endurance Reserve, thus simulating a Vehicle's power plant, engine, or the like. The *Hero System* does not base the END cost for Movement Powers on the weight of the object being moved — but "realistically," the greater a Vehicle's mass, the more END it should require to move it. If you want to simulate this in your game, add the Vehicle's Size category to the END cost for its Movement Powers.

SENSE-AFFECTING POWERS

Because Vehicles commonly use Radio Group Senses, such as Radar, to perceive their targets, Sense-Affecting Powers bought by or to affect Vehicles should typically pay the "Targeting Sense Group" charge for Sense-Affecting Powers bought to affect the Radio Sense Group.

SENSORY POWERS

Many Vehicles have Sensory Power devices installed. Submarines use various forms of Sonar, aircraft and starships use Radar, a superhero's car has a thermavision scope that provides Infrared Perception... and just about all vehicles in the modern era and beyond have Radio Perception (and sometimes Transmission as well). Chapter Seven has plenty of examples.

Vehicles themselves do not have Senses — when they buy Enhanced Senses or other Sensory Powers, those Senses aren't actually used by the Vehicle itself, but by its Computer, operator, and/or passengers (see page 169), who make PER Rolls using Systems Operation. Thus, many sensory devices take the *Affected As More Than One Sense Limitation* from page 126 of the *Hero System 5th Edition, Revised*. After all, a driver can't listen to the





radio if he's been deafened, and a pilot can't see a radar screen if he's blinded.

Sentient Vehicles, or Vehicles in campaigns where the GM allows them to have INT, can have Senses and perceive. However, they do not come with any innate Senses; the designer must buy even standard Senses like Normal Sight and Normal Hearing for them (see the sidebar on page 161 of the *Hero System 5th Edition, Revised* for costs).

In some campaigns, characters should be allowed to put vehicular Senses and communications systems into a Variable Power Pool, and to apply Advantages such as MegaScale to them for long-range use. See pages 55 and 199-201 of *Star Hero* for further discussion of this topic.

ABSORPTION

Some types of fantastic vehicles — supercars, starships, and the like — can absorb some of the force of incoming attacks (typically only energy attacks) and convert it into power (*i.e.*, recharge an Endurance Reserve). The *Limited Phenomena* Limitation is not only appropriate, it may be required by the GM.

AID

Aid has several applications related to Vehicles. (See also Characteristics, below.)

Chemical Boosters

In some dark and gritty settings, such as Post-Apocalypse or Cyberpunk science fiction, some vehicles come equipped with a system that pumps a drug into the operator by direct injection or an inhaled gas. The drug enhances the

operator's abilities, typically aiding his DEX but sometimes keeping him awake and/or boosting his perceptions instead.

Driver Reflex Enhancer: Aid DEX 3d6 (30 Active Points); OIF (-½), Others Only (only affects Vehicle's operator; -½), 4 Charges (-1). Total cost: 10 points.

Turbocharger

Vehicles often have devices which provide a temporary boost of speed. Examples include nitrous oxide injectors for sportscars and special afterburner rockets for aircraft and starships. You can create a turbocharger several ways; one involves Aid:

1. Use the Succor option for Aid in most cases, since the boost should keep functioning at full effect until the device runs out of fuel or energy. The GM may limit the number of Active Points in the Aid if appropriate.
2. The Aid applies to a single Movement Power. If the Vehicle wants to boost more than one mode of movement, it should buy multiple turbochargers.
3. For most turbochargers, apply the Advantage *Uncontrolled* — once they're turned on, they last until they burn up all their fuel. If the operator can control the fuel feed, *Uncontrolled* may not be necessary. (Alternately, the GM may allow some form of Continuing Charges or Fuel Charges.)

Since using Aid counts as an Attack Action, many turbochargers have the Advantage *Trigger* so the operator can activate them as a Zero-Phase Action.

4. The Limitation *Self Only* (-½) must be applied, since the Vehicle cannot Aid other Vehicles. The Focus Limitation, typically OIF, also applies unless the system is so inherent to the Vehicle that, like the Vehicle's Movement Powers, it shouldn't have Focus.

Other appropriate Limitations include *Activation Roll*, *Extra Time* (to activate), *Incantations* (operator's voice activation), and *Side Effects* (damage caused to the Vehicle by pushing it beyond its normal performance specifications).

5. To power the Aid, the Vehicle buys an Endurance Reserve. The REC of the Reserve takes a Limitation that it can only Recover when refueled; typically, turbocharger fuels are relatively rare and expensive.

Sportscar Turbocharger: Succor Running 6d6, Trigger (dashboard control; +¼), Uncontrolled (END from Endurance Reserve feeds Power on each of Vehicle's Phases until exhausted, can be shut off by depriving it of fuel; +½) (52 Active Points); OIF Bulky (-1) (total cost: 26 points) *plus* Endurance Reserve (20 END [OIF Bulky (-1); total cost: 1 point], 20 REC [OIF Bulky (-1), Only Recovers When Refueled (-2); total cost: 5 points]) (total cost: 6 points). Total cost: 32 points.

ARMOR

Vehicles rarely buy this power; it's easier to simply buy more DEF, which has the same function and cost. However, for some devices and effects, Armor may be more appropriate, particularly if the Vehicle's Physical and Energy defenses differ. The rules and options discussed on pages 11-13 for DEF apply to Armor, unless the GM objects.

Since Vehicles typically don't take the *Focus* Limitation for Armor (it's too intrinsic to the Vehicle), they sometimes apply the *Visible* Limitation instead.

CHANGE ENVIRONMENT

There are several types of equipment for Vehicles that can alter the surroundings. A few of the most common include the following:

Airlocks

Airlocks are specially-sealed chambers that allow a character to enter and exit a Vehicle designed to operate in an environment hostile to human life (such as a submarine or a starship). Normally an airlock is pressurized and filled with breathing gases. A character enters through the airtight door that connects the airlock to the rest of the vehicle, and in preparation for leaving the vehicle dons protective gear (such as a SCUBA suit or spacesuit). When he's prepared, he shuts the door to the vehicle (to seal the chamber) and opens (or orders the vehicle's computer to open) the other airtight door, which leads to the hostile environment. When he's ready to come back inside, he enters the chamber and shuts the environment-side door, and the vehicle then re-pressurizes the chamber, refills it with breathing gases, and if necessary pumps out water. Airlocks often make for great dramatic scenes where a charac-

ter running out of oxygen has to get back inside, or manually open the environment-side door to cause explosive decompression to suck some space monster out of the starship.

In game terms, you can build an airlock as a Change Environment 1", Varying Effect (restore or remove normal pressure and breathing environment; +¼) (total cost: 6 points). If necessary, an airlock can be larger.

Locks and Security Systems

Rather than buying locks and security devices as the Lockpicking and Security Systems Skills (see pages 18-19), some gamers may prefer to simulate these systems by using Change Environment to impose penalties on thieves' Skill Rolls. In this case, the Change Environment must be large enough to cover the entire Vehicle (or the parts of it the character wishes to affect), and must be bought once for each Skill the Vehicle should penalize. Anyone with the proper means of entry (a key, access code, or the like) suffers no penalty; this doesn't qualify for a Power Modifier, since its drawbacks balance its benefits. The power should have the Limitations *No Range* and *Self Only*, since it cannot affect the systems on other Vehicles.

Slicks

Slicks are substances applied to a surface to make that surface difficult to stand or drive on. Examples include oil slicks and ice slicks. To create one, buy Change Environment to affect all DEX-based rolls (4 points per -1 after the initial free -1 the Power comes with), which primarily means Combat Driving rolls in a vehicular context. The *Long-Lasting Adder* or *Continuing Charges* may be applicable given the special effects, but even in that case there's usually a way to remove or negate the slick easily (melt the ice, put some sand over the oil). You should apply the Limitation *Only Affects Characters Who Are Moving On The Ground* (-¼), ("characters" also includes ground vehicles like cars).

Typically, a Vehicle with *Clinging* can ignore the effects of a slick. The GM makes the final determination based on special effects (or the Limitations on the *Clinging*, if any).

CHARACTERISTICS

Characteristics is a flexible Power, and can apply to Vehicles in many ways. For example, a freighter might buy extra STR with the Limitation *Only For Lifting And Carrying* (-1), since its higher STR wouldn't help it cause damage in combat.

Alternately, a Vehicle may boost the Characteristics of its operator rather than itself. For example, a Vehicle with a neural interface system might boost its operator's DEX and SPD so that he can "keep up" with the Vehicle's higher Characteristics. Any large, imposing Vehicle might add to its operator's PRE, at least for the purpose of making some Presence Attacks. Aid usually works better for this, but in some instances the *Characteristics* Power may apply.

VEHICULAR POWER EXAMPLES

Intense Interference: The vehicle can generate a large area of interference to block enemy sensors and transmissions (though it's subject to the same effect). Make the MegaScales larger to create fields useful in space combat.

Darkness to Radio Group 8" radius, Mega-Area (1" = 1 km; +¼), MegaRange (1" = 10 km; +½) (140 Active Points); OAF Bulky (-1 ½). Total cost: 56 points.

Smoke Generator:

Mounted in the back of a vehicle, this device generates a cloud of thick, vision-impairing smoke. The smoke trails behind the vehicle, covering the entire area the vehicle moved over after activating it. This version assumes the Vehicle can travel a maximum of 64" per Phase. If the Vehicle moves less than that, make the Line only as long as the Vehicle's travel path; if it travels more, the Line stops when it becomes 64" long.

Darkness to Sight Group 32" radius (64" long and 4" wide Line; +½) (480 Active Points); OIF Bulky (-1), No Range (-½), Limited Arc Of Fire (0 Degrees behind vehicle, only on same horizontal level; -1), 4 Charges lasting 1 Turn each (-½). Total cost: 120 points.

Vehicular Fire Extinguishing System:

When activated, this system extinguishes fires inside a small vehicle (about the size of a typical automobile) by filling the vehicle with fire-dampening chemical foam. The foam dissipates rapidly, but blinds the operator or passengers in the Seg-

Continued from last page

ment when the system is activated. In larger vehicles, the system may be linked to sensors that can detect fires and activate it automatically.

Dispel Fire Powers 15d6, all Fire powers simultaneously (+2) (135 Active Points); Only Within Vehicle (-½), 8 Charges (-½), Side Effects (all occupants of Vehicle blinded for Segment in which power is used, always occurs; -1). Total cost: 45 points.

Defensive Airjets: The vehicle mounts jets of compressed air that can blow away smoke, gases, mist, fog, and the like.

Dispel Gas/Mist/Smoke Powers 20d6, any Gas/Mist/Smoke power one at a time (+¼) (75 Active Points); No Range (-½), 8 Charges (-½). Total cost: 37 points.

CLAIRSENTIENCE

There are two common applications for Clairsentience with Vehicles: internal security monitors, listening devices, and the like (primarily found on large vehicles like starships); and remote-controlled probes and similar devices designed to extend the range of the ship's normal senses. (Probes can also be designed as separate Vehicles or Automatons, if desired.) Here are some examples:

Long-Range Reconnaissance Probe: The Vehicle launching this sensory device has the ability to move its perception point and maintain multiple perception points (the number of probes it can have active at a time) (see *Star Hero*, page 53). The probes have the Limitation OAF Bulky, because it is possible to remove them from the vehicle, shoot them down in mid-flight (their DCV depends on their size, as defined by the GM), and so forth.

Clairsentience (Radio Group), Mobile Perception Point, Multiple Perception Points (up to four at once), MegaScale (1" = 1 billion km; +2½) (122 Active Points); OAF Bulky (-1½), Extra Time (takes probe 1 Phase or more to get to perception point, depending on distance thereto; -0), Perception Point Cannot Move Through Solid Objects (-0). Total cost: 49 points

Internal Security Monitors: A large vehicle's security team uses this system to keep an eye on events inside the vessel.

Clairsentience (Sight And Hearing Groups), Mobile Perception Point, Multiple Perception Points (up to eight at once), 8x Range (2,000") (65 Active Points); OAF Immobility (-2), Perception Point Cannot Move Through Solid Objects (-0). Total cost: 22 points.

CLINGING

Vehicles can buy Clinging, though they rarely do; it's even rarer for a Vehicle to buy Clinging for greater than its normal STR. It's most often used for bizarre insect-shaped Vehicles and the like.

Clinging typically protects a Vehicle from the effects of slicks (see Change Environment, above). If that's not the case, the Clinging takes a *Does Not Work Against Slicks* (-¼) Limitation. With the GM's permission, a Vehicle can buy Clinging with the Limitation *Only To Protect Against Slicks* (-1½) Limitation (or -2 for a specific type of slick).

DISPEL

Various forms of Dispel are often used to target specific systems on a Vehicle. An attacker might use Dispel HRRP to represent an electronic pulse weapon specifically designed to fry a Vehicle's communication system, for example. If appropriate, you may apply the *PD (or ED) Applies* (-1) Limitation described for Drain on page 151 of the *Hero System 5th Edition, Revised*.

ENDURANCE RESERVE

Endurance Reserve is commonly used to build power plants or fuel supplies for Vehicles. See pages 153-57 for more information and examples.

The text of the *5th Edition, Revised* warns GMs about the possible problems of large Endurance Reserves and the *Increased Endurance Cost* Limitation. These considerations are as relevant for Vehicles as normal characters, but are often balanced by the fact that Vehicles have so many systems to maintain at all times, all (or most) of them costing END. A character can only use a weapon with *Increased Endurance Cost* once per Phase, generally, but a Vehicle with a large crew and lots of weapons may be able to make a dozen attacks in a Phase, at proportionately greater END cost. Keep this in mind when deciding on the size of an Endurance Reserve and the appropriateness of *Increased Endurance Cost*.

EXTRA LIMBS

If a Vehicle has Extra Limbs (such as the limbs of a mech, or a survey ship's waldoes), those limbs have the Vehicle's STR.

FLASH

Characters often use Flash to build vehicular weapons. Vehicles designed for anti-personnel missions may have "flashbang" weapons to incapacitate mobs, and starships engaged in space combat could use "interferation bursts" to blind their opponents' sensors temporarily.

A Flash must be directed against either a Vehicle or its occupants; it cannot affect both unless it affects an area or can otherwise hit multiple targets. Of course, you should also consider what Senses the Vehicle and occupants have. Most cars do not have Sight Group Senses, so a Sight Group Flash fired at a car is probably intended to blind the occupants, not the Vehicle. Similarly, a Radio Group Flash is probably directed solely at the Vehicle. As always, the GM should adjudicate the situation by applying common sense, dramatic sense, and considerations of game balance.

HEALING

Healing is a rare Power for Vehicles, but not unheard of. In some genres, such as comic book superheroes and science fiction, high technology allows a damaged vehicle to repair itself. You can buy this as a form of Healing BODY, typically with *Extra Time*. With the GM's permission, you can apply the Regeneration option, but the Resurrection option should not be allowed. If a system is particularly vital or difficult to repair, the GM may require the Vehicle to have a variant of the *Can Heal Limbs* Adder — *Can Repair System* — to fix it with Healing.

Vehicles can also have systems or devices on board for Healing occupants. The Autodoctor (page 151) is an example of this.

IMAGES

Images has many uses for vehicular equipment. The headlights found on just about every modern vehicle are the most prominent example, but a Vehicle could also have a public address system, a holographic disguise system, sirens, or electronic countermeasures defenses to interfere with enemy sensors. See Chapter Seven for some examples.

INVISIBILITY

Wonder Woman's plane aside, Invisibility to Sight Group and other normal human Senses is rarely used for Vehicles. On the other hand, Invisibility to Radar Group is often ideal for representing "stealth" technology and the like. If this approach is too absolute for the GM's taste, substitute Change Environment or Images instead (which just make detecting the Vehicle harder, not impossible).

LIFE SUPPORT

Life Support is a crucial Power for any Vehicle designed to carry passengers into environments hostile to them, including submarines, spacecraft, and many jets. In addition to Self-Contained Breathing, most vehicles need a Safe Environment or two: submarines have High Pressure and Intense Cold; spacecraft have High Radiation, Intense Cold, Intense Heat, and Low Pressure/Vacuum.

Additionally, many Vehicles carry stores of food and drink, defining this as Diminished Eating (no need to eat) with Fuel Charges. Until they consume all the food, the Vehicle's occupants need not worry about starvation or dehydration.

In most cases, Life Support that protects a Vehicle's occupants against the crushing pressures of the ocean or the airlessness of space does not protect them from each others' attacks. If the driver uses a knockout gas weapon against an unruly passenger, the Vehicle's Life Support (Self-Contained Breathing) doesn't help the passenger at all. The GM may allow a -1 Limitation, *Only Protects Occupants Against Exterior Phenomena*, to reflect this, or simply consider it part and parcel of the special effect worth no Limitation value (since it's as helpful as it is restrictive).

MISSILE DEFLECTION & REFLECTION

Some large Vehicles have Missile Deflection to represent "point defenses" that destroy incoming missiles and other physical attacks; see page 141 for some examples. However, Vehicles almost never have Reflection; they can defend themselves, but not turn those attacks against their attackers.

MULTIFORM

Characters frequently use Multiform to build mecha that can shift configurations; see Chapter Six for details. Otherwise it's usually inappropriate for Vehicles.

SHAPE SHIFT

Vehicles that can literally change shape from one to another usually use Multiform (page 107), though Shape Shift may be appropriate if the Vehicle's Characteristics and abilities don't change. More common applications of Shape Shift involve changing some aspect of a Vehicle to hide or disguise it. See page 137.

SUMMON

Because Vehicles are built similarly to characters, and have a defined point cost, it's possible to Summon them, if the GM permits. The cost of the Summon depends on the total cost of the Vehicle (not its cost divided by 5), and the character must apply the Slavishly Loyal (+1) Advantage. Applicable Limitations typically include Focus (as with other Vehicle equipment) and Charges.

SWINGING

Swinging is the Movement Power least associated with Vehicles. Only in the strangest of fantasy or science fiction settings would characters have even the slightest chance of encountering a Vehicle that moves by Swinging. Such Vehicles would use the standard rules for Swinging.

TELEPORTATION

Besides Movement Skill Levels or the No Turn Mode Advantage, another way for a Vehicle to eliminate its Turn Mode is to buy a Pivoting Turn ability:

Teleportation 2", Position Shift (9 Active Points); Only To Make Direction-Changing Half Moves (-½), Requires A Combat Driving/Piloting Roll (-½). Total cost: 4 points.

The character designing the Vehicle must choose an "axis point" around which the Vehicle pivots (typically, but not always, its center of mass). When the operator activates this ability, he "turns on a dime," instantly changing the direction in which his Vehicle moves. However, since it requires him to make a Half Move with his "Teleportation," he only has a Half Move left to make with any of his Vehicle's other modes of movement if he wishes to continue moving.

Since Pivoting Turn may be considerably cheaper than buying Movement Skill Levels or applying Advantages to accomplish the same thing, GMs may want to limit its use, or forbid it entirely.

VEHICULAR POWER EXAMPLES

Friendly Gremlins: An airplane with this power has some kind-hearted gremlins aboard who make sure things usually go right... though they occasionally play a prank or two.

Luck 4d6. Total cost: 20 points.

Remote Control System: A Vehicle's operator, or a member of its crew, uses this system to communicate with and guide missiles, drones, probes, and the like. It only works with objects fitted with a special receiver.

Mind Link, specific group of people one mind at a time, No LOS Needed (20 Active Points); OIF Bulky (closed radio link or the like; -1), Affected As Radio And Sight Groups, Not Mental Group (-½). Total cost: 8 points.

Starship Psychic Shielding: After the Brain Parasites' first devastating attacks, Humanity installed special psychic shielding in the hulls of all its starships to protect the crews from the Parasites' deadly mental attacks.

Mental Defense (10 points) (10 Active Points); Costs Endurance (-½). Total cost: 7 points.

POWER ADVANTAGES



Most Power Advantages work for Vehicles the same as for regular characters. However, a few require special rules for special circumstances.

DELAYED EFFECT

It's not uncommon for Vehicles to have large, complex weapons that require a lot of preparations before they're ready for use. With the GM's permission, you can simulate this with the *Delayed Effect* Advantage. That way a character and his friends can spend a lot of time back at the garage outfitting their Supercar with heat-seeking missiles, then fire the missiles in combat with just a Half-Phase Action. The GM must establish a way to limit the number of such devices a Vehicle can have (such as its Computer's INT/5, or the operator's INT/5, or the like).

INDIRECT

Given the nature and special effects of vehicular defenses, a properly-defined Indirect attack may be able to bypass them and attack a Vehicle's interior or occupants directly. For example, in a *Star Hero* campaign, starships might have Teleporting Bombs that appear in the middle of an enemy ship. Obviously, this could be an unbalancingly effective attack, so the GM may need to forbid it or monitor its use carefully. At the very

least, the attacker needs a way to precisely sense his target point inside the Vehicle; if not, the GM may impose nonperception penalties on the Attack Roll. A miss may not miss the Vehicle as a whole, but it won't hit exactly what the attacker wants to. A Vehicle that has Hardened DEF isn't subject to this sort of attack.

INVISIBLE POWER EFFECTS

Some Vehicles apply this Advantage to their Movement Powers to make them silent. If this effect seems too absolute for the campaign, the GM may instead make the Vehicle buy Stealth, or use Change Environment or Images to impose penalties on attackers' ability to sense the Vehicle.

MEGASCALE

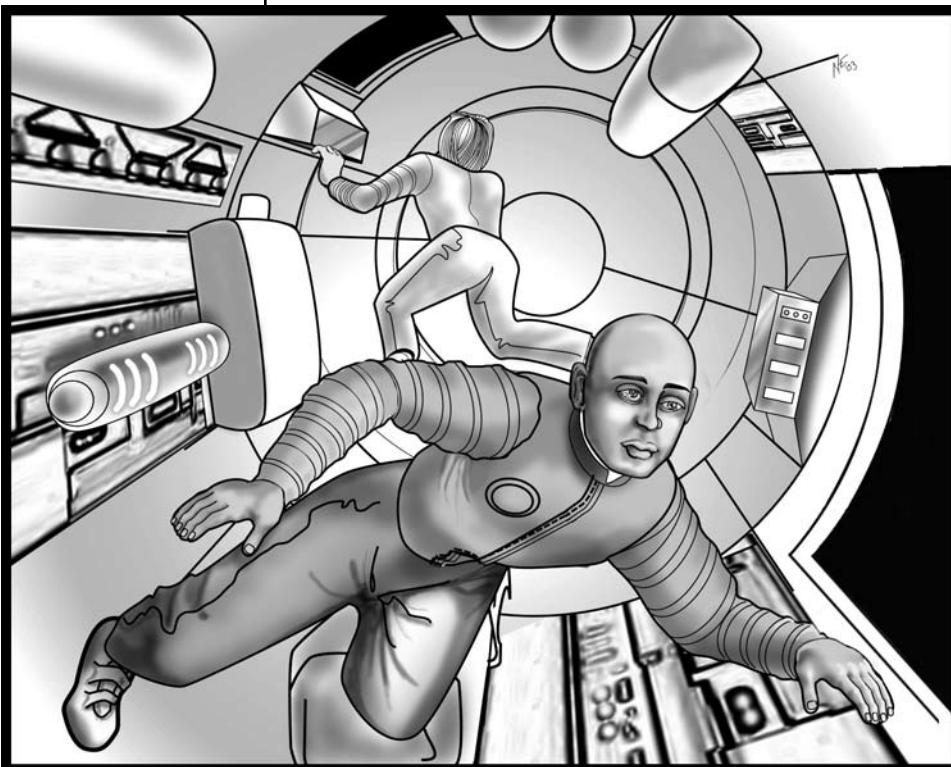
MegaScale has two major uses for Vehicles. First, there's MegaMovement velocity — vehicles like jetfighters often use it to achieve supersonic speeds, and starships may need it to achieve FTL speeds. Second, for Vehicles designed to attack distant targets — most starships, many large military seacraft — this Advantage is essential. If appropriate, you can build a MegaScaled weapon as a two-slot Multipower (one slot without MegaScale, for close-range attacks, and one with). See Chapter Seven for numerous examples.

RANGE ADVANTAGES


Many combat-oriented Vehicles come with sophisticated rangefinding and aiming systems, which you can sometimes simulate with Advantages like *No Range Modifier* or *Increased Maximum Range*. These are often bought as "naked" Advantages, to apply to any of the Vehicle's weapons. If so, a *Requires A Navigation Roll* Limitation may be appropriate, to simulate the fact that the character using the ranging technology has to program in the attack coordinates properly. If the character misses the roll, he can still attack, but the normal Range Modifier applies.

USABLE ON OTHERS

Generally speaking, a Vehicle does not have to apply this Advantage to a power used primarily or exclusively by its operator and/or passengers. However, it may be required if the Vehicle wants a system that can affect both it and its operator/passengers. See page 116 for further information.



POWER LIMITATIONS



As with Advantages, most Limitations work for Vehicles just as in any other part of the *Hero System*. A few need special handling, or otherwise deserve special mention.

CHARGES

Since Vehicles do not have natural END to fuel their Powers, they often take Charges (particularly for Attack Powers) on them.

The Fuel Charges variant of Continuing Charges is particularly common for Vehicles. As its name suggests, it's an obvious choice for Vehicle movement and other abilities that require a specific source of fuel. It's also a good way to represent any consumable resource the Vehicle has in limited supply, like the Life Support (air and food) in a starship's escape pods. If multiple powers draw from the same source of fuel, usually that works better as an Endurance Reserve (see pages 153-57 for several examples).

The value of Fuel Charges cannot become an Advantage; at worst, it's a -0 Limitation. Gamemasters should review any use of Fuel Charges to make sure it's not abusive; weapons, for example, should rarely have Fuel Charges.

ENDURANCE LIMITATIONS

The *Costs Endurance* Limitation is commonly used on Vehicle powers when the designer wants all of the Vehicle's systems to draw off a common source of power (an Endurance Reserve). Since Vehicle movement automatically costs no END, *Costs Endurance* is a good way to simulate a "realistic" engine. Systems that strain the Vehicle's power resources can take *Increased Endurance Cost* Limitation, too, but the GM should take a close look at *Increased Endurance Cost* powers that draw from an Endurance Reserve to make sure they're not abusive.

At the GM's option, Vehicle designers can define *Costs Endurance* as indicating that a Vehicle power uses the operator's END, not END from an Endurance Reserve. For example, a bicyclist has to spend his own END to keep the bike moving, the slaves chained to the oars of a fantasy galley expend their own END to row it through the water, and a cybernetic car with a jacked-in driver might tire the driver out.

EXTRA TIME

Vehicle equipment often requires a little time to "warm up," which you can simulate with *Extra Time* (but don't forget that starting a Vehicle automatically take a Half Phase). For Vehicles that require the manual shifting of gears or the

like, you can take an *Extra Time* Limitation on the Vehicle's movement to indicate that the operator has to spend a Half Phase (or longer) to accelerate, decelerate, or switch from Combat to Noncombat velocities.

FOCUS

Much, if not most, of the equipment aboard a Vehicle is built with the *Focus* Limitation (plus Bulky, as usual for vehicular equipment). See pages 7, 16 for more information.

Bulky And Immobile Foci

Any vehicular Focus automatically gets an extra -½ Limitation, as though it was Bulky (see the *Hero System 5th Edition, Revised*, page 469), though this doesn't halve a Vehicle's DCV. At the GM's option, a Vehicle can take Bulky on a Focus a second time to indicate that using the Focus reduces the Vehicle to half DCV, but in this case Bulky is only worth an additional -¼.

Generally, a Focus on a Vehicle may not be Immobile. But given the enormous size of certain Vehicles (like gigantic starships), some of their equipment may qualify as Immobile instead of Bulky. It moves with the vehicle, of course, but within the vehicle it stays put. A Teleportation Platform located on Deck 37 Aft remains there all the time; it can't show up on Deck 15 Starboard, even if the characters desperately need it there. The GM determines when Immobile applies. Typically only Vehicles that are large enough to have crews in the dozens or hundreds should have Immobile equipment; smaller ships are sufficiently maneuverable and traversable that their equipment remains simply Bulky. And of course, the equipment/system itself must be both large and firmly attached to the ship to qualify as Immobile.

Removing And Using Vehicular Foci

Generally, characters cannot remove a Vehicle's Focus and easily use it as if it were a personal Focus. Vehicular Foci are separate items, but they're built for a Vehicle's use, not independent use. However, in the interest of drama and excitement, the GM may wish to allow this in some cases.

Removing an Accessible vehicular Focus requires one Phase. The GM may require a Mechanics, Electronics, or similar Skill Roll, but shouldn't inhibit the character too much, since Accessible Foci by definition are easy to remove. There should be no Skill Roll penalty, and even if the character lacks the necessary Skills, he should still be able to remove and use the Focus (though perhaps at decreased effect). An Inaccessible vehicular Focus requires one Turn to remove; the same considerations regarding Skill Rolls apply.

SIDE EFFECTS: DANGEROUS EXHAUSTS

These examples assume 20" of movement (40 Active Points).

Helicopter Rotor

Blades: KA 2d6 in a 6" Radius around Vehicle; Extreme Side Effect, automatically occurs when Flight is in use, only affects environment around Vehicle. Total value: -1¼.

Rocket Exhaust:

KA 3d6, Armor Piercing, in a 8" Line behind Vehicle; Extreme Side Effect, automatically occurs when Flight is in use, only affects environment behind Vehicle. Total value: -1¼.

Rocketcar Exhaust:

KA 1d6 in a 3" Line behind Vehicle. Major Side Effect, automatically occurs when Ground Movement is in use, only affects environment behind Vehicle. Total value: -¾.

Even when it's removed from a Vehicle, a vehicular Focus is still considered Bulky, meaning that using it halves a character's DCV. The GM may waive this rule in the interest of common sense and dramatic sense.

GESTURES

Just because a character has to move his arms and hands to turn a steering wheel or operate a radio does not entitle that equipment to a Gestures Limitation — it's a part of the *Focus* Limitation (if applicable) or so trivial that it's not worth a Limitation. However, there may be some instances in which operating vehicular equipment requires Gestures, such as a mech that has to manipulate its limbs in a certain way to project a power-blast.

INCANTATIONS

Vehicle operators may have to use spoken commands to activate some equipment. This may qualify for an *Incantations* Limitation, but GMs should examine any use of this Limitation carefully to make sure it's not abusive. If the voice control can be manually overridden, the Limitation is usually inappropriate.

LIMITED ARC OF FIRE

A Vehicle can buy its weapons with Limited Arc Of Fire. This Limitation signifies that the weapon cannot fire in all directions; instead, it can only cover certain areas. The value of the Limitation depends on the size of the arc and whether the weapon can only fire on targets on the same horizontal level as itself (see accompanying table).

LIMITED ARC OF FIRE

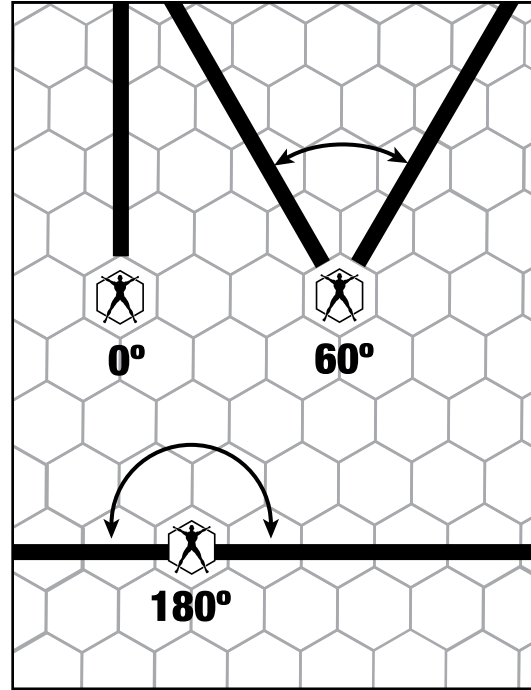
Arc Of Fire	Limitation Value
One hex row	-¾
60 degrees	-½
180 degrees or more	-¼
Additional Modifiers	Value
Only on same horizontal level	¼ more Limitation

LIMITED POWER

Dropped (-½)

This Limitation for Attack Powers represents an attack that a Vehicle (or character) must drop on its target from above — such as a bomb. The attack must be a ranged attack (either normally or with the Ranged Advantage), and only works if the attacker is at least one-fifth of the power's Active Points above the target in inches. The target must still be within the power's normal range (though such powers are often bought with Increased Maximum Range so attackers can drop them from vast heights). Once dropped, the attack approaches the target at normal falling speeds (see page 434 of the *Hero System 5th Edition, Revised*), so it usually takes multiple Segments to reach its target.

Typically this Limitation has a value of -½. However, that assumes the target has a chance to detect the attack and avoid it. If that's rarely the case, reduce it to a -0 Limitation.



Fuel Dependent (-¼ to -1) ▲

Gamemasters who don't want to worry about tracking Endurance Reserves or Fuel Charges in their campaign may, if they wish, substitute the Limitation *Fuel Dependent* for Vehicles' movement (and many other systems). This signifies that the Vehicle requires some sort of fuel, which it uses up and must periodically replenish. The value of the Limitation depends on how common the fuel is, and how often the Vehicle requires refueling (see accompanying box; maximum value of the Limitation is -2). Of course, refueling time depends on how much the character uses the Vehicle; the values in the table assume relatively frequent use during most adventures. If that's not the case, reduce the value of the "refueling time" modifier proportionately.

FUEL DEPENDENT

Commonality	Value
Very Common	-¼
Common	-½
Uncommon	-1
Refueling Time	Value
Once per Minute or less	1½ more Limitation
Once per 5 Minutes	1¼ more Limitation
Once per 20 Minutes	1 more Limitation
Once per Hour	¾ more Limitation
Once per 6 Hours	½ more Limitation
Once per Day or less	¼ more Limitation
Modifiers	Value
Fuel is very expensive or difficult to obtain	¼ more Limitation

Only Applies To Single Weapon (-1)

As discussed on pages 172, 174, typically when a piece of Vehicle equipment obtains or provides some bonus in combat — such as Find Weakness — it applies to all of the Vehicle's attacks, even

attacks made by characters or systems other than the one who obtained or provided the bonus. If you want to design a system that only applies to one weapon or attack (such as a dedicated Find Weakness sensor that works with one specific blaster), you may apply this -1 Limitation to it.

Partial Coverage/Only Within Affected Area

A character can build parts of a Vehicle (typically a very large one, such as a starship or aircraft carrier) with more of something (typically BODY or DEF) in a particular area. Since it doesn't apply to the entire Vehicle, it takes a *Partial Coverage Limitation*.

To derive the value for Partial Coverage, determine the overall size of the Vehicle and the size of the affected section. For each increment of Size reduction (each step upward on the Expanded Vehicle Size Table), the Limitation is worth $-\frac{1}{4}$ (maximum of -2).

In some cases, you can refer to this Limitation as *Only Within Affected Area*. This applies to powers that only work in some small area of the Vehicle, rather than throughout it. For example, a starship might have a 20" x 20" area where it could vastly increase the strength of its artificial gravity to restrain prisoners.

Example: *The Galactic Empire constructs a Star Obliterator, a Vehicle a kilometer long (500" x 250"). It wants to provide special defenses for the bridge (to protect the lives of*

the captain and the chief officers), so it buys +20 DEF for an area 10" x 10". Since the DEF protects such a small part of the ship, it gets a -2 Partial Coverage Limitation (total cost: 10 points).

Additionally, the aft part of the ship (a 200" x 100" section) has a special backup life support system — the crew can retreat there if main life support fails. Since this is four steps down the Expanded Vehicle Size Table, the Life Support takes a -1 Only Within Affected Area Limitation.

REQUIRES A SKILL ROLL

The *Requires A Skill Roll Limitation* is appropriate for many Vehicle powers. Typically Combat Driving, Combat Piloting, or Systems Operation are the Skills used, representing abilities that depend on the operator's skill. When he builds a Vehicle, a character must specify whether the Vehicle itself, or its operator, has to make the Required Skill Roll.

At the GM's option, a character who fails a Required Skill Roll on vehicular equipment doesn't fail to activate or use the power, he simply suffers a penalty for using it — -1 OCV, or the like, per point by which he misses the roll. The GM determines the exact effects. In this case, halve the value of the Limitation (if it's only $-\frac{1}{4}$, reduce it to -0).

SIDE EFFECTS

When a character creates a vehicular ability with a Side Effect, he must specify whether the effect harms the Vehicle itself, or its operator. If it affects both, he can take the Limitation twice.

Side Effects is appropriate for Movement Powers that can cause damage to nearby people and objects, such as helicopter rotor blades or a rocket's fiery exhaust. Typically this Side Effect involves Killing Damage, and occurs automatically; the GM and the player must define the exact parameters of the effect (see sidebar, page 30).

Gamemasters should remember that Side Effects is a Limitation. If players repeatedly use their Vehicles' dangerous exhausts as weapons, they should pay points for them.

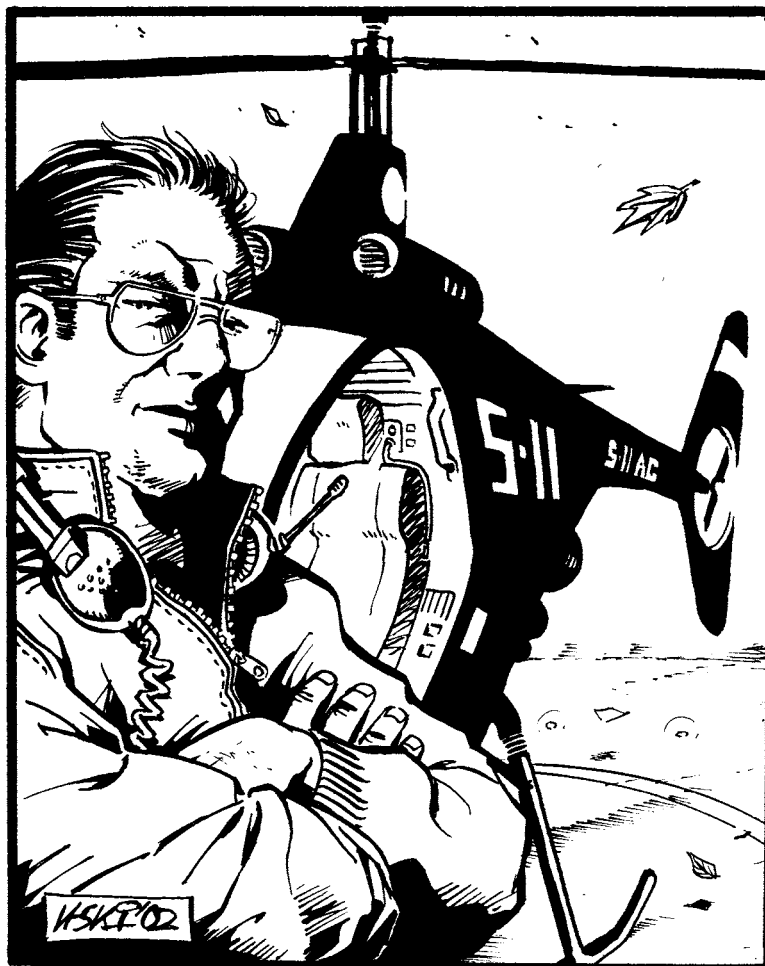
POWER FRAMEWORKS FOR VEHICLES

Vehicles are allowed to take Power Frameworks, if justified by their special effects. Typically Vehicles can only take Multipowers and Variable Power Pools, not Elemental Controls, but the final decision is up to the GM.

Vehicles may not place all their modes of movement in a Power Framework; they must buy them separately. However, they could place multiple forms of the same mode of movement in a Framework. For example, a plane with both normal and MegaScaled Flight, or a starship with Flight and FTL Travel deriving from the same propulsion system, could put both in a Multipower.

Similarly, Vehicles may not place all their weapons in a Power Framework; they must buy them separately. However, a single weapon with multiple functions (such as a gun with different types of ammunition, or a space laser with regular and MegaScaled ranges) could be built as a Framework (almost always a Multipower).

Vehicular Variable Power Pools are much less common than vehicular Multipowers. The most common type is a VPP for sensors and communications (see page 159 for an example).



DISADVANTAGES



Vehicles can take Disadvantages, though the options open to them are more restricted than for ordinary characters. Typically, Vehicles cannot take Disadvantages not discussed below, but the final decision is up to the GM.

DEPENDENCE

Typically, vehicles require spare parts and repairs over the course of their lives; most also need fuel to remain “active.” This doesn’t entitle them to a *Dependence* Disadvantage, any more than a normal character can take a *Dependence* because he needs to eat or periodically requires health care. However, in the GM’s discretion, if a Vehicle needs a particularly unusual type of replacement part, and needs to have it replaced frequently, a *Dependence* may be justified.

DEPENDENT NON-PLAYER CHARACTER

Although more common for Bases, this Disadvantage can apply to Vehicles (primarily large Vehicles that need their own crew of tenders, repairmen, and the like). The owner and/or operator of the Vehicle should feel a special need to protect these DNPCs — and maybe the Vehicle itself, if sentient, feels the same.

DISTINCTIVE FEATURES

If appropriate, Vehicles can take *Distinctive Features*. This typically signifies a Vehicle whose appearance sets it apart from other Vehicles in some disadvantageous way, or which inspire strong negative emotions in people. Examples include:

- distinctive markings (police cars, military vehicles, and the like)
- appearance inspiring awe or fright (large military vehicles)
- appearance inspiring covetousness (sportscars, luxury vehicles)

Most vehicular *Distinctive Features* are *Concealable With Difficulty* (repainting, changing parts) or *Not Concealable*, and *Noticed And Recognizable*. Some, particularly military vehicles deliberately designed to terrify the opposition, may *Cause Major or Extreme Reactions*.

HUNTED

A Vehicle could be *Hunted* (most likely, *Watched*) by an individual or group. For example, if a corporate sponsor builds a supercar for a popular superhero, it may *Watch* the car to make sure it’s not used for purposes that could reflect badly on the company.

The thing to remember about a vehicular *Hunted* is that the *Hunter* is after the *Vehicle*, not the people who own, operate, or ride in it. He wants the *Vehicle* for some reason — usually to steal it, get it back if someone stole it from him, or deconstruct and study it. Of course, the same person may *Hunt* both a *Vehicle* and its operator, but that’s not required.

PHYSICAL LIMITATION

Physical Limitations represent ongoing problems with a *Vehicle*’s physical structure or capabilities. Examples include:

Alien Computer (Frequently, Greatly Impairing; 15 points). The *Vehicle*’s computer was built, modified, or warped by aliens (or other unusual beings), and doesn’t always work the way it’s supposed to. Once per game session, the GM should have the computer make an INT Roll at -3. If it succeeds, nothing goes wrong. If it fails, a program or Skill Roll is misinterpreted, with comic and/or dangerous results. (The GM may prefer that the *Computer*, rather than the *Vehicle*, take this *Disadvantage*.)

Cannot Enter Atmospheres (Infrequently, Greatly Impairing; 10 points). A starship with this *Physical Limitation* was not built to withstand the rigors of atmospheric flight. For every Phase it spends within an Earth-equivalent atmosphere, it takes 1d6 *Killing Damage* (no defense applies) (the GM can alter the number of dice to reflect atmospheres thinner or denser than Earth’s). If it stays too long in the atmosphere, it gets torn apart.

Cannot Land (Infrequently, Greatly Impairing; 10 points). A *Vehicle* with this *Disadvantage* cannot land on the ground. It’s typically taken for starships that cannot make planetfall, or sailing ships so large they must always remain at least 100’ from the shore (or, if appropriate, can only use special harbors). A *Vehicle* cannot have both this and the *Cannot Enter Atmospheres* *Physical Limitation*.

If a *Vehicle* with this *Limitation* does try to land, any *Accessible Foci* attached to its outside are torn away, and it takes a number of dice of *Killing Damage* equal to its DEF+BODY divided by 5. This damage typically applies to the hull or whatever other part of the *Vehicle* touches the ground, but the GM may apply it generally to represent the force of impact.

Constant Malfunctions (Frequently, Greatly Impairing; 15 points). The GM rolls for the *Vehicle* each game session. On a roll of 11-, something on the *Vehicle* malfunctions or stops working at a crucial moment; the GM randomly determines which

system goes kablooe, or chooses the one with the most dramatic impact.

Crew (varies). Some vehicles require just a single operator to function. Others carry a crew of hundreds, each with a specific job that helps keep the vehicle working at peak efficiency.

The default *Hero System* rules don't consider requiring a large crew to be a Disadvantage, since the drawbacks to having a large crew — the difficulties suffered when the Vehicle lacks its full crew complement — are balanced by the fact that when the crew is present, it greatly expands the Vehicle's capabilities. However, the GM, at his option, could allow a Physical Limitation, *Crew*, to reflect the problems that arise if a Vehicle is less than fully staffed. The value of the Disadvantage depends mostly on how likely the Vehicle is to experience crew-related problems, which establishes the frequency. A tank involved in a war may suffer a lot of crew casualties during the typical scenario, making *Crew* a Frequent problem. On the other hand, a starship mainly engaged in exploration missions may only experience *Crew* difficulties Infrequently. In any case, the problems themselves, when suffered, are usually Slightly Impairing.

Page 176 has rules for the effects of reduced crew size. The GM should consider these rules when setting the value of a *Crew* Disadvantage. Additionally, he should consider how easy it is for the Vehicle to replace its crew. If the Vehicle has a lot of backup Computers that can fill in for injured crewmembers, the Disadvantage is worth less; if people require advanced, specialized training before they can join the crew, the Disadvantage may be worth a bit more.

No Locks (Infrequently, Slightly Impairing; 5 points).

In a setting where Vehicles normally have locks, a Vehicle which cannot be locked is at a much greater risk of theft or vandalism. The GM may adjust the value of the Disadvantage depending on how likely those unfortunate occurrences are.

Requires Linked Operator (Infrequently, Greatly Impairing; 10 points). Common in Cyberpunk campaigns, this Disadvantage signifies a Vehicle that can only be operated by a person who's "jacked in" to it via a direct neurological link of some sort. This requires an operator to have special implants and equipment; without them, a person cannot operate the Vehicle.

Slow Starter (Infrequently, Slightly Impairing; 5 points). Ordinarily, a Vehicle takes a Half Phase to start (see page 174). If it takes longer than that, up to 1 Minute, it has this Physical Limitation. If starting the Vehicle takes longer than a minute, increase the Disadvantage to Greatly Impairing and the value to 10 points.

Two-Wheeled (Infrequently, Slightly Impairing; 5 points). This Disadvantage applies to motorcycles, bicycles, and the like. It represents the fact that the vehicle is less well-balanced than typical vehicles. If a Vehicle with this Physical Limitation is struck from the side, its operator must make a successful Combat Driving roll at -1 per 2 BODY damage rolled for the attack to maintain control; if the roll fails, he loses control and crashes.

REPUTATION

With the GM's permission, a Vehicle may have a negative Reputation separate from its owner's (if any). For example, a Cutting-Edge Sportscar might be in constant danger of theft due to its Reputation, and hotshot racers might come from all around to challenge it (or, more accurately, its operator) to a race.

SOCIAL LIMITATION

Although Vehicles don't interact with society per se, they can have certain Social Limitations to reflect how they are treated, if appropriate. Examples include:

Publicly Known (Frequently, Major; 15 points): This is the same thing as Public Identity — everyone knows where to find the Vehicle, what it can do, what it contains, and so forth. If someone attacking the Vehicle makes an INT Roll, he may, at the GM's option, receive a +2 bonus to Find Weakness, Analyze Vehicle, and similar rolls.

Vehicle (Frequently, Minor; 10 points): In a setting featuring sentient vehicles, it's likely that most Vehicles will be regarded not as citizens, but as property, like robots and computers. This Social Limitation reflects that.

SUSCEPTIBILITY

With the GM's permission, a Vehicle could take a Susceptibility. This is rare, but not unheard of, particularly in fantasy and science fiction. For example, a starship built out of planes of force might start to fall apart (*i.e.*, take damage) if exposed to certain energy phenomena.

VULNERABILITY

Vehicles may take Vulnerabilities, if appropriate, though of course they should only be Vulnerable to BODY damage. In addition to standard overall Vulnerabilities, a Vehicle might be Vulnerable to any attack that hits a specific location (representing a "weak point," for instance) or the like; this typically counts as an Uncommon phenomenon.



2 TIRES, TRENDS, & TRACKS: GROUND VEHICLES

In most campaigns, ground vehicles — cars, chariots, tanks, and the like — are the most common type of vehicle encountered.

Even in *Star Hero* games, characters frequently find themselves plan-

etside, traversing strange alien worlds in hovercraft or advanced ATVs. This chapter discusses the different types of ground vehicles and how to build them, and provides sixteen examples to get you started.

GROUND VEHICLE BASICS



To build a ground vehicle, you need to know two things: what powers it; and how it maintains contact with the ground. Those two factors tell you the best way to build a particular vehicle, including the Movement Power most appropriate for it.

GROUND MOVEMENT (RUNNING)

Ground Movement (or Running, to use its usual name) is probably the most common mode of movement for Vehicles. Except for watercraft, helicopters, and some spacecraft, most Vehicles have at least a few inches of Ground Movement, and many use it as their only form of movement.

All Vehicles start with Ground Movement 6"; the types mentioned above sell it back to represent the fact that they can't move on the ground. Even though these inches are free, if a Vehicle applies a Power Advantage to its Running, it must account for the 12-point cost when calculating the value of the power, unless the rules note an exception. For example, if a Vehicle with Ground Movement 15" wants to apply the *No Turn Mode* (+¼) Advantage (page 15), the Active Point cost for its Ground Movement is: 30 points (15" x 2 points per inch) times 1.25 = 37.5 (rounds down to 37), minus the 12 points' worth of free Ground Movement = 25 points. Any Limitations would apply to that 25 points.

Unlike characters, Vehicles automatically have a Turn Mode with Ground Movement. Ways to reduce or eliminate the Turn Mode include Movement Skill Levels and the *No Turn Mode* Advantage, discussed elsewhere in this book.

LIMITATIONS FOR GROUND MOVEMENT

The following Limitations apply to Ground Movement generally. Chapter One discusses many others appropriate Power Modifiers.

Only On Appropriate Terrain (-¼ or more)

This Limitation signifies a form of Ground Movement that only works on certain surfaces. The accompanying table lists examples and suggested values.

Restricted Path (-1 or more)

This Limitation represents a Vehicle that can only travel along a predefined path or paths. It most often applies to trains, subways, monorails, and the like; it could also apply to elevators defined as Vehicles. Typically it's worth -1, but it may be worth more (to a maximum of -2) if the

number of paths is very small. Vehicles with this Limitation should also take the Limited Maneuverability Limitation at the -1 level, and cannot take Advantages such as No Turn Mode or Sideways Maneuverability.

COMBAT DRIVING

Regardless of what powers you use to build a ground vehicle, characters use Combat Driving to operate them in crisis conditions.

ONLY ON APPROPRIATE TERRAIN

Value	Type Of Terrain
-1	Snow and ice: Vehicle can only operate at full speed on snow and ice. It can only attain one-fourth (25%) of Combat velocity on other surfaces, and may suffer Control Roll penalties.
-½	Very smooth surfaces: Vehicle can only operate at full speed on relatively unmarred pavement and similar very smooth surfaces. On less smooth surfaces (such as a badly potholed road, gravel road, or typical off-road terrain), it can only attain half (50%) of its Combat velocity (at most), and suffers Control Roll penalties (page 170)
-¼	Smooth surfaces: Vehicle can only operate at full speed on surfaces at least as smooth as rough roads, gravel roads, smooth meadows, and the like. On less smooth surfaces (such as typical off-road terrain), it can only attain half (50%) of its Combat velocity (at most), and suffers Control Roll penalties (page 170)

The values listed in this table assume the Ground Movement will be used in a campaign that primarily takes place in an urban, temperate environment. Gamemasters should adjust these values for other settings.

POWERING GROUND VEHICLES

Like any other vehicle, a ground vehicle needs a way to propel itself — a source of power to move it along the road. There are basically five ways to power a ground vehicle: gravity (coasting); operator muscle power (pedaling and pushing); external muscle power (towing and pulling); wind power (land sailing); and motors and engines.

GRAVITY (COASTING)

Vehicles powered by gravity are *coasting*. They cannot power or move themselves; the only way they can move is for gravity to drag them downhill (as with children's sleds and toboggans, snowboards, and skateboards in some instances). They barely qualify as "vehicles" at all.

Vehicles with this form of movement buy it as Gliding that takes a $-\frac{1}{2}$ Limitation, *Coasting*. This is similar to the *Ground Gliding* Limitation (*Hero System 5th Edition, Revised*, page 182), but is even more restrictive. First, the Gliding only works in contact with the ground; the Vehicle may be able to leave the ground for brief moments (such as when a skateboarder jumps over an obstacle), but that's all. Second, it leaves traces or tracks, unless the surface prevents it (as pavement would). Third, the Vehicle must "drop" 1" per Phase, as with normal Gliding, but in this case the drop involves going down an incline such as a hill or ramp. If an incline doesn't allow for at least 1" drop per Phase, the GM may restrict the number of inches the Vehicle can move based on the steepness of the incline; a Vehicle can only build up so much speed on a shallow slope. If the incline is steeper than 1" per Phase, normal rules for the affect of gravity on movement apply.

The GM may also allow the operator of a light-weight coasting Vehicle to make up for some of its loss of velocity by "pushing" the vehicle in some way (such as a skateboarder pushing forward on the ground with his foot). As long as the Vehicle does not weigh more than 25 kg, the operator can use a Half-Phase Action to add a number of inches of movement equal to his standing leap (half the distance in the Leap column of the Strength Table on page 34 of the *Hero System 5th Edition, Revised*). The Vehicle still cannot exceed the maximum speed indicated by the inches of movement purchased for it (plus any inches gained from gravity).

At most, a Vehicle with the *Coasting* Limitation can have 360" Gliding per Turn — terminal velocity based on gravity, in other words. On worlds with different gravity than Earth's, you should adjust this appropriately; see *Star Hero*, page 279. The Vehicle should not buy any Noncombat multiples, and may take the *No Noncombat Movement* ($-\frac{1}{4}$) Limitation.

OPERATOR MUSCLE POWER (PEDALING AND PUSHING)

Some ground vehicles, including bicycles, unicycles, and non-motorized wheelchairs and scooters, derive their power primarily from the muscles of the rider. These vehicles have a lot in common with coasting vehicles, and often benefit from the effects of gravity on movement (*Hero System 5th Edition, Revised*, page 364) or also have a coasting-based Gliding power.

In the simplest cases, you can build these vehicles as bonuses to a character's base Running, bought with the following Limitations: Focus (OAF, typically), Turn Mode ($-\frac{1}{4}$), Only On Appropriate Terrain ($-\frac{1}{4}$), and in some cases Cannot Move Backwards ($-\frac{1}{4}$). The latter Limita-

tion would be appropriate for some bikes, but not for the likes of wheelchairs and unicycles.

If you prefer to build these vehicles as actual Vehicles, buy Ground Movement, typically 12" worth — twice the Running of an average person — with the following Limitations: Velocity Cannot Exceed Twice Rider's Running (-0), *Costs Endurance* (rider's END; $-\frac{1}{2}$), and Only On Appropriate Terrain ($-\frac{1}{4}$). Cannot Move Backwards ($-\frac{1}{4}$) is often appropriate as well. Velocity Cannot Exceed Twice Rider's Running signifies that there's an upper limit on the Vehicle's speed, based on the strength and stamina of the rider. The Vehicle should not buy any Noncombat multiples, and may take the *No Noncombat Movement* ($-\frac{1}{4}$) Limitation.

Some operator-powered Vehicles are designed with more inches of Ground Movement, to allow more powerful riders to achieve more speed. In the case of operator-powered vehicles with multiple pedallers — "kinetic sculptures" — the Vehicle should have 12" of Ground Movement, +2" per potential pedaller after the first. When the Vehicle has more than one operator, use the highest Running of all of them, +1" per person after the first, to determine the Vehicle's speed.

EXTERNAL MUSCLE POWER (TOWING AND PULLING)

Towed vehicles — carts, chariots, wagons, sleds, and the like — were among the first vehicles ever invented. They're built using Gliding with the Limitation *Towed* ($-\frac{1}{2}$). Towed is identical to *Coasting* (see above), except that the Vehicle does not have to "drop" 1" per inch moved, and usually can't even roll downhill on its own. For example, the front bar on a chariot prevents it from rolling, and a cart or wagon usually has a brake to stop the wheels from moving when it's at rest. (Of course, if the operator forgets to set the brake, the Vehicle could roll as if *Coasting*.) A towed vehicle should also have the Limitation *Costs Endurance* (towing creature's END; $-\frac{1}{2}$).

However, a towed Vehicle's movement depends not just on its inches of Gliding, but on the strength of what's pulling it along. Typically this means a beast of burden, such as a horse or dog, but that depends on the setting and the circumstances. A towed Vehicle's maximum movement equals the maximum of its inches of Gliding or the tower's inches of Running, whichever is less.

But there's more to consider than just the towing creature's inches of Running — his STR matters, too. Compare the total mass of the Vehicle and its contents (if any) to the tower's STR and consult the Encumbrance Table (*Hero System 5th Edition, Revised*, page 379). Encumbrance reduces the inches of Running the towing creature can apply to the Vehicle. If the weight of the Vehicle exceeds what the towing creature can lift, or the Encumbrance penalty reduces its Running to 0" or below, it cannot move the Vehicle. If it can move the Vehicle, all normal Encumbrance penalties apply.

Sometimes, an operator hitches more than one animal (or other towing creature) to his Vehicle — such as a dogsled team or a forty-mule wagon train. In this case, add the weight that all the towing creatures can lift together (don't add their STRs, just the weight they can lift). Then compare this total to the Strength Table (*Hero System 5th Edition, Revised*, page 34) to determine the “group STR” of the animal team. Use that STR as described above. (Alternately, if all the animals are the same STR, for every x2 animals, add +5 STR.) All towing creatures must pay the END cost for the Vehicle's movement while they tow.

An animal (or other being) harnessed to tow a Vehicle is at ½ DCV if attacked individually. It may also be hit as part of an attack on the overall Vehicle, if the attacker rolls an appropriate Location on the Hit Location table. If the towing creature is killed, or so badly injured it cannot move, the Vehicle immediately stops moving. In the case of multiple-tower teams, add the injured towing creature's weight to the weight of the Vehicle; that may be enough to bring it to a halt or slow it down. If the Vehicle stops this way, the operator must make a Combat Driving roll at -2; if he fails, the Vehicle crashes.

A towed Vehicle should not take any extra Noncombat multiples or maneuverability-related Advantages. In fact, many take the *No Noncombat Movement* (-¼) and *Limited Maneuverability* Limitations.

The connection point between the towing creature and the Vehicle is vulnerable. It typically has a DEF equal to the DEF of the Vehicle (or less, if appropriate), and only 1-2 BODY. A Vehicle designer may buy extra DEF or BODY especially for it with the *Partial Coverage* (-2) Limitation. If damage or a deliberate act severs the connection, the Vehicle separates from the towing creature and decelerates at its normal rate until it comes to a stop.

Since the towing creature and towed Vehicle are so closely tethered, add their Knockback modifiers together if any one of them is attacked.

Vehicles Towing Vehicles

In some cases, one Vehicle tows another Vehicle, rather than being towed by an animal or the like. Examples include train cars (towed by a locomotive), the trailer of a tractor-trailer, and motorcycle sidecars. This works like other towing situations (except that the towed Vehicle doesn't take the *Costs Endurance* Limitation unless the towing Vehicle is built with an Endurance Reserve).

WIND POWER (LAND SAILING)

A few ground vehicles, such as the “prairie schooners” of the early American pioneers, use wind power to propel themselves. In essence, they're a cross between a towed vehicle and a wind-powered watercraft; the wind

takes the place of the towing creature. Buy a wind-powered ground vehicle like a Vehicle with the *Sailed* Limitation (page 57).

MOTORS AND ENGINES

Many vehicles — and certainly most of the ground vehicles that appear in a typical *Hero System* campaign — use engines and motors to provide the power that moves the vehicle forward. From the steam engines of early locomotives, to the most advanced internal combustion engines in modern automobiles, technology has provided ways to move land vehicles far faster than any of the other methods described above.

Engine-based Vehicles use Ground Movement to represent how they move. The Advantages and Limitations on their movement have more to do with how they maintain contact with the ground (see below) than their source of power. However, engines do require fuel. Typically this means buying Fuel Charges for the Ground Movement, or taking the optional *Fuel Dependent* Limitation (page 30).

Types Of Engines

Roughly speaking, there are three types of engines that might be found on vehicles: steam engines; internal combustion engines; and turbines. (Additionally, see the Power Systems section on page 153. In *Star Hero* campaigns or other games with highly advanced technology, some of those systems could be adapted to ground vehicles.)

People have used steam engines for ground vehicles since the early 1800s, though the principles behind them were known almost 2,000 years ago, and the first steam-powered ocean vessel, the *Gran Louis*, was launched in 1751. They consist of a boiler where a wood- or coal-fueled fire heats water until it becomes steam, and an engine into



which the pressurized steam is released to work pistons. Early steam engines led to forced draft steam engines, and then to triple- and quadruple-expansion steam engines, both of which allowed for higher pressures and smoother working. It takes one minute to get a steam engine started (an *Extra Time* Limitation).

Internal combustion engines ignite fuel inside an enclosed cylinder to work a piston. Gas-burning engines burn a mixture of fuel and oxygen; diesel engines compress the fuel to ignite it. Until the 1930s the driver usually had to get out and crank the engine to start it (an *Extra Time* Limitation); thereafter electric starters were standard. Advanced engines are made of lighter-weight metals (or even ceramics), and can burn other fuels (such as hydrogen-oxygen mixtures).

Turbines turn a series of vanes to produce rotary motion. This is simpler than working a piston, and so usually allows for a lighter-weight engine and a smoother ride. Steam turbines were used in vehicles beginning in 1896, and gas turbines deriving from jet engine technology exist during the latter half of the twentieth century. Magnetohydrodynamic turbines, using magnetic fields and ionized plasma, are even more powerful than gas turbines.

Steam engines and gasoline-powered internal combustion engines require outside oxygen and positive atmospheric pressure, so they won't work underwater or on planets with Thin or Trace atmospheres (see *Star Hero*, page 87). Other engines don't suffer from, or can be modified to avoid, these restrictions.

Converting Real-World Engines

Many gamers like to try to convert real-world ground vehicles into game terms. Mostly this means figuring out how many inches of Ground Movement a car or motorcycle needs to match its real-world maximum speed. Calculating the top speed a given engine can impart to a vehicle depends on the size and configuration of the engine, the weight and configuration of the vehicle, air resistance (drag), considerations of horsepower and torque, friction, and many other

factors. In short, it involves complex physics equations far too detailed to go into here.

Rather than jumping through so many hoops, it's easier to find out the top speed of the car as reported in reference sources and work from there. First, convert a vehicle's speed in miles per hour to *Hero System* inches. There are 804.5" per mile, so multiply MPH by 804.5. That's how many inches the vehicle can travel in an hour at top speed. (If you're using kilometers per hour, multiply by 500 instead.)

Divide that figure by 60 (to get inches per minute), and divide the result by 5 (to get inches per Turn). Once you know inches per Turn, divide by the Vehicle's SPD to determine how many inches it has to move per Phase to maintain that velocity. Since that represents the Vehicle's maximum (Noncombat) velocity, typically a Vehicle needs to buy half that many inches of movement.

Example: *Nighthawk* wants to build a supercar with a top speed of 200 miles per hour. That equals 160,900" per hour (200 x 804.5), or 2,682" per Minute, or 536" per Turn. *Nighthawk* wants his car to have SPD 6 (to match his own SPD), so it needs to move 89" per Phase (he rounds up to 90" per Phase). Given the supercar's normal x2 Noncombat multiplier, he needs a total of 45" of Ground Movement, costing his Vehicle 78 points.

See the accompanying Miles Per Hour Table for a quick reference.

If you want a ground vehicle's engine to provide power for other systems on the Vehicle, you should buy it as an Endurance Reserve or the like.

MAINTAINING GROUND CONTACT

Power alone isn't enough — a ground vehicle also needs a way to maintain contact with the ground so it can move forward. There are six primary ways to do this: Antigravity; Duct Fans; Legs; Runners; Tracks; and Wheels. Here's how to simulate them in *Hero System* terms.

ANTIGRAVITY

In science fiction settings, it's possible to have hovercraft and similar vehicles which ride on fields of antigravity strong enough to keep the vehicle a few feet off the ground, but too weak for true flight. You can buy this not as Ground Movement, but as Flight with the Limitation *Must Remain Within 4" Of A Surface* (-½). That allows for a limited amount of maneuverability, while keeping the Vehicle firmly linked to the ground; it could not, for example, cross a chasm or "fly" from the roof of one tall building to another. It could, however, "fly" over a body of water. Given its high maneuverability, any of the maneuverability-related Advantages are appropriate, but not required.

MILES PER HOUR TABLE

Inches	Speed				
	2	3	4	5	6
5"	7	11	15	19	22
10"	15	22	30	37	45
15"	22	34	45	56	67
20"	30	45	60	75	90
25"	37	56	75	93	112
30"	45	67	90	112	134
35"	52	78	104	130	157
40"	60	90	119	149	179
45"	67	101	134	168	201
50"	75	112	149	186	224

"Inches" indicates the number of inches the Vehicle has purchased (plus any it gets for free). This table assumes Vehicles have the standard x2 Noncombat velocity and use it when achieving maximum speed.

DUCT FANS

The mode of propulsion for some types of modern-day hovercraft, duct fans are large fans positioned beneath and behind a vehicle to allow it to ride on a cushion of air. While they can travel over rough terrain (such as potholed roads and most cleared, level land), they cannot handle steep inclines, leap over obstacles, or cope with extremely rough ground. Take a $-\frac{1}{4}$ *Only On Appropriate Terrain* Limitation to reflect this.

You can build duct fans as Ground Movement, typically with no more than a x4 Noncombat multiplier (at most) and the *Sideways Maneuverability* Advantage at the $+\frac{1}{4}$ level (see page 15). Many duct fan vehicles also have the same amount of surface-only inches of Swimming to represent their ability to travel across calm bodies of water. Neither mode of movement should take the *No Turn Mode* Advantage. At the GM's option, a character can apply the *OAF* Limitation to duct fan Ground Movement if the fans are easily accessed and damaged.

LEGS

Some Vehicles walk much like humans and animals do, but on mechanical legs. Since this form of movement is almost exclusively associated with mecha, it's discussed in Chapter Six.

RUNNERS

Vehicles designed to move over ice and other slick surfaces, such as sleds, have runners (or "blades") that allow them to be pulled over the ground easily. They function as a towed vehicle, with the additional Limitation *Only On Appropriate Terrain* (ice and snow; -1). The GM may allow them to move at up to one-fourth (25%) speed over other relatively slick surfaces, like a level field of short grass. Because they're specifically designed to move on ice and snow, they do not suffer the standard Combat Driving penalty for doing so (see Environmental Movement, page 21).

TRACKS

Tracks are a series of pads (usually made of metal or rubber) attached to a sturdy but flexible loop made of metal links turned by two sprocket wheels. A linear series of small wheels (idler wheels) inside the loop and in contact with its bottom half supports the weight of the vehicle. They're most commonly found on tanks, construction vehicles, and snowmobiles. Some, such as tanks, have a slight upward arch on the outer bottom edge of the track (to make it easier to move over obstacles); others use flat loops to maximize contact with the ground.

Steering a tracked vehicle involves altering the speed of one track so that torque causes the vehicle to turn in the direction of the slower track. Tracked vehicles can "climb" (crawl) over barriers no more than about half the height of the looped track, though they're often heavy and sturdy enough to just crush or smash through bigger obstacles. Due to their weight and form, they sometimes damage roadways. However, they're usually superb for off-road condi-

tions; while they can't negotiate steep gullies or step over crevasses, they can maneuver over terrain that would stop a wheeled vehicle.

You can build tracked vehicles as Ground Movement with the $-\frac{1}{4}$ level of *Only On Appropriate Terrain* to represent the few places they have trouble going; they don't take OAF like wheels do because they typically have the same DEF as the Vehicle itself. The maximum Noncombat multiplier should be x4. They should not take any maneuverability-related Advantages (except possibly No Turn Mode, for tracked vehicles that can stop one tread so quickly they almost "turn on a dime"). With the GM's permission, they may be able to take an automatic Side Effect to represent the damage they do to roads and other surfaces, but if so this is a $-\frac{1}{4}$ Limitation (since it's Minor and only affects the environment around the Vehicle).

WHEELS

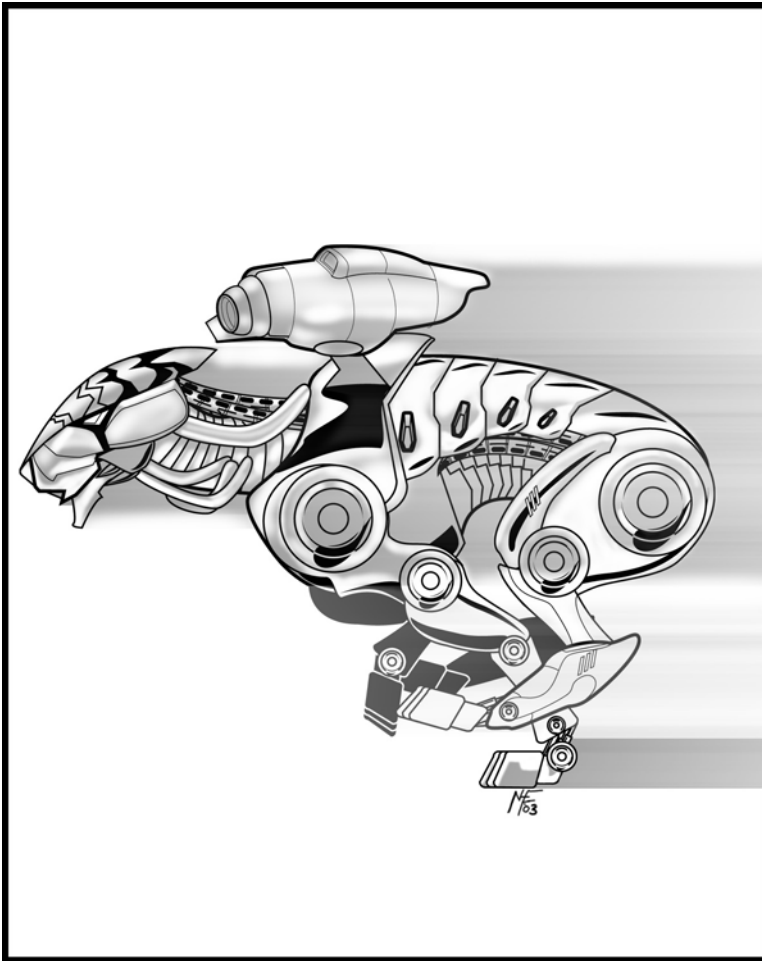
The most common way for a vehicle to maintain contact with the ground is wheels — circular supports that turn around a pivot point, or which are attached in pairs to an axle so that the whole assembly turns in a uniform fashion. In the modern day, the most common form of wheels is tires (a rubber casing surrounding a smaller metal wheel, to allow for a smoother ride), but throughout history wheels have been made of many substances.

Wheeled vehicles are usually bought as Ground Movement with two Limitations. The first is the $-\frac{1}{4}$ level of *Only On Appropriate Terrain*. A vehicle with wheels is usually limited to moving over relatively smooth terrain. While some all-terrain vehicles can handle just about any environment, most wheeled vehicles have difficulty with rough ground, badly potholed roads, and so forth. Similarly, they can't cross chasms or maneuver into and out of deep ravines.

The second, and more important, Limitation is Obvious Accessible Focus (worth $-1\frac{1}{2}$, since it gets the Bulky modifier like most vehicular Foci). While a vehicle's wheels cannot be removed from the vehicle in one Phase, they can easily be damaged or destroyed in that time, making them Accessible. They do not receive the benefit of the vehicle's BODY or DEF. When you build a vehicle with wheels, the wheels have BODY 2, DEF 2 (if the vehicle's BODY and/or DEF is lower than 2, the wheels have that BODY and/or DEF instead). If you want sturdier wheels, you may add BODY or DEF using the *Partial Coverage* (-2) Limitation. See the accompanying table for details on and costs of various types of wheels.

When a Vehicle takes wheels, it may have up to four wheels. If it wants more than that, it must pay for them at the usual rate of x2 wheels for +5 Character Points, or the actual cost of the wheels, whichever is lower. If the wheels are Standard, they have a cost of 1 Character Point for these purposes.

Wheeled Vehicles usually have a Noncombat multiplier of no more than x8, but it can be higher. They can buy No Turn Mode and Full Reverse, if appropriate, but not Sideways Maneuverability.



Losing Wheels

Losing wheels usually slows a Vehicle down, and can eventually bring it to a complete halt. As a general guideline, reduce a Vehicle's movement in proportion to the percentage of wheels it has lost. For example, if a truck has 18 wheels, and seven of them (39%) are blown away by attackers, reduce its Ground Movement by 39%. In the case of ground vehicles with tires, the GM may reduce this effect slightly, since even without a tire the vehicle can ride on the rim.

OTHER MODES OF GROUND MOVEMENT

A few ground vehicles move in other ways: by jumping or digging in the earth.

LEAPING

While no Vehicle gets any inches of Leaping from its STR — they all start with 0" Leaping — they can buy Leaping if they wish. This isn't common, since riding in a Vehicle that bounces down the road is neither dignified nor comfortable, but it occasionally shows up for Vehicles that have "jump-jets" or the like. In most cases, a Vehicle shouldn't be allowed to buy more Leaping than it could naturally have for its STR; mecha are often an exception, due to their humaniform construction.

Of course, many wheeled ground vehicles can make jumps off of ramps or the like, as described on page 212. A Vehicle could buy Leaping with the -1 Limitation, *Only Adds To Jumping*, so that the inches only apply when the Vehicle makes a jump.

TUNNELING

Even more unusual than Leaping is Tunneling. Nevertheless, pulp-era masterminds, comic-book supervillains, and science fiction prospectors could all have "mole machines" designed to dig down into earth and rock. Typically these Vehicles also have Ground Movement, and can't tunnel at a greater velocity than they can move along the ground.

GROUND VEHICLE SUMMARY

Here's a quick reference for how to build various common types of ground vehicles.

Automobiles, Trucks, Buses and the like: Ground Movement, wheeled (OAF) with tires ranging from Standard to Super-Reinforced, Only On Appropriate Terrain (-¼), Fuel Charges (varies). Larger examples take Limited Maneuverability (-¼) as well.

Bicycles: As extra inches of Running, OAF (-1), Turn Mode (-¼), Only On Appropriate Terrain (-¼) or as a Vehicle with Ground Movement, wheeled (OAF), Only On Appropriate Terrain (-¼), Velocity Cannot Exceed Twice Rider's Running (-0), *Costs Endurance* (rider's END; -½), and the *Two-Wheeled Physical Limitation*, with Standard, Heavy, or Racing tires.

Carts, Chariots, Wagons, and the like: Gliding, Towed (-½), wheeled (OAF, with wheels ranging from Wood to Metal), Only On Appropriate Terrain (-¼), *Costs Endurance* (towing creature's END; -½).

Hovercraft (Antigravity): Flight, Must Remain Within 4" Of A Surface (-½).

Hovercraft (Duct Fans): Ground Movement, Sideways Maneuverability (+¼), Only On Appropriate Terrain (-¼).

Motorcycle: As Automobile, but with the *Two-Wheeled Physical Limitation*, and DEF that has the *Does Not Protect Occupants* (-½) Limitation.

Sleds and Sleighs: Gliding, Towed (-½), runners, Only On Appropriate Terrain (snow and ice; -1).

Snowmobiles: Ground Movement, tracked and runners, Only On Appropriate Terrain (snow/ice; -1), Fuel Charges (varies).

Tanks: Ground Movement, tracked, Only On Appropriate Terrain (-¼), Fuel Charges (varies).

Trains: Ground Movement, wheeled (OAF, metal wheels), Restricted Path (-1), Limited Maneuverability (-1), Fuel Charges (varies), *Extra Time* (steam engines).

OTHER PARTS OF A GROUND VEHICLE

Besides its means of powering itself and maintaining contact with the ground, a ground vehicle has many other parts and pieces that hold it together and make operating it easier. Some of the major devices and systems found in most ground vehicles, and how you might make use of them in your game, include:

Brakes: The brakes apply pressure to the wheels to slow down, and eventually stop, the vehicle. In primitive ground vehicles, a brake may be nothing more than a piece of wood positioned so the operator can move it against the wheel; in a modern automobile, the braking system involves complex hydraulics. You can represent an improved braking system (including anti-lock brakes, which improve stopping speed while minimizing the chance of skidding and loss of control) in several ways: as the *Increased Deceleration Adder* or a construction trade-off that gives a vehicle more deceleration (page 23); or as *Combat Skill Levels* with the *Hit The Brakes* maneuver (page 179).

Carburetors and Fuel Injectors: Carburetors, and their more modern replacements fuel injectors, mix the proper amount of air and fuel so the engine runs with maximum efficiency. Fuel injectors have been available since the 1950s; since the early 1980s in Europe and 1990 in America, they have completely replaced carburetors on ground vehicles. To simulate improved fuel injectors, you could buy one or two extra inches of *Ground Movement*, since the greater the efficiency of the engine, the faster it can move the car.

Chassis: Broadly speaking, the chassis is the body of the car — the framework to which the manufacturer attaches the engine, wheels, and other systems. The chassis determines the shape and configuration of the vehicle — for example, whether it's got wheel wells or open wheels, and whether the engine is in front of or behind the driver. The best way to represent an improved chassis is to buy more *BODY* for a Vehicle, or perhaps a few more points of *DEF*. A Vehicle's chassis might also justify giving it a *Distinctive Features* Disadvantage.

Drive Train: The drive train includes the transmission, torque converter, differential, and other parts of the automobile that help convert engine power into forward movement. To represent an improved drive train, buy a few extra inches of *Ground Movement*, one *Noncombat Multiple*, or perhaps even the *Increased Acceleration/Deceleration Adders* (page 23) — all representing more efficient shifting of gears, the ability to get the most out of the engine's power, and so forth.

Suspension: The suspension is the springs, shock absorbers, supports, and other parts of the car that support the chassis and other components on the wheels and axles, and which keep the

WHEELS TABLE

Wheel Type	DEF	BODY	Cost	Notes
Standard	2	2	0	This is the default wheel type, of undefined substance or style
Metal, solid	6	6	4	
Metal, spoked	6	5	4	
Stone, solid	5	5	3	
Stone, spoked	5	4	3	
Wood, solid	4	4	2	
Wood, spoked	4	3	2	
Metal reinforcement	+1	+0	+1	Metal bands attached to the outer edge of a stone or wooden wheel.
Tire Type	DEF	BODY	Cost	Notes
Standard	2	2	0	This is the default tire type
Heavy	3	3	4	
Puncture-Resistant	4	4	4	
Racing	3	3	6	Provide +1 to <i>Combat Driving</i> rolls due to improved handling, but are Susceptible (to being driven on anything but a smooth racing track; take 1 <i>BODY</i> per hour of operation, or 2 <i>BODY</i> per hour on rough terrain; -0)
Reinforced	5	5	5	
Self-Inflating	var	var	+5	Any tire except Solid or Super-Reinforced can be made Self-Inflating. Whenever the tire takes its full <i>BODY</i> damage, the tire automatically seals the puncture and reinflates itself (<i>Healing BODY</i> 2d6 (set effect: enough to return the tire to 1 <i>BODY</i>), <i>Trigger</i> (+¼); <i>OAF</i> (-1), <i>Self Only</i> (-½), 1 <i>Charge</i> (-2); total cost: 5 points). It can only do this once (you must replace the tire to recover the <i>Charge</i>), and cannot do it if the tire is completely destroyed (<i>i.e.</i> , takes twice its <i>BODY</i> in damage). Pay the +5 point cost once for all tires on a ground vehicle. Standard tires that provide a +1 <i>Combat Driving</i> bonus for rolls to maintain control on snow and ice
Snow	var	var	+2	
Solid	6	6	6	
Super-Reinforced	7	7	6	

The *BODY* of wheels and tires assumes they're roughly the diameter of a modern automobile tire, and in the case of wheels about 5-8 cm wide. For substantially larger wheels and tires, such as those found on some construction vehicles or wagons, the GM may wish to increase the *BODY*.

A tire's *BODY* represents how much *BODY* it takes to deflate it, making it useless; completely destroying it takes twice its *BODY*. All tires' *BODY* is *Vulnerable* (-1) to sharp attacks (such as blades), but tires have +4 *DEF*, *Only Versus Blunt Attacks* (-1) (such as clubs) (this extra *DEF* adds 2 points to the tires' cost, which are already figured in). Standard tires gain these benefits for no point cost.

"Cost" indicates the Character Point cost the Vehicle pays for the wheels themselves; it does not include the cost of the *Ground Movement* for the Vehicle. It includes the application of the *OAF* and *Partial Coverage* (-2) Limitations.

wheels in contact with the ground. They come in many types, such as double-wishbone or McPherson, each with its own benefits and drawbacks for various types of ground vehicles.

The higher the quality of a vehicle's suspension, the better it handles (because it keeps the wheels in better contact with the ground), and the more comfortable the operator and passengers are. You can represent an improved suspension by buying a *Movement Skill Level* or two.

GROUND VEHICLE EVERYVEHICLE EQUIPMENT

The following systems and pieces of equipment are commonly found on modern-day ground vehicles and have so little game effect you should normally consider them Everyvehicle Equipment for ground vehicles. The text provides power construction suggestions for GMs who prefer to make Vehicles pay for some or all of these devices.

The GM decides which, if any, of these devices is Everyvehicle Equipment for a given type of vehicle, based on special effects and common sense. For example, a motorcycle shouldn't have a Heater/Air Conditioner, and muscle-powered vehicles may not have any of these systems.

Battery: Ground vehicles have batteries to get their motors started and run systems like the radio and heater. As long as these devices only operate when the vehicle's engine is running, the battery can last for years, since the engine's action recharges it. If people use those systems while the car is turned off, the battery can burn out in as little as a few hours. (You can buy this as an Endurance Reserve, with 10 END, and 10 REC that only Recovers while the vehicle's engine is running (-¼); in that case, make many of the devices described below Cost Endurance (-½), if they don't already.)

Cigarette Lighter: A device that quickly heats a metal coil, so that passengers can use the hot metal to light cigarettes. Many devices can plug into the cigarette lighter's socket and draw power from the battery. (Change Environment (make device hot enough to light cigarettes), Reduced Endurance (0 END; +½); OIF Bulky (-1); total cost: 3 points.)

Clock: A typical time-telling device. (Absolute Time Sense; OIF Bulky (-1); total cost: 1 point.)

Ground Vehicle Sensors: The plethora of sensors that indicate the performance of a ground vehicle: odometer, speedometer, tachometer; engine temperature gauge, fuel gauge, and so forth. (Detect

Vehicle Performance And Use Information 16-; OIF Bulky (-1); total cost: 6 points.)

Headlights: Strong lights on the front of the car to illuminate the road at night or in other conditions of restricted visibility. (Sight Group Images, Increased Size (8" Cone; +½), Reduced Endurance (0 END; +½); OIF Bulky (-1), Only To Create Light (-1), Limited Arc Of Use (60 Degrees forward, same horizontal level; -¾); total cost: 5 points.)

Heater/Air Conditioner: Climate-control devices designed to keep the operator and passengers cool in hot conditions, and warm in cold weather. (Life Support (Safe Environments: Intense Heat, Intense Cold); OIF Bulky (-1); total cost: 2 points.)

Internal Lights: Various lights inside the vehicle, to illuminate its interior if necessary. (Sight Group Images, 1" radius, Reduced Endurance (0 END; +½); OIF Bulky (-1), Only To Create Light (-1), Self Only (-½); total cost: 4 points.)

Locks, Standard: Basic locks for the vehicle's doors, trunk, and ignition. (Lockpicking 8-; total cost: 1 point.)

Radio: A typical AM/FM radio receiver, possibly with tape deck, CD player, or the like included. (Radio Perception; OIF Bulky (-1); total cost: 4 points.)

Seatbelts: Safety restraints to protect the passengers from the effects of sudden starts, stops, and collisions. (+4 PD; OIF Bulky (-1), Only To Protect Occupants Against Damage From Collisions (-2); total cost: 1 point.)

Signal Lights: Turn signals, brake lights, and other exterior lights that signal the driver's intentions to other drivers. (Sight Group Images, 1" radius, Reduced Endurance (0 END; +½); OIF Bulky (-1), Only To Create Specific Types Of Light (-1), Self Only (-½); total cost: 4 points.)

Windshield Wipers: Rubber-bladed "arms" that keep the windshield free from rain or snow, thus ensuring the driver's vision isn't impeded. (Change Environment (keep windshield unobstructed), Reduced Endurance (0 END; +½); OIF Bulky (-1); total cost: 3 points.)

SAMPLE GROUND VEHICLES



The rest of this chapter contains sixteen sample ground vehicles, ranging from chariots to supercars, both as a resource for players and GMs and as examples if you want something to review before building your own ground vehicles.

TEN-SPEED BICYCLE

Val	Char	Cost	Notes
0	Size	0	1" x .25"; -0 KB; -0 DCV
10	STR	0	Lift 100 kg; 2d6 HTH [0]
14	DEX	12	OCV: 5/DCV: 5
4	BODY	-6	
2	DEF	0	
3	SPD	6	Phases: 4, 8, 12
Total Characteristic Cost: 12			

Movement: Ground: 12"/24"

Abilities & Equipment

Cost	Power	END
3	<i>Pedaling:</i> Ground Movement +6" (12" total); OAF (standard tires; -1½), Cannot Move Backwards (-¼), Velocity Cannot Exceed Twice Rider's Running (-0), Only On Appropriate Terrain (-¼), <i>Costs Endurance</i> (rider's END; -½)	1
-2	<i>Ground Vehicle:</i> Swimming -2" (0" total)	

Total Abilities & Equipment Cost: 1

Total Vehicle Cost: 13

Value Disadvantages

5	Physical Limitation: Two-Wheeled (Infrequently, Slightly Impairing)
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Total Disadvantage Points: 5

Total Cost: 8/5 = 2

Description: The character sheet depicts a typical ten-speed bicycle, such as an average commuter might ride in a bicycle-friendly community. The bicycle's status as an inexpensive, compact, non-polluting, exercise-rich mode of transportation also makes it a favored mode of transportation for many people, particularly in large, crowded cities.

There are many different versions of bicycles, among them beginners' one-speed bikes (with or without training wheels), dirt bikes, and racing bikes with fifteen or more gears. You can use this write-up for them by making minor changes to the size and the number of inches of Ground Movement the bike has.

CHARIOT

Val	Char	Cost	Notes
2	Size	10	1.6" x .8"; -2 KB; -1 DCV
20	STR	0	Lift 400 kg; 4d6 HTH [0]
15	DEX	15	OCV: 5/DCV: 5
12	BODY	0	
3	DEF	2	Does Not Protect Occupants (-½)
3	SPD	5	Phases: 4, 8, 12
Total Characteristic Cost: 32			

Movement: Ground: 0"/0"
Gliding (Towed): 15"/30"
Swimming: 0"/0"

Abilities & Equipment

Cost	Power	END
-12	<i>Not Self-Mobile:</i> Ground Movement -6" (0" total)	
-2	<i>Ground Vehicle:</i> Swimming -2" (0" total)	
4	<i>Towed Wheeled Vehicle:</i> Gliding 15"; OAF Bulky (-1½), Towed (-½), <i>Costs Endurance</i> (towing creature's END; -½), Only On Appropriate Terrain (-¼)	1
3	<i>Metal-Banded Spoked Wooden Wheels</i> (5 DEF, 3 BODY; see page 41)	0

Total Abilities & Equipment Cost: -7

Total Vehicle Cost: 25

Value Disadvantages

None

Total Disadvantage Points: 0

Total Cost: 25/5 = 5

OPTIONAL EQUIPMENT

Cost	Equipment
+8	<i>Wheel Scythes:</i> HKA 1d6 (up to 2d6 with STR and velocity), Reduced Endurance (0 END; +½); OIF Bulky (-1), Real Weapon (-¼), Must Perform A Move By To Use (-½)

Description: Chariots were used by many ancient peoples, including the Egyptians, Greeks, Romans, and Irish. They consist of semi-circular carriage open at the back (so the driver and passenger can easily climb in and out) with an axle beneath and a pair of wheels (one to each side), and a tow-pole at the front to which one or more horses were tied. When no horses are attached, the vehicle tips forward so the tow-pole rests on the ground and prevents the vehicle from moving. Some war-chariots also had long scythe-like blades projecting from the hub of the wheel, allowing the driver to make lethal sideswipes against people and other chariots.

The carriage itself, typically made of wood or wicker and sometimes reinforced with metal, is open to the air, and its sides and front only come up to about the level of a person's waist. Its DEF is bought with the Does Not Protect Occupants Limitation, but at the GM's discretion, the DEF might protect against attacks that hit an occupant in Hit Locations 13-18.

Some chariots carried only one person — the owner, who both drove and fought from it. Others had two people, a driver and the owner, thus leaving the owner free to concentrate on fighting or watching the passing scenery. Some chariots could carry as many as four people.

STAGECOACH

Val	Char	Cost	Notes
3	Size	15	2" x 1"; -3 KB; -2 DCV
35	STR	10	Lift 3,200 kg; 7d6 HTH [0]
10	DEX	0	OCV: 3/DCV: 3
13	BODY	0	
4	DEF	5	Does Not Protect Driver(s); -¼
3	SPD	10	Phases: 4, 8, 12
			Total Characteristic Cost: 40

Movement: Ground: 0"/0"
Gliding (Towed): 9"/18"
Swimming: 0"/0"

Abilities & Equipment

Cost	Power	END
-12	<i>Not Self-Mobile:</i> Ground Movement -6" (0" total)	
-2	<i>Ground Vehicle:</i> Swimming -2" (0" total)	

2	<i>Towed Wheeled Vehicle:</i> Gliding 9"; OAF Bulky (-1½), Towed (-½), <i>Costs Endurance</i> (towing creature's END; -½), Only On Appropriate Terrain (-¼)	1
2	<i>Spoked Wooden Wheels:</i> (4 DEF, 3 BODY; see page 41)	0

Total Abilities & Equipment Cost: -10

Total Vehicle Cost: 30

Value Disadvantages

None

Total Disadvantage Points: 0

Total Cost: 30/5 = 6

Description: Ubiquitous throughout the American West during the latter half of the 1800s, stagecoaches crop up in just about every *Western Hero* game. This writeup represents the typical six-horse Concord coach, which weighed around 2,000 pounds and cost \$1,200 to \$1,500. The coach itself rested on a thoroughbrace construction (two three-inch-wide leather strips) to make the ride relatively smooth (though not truly comfortable). It averages about eight miles per hour on decent roads in good weather.

Up to twenty-one passengers could ride in a stagecoach (nine inside, twelve sitting on the roof with the luggage and cargo). The driver sat on top in the front, exposing him to the elements but giving him an excellent view of the scenery. He was often accompanied by a guard "riding shotgun" in case bandits or outlaws tried to rob the stage. Valuables and mail are stored in the "boot" underneath their seat.



TWO- OR FOUR-DOOR AUTOMOBILE

Val	Char	Cost	Notes
4	Size	20	2.5" x 1.25"; -4 KB; -2 DCV
30	STR	0	Lift 1,600 kg; 6d6 HTH [0]
15	DEX	15	OCV: 5/DCV: 5
14	BODY	0	
3	DEF	2	Limited Coverage (not on windshield/windows; -¼)
3	SPD	5	Phases: 4, 8, 12
			Total Characteristic Cost: 42

Movement: Ground: 25"/100"
Swimming: 0"/0"

Abilities & Equipment

Cost	Power	END
16	<i>Motorized Wheeled Vehicle:</i> Ground Movement +19" (25" total), x4 Noncombat; OAF (standard tires; -1½), Only On Appropriate Terrain (-¼), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0)	[1cc]
-2	<i>Ground Vehicle:</i> Swimming -2" (0" total)	

Total Abilities & Equipment Cost: 14
Total Vehicle Cost: 56

Value Disadvantages

None

Total Disadvantage Points: 0
Total Cost: 56/5 = 11

OPTIONAL EQUIPMENT

Cost	Equipment
15	<i>Police Car:</i> Add Emergency Lights & Siren and Public Address System (page 166) (and possibly also a <i>Distinctive Features</i> Disadvantage)

Description: This character sheet represents a typical two- or four-door American automobile as of about the year 2000. It has a top speed of about 110 miles per hour (and that's pushing it), and can carry three passengers comfortably, or up to five if they're crammed in. It also has a trunk with room for two or three large suitcases or the like.

You can use this writeup for most mid-sized automobiles, subtracting or adding a few inches of movement or a Size category to get a compact, a luxury car, a taxi, or the like. The options let you convert this car into a simple police car; many such cars also have improved handling and some extra inches of Ground Movement.

LOTUS ESPRIT TURBO

Val	Char	Cost	Notes
3	Size	15	2" x 1"; -3 KB; -2 DCV
25	STR	0	Lift 800 kg; 5d6 HTH [0]
21	DEX	33	OCV: 7/DCV: 7
13	BODY	0	
3	DEF	2	Limited Coverage (not on windshield/windows; -¼)
4	SPD	9	Phases: 3, 6, 9, 12
			Total Characteristic Cost: 59

Movement: Ground: 30"/120"
Swimming: 0"/0"

Abilities & Equipment

Cost	Power	END
19	<i>Motorized Wheeled Vehicle:</i> Ground Movement +24" (30" total), x4 Non-combat; OAF (standard tires; -1½), Only On Appropriate Terrain (-¼), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0)	[1cc]
-2	<i>Ground Vehicle:</i> Swimming -2" (0" total)	

Skills
6 *Superb Handling:* +3 with Ground Movement

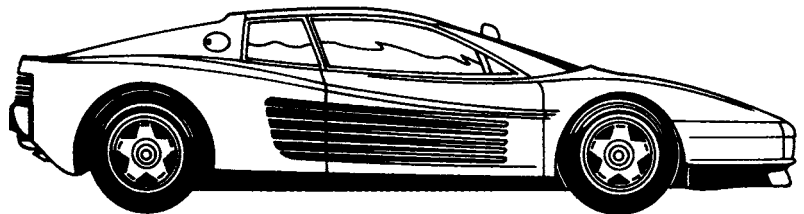
Total Abilities & Equipment Cost: 23
Total Vehicle Cost: 82

Value Disadvantages

10	<i>Distinctive Features:</i> Sportscar (Concealable With Difficulty; Noticed And Recognizable)
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Total Disadvantage Points: 10
Total Cost: 72/5 = 14

Description: The Lotus Esprit Turbo is a sleek, high-powered sportscar able to go from zero to 60 in as little as 4.7 seconds and reach top speeds of about 180 miles per hour. With its advanced engine and superb suspension, it handles extremely well.



SPORTS UTILITY VEHICLE

Val	Char	Cost	Notes
4	Size	20	2.5" x 1.25"; -4 KB; -2 DCV
35	STR	5	Lift 3,200 kg; 7d6 HTH [0]
14	DEX	12	OCV: 5/DCV: 5
14	BODY	0	
4	DEF	5	Limited Coverage (not on windshield/windows; -¼)
3	SPD	6	Phases: 4, 8, 12
			Total Characteristic Cost: 48

Movement: Ground: 23"/92"
Swimming: 0"/0"

Abilities & Equipment

Cost	Power	END
14	<i>Motorized Wheeled Vehicle:</i> Ground Movement +17" (23" total), x4 Noncombat; OAF (standard tires; -1½), Only On Appropriate Terrain (-¼), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0)	[1cc]
-2	<i>Ground Vehicle:</i> Swimming -2" (0" total)	

Total Abilities & Equipment Cost: 12

Total Vehicle Cost: 60

Value Disadvantages

None

Total Disadvantage Points: 0

Total Cost: 60/5 = 12

Description: This writeup represents a typical SUV, or sports utility vehicle. Although its large size and four-wheel drive allow it to handle far rougher terrain than a typical automobile, there are still limits on where it can go.

You can also use this writeup for many types of pickup trucks. The major difference between them is that any cargo carried by a pickup truck remains exposed to the elements (and attacks).



SUPERCAR

Val	Char	Cost	Notes
4	Size	20	2.5" x 1.25"; -4 KB; -2 DCV
40	STR	10	Lift 6,400 kg; 8d6 HTH [0]
23	DEX	39	OCV: 8/DCV: 8
18	BODY	4	
6	DEF	12	
5	SPD	17	Phases: 3, 5, 8, 10, 12
			Total Characteristic Cost: 102

Movement: Ground: 36"/144"
Swimming: 0"/0"

Abilities & Equipment

Cost	Power	END
24	<i>Motorized Wheeled Vehicle:</i> Ground Movement +30" (36" total), x4 Noncombat; OAF (reinforced tires; -1½), Only On Appropriate Terrain (-¼), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0)	[1cc]
10	<i>Reinforced Self-Inflating Tires:</i> (5 DEF, 5 BODY; see page 41)	0
-2	<i>Ground Vehicle:</i> Swimming -2" (0" total)	
30	<i>Twin Forward Machine Guns:</i> RKA 2d6, Armor Piercing (+½), Autofire (5 shots; +½), 50 Charges (+½); IIF Bulky (-¾), Limited Arc Of Fire (60 Degrees forward, only on same horizontal level; -¾)	[50]
14	<i>Retractable Side-Mounted Rocket Launchers:</i> RKA 3d6, Explosion (+½); IIF Bulky (-¾), Limited Arc Of Fire (one hex row in front of vehicle, only on same horizontal level; -1), 1 Charge (-2)	[1]
5	<i>Retractable Side-Mounted Rocket Launchers:</i> Another RSML (total of two)	
6	<i>Oil Slicker:</i> Change Environment 8" Cone, -4 to all DEX-based Rolls to move on/through; IIF Bulky (-¾), Real Weapon (-¼), No Range (-½), Limited Arc Of Fire (60 Degrees behind vehicle, only on same horizontal level; -¾), Only Affects Characters Who Are Moving On The Ground (-¼), 4 Charges (-1)	[4]
19	<i>Armored Panels:</i> +8 DEF; Limited Coverage (not on windshield/windows; -¼)	0
10	<i>Retractable Armor:</i> +6 DEF; Nonpersistent (-¼), Extra Time (Half Phase to activate; -¼), Visible (-¼)	0
2	<i>Advanced Restraint System:</i> +10 PD; OIF Bulky (-1), Only To Protect Occupants Against Damage From Collisions (-2)	0
25	<i>Extremely Advanced Locks:</i> Lockpicking 20-	0
10	<i>Hermetically Sealed, With Oxygen Supply:</i> Life Support (Self-Contained Breathing)	0
5	<i>Communications Systems:</i> HRRP (Radio Group); OIF Bulky (-1), Affected As Sight And Hearing Groups As Well As Radio Group (-½)	0
6	<i>Ejection Seats:</i> Telekinesis (26 STR); OIF Bulky (passenger's side seat; -1), Affects Whole Object (-¼), No Range (-½), Only To Throw Target Straight Up (-2), 1 Recoverable Charge (-1¼)	[1rc]

- 5 *Ejection Seats*: Another Ejection Seat (driver's seat) [1rc]
- 45 *Anti-Theft System*: EB 8d6, NND (defense is rED on the parts of the body touching the car; +1), Trigger (when someone attempting unauthorized entry fails, or fails to make, a Security Systems roll to access vehicle; +¼); IIF Bulky (-¾), 12 Charges (-¼) [12]

Skills

- 10 *Tactical Computer*: +2 with Ranged Combat
- 8 *Superb Handling*: +4 with Ground Movement
- 6 *Autopilot*: Combat Driving 14-; OIF Bulky (-1)
- 10 *Navigational Computer*: AK: Campaign City & Environs 30-; OIF Bulky (-1)

Total Abilities & Equipment Cost: 248
Total Vehicle Cost: 350

Value Disadvantages

None (or to be chosen by player)

Total Disadvantage Points: 0
Total Cost: 350/5 = 70

OPTIONAL EQUIPMENT

Cost Superhero/Vigilante Options Package

- 6 *Criminalistics Lab*: Criminology 14-; OIF Bulky (-1)
- 6 *Criminalistics Lab*: Forensic Medicine 14-; OIF Bulky (-1)
- 10 *Underworld Database*: KS: The Underworld 30-; OIF Bulky (-1)

Description: While this automobile resembles a typical car — often a sportscar or other high-end vehicle — in fact it's a heavily armed and armored supercar, suitable for use by dashing super-spies or grim crimefighters. Able to reach speeds in excess of 250 miles per hour, it carries armor capable of deflecting small arms fire (and additional retractable armor for emergencies). Its weapons, including twin forward-mounted machine guns, one-shot rocket launchers that pop out from the doors to fire forward, and an oil slick generator, are bought as IIF because they're normally concealed. When in use, they're quite obvious.

This Vehicle doesn't have a Computer, but rather several Skills or other abilities simulating a computer. You could easily remove these and build an actual Computer into it if you wish.

TRACTOR-TRAILER TRUCK

Val	Char	Cost	Notes
10	Size	50	10" x 5"; -10 KB; -6 DCV
60	STR	0	Lift 100 tons; 12d6 HTH [0]
10	DEX	0	OCV: 3/DCV: 3
20	BODY	0	
4	DEF	5	Limited Coverage (not on windshield/windows; -¼)
3	SPD	10	Phases: 4, 8, 12
			Total Characteristic Cost: 65

Movement: Ground: 21"/84"
 Swimming: 0"/0"

Abilities & Equipment

Cost	Power		END
12		<i>Motorized Wheeled Vehicle</i> : Ground Movement +15" (21" total), x4 Non-combat; OAF (standard tires; -1½), Only On Appropriate Terrain (-¼), Limited Maneuverability (-¼), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0) [1cc]	
14		<i>Eighteen Wheels</i> : +14 wheels (total of 18)	0
-2		<i>Ground Vehicle</i> : Swimming -2" (0" total)	
3		<i>CB Radio</i> : Radio Perception/Transmission; OAF Bulky (-1½), CB Band Only (-1)	0

Total Abilities & Equipment Cost: 27
Total Vehicle Cost: 92

Value Disadvantages

None

Total Disadvantage Points: 0
Total Cost: 92/5 = 18

Description: This writeup represents a typical "eighteen-wheeler" tractor-trailer truck. It's about 72 feet (11") long, 10 feet (1.5") wide, and can carry a weight of around 40,000 pounds on its rear axle.

This Vehicle actually consists of two parts, the "semi" in front (where the engine is and the driver rides) and the trailer, which attaches to the semi with a "kingpin" that fits into a large bolt-like holder. Technically, it would be more accurate to write the semi up as a normal motorized wheeled Vehicle, and the trailer as a towed vehicle, since it can't move on its own — but that's more detail than most games need. Usually it's easier just to think of it as one overall vehicle.

If the driver of a tractor-trailer fails a Combat Driving roll to decelerate more quickly than normal, there's a chance the vehicle "jackknives," moving forward on its own to end up at a 90-degree angle to the semi. To determine if a jackknife occurs, the GM should roll 2d6, adding 1 for each point by which the driver missed his roll. On a result of 8 or more, the truck jackknives.

SCHOOL BUS

Val	Char	Cost	Notes
7	Size	35	5" x 2.5"; -7 KB; -4 DCV
45	STR	0	Lift 12.5 tons; 9d6 HTH [0]
10	DEX	0	OCV: 3/DCV: 3
17	BODY	0	
4	DEF	5	Limited Coverage (not on windshield/windows; -¼)
2	SPD	0	Phases: 6, 12
			Total Characteristic Cost: 40

Movement: Ground: 22"/88"
Swimming: 0"/0"

Abilities & Equipment

Cost	Power	END
12	<i>Motorized Wheeled Vehicle:</i> Ground Movement +16" (22" total), x4 Noncombat; OAF (standard tires; -1½), Only On Appropriate Terrain (-¼), Limited Maneuverability (-¼), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0) [1cc]	
2	<i>Six Wheels:</i> +2 wheels (total of 6)	0
-2	<i>Ground Vehicle:</i> Swimming -2" (0" total)	

Total Abilities & Equipment Cost: 12

Total Vehicle Cost: 52

Value Disadvantages

None

Total Disadvantage Points: 0

Total Cost: 52/5 = 10

Description: Large, orange school buses are a familiar sight in most places in America. A typical school bus is about 30-35 feet long (5"), about eight feet (a little more than 1") wide, and can carry as many as 72 students plus a driver. It has an emergency exit in the back, and its signal lights include numerous lights and signs to alert other drivers to its presence and remind them to stop when it stops to pick up children.

ARMORED CAR

Val	Char	Cost	Notes
6	Size	30	4" x 2"; -6 KB; -4 DCV
45	STR	5	Lift 12.5 tons; 9d6 HTH [0]
10	DEX	0	OCV: 3/DCV: 3
20	BODY	4	
5	DEF	9	
3	SPD	10	Phases: 4, 8, 12
			Total Characteristic Cost: 58

Movement: Ground: 20"/80"
Swimming: 0"/0"

Abilities & Equipment

Cost	Power	END
11	<i>Motorized Wheeled Vehicle:</i> Ground Movement +14" (20" total), x4 Noncombat; OAF (standard tires; -1½), Only On Appropriate Terrain (-¼), Limited Maneuverability (-¼), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0) [1cc]	
7	<i>Armored Section:</i> +3 DEF; Limited Coverage (not on windshield/windows or engine cowlings; -¼)	0
4	<i>Heavy:</i> Knockback Resistance -2 (adds to standard -6)	0
5	<i>Reinforced Tires:</i> (5 DEF, 5 BODY; see page 41)	0
2	<i>Six Wheels:</i> +2 wheels (total of 6)	0
-2	<i>Ground Vehicle:</i> Swimming -2" (0" total)	
4	<i>Radio:</i> Radio Perception/Transmission; OAF Bulky (-1½)	0

Total Abilities & Equipment Cost: 31

Total Vehicle Cost: 89

Value Disadvantages

10	<i>Distinctive Features:</i> Armored Car (Concealable With Difficulty; Noticed And Recognizable)	
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Total Disadvantage Points: 10

Total Cost: 79/5 = 16

Description: This character sheet represents a typical armored car, with six wheels and a gross vehicular weight of about 26,000 pounds. Many other sizes are possible; large national security firms sometimes operate armored tractor-trailers, for example.

Although the armored car is tougher all-around than a typical automobile, only the body around the driver's section and the rear cargo section is heavily armored. The windshield, windows, and engine cowlings in the front remain relatively vulnerable.

STEAM LOCOMOTIVE

Val	Char	Cost	Notes
9	Size	45	8" x 4"; -9 KB; -6 DCV
55	STR	0	Lift 50 tons; 11d6 HTH [0]
10	DEX	0	OCV: 3/DCV: 3
19	BODY	0	
5	DEF	7	Limited Coverage (not on parts of cab; -¼)
2	SPD	0	Phases: 6, 12
			Total Characteristic Cost: 52

Movement: Ground: 15"/60"
Swimming: 0"/0"

Abilities & Equipment

Cost Power **END**

4 *Steam-Powered Wheeled Vehicle:* Ground Movement +9" (15" total), x4 Noncombat; OAF (spoked metal wheels; -1½), Restricted Path (-1), Limited Maneuverability (-1), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0), Extra Time (1 Minute; -1½) [1cc]

4	<i>Spoked Metal Wheels:</i> (6 DEF, 5 BODY; see page 41)	0
6	<i>Ten Wheels:</i> +6 wheels (total of 10)	0
-2	<i>Ground Vehicle:</i> Swimming -2" (0" total)	

Total Abilities & Equipment Cost: 12
Total Vehicle Cost: 64

Value Disadvantages

None

Total Disadvantage Points: 0

Total Cost: 64/5 = 13

Description: This character sheet represents a large steam locomotive of the "Wild West" era, such as a Consolidated 2-8-0. It's about 50 feet long, ten feet wide, and can travel at about 45 miles per hour on good, level track.

This writeup does not include the tender (the fuel car often attached immediately behind it) or the rolling stock (passenger and freight cars it pulls). Those would be built as towed wheeled vehicles with a speed equal to the locomotive's.



**M2 BRADLEY INFANTRY
FIGHTING VEHICLE**

Val	Char	Cost	Notes
5	Size	25	3.2" x 1.6"; -5 KB; -3 DCV
45	STR	10	Lift 12.5 tons; 9d6 HTH [0]
12	DEX	6	OCV: 4/DCV: 4
20	BODY	5	
14	DEF	36	
3	SPD	8	Phases: 4, 8, 12
			Total Characteristic Cost: 90

Movement: Ground: 18"/36"
Swimming: 2"/4"

Abilities & Equipment

Cost	Power	END
19	<i>Motorized Tracked Military Vehicle:</i> Ground Movement +12" (18" total); Only On Appropriate Terrain (-¼), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0)	[1cc]
79	<i>25mm M 242 Chain Gun:</i> RKA 4d6+1, Autofire (5 shots; +½), +1 Increased STUN Multiplier (+¼), 900 Charges (+1); OIF Bulky (-1), Real Weapon (-¼)	[900]
51	<i>7.62mm M240 Machine Gun:</i> RKA 2d6+1, Autofire (10 shots; +1), +1 Increased STUN Multiplier (+¼), 2,200 Charges (+1); OIF Bulky (-1), Real Weapon (-¼)	[2,200]
52	<i>TOW Missile Launchers:</i> RKA 5d6, Armor Piercing (+½), Explosion (+½), Increased Maximum Range (1,875", or 3.75 km; +¼); OIF Bulky (-1), Real Weapon (-¼), 4 Charges (-1)	[4]
5	<i>TOW Missile Launchers:</i> Another TOW Missile Launcher, but with only 3 Charges (total of 2)	[3]
14	<i>M257 Smoke Grenade Launchers:</i> Darkness to Sight Group 4" radius; OIF Bulky (-1), Real Weapon (-¼), 4 Continuous Charges lasting 1 Turn each (-½)	[4cc]
5	<i>M257 Smoke Grenade Launchers:</i> Another Smoke Grenade Launcher (total of 2)	[4]
22	<i>Engine Smokescreen Generator:</i> Darkness to Sight Group 5" radius; No Range (-½), 4 Charges lasting 1 Turn each (-½), Real Weapon (-¼)	[4cc]
10	<i>Strong Armor:</i> Hardened for 14 DEF	0
7	<i>Front Defense:</i> +4 DEF, Hardened (+¼); Limited Coverage (front 60 degrees; -1)	0
12	<i>NBC Protection:</i> Life Support (Safe Environment: High Radiation; Immunity to chemical and biological warfare agents)	0
3	<i>Flotation Screen:</i> Life Support (Self-Contained Breathing); OIF Bulky (-1), Only For Forging Shallow Water (-1), Extra Time (1 Minute to activate; -¾)	0
5	<i>Radio:</i> Radio Perception/Transmission; OIF Bulky (-1)	2
	<i>Nightvision:</i> Infrared Perception (Sight Group); OIF Bulky (-1)	0
2	<i>Nightvision:</i> Ultraviolet Perception (Sight Group); OIF Bulky (-1)	0

Talents

3 *Laser Rangefinder:* Absolute Range Sense

Skills

10 *Target Acquisition And Tracking:* +2 with Ranged Combat

Total Abilities & Equipment Cost: 299

Total Vehicle Cost: 389

Value Disadvantages

25 *Distinctive Features:* US Army IFV (Not Concealable; Causes Extreme Reaction [fear])
5 *Physical Limitation:* all weapons must point in same direction (Infrequently, Slightly Impairing)

Total Disadvantage Points: 30

Total Cost: 359/5 = 72

OPTIONAL EQUIPMENT
Cost Equipment

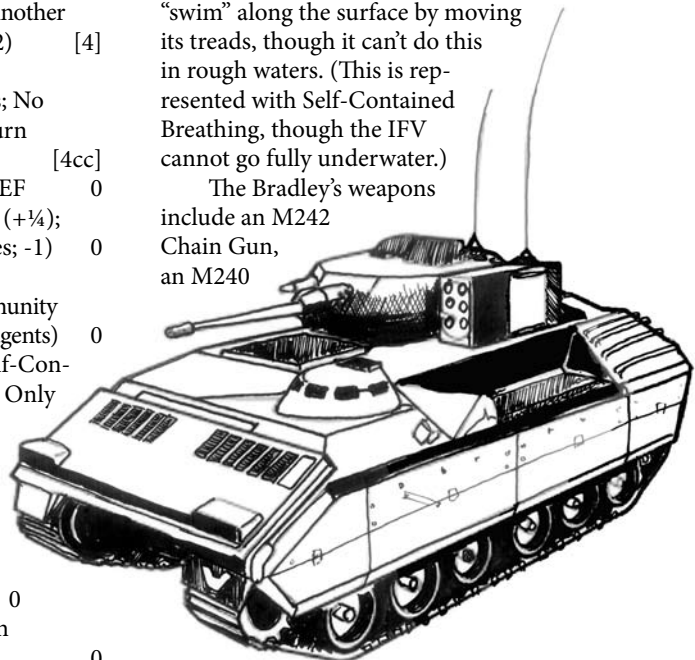
15 *M2A3 Variant Armor:* +4 DEF, Hardened (+¼)
2 *Commander's Independent Thermal Viewer:* Infrared Perception (Sight Group); OIF Bulky (-1)
5 *Upgraded Target Acquisition And Tracking:* +1 with Ranged Combat

Total cost: +22 points

Description: First fielded in 1981, the M2 Bradley IFV has a crew of three and can carry up to seven troops (who enter through a rear power ramp). It has a maximum speed of 41 miles per hour. It has an aluminum hull with spaced laminate steel armor for added protection (some more recent variants, such as the A3, have even more armor). It weighs about 24,000 kg.

The Bradley has fording amphibious capability, though this requires the crew to erect the IFV's flotation screen. With the screen up, the Bradley can "swim" along the surface by moving its treads, though it can't do this in rough waters. (This is represented with Self-Contained Breathing, though the IFV cannot go fully underwater.)

The Bradley's weapons include an M242 Chain Gun, an M240



machine gun, two TOW missile launchers, and two smoke grenade launchers with four grenades each. (The engine can also create a thick screen of smoke around the tank.) All the weapons are mounted on the front of the turret, which can rotate 360 degrees with an elevation of +60° to -10°, but that means they're all pointing in the same direction — if the Chain Gun is firing to the right, all the other weapons can only fire in that direction as well. However, the rear troop compartment has firing ports and periscopes so the passengers can also attack.

M1A1 ABRAMS MAIN BATTLE TANK

Val	Char	Cost	Notes
6	Size	30	4" x 2"; -6 KB; -4 DCV
5	STR	15	Lift 50 tons; 11d6 HTH [0]
10	DEX	0	OCV: 3/DCV: 3
25	BODY	9	
20	DEF	54	
3	SPD	10	Phases: 4, 8, 12

Total Characteristic Cost: 118

Movement: Ground: 18"/36"
Swimming: 2"/4"

Abilities & Equipment

Cost	Power	END
19	<i>Motorized Tracked Military Vehicle:</i> Ground Movement +12" (18" total); Only On Appropriate Terrain (-¼), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0)	[1cc]
120	<i>M256 120mm Smoothbore Cannon:</i> RKA 8d6, Indirect (can be arced over some intervening obstacles; +¼), +1 Increased STUN Multiplier (+¼), Increased Maximum Range (2,000"; +¼), 55 Charges (+½); OIF Bulky (-1), Real Weapon (-¼)	[55]
51	<i>7.62mm M240 Machine Guns:</i> RKA 2d6+1, Autofire (10 shots; +1), +1 Increased STUN Multiplier (+¼), 5,700 Charges (+1); OIF Bulky (-1), Real Weapon (-¼)	[5,700]
5	<i>7.62mm M240 Machine Guns:</i> Another M240 Machine Gun (mounted for anti-aircraft use)	[5,700]
65	<i>12.7mm M2 Anti-aircraft Machine Gun:</i> RKA 3d6, Autofire (10 shots; +1), +1 Increased STUN Multiplier (+¼), 1,000 Charges (+1); OIF Bulky (-1), Real Weapon (-¼)	[1,000]
16	<i>M250 Smoke Grenade Launchers:</i> Darkness to Sight Group 4" radius; OIF Bulky (-1), Real Weapon (-¼), 6 Continuing Charges lasting 1 Turn each (-¼)	[6]
5	<i>M250 Smoke Grenade Launchers:</i> Another Smoke Grenade Launcher (total of 2)	[6]
15	<i>Heavy Armor Package:</i> Hardened for 20 DEF	0
18	<i>Front Defense:</i> +10 DEF, Hardened (+¼); Limited Coverage (front 60 degrees; -1)	0
12	<i>NBC Protection:</i> Life Support (Safe Environment: High Radiation; Immunity to chemical and biological warfare agents)	0
2	<i>Deep Water Fording Kit:</i> Life Support (Self-Contained Breathing); OIF Bulky (-1),	

	Only For Fording Shallow Water (-1), Extra Time (1 Minute; -1½)	0
5	<i>Radio:</i> Radio Perception/Transmission; OIF Bulky (-1)	0
2	<i>Nightvision:</i> Infrared Perception (Sight Group); OIF Bulky (-1)	0
2	<i>Nightvision:</i> Ultraviolet Perception (Sight Group); OIF Bulky (-1)	0
2	<i>Commander's Independent Thermal Viewer:</i> Infrared Perception (Sight Group); OIF Bulky (-1)	0

Talents

3 *Laser Rangefinder:* Absolute Range Sense

Skills

15 *Target Acquisition And Tracking:* +3 with Ranged Combat

Total Abilities & Equipment Cost: 357

Total Vehicle Cost: 475

Value Disadvantages

25	<i>Distinctive Features:</i> US Army MBT (Not Concealable; Causes Extreme Reaction [fear])
5	<i>Physical Limitation:</i> all weapons except for anti-aircraft machine guns must point in same direction (Infrequently, Slightly Impairing)

Total Disadvantage Points: 30

Total Cost: 445/5 = 89

Description: First produced in 1987, the M1A1 represents a significant improvement over the standard M1 tank which was completed in 1980. It carries a crew of four. Its advanced Chobham armor, enhanced with both steel and depleted uranium plates, protects it from most attacks... but all that protection makes it weigh about 65 tons!

The M1A1's weapons include a 120mm main gun, two M40 machine guns (one for anti-aircraft use), an M2 anti-aircraft gun, and smoke generation systems. All the weapons are mounted on the front of the turret, which can rotate 360 degrees with an elevation of +20° to -9°; however, the two anti-aircraft machine guns have free movement and greater ranges of elevation.

HARLEY-DAVIDSON VRSCA V-ROD

Val	Char	Cost	Notes
1	Size	5	1.25" x .64"; -1 KB; -0 DCV
25	STR	10	Lift 800 kg; 5d6 HTH [0]
18	DEX	24	OCV: 6/DCV: 6
11	BODY	0	
4	DEF	4	Does Not Protect Occupant (-½)
4	SPD	12	Phases: 3, 6, 9, 12
			Total Characteristic Cost: 55

Movement: Ground: 24"/96"
Swimming: 0"/0"

Abilities & Equipment

Cost Power **END**

- 15 *Motorized Two-Wheeled Vehicle:*
Ground Movement +18" (24" total), x4 Noncombat; OAF (standard tires; -1½), Only On Appropriate Terrain (-¼), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0) [1cc]
- 2 *Ground Vehicle:* Swimming -2" (0" total)

Skills

- 4 *Superb Handling:* +2 with Ground Movement

Total Abilities & Equipment Cost: 17

Total Vehicle Cost: 72

Value Disadvantages

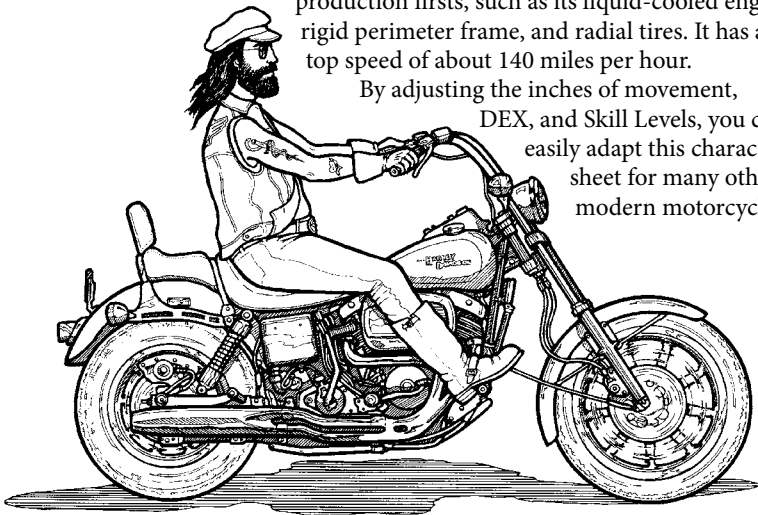
- 10 *Distinctive Features:* Valuable Motorcycle (Concealable With Difficulty; Noticed And Recognizable)
- 5 *Physical Limitation:* Two-Wheeled (Infrequently, Slightly Impairing)

Total Disadvantage Points: 15

Total Cost: 57/5 = 11

Description: Harley-Davidson's new VRSCA V-Rod, developed in conjunction with Porsche's engineering division, is a powerful and exotic "neo-retro" motorcycle which combines space age looks with the basic sensibilities of an American cruiser. Harley Davidson defines the V-Rod as a "performance custom." It features numerous Harley production firsts, such as its liquid-cooled engine, rigid perimeter frame, and radial tires. It has a top speed of about 140 miles per hour.

By adjusting the inches of movement, DEX, and Skill Levels, you can easily adapt this character sheet for many other modern motorcycles.

**HOVERCRAFT**

Val	Char	Cost	Notes
4	Size	20	2.5" x 1.25"; -4 KB; -2 DCV
40	STR	10	Lift 6,400 kg; 8d6 HTH [0]
20	DEX	30	OCV: 7/DCV: 7
14	BODY	0	
5	DEF	7	Limited Coverage (not on wind-shield/windows; -¼)
4	SPD	10	Phases: 3, 6, 9, 12
			Total Characteristic Cost: 77

Movement: Flight: 40"/160"
Ground: 0"/0"
Swimming: 0"/0"

Abilities & Equipment

Cost Power **END**

- 85 *Antigrav Units:* Flight 40", x4 Noncombat, Sideways Maneuverability (+½); Must Remain Within 4" Of A Surface (-½) 0
- 12 *Hover Only:* Ground Movement -6" (0" total)
- 2 *Hover Only:* Swimming -2" (0" total)
- 5 *Communications Systems:* HRRP (Radio Group); OIF Bulky (-1), Affected As Sight And Hearing Groups As Well As Radio Group (-½) 0

Total Abilities & Equipment Cost: 76

Total Vehicle Cost: 153

Value Disadvantages

None (or chosen by player)

Total Disadvantage Points: 0

Total Cost: 153/5 = 31

OPTIONAL EQUIPMENT**Cost Military Options Package**

- 2 Remove Limited Coverage Limitation from 5 DEF
- 15 +5 DEF
- 45 *High-Energy Military Laser:* RKA 3d6, Armor Piercing (+½), 50 Charges (+½); OIF Bulky (-1) [50]
- 6 *Radar Array:* Radar (Radio Group); OIF Bulky (-1), Affected As Sight Group As Well As Radio Group (-½) 0

Total cost: +68 points

Cost Police Options Package

- 15 *Alert System:* Add Emergency Lights & Siren and Public Address System (page 166)
- 13 *Traffic Monitoring System:* Detect Speed And Regulations Compliance Of Other Vehicles 16-, Discriminatory, Analyze, Range; OIF Bulky (-1)
- 16 *Anti-Speeding Beam:* Suppress Ground Movement 8d6; OIF Bulky (-1), Only Works On Civilian Hovercrafts' Ground Movement (-½)
- 7 *Anti-Speeding Beam Battery:* Endurance Reserve (30 END, 12 REC); OIF Bulky (-1)

Total cost: +51

Description: In the far future, when antigravity technology is commonplace, hovercraft replace automobiles. Faster and more maneuverable than vehicles which make physical contact with the ground, they make transportation and cargo-carrying more efficient than ever.

This writeup represents a typical personal civilian hovercraft, such as the average citizen might drive to work. It can carry the driver and up to six passengers comfortably. The options packages represent common alterations for hovercraft used by the police and military.

CYBERTANK

Val	Char	Cost	Roll	Notes
60	STR	50	21-	Lift 100 tons; 12d6 [6]
20	DEX	30	13-	OCV: 7/DCV: 7
10	CON	0	11-	
30	BODY	40	15-	
25	INT	15	14-	PER Roll 14-
0	EGO	0	—	ECV: N/A
40	PRE	30	17-	PRE Attack: 8d6
10	COM	0	11-	
40	PD	108		Total: 40 PD (40 rPD)
40	ED	117		Total: 40 ED (40 rED)
6	SPD	30		Phases: 2, 4, 6, 8, 10, 12
14	REC	0		
0	END	-10		
—	STUN	—		Total Characteristics Cost: 410

Movement: Running: 30"/60"
Leaping: 0"/0"
Swimming: 0"/0"

Cost	Powers	END
38	<i>Motorized Tracked Military Vehicle:</i> Ground Movement +24" (30" total); Only On Appropriate Terrain (-¼)	(0)
-2	<i>Ground Vehicle:</i> Swimming -2" (0" total)	
540	<i>Micro-Nukes:</i> RKA 20d6, Explosion (-1 DC/3"; +1), Increased Maximum Range (15,000", or 30 km; +¼); 10 Charges (-¼)	[10]
300	<i>Mega-Cannon:</i> RKA 10d6, Armor Piercing (+½), 60 Charges (+½)	[60]
150	<i>Blaster Cannons:</i> RKA 5d6, Explosion (+½), 45 Charges (+½)	[45]
15	<i>Blaster Cannons:</i> Seven more Blaster Cannons (total of 8)	[45]
112	<i>Minor Weapons Systems:</i> RKA 2d6, Variable Advantage (+1 Advantages; +2), Variable Special Effects (any weapon; +¼), Reduced Endurance (0 END; +½)	0
15	<i>Cybertank Body:</i> Does Not Bleed	0
45	<i>Cybertank Body:</i> Takes No STUN	0
30	<i>Atomic Battery:</i> Reduced Endurance (0 END; +½) on 60 STR	0
30	<i>Atomic Battery:</i> Reduced Endurance (0 END; +½) on Ground Movement 30"	0
120	<i>Cybertank Body:</i> Damage Resistance (40 PD/40 ED)	0
144	<i>Heavy:</i> Knockback Resistance -24"	0
45	<i>Cybertank Body:</i> Life Support: Total	0
5	<i>Visual Sensors:</i> Infrared Perception	

	(Sight Group)	0
5	<i>Visual Sensors:</i> Ultraviolet Perception (Sight Group)	0
18	<i>Visual Sensors:</i> +12 versus Range for Sight Group	0
15	<i>Auditory Sensors:</i> Active Sonar (Hearing Group)	0
3	<i>Auditory Sensors:</i> Ultrasonic Perception (Hearing Group)	0
12	<i>Radio Sensors:</i> HRRP (Radio Group)	0
20	<i>Radar Array:</i> Radar (Radio Group), Increased Arc Of Perception (360 Degrees)	0
9	<i>Sensor Enhancements:</i> +3 PER with all Sense Groups	0

Talents

12 *Onboard Computer Systems:* Absolute Range Sense, Absolute Time Sense, Bump Of Direction, Lightning Calculator

Skills

20 +2 Overall
20 +4 with Ranged Combat
7 Computer Programming 16-
7 Electronics 16-
19 KS: Militaries Of The World 30-
7 Systems Operation 16-
7 Tactics 16-

Total Powers & Skills Cost: 1,768

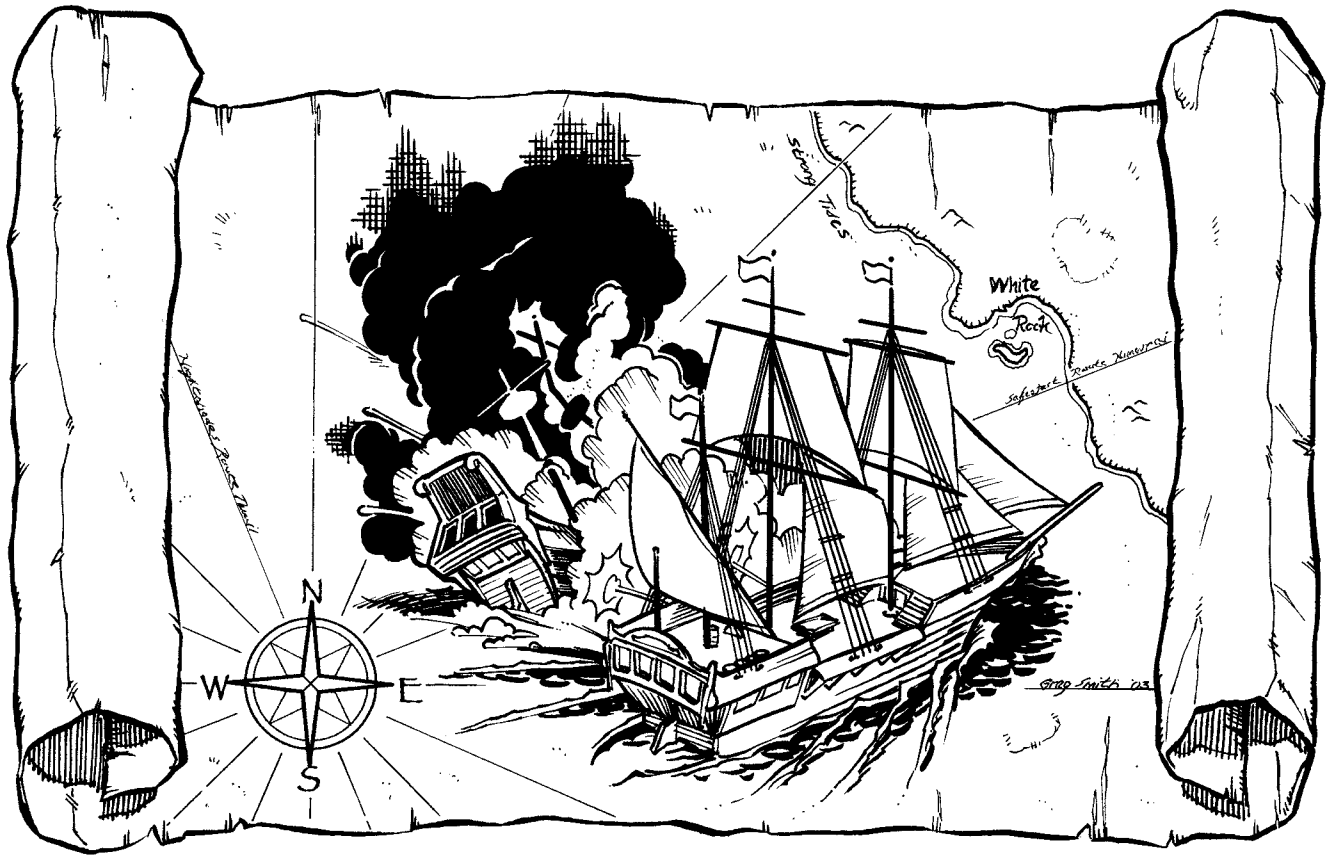
Total Cost: 2,178

75+ Disadvantages

5 Physical Limitation: Affected By Cyberkinesis (has EGO 30 for purposes of cyberkinetic powers, and can be affected by cyberkinesis-based Presence Attacks) (Infrequently, Slightly Impairing)
15 Physical Limitation: Gargantuan (64m long; -10 DCV, +10 to PER Rolls to perceive) (Frequently, Greatly Impairing)
12 Physical Limitation: Reduced Leap, cannot leap (Infrequently, Slightly Impairing)
15 Physical Limitation: Very Limited Manipulation (Frequently, Greatly Impairing)
25 Psychological Limitation: Must Obey Programmer's/Owner's Commands (Very Common, Total)
2,031 Experience Points

Total Disadvantage Points: 2,178

Description: This character sheet provides an example of how to build a sentient vehicle as an Automaton rather than a Vehicle. It depicts a cybernetic tank of the distant, dark future — an enormous machine body run by an organic mind, whose only purpose is to destroy the enemies its programmer sends it against. Equipped with heavy armor, a mega-blaster cannon, various other blasters and weapons, and ten micro-nuke missiles with a range of 30 kilometers, it's the king of the battlefield.



3 TO SAIL THE OCEAN BLUE WATER VEHICLES

As fun as it is to travel over land, it's often necessary or desirable to travel over (or under) water. People have been “going down to the sea in ships” for mil-

lennia, and despite the rise of air travel, watercraft remain vital to commerce and entertainment. This chapter discusses the different types of water vehicles and how to build them, and provides ten examples to get you started.

WATER VEHICLE BASICS



To build a water vehicle, you mainly need to know what powers it. Many other considerations (hull size and shape, for example) go into the real-world calculations of how a watercraft works, but for game purposes those are either irrelevant or simply influence the vessel's speed.

All water vehicles are built with the Power *Swimming*.

SWIMMING

All Vehicles start with 2" of Swimming, and watercraft add to that in varying degrees. Even though these inches are free, if a Vehicle applies a Power Advantage to its Swimming, it must account for the 2-point cost when calculating the value of the power, unless the rules note an exception (see page 35 for an example involving Running).

Unlike characters, water Vehicles automatically have a Turn Mode with Swimming. Except in the case of some ultra-advanced technologies or magical watercraft, water Vehicles may reduce their Turn Mode with Movement Skill Levels, but should not completely eliminate it (either that way, or with the *No Turn Mode Advantage*) — they're simply not that maneuverable. In fact, most water Vehicles take the *Limited Maneuverability* Limitation on their Swimming, and unless the GM gives permission should not take any maneuverability-related Advantages. Many motorized water Vehicles take the *Cannot Move Backwards* Limitation.

SURFACE ONLY (-1)

Except for submarines and other vessels which can go underwater, most water vehicles take the *Surface Only* (-1) Limitation on their Swimming. This allows them to sail along the surface; if they go underwater, it means they've sunk.

COMBAT DRIVING/PILOTING

If a water Vehicle can only move on the surface, a character uses Combat Driving to maneuver it in combat. If a water Vehicle can submerge and fight underwater, a character uses Combat Piloting to maneuver it in combat.

In games where sailed vessels play an important part, GMs may wish to expand on the Skill needed to operate them. Rather than a simple Transport Familiarity, the GM could require characters to buy a revised form of Combat Driving, *Combat Sailing*, based on DEX. Characters would use this to make Skill Rolls to arrange the sails properly (or take them down in time to prevent

storms from damaging them), tack against the wind, and perform other tasks relating to keeping the ship moving. On a badly-failed roll (by 6 or more), the crew may hoist the sails so poorly that the ship heels (rolls) too much, causing it to tip over, take on water, and sink... unless the crew discovers the error before the problem becomes uncorrectable.

POWERING WATER VEHICLES

There are three basic ways for a water vehicle to propel itself across (or beneath) the waves: pushing against the water, harnessing the wind, or being towed by sea creatures. Wind power requires sails; pushing against the water involves rowing or propellers. Some water vehicles have more than one type of propulsion.

ROWING

Small watercraft (such as rowboats and kayaks) and larger vessels used by ancient peoples (such as Greek biremes or Viking knarrs) move through the water thanks to the muscle power of people on board. They use oars (long poles with a flattened "blade" at one end) to push the vessel through the water. The stronger the rower, or the more rowers there are, the faster the vessel can go.

You can build a rowed water Vehicle using Swimming, Surface Only (-1), OAF (oars), *Costs Endurance* (rower's END; -½). Breaking a rowed vessel's oars is a common tactic in early naval warfare. Applying OAF means a ship has up to four oars; for each +5 Character Points or the actual cost of the oars (whichever is cheaper), the vessel can up to double the number of oars it has, per the usual rules. Oars are assumed to have BODY 2, DEF 2 (if the vehicle's BODY and/or DEF is lower than 2, the oars have that BODY and/or DEF instead). If a vessel wants to have sturdier oars, it can make them stronger and tougher in much the same manner as tires (page 41).

However, a rowed Vehicle's movement depends not just on its inches of Swimming, but on the strength of the rower(s). A rowed Vehicle's maximum movement equals the maximum of its inches of Swimming or the rower's inches of Leaping (see below), whichever is less.

To determine how fast a rower can row a watercraft, consult the Strength Table (*Hero System 5th Edition, Revised*, page 34) and find out how far the rower can make a running broad

KNOTS

Water vehicles measure their speed in knots. One knot equals one nautical mile per hour, or 1.151 statute miles (926") per hour. Thus, a ship which can maintain a speed of 20 knots travels at 23 miles per hour.

WATER VEHICLES AND STRENGTH

Most Vehicles, if loaded with more weight than their STR can carry, simply can't move (see page 10). Water Vehicles are different. If a character loads too much weight onto one, it sinks or capsizes.

SINKING

A watercraft sinks when it takes on too much water to remain afloat. Typically water enters the hull through holes made by attacks or running aground, but it can also do so if the ship heels (tips over).

To determine if a ship sinks, first determine how much water has leaked into the hull. Each cubic hex of water weighs approximately 17,600 pounds (8,000 kilograms). When the weight of the water inside the hull, in addition to the weight of other objects on board, exceeds the Vehicle's lifting capacity based on STR, the Vehicle sinks. That's why bulkheads (page 59) can help keep

Continued on next page



Continued from last page

a ship afloat — they partition off the inside of the vessel and prevent too much water from leaking in.

jump forward Leap with his STR. Subtract 1” for each point of Size the water Vehicle has. If the final result is 0” or less, the rower isn’t strong enough to move the Vehicle. If the result is 1” or more, that’s how fast the rower can move the vessel, to a maximum of the inches of Swimming it’s purchased. If the rowing inches exceed the Swimming inches, that usually indicates too many rowers or a poor vessel design.

Sometimes, an operator has more than one rower — a slave galley in a fantasy setting might have a crew of hard-muscled slaves chained to the oars, for example. In this case, add the weight all the rowers can lift together (don’t add their STRs, just the weight they can lift). Then compare this total to the Strength Table to determine the “group STR” of the rowers. Use that STR as described above. (Alternately, if all the rowers are the same STR, for every x2 rowers, add +5 STR.) All rowers must pay the END cost for the Vehicle’s movement while they row.

A rower is at ½ DCV if attacked individually. He may also be hit as part of an attack on the overall Vehicle (if the attacker rolls an appropriate Location on the Hit Location table for the Vehicle). If a rower is killed, or so badly injured he cannot row, the Vehicle immediately stops moving. In the case

of multiple rowers, add the injured rower’s weight to the weight of the Vehicle; that may be enough to bring it to a halt or slow it down. If a water Vehicle stops this way, that typically means it’s adrift, at the mercy of the currents, but it may indicate that it capsizes or the like.

A rowed Vehicle should not take any extra Noncombat multipliers or maneuverability-related Advantages. In fact, many take the No Noncombat Movement (-¼) and Limited Maneuverability Limitations.

Losing Oars

Losing oars usually slows a water Vehicle down, and can eventually bring it to a complete halt. As a general guideline, reduce a Vehicle’s movement in proportion to the percentage of oars it has lost. For example, if a bireme has 36 oars, and 16 of them (44%) are destroyed by attackers, reduce its rowing-based Swimming by 44%. (The Vehicle may also need to take time to shift its remaining oars around so that it has a roughly equal number on each side.)

PROPELLERS

Propellers are mechanical means of pushing against the water. They include the paddlewheels on Mississippi riverboats, the outboard motors on

speedboats, and the powerful screws of nuclear submarines.

You can build a propeller-powered water Vehicle with straightforward Swimming (and the *Surface Only* Limitation if appropriate) on Fuel Charges, with a Side Effect because of the danger they pose if someone comes into contact with them. Propellers such as paddlewheels don't allow for much maneuverability, making Limited Maneuverability appropriate and maneuverability Advantages totally inappropriate. On the other hand, motorized propellers allow for maximum maneuverability of a water vehicle; while No Turn Mode probably isn't appropriate, a Movement Skill Level or two may be.

Some high-tech ships may have magnetohydrodynamic propulsion, which means they use magnetic fields to compress water in a tube and propel it backward at high velocity. In effect this creates a "water rocket" that not only moves the Vehicle at high speeds, but is nearly silent. You can buy this by creating a Change Environment effect to interfere with others' ability to hear the Vehicle, or by applying Invisible Power Effects to Swimming.

TOWED WATER VEHICLES

It's possible that water Vehicles in science fiction and fantasy settings might be towed by large, strong aquatic creatures. You can build these with Swimming, but they work using the same rules as towed ground vehicles (page 36) in terms of their speed, maneuverability, and the like.

WIND POWER (SAILING)

The most efficient, but also most complicated, way to move a water vehicle prior to the invention of the engine is wind power — sailing, in other words. To build a sailing Vehicle, buy Swimming, *Surface Only* (-1), OAF, plus the additional Limitation *Sailed* (-1), and if appropriate the Limited Maneuverability Limitation. Sailed signifies that there has to be wind for the vessel to move, and the vessel's speed depends mostly on how fast the wind blows and how well the crew manages the vessel (see below). A sailed water Vehicle's maximum movement equals the maximum of its inches of Swimming or the inches of Swimming provided by the wind, whichever is less.

Sailing works because the wind creates both aerodynamic lift and forward force. The wind blows across the sails, creating sideways momentum; the crew has to trim the sails to channel the force of the

SAILING SPEED TABLE

Wind	Inches Per Turn	Wind Speed (MPH)	Control Roll Modifier	Roll (2d6)
None	0"	0	-0	2
Very Light	12" to 36"	4-17	-0	3-4
Light	48" to 72"	18-30	-0	5-6
Moderate	84" to 108"	31-44	-1	7-8
Heavy	120" to 144"	45-57	-2	9-10
Very Heavy	156" to 180"	58-71	-4	11
Storm Force	192" or more	72 or more	-8	12

Angle Of Sail	Percent	Roll (2d6)
Directly behind	50% of wind speed	2-4
Up to 45° behind	66% of wind speed	5
46° to 89° behind	80% of wind speed	6
Directly from the side	100% of wind speed	7
46° to 89° in front	80% of wind speed	8-9
Up to 45° in front	66% of wind speed	11
Directly in front	33% of wind speed	12

The percentages listed for angle of sail assume the crew is properly doing its job and trimming the sails to allow for maximum speed under prevailing conditions. The GM should have the characters or crew make a PS: Sailing (or Combat Driving[Sailing]) roll. If the roll succeeds, the Vehicle gets the full listed percentage of the wind speed, +1% for every point by which the roll succeeded (maximum of 100%). If the roll fails, reduce the percentage by 2% per point by which they missed the roll.

"Control Roll" indicates the modifier to any Control Rolls the Vehicle has to make.

wind properly. The vessel's keel (or centerboard) helps keep the vessel from moving sideways with the wind, and provides stability. The vessel's rudder (which, like the keel, is underwater) allows it to turn; a crewmember operates it via a tiller or wheel. The angle of sail is the difference between the boat's heading and the direction the wind's coming from; as the boat changes course, the angle of sail changes, and the crew adjusts the sails to harness the wind's power as efficiently as possible. (Sailing directly into the wind, or tacking, actually involves sailing in a zig-zag pattern at 45 degree angles to the oncoming wind.)

Sailing Speed

For game purposes, determining how much speed the wind can impart to a sailing Vehicle depends on five factors. The first is the Vehicle's purchased inches of Swimming. Regardless of wind speed, a Vehicle cannot Swim faster than it's paid for. The GM may, of course, waive this rule for dramatic purposes, such as when he wants a storm to push the PCs' ship far off-course. (Realistically, it is possible for some boats to sail faster than the wind, but it involves complex calculations of relative wind speed that are beyond the scope of this book.)

The second factor is the speed of the wind itself, rated in inches per Segment. The third is the angle of sail. See the Sailing Speed table for details, including random wind speed and angle generation for GMs who don't want to simply make that up or let the dramatic needs of the story dictate it.

The fourth factor is the condition of the water itself. See the Water Conditions Table for details (At the GM's option, the current may also affect other types of water vehicles). The fifth factor is the type and shape of the sails (see below).

RUNNING AGROUND

One of the dangers water vehicles face is running aground — coming too close to the shore, or hitting a sandbar, coral reef, or other underwater obstruction. The bigger and heavier the Vehicle, the further away from shore it must stay, or risk running aground.

As a general guideline, a watercraft should not come closer than its Size times 3" to the shore. If it comes closer than that, or encounters an underwater obstruction it's unaware of, it risks running aground. The GM determines when this occurs, taking into account the depth of the water, nature of the shoreline, and nearby watercraft facilities.

If a water Vehicle runs aground, it performs a Move Through on itself, taking full damage based on its velocity and STR. (The GM may substitute the same number of DCs of Killing Damage if the obstacle encountered is particularly sharp or pointed, like some rocks and coral reefs, or rule that a ship simply gets stuck without taking damage.) It may apply its defenses, and the damage automatically applies to the Hull Hit Location if the campaign uses Hit Locations.

See also the *Cannot Land* Physical Limitation on page 32, whose rules replace these general rules for some water Vehicles.

Some ships, such as some Viking longships, are constructed to land on beaches without much trouble. Have the ship's captain make a Combat Driving (Sailing) roll to beach the ship safely; if he succeeds, the vessel takes no damage.

GALES AND HURRICANES

According to meteorologists, wind of 32-38 miles per hour is a near gale. Winds of 39-46 MPH are a gale; of 47-54 MPH, a strong gale; and winds of 55-63 MPH a storm. A hurricane (known in the Pacific as a typhoon, and in the Indian Ocean as a cyclone) is a storm with sustained winds of 74 miles per hour or more.

Example: *Determined to win the America's Cup, Reginald Rigsby buys an all-new racing yacht defined as having +4" Swimming (6" total). The boat has a fore-and-aft rig, so the shape of the sails don't decrease its velocity any.*

On the first day of the race, Rigsby's yacht experiences moderate winds (8" velocity) coming from 75 degrees behind the yacht. Having been threatened with flogging should they make a mistake, the crew works efficiently and trims the sails properly. They crew makes its collective PS: Sailing roll by 2, gaining +2% wind speed. The ship sails with a moderate current, so the GM rolls 1d6+1, gets a total of 4, and so adds 4% more to the speed. So, here's how fast the yacht moves:

*Base of 80% of wind speed due to angle of sail
+2% for crew efficiency
+4% for the current*

That yields a total of 86% of the wind speed (8"), or 6.88", which rounds up to 7". However, since Rigsby's yacht has a maximum sailing speed of 6", it can only move 6" per Phase (unless it's willing to move at Noncombat speeds).

Sails And Masts

Sails are considered Obvious Accessible Foci because they're easy to perceive and to damage. They come in three basic arrangements, or riggings.

Square rigs, such as those found on Viking longships and Greek biremes, consist of a single large, square-shaped sail attached to a single mast and yardarm and situated perpendicular to the hull. Compared to other riggings, square rigs are inefficient; subtract 2d6 from the percent of maximum speed the ship can attain for all angles of sail except "directly behind." (Roll once per minute.)

Fore-and-aft rigs, such as those found on most small modern sailing vessels, consist of one or more triangular-shaped sails attached to a mast and a boom and situated parallel to the hull. They include lateen sails, lugsails, gaffs, and bermudan sails. Compared to other riggings, they're efficient and allow for great speed (that's why racing yachts use them); they have no negative effect on percentage of maximum speed.

A full rig, such as on the galleons and clipper ships of old, requires two or more masts, to which multiple sails (both square and triangular) attach via yardarms. A complex network of ropes and pulleys, each with its own name or term, controls the raising, lowering, and shifting of the sails. Full rigs have no negative effect on percentage of maximum speed.

Full rigs become both possible and required at Size 9 and above. At Sizes 9-11, a ship must have two masts; at Sizes 12-14, a ship can have two or three masts; at Sizes 15-17, a ship can have two to four masts; and so forth. A ship only gets one mast for free when it purchases sail-based movement; it must pay +5 Character Points per up to x2 masts

WATER CONDITIONS TABLE

With The Current/Tide	Percent Roll	Control Modifier
Weak current	+1d6-2	-0
Moderate current	+1d6+1	-0
Strong current	+2d6+2	-1
Against The Current/Tide	Percent Roll	Control Modifier
Weak current	-1d6-2	-0
Moderate current	-1d6+1	-1
Strong current	-2d6+2	-2
Other Conditions	Percent Roll	Control Modifier
Calm waters	±0	-0
Choppy waters	-½d6	-1
Rough waters	-1d6+2	-2
Extremely rough waters	-2d6+4	-4
Too rough to sail	x0 (<i>i.e.</i> , vessel cannot control its direction; it's at the mercy of wind and wave)	

The listed percentages are cumulative, and affect the percentage from the Angle Of Sail part of the Sailing Speed Table. For example, if a ship is sailing with a strong current in choppy waters, roll 2d6+2 and add that to the percent of speed from angle of sail, then roll ½d6 and subtract it from the total percent of speed.

"Control Roll" indicates the modifier to any Control Rolls the Vehicle has to make. Current/tide penalties are usually cumulative with wind speed penalties; water conditions penalties are not, since the wind speed penalty accounts for the presumed roughness of the waters under the prevailing weather conditions.

thereafter. Masts have DEF equal to the Vehicle's, and BODY equal to the ship's Size (for example, on a Size 9 ship with DEF 6, the masts have DEF 6, BODY 9). With the GM's permission, a sailing Vehicle may improve the DEF or BODY of its mast(s) by purchasing more DEF or BODY with the *Partial Coverage* (-2) Limitation. Even if the GM permits this, a mast's DEF or BODY can only be increased by 50% each at the most.

When a Vehicle purchases sail-based movement (*i.e.*, Swimming with the Surface Only, OAF, and Sailed Limitations), it gets a number of square meters of sail equal to up to its Size times its total inches of sail-based Swimming, with the sail having DEF 1 and BODY equal to the Vehicle's Size. The sails may be of either shape (square or triangular), or the Vehicle may split the overall area into multiple sails to create a full rig.

A sailing Vehicle may improve the DEF or BODY of its sails by purchasing more DEF or BODY with the *Partial Coverage* (-2) Limitation. This requires the GM's permission, which should depend on the technology available. Ordinary canvas sails shouldn't buy any extra DEF; only when sturdier materials (such as plastics) become available should buying more DEF become possible. On the other hand, buying more BODY can represent buying more sails, or improving the quality of existing sails. In the former case, every +5

WIND DAMAGE TABLE

Wind	Damage To Sails	Damage To Masts
Heavy	0	1d6-5
Very Heavy	1d6-4	1d6
Storm Force	1d6-3, or more	2d6-5, or more

BODY doubles the area of sail a ship has.

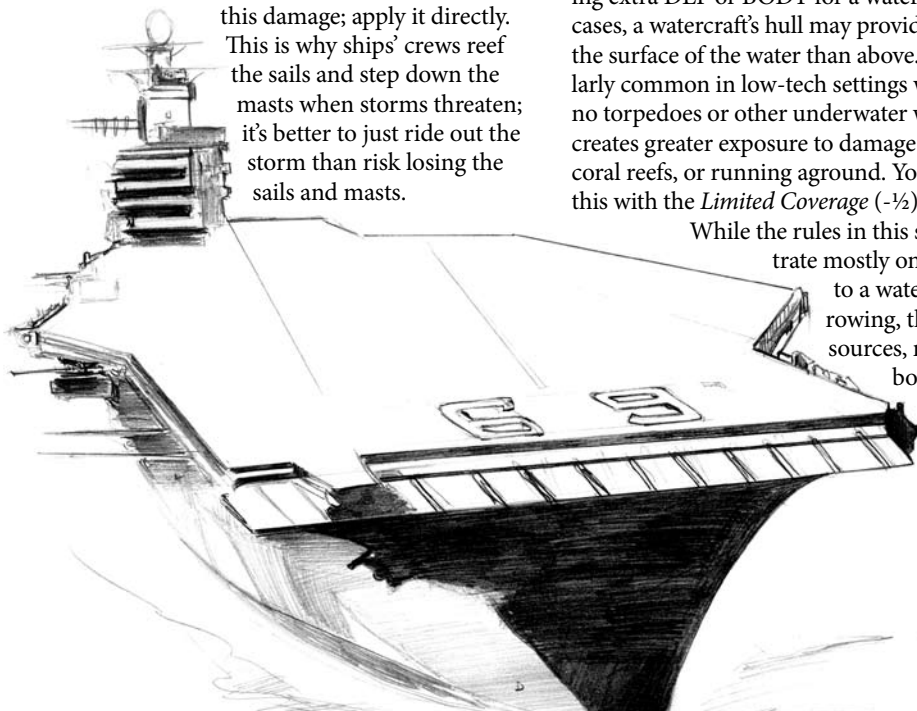
A ship that does not have at least its standard area of sail cannot move as fast as it can with normal sails. If the ship has less than its standard area of sail, determine what percentage of its standard sails' BODY remain available to it. Multiply its inches of sailing movement by that percentage, reducing its maximum velocity. (Thus, buying more sail area, by buying extra BODY, is a good idea; it effectively gives the ship "backup sails" to keep it moving even if a large part of its sails are destroyed.) If a Vehicle has no sails at all (either because the crew has taken them down, or they've been destroyed), it cannot sail at all; it just drifts with the current.

Tearing Sails, Snapping Masts

A ship's sails and masts can suffer damage in many ways, including enemy attacks — a lucky cannon shot can smash through a mast, or a boarder with a blade can cut a hole in a sail large enough to render it useless. You can resolve attacks from other Vehicles or characters in the usual manner, but there's another factor to consider: the wind.

Masts and sails can only take so much pressure. If the wind is too strong for them, they'll tear, snap, and break, often with disastrous consequences. The Wind Damage Table indicates the Killing Damage a ship's sails and masts take per Phase from high winds (minimum of 0 per Phase). Do not use Hit

Location modifiers to alter this damage; apply it directly. This is why ships' crews reef the sails and step down the masts when storms threaten; it's better to just ride out the storm than risk losing the sails and masts.



MULTIPLE FORMS OF SWIMMING

Many watercraft have more than one type of Swimming. An ancient warship might have sails for rapid travel between ports, but oars for battle or times when the wind dies down; a dinghy might have a pair of oars in case its outboard motor runs out of gas. To represent this, the Vehicle should buy Swimming twice, and then choose whichever form it wants to use in a particular situation (typically, but not always, the one that provides the most inches of movement).

OTHER PARTS OF A WATER VEHICLE

Besides its means of propelling itself through the water, an aquatic vehicle has many other parts and pieces that hold it together and make operating it easier. Some of the major devices and systems found in most water vehicles, and how you might make use of them in your game, include:

Bulkhead: A bulkhead is an internal "wall" in the ship that divides it into two or more watertight compartments, thus minimizing the risk of sinking if the ship suffers hull damage. To create a bulkhead, a Vehicle must buy Life Support (Self-Contained Breathing) with the *Partial Coverage* Limitation to represent how much of the ship's interior that bulkhead protects. If the ship wants multiple compartments, it can apply the usual "+5 points doubles the number of objects" rule. If the vessel suffers damage sufficient to let water enter the ship (see page 201), the water can only flood into the area cordoned off by the bulkhead(s), thus protecting the rest of the ship.

Hull: The outer "shell" of a ship, into which its decks and other parts are put. You can represent an improved, enhanced, or reinforced hull by purchasing extra DEF or BODY for a water Vehicle. In some cases, a watercraft's hull may provide less DEF below the surface of the water than above. This is particularly common in low-tech settings where there are no torpedoes or other underwater weapons, but creates greater exposure to damage from ramming, coral reefs, or running aground. You can simulate this with the *Limited Coverage* (-½) Limitation.

While the rules in this section concentrate mostly on the force applied to a water vehicle through rowing, the wind, or other sources, realistically the boat's resistance, or drag, through the water is also important, and drag depends largely on hull shape/configuration. Some hulls are designed to minimize drag, thus improving

WATER VEHICLE SUMMARY TABLE

Here's a quick-reference table for how to build various common types of water vehicles.

Aircraft carriers, destroyers, and other large military ships: Swimming, Surface Only (-1), Fuel Charges, Limited Maneuverability (-¾ or more), Side Effects (dangerous propeller)

Biremes, triremes, longships, and the like: Swimming, Surface Only (-1), OAF (oars; -1), Costs Endurance (rower's END; -½) and Swimming, Surface Only (-1), Sailed (-1), OAF (sails; -1), Cannot Move Backwards (-¼)

Canoes, rowboats, lifeboats: Swimming, Surface Only (-1), OAF (oars; -1), Costs Endurance (rower's END; -½)

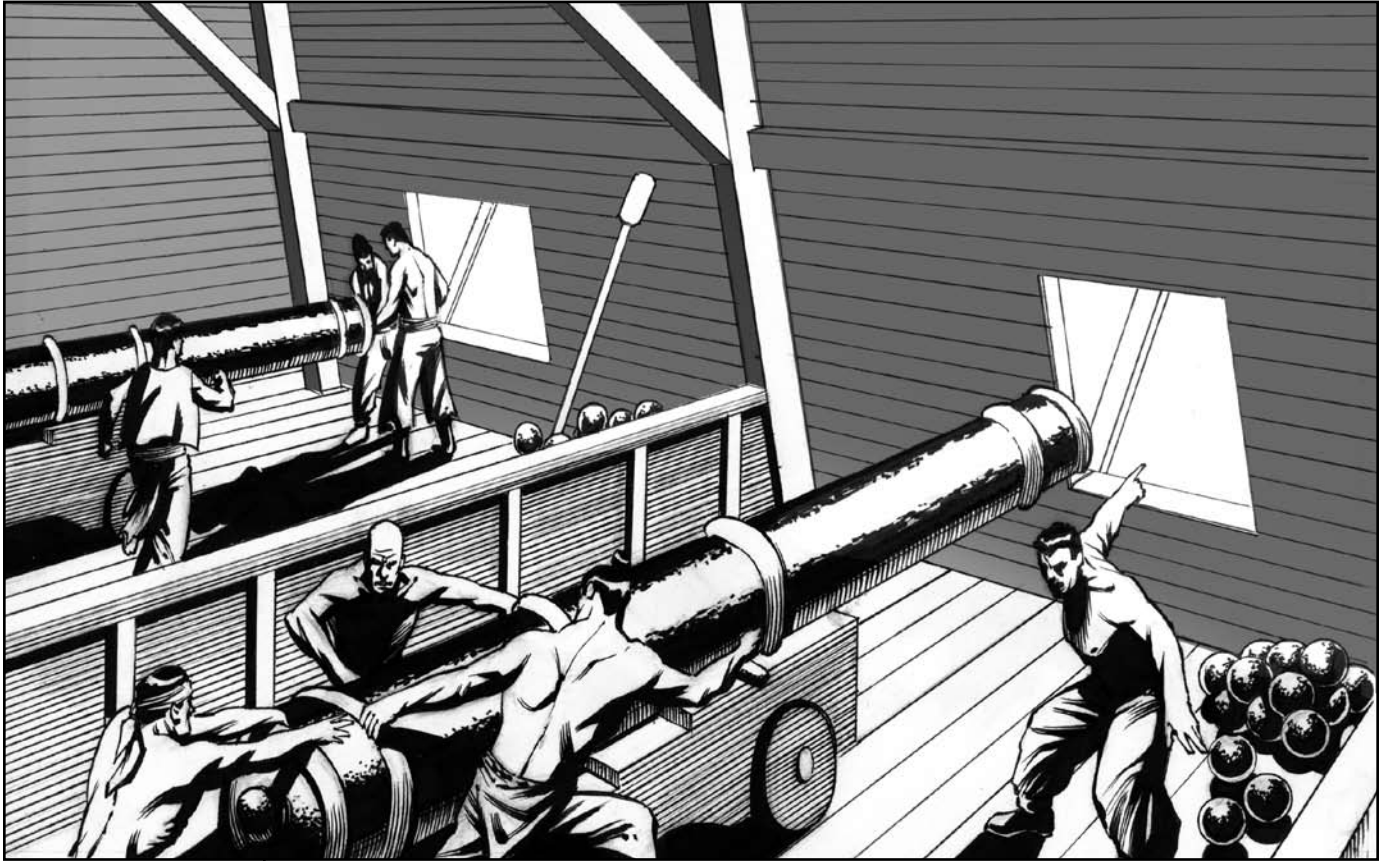
Cruise ships, freighters, tankers: Swimming, Surface Only (-1), Fuel Charges, Limited Maneuverability (-¾ or more), Side Effects (dangerous propeller)

Galleons, clipper ships: Swimming, Surface Only (-1), Sailed (-1), OAF (sails; -1), Limited Maneuverability (-¾ or more), Cannot Move Backwards (-¼)

Sailboats, racing yachts: Swimming, Surface Only (-1), Sailed (-1), OAF (sails; -1), Cannot Move Backwards (-¼)

Speedboats, luxury yachts: Swimming, Surface Only (-1), Fuel Charges, Side Effects (dangerous propeller)

Submarines: Swimming, Fuel Charges, Limited Maneuverability (-¾ or more), Side Effects (dangerous propeller)



the ship's ability to move through the water. Light, flat-bottomed skimming boats, hydrofoils, multi-hulled boats (such as catamarans), and the like all have hulls crafted, at least in part, to improve speed. In seaman's terms, the smaller the "wetted surface" (the area of the hull in the water), the less drag there is, and the faster the ship can go. However, the longer a water vehicle's waterline, the faster it tends to move. Finding the right configuration for a watercraft's hull can be tricky! In game terms, the easiest way to represent this is simply to give a vehicle with a more "aquadynamic" hull a few more inches of Swimming relative to a similar boat whose hull creates more resistance.

Keel: The "backbone of the ship," the strong center "rib" that runs the length of the vessel and gives it its stability. Additionally, on most vessels part of the keel is shaped to descend into the water, thus keeping the ship from sliding sideways in the wind and making it easier to maneuver. An improved or enhanced keel might provide a +1 bonus to Combat Driving (Sailing) rolls to maneuver a water Vehicle.

Outrigger: An extension of the hull, built to stick out to the side of the hull and provide greater stability. Often seen on catamarans, ancient Polynesian boats, and the like.

Rudder: A large, flat, shaped board or piece of metal attached to the rear of the vessel and reaching down into the water. By turning the rudder

with a tiller or wheel, the crew can steer the ship. An improved or enhanced rudder might provide a +1 bonus to Combat Driving (Sailing) rolls to maneuver a water Vehicle.

WATER VEHICLE EVERYVEHICLE EQUIPMENT

The Everyvehicle Equipment listed for ground vehicles (page 42) typically also applies to water vehicles with the necessary changes in points of detail (for example, "Ground Vehicle Sensors" becomes "Water Vehicle Sensors" on modern boats; a speedboat lacks Heating/Air Conditioning). The following additional equipment counts as water Vehicle Everyvehicle Equipment:

Airlocks: Appropriate for submarines and other underwater craft. See page 25.

Navigation Instruments: Ships designed for travel on oceans and other large bodies of water need a way to stay on course. In early vessels, this might be a primitive compass; on modern-day ships, it could involve GPS trackers and the like. (Bump Of Direction, with the *Requires A Navigation Roll Limitation*, if appropriate.)

SAMPLE WATER VEHICLES



The rest of this chapter contains ten sample water vehicles, ranging from canoes to aircraft carriers, both as a resource for players and GMs and as examples if you want something to review before building your own watercraft.

CANOE

Val	Char	Cost	Notes
0	Size	0	1" x .5"; -0 KB; -0 DCV
10	STR	0	Lift 100 kg; 2d6 HTH [0]
11	DEX	3	OCV: 4/DCV: 4
10	BODY	0	
2	DEF	0	Does Not Protect Some Occupants (-¼)
2	SPD	0	Phases: 6, 12
Total Characteristic Cost: 3			

Movement: Ground: 0"/0"
Swimming: 6"/12"

Abilities & Equipment

Cost	Power	END
1	<i>Rowed Watercraft:</i> Swimming +4" (6" total); Surface Only (-1), OAF (oars; -1), <i>Costs Endurance</i> (rower's END; -½)	1
-12	<i>Water Vehicle:</i> Ground Movement -6" (0" total)	
7	<i>Carrying Capacity:</i> +10 STR, Reduced Endurance (0 END; +½); Only To Overcome Encumbrance Penalties (-1)	0

Total Abilities & Equipment Cost: -4

Total Vehicle Cost: -1

Value Disadvantages

None

Total Disadvantage Points: 0

Total Cost: -1/5 = 1

Description: This character sheet represents a typical canoe, such as those used by the North American Indians and many similarly-developed cultures, and still used today for recreation. It comes equipped with two oars. You can also use this write-up for rowboats, dinghies, and other small rowed boats. By expanding its Size a bit, you can use it for large lifeboats.

TRIREME

Val	Char	Cost	Notes
12	Size	60	16" x 8"; -12 KB; -8 DCV
55	STR	-15	Lift 50 tons; 11d6 HTH [0]
11	DEX	3	OCV: 4/DCV: 4
22	BODY	0	
4	DEF	5	Does Not Protect Some Occupants (-¼)
3	SPD	9	Phases: 4, 8, 12
Total Characteristic Cost: 62			

Movement: Ground: 0"/0"
Swimming (rowed): 4"/8"
Swimming (sailed): 6"/12"

Abilities & Equipment

Cost	Power	END
1	<i>Rowed Watercraft:</i> Swimming +2" (4" total); Surface Only (-1), OAF (oars; -1), <i>Costs Endurance</i> (rower's END; -½), <i>Increased Endurance Cost</i> (x3 END; -1), Limited Maneuverability (-¼)	3
30	<i>170 Oars:</i> x42.5 oars (total of 170)	
1	<i>Sailed Watercraft:</i> Swimming +4" (6" total); Surface Only (-1), Sailed (-1), OAF (sails; -1), Limited Maneuverability (-¼), Cannot Move Backwards (-¼)	0
5	<i>Two Masts:</i> x2 masts (total of 2)	
-12	<i>Water Vehicle:</i> Ground Movement -6" (0" total)	
3	<i>Bronze Ram:</i> Stretching 1", Reduced Endurance (0 END; +½); Always Direct (-¼), No Noncombat Stretching (-¼), Only To Cause Damage With Move Throughs (-½), No Velocity Damage (-¼)	0

Total Abilities & Equipment Cost: 28

Total Vehicle Cost: 90

Value Disadvantages

25 Distinctive Features: Warship (Not Concealable; Causes Extreme Reaction [fear])

Total Disadvantage Points: 25

Total Cost: 65/5 = 13

Description: A trireme is a type of warship used by the ancient Greeks and Romans; it was developed from the bireme beginning in the sixth century B.C. Made of lightweight fir wood, it was about 30-40 meters long and four to six meters wide, with a prow often decoratively carved or painted with an eye on either side. The Greek version had a crew of up to 30, plus 170 oarsmen, plus soldiers.

The ship's name comes from the fact that it

had three rows of three to four meter-long oars; it could attain rowing speeds of up to eight knots in short bursts. The Greeks referred to the three types of oarsmen from top to bottom as *thranites*, *zygites*, and *thalamians*. Additionally, a trireme had a square mainsail, and sometimes a secondary sail forward. Typically the ship reefed its sails and took down its masts before going into battle, but if caught by surprise might not have time to do so.

In battle, a trireme's soldiers could fire arrows or sling stones at opposing ships, while its crew maneuvered the vessel to snap off other ships' oars or employ the three meter-long bronze ram mounted to the bottom front of the ship.

VIKING LONGSHIP

Val	Char	Cost	Notes
13	Size	65	20" x 10"; -13 KB; -8 DCV
50	STR	-25	Lift 25 tons; 10d6 HTH [0]
13	DEX	9	OCV: 4/DCV: 4
23	BODY	0	
4	DEF	5	Does Not Protect Some Occupants (-¼)
3	SPD	7	Phases: 4, 8, 12
			Total Characteristic Cost: 61

Movement: Ground: 0"/0"
Swimming (rowed): 4"/8"
Swimming (sailed): 6"/12"

Abilities & Equipment

Cost	Power	END
1	<i>Rowed Watercraft:</i> Swimming +2" (4" total); Surface Only (-1), OAF (oars; -1), <i>Costs Endurance</i> (rower's END; -½), <i>Increased Endurance Cost</i> (x3 END; -1), Limited Maneuverability (-¼)	3
20	<i>60 Oars:</i> x15 oars (total of 60)	
1	<i>Sailed Watercraft:</i> Swimming +4" (6" total); Surface Only (-1), Sailed (-1), OAF (sails; -1), Limited Maneuverability (-¼), Cannot Move Backwards (-¼)	0
-12	<i>Water Vehicle:</i> Ground Movement -6" (0" total)	

Total Abilities & Equipment Cost: 10

Total Vehicle Cost: 71

Value Disadvantages

25 Distinctive Features: Viking raiding ship (Not Concealable; Causes Extreme Reaction [fear])

Total Disadvantage Points: 25

Total Cost: 46/5 = 9

Description: The Vikings of Scandinavia were well-known, and justly feared, for their fast, powerful longships that enabled them to raid coastal settlements and escape pursuers. This character sheet represents a drakkar ("dragon"), or "super longship," built in the late 900s or early 1000s; it's larger than most other longships, and has a higher freeboard (thus allowing archers to shoot down at other ships, and the ship to make longer voyages). Ships similar to these were used by Eric the Red and Leif Ericsson.

A longship of this size had 30 pairs of oars (each oar being up to six meters long), a single square sail, and a crew of up to 180. It could achieve speeds of up to eight knots rowing if necessary (though five knots was more common), and up to about 12 knots by wind power. The sail was made of diamond-shaped pieces of linen, trimmed with leather for strength, sewn together in a square shape.

Like other Viking ships, longships were clinker-built, with a hull made of overlapping boards and an internal frame added after the hull was built. (Mediterranean ships were carvel-built, with a frame to which non-overlapping boards were attached.) The bow and stern raise up so that they're almost at right angles to the keel. The ship has 30 rum, referring to the space in which one rowing bench was fit. Other Viking ship types include the skuta (about 15 rum) and the skeid (the same size as the drakkar); some kings built longships of up to 37 rum. The ship's shallow draft (less than one meter for some vessels) allowed for high speeds, easy beach landings, and the penetration of some estuaries and rivers.

Vikings often decorated their ships extensively. The prow might be carved to resemble a dragon or monster, and sometimes gilded (the carving would be removed when at sea, to avoid losing it); the sides might be painted with colored stripes, with decorative shields hung alongside (real shields would be hung alongside only in harbors, for recognition purposes). A steerboard on the right side allowed the pilot to steer the ship; from it comes our term starboard.

GALLEON

Val	Char	Cost	Notes
13	Size	65	20" x 10"; -13 KB; -8 DCV
70	STR	-5	Lift 400 tons; 14d6 HTH [0]
10	DEX	0	OCV: 3/DCV: 3
25	BODY	2	
6	DEF	10	Does Not Protect Some Occupants (-¼)
3	SPD	10	Phases: 4, 8, 12

Total Characteristic Cost: 82

Movement: Ground: 0"/0"
Swimming (sailed): 3"/6"

Abilities & Equipment

Cost	Power	END
1	<i>Sailed Watercraft:</i> Swimming +1" (3" total); Surface Only (-1), Sailed (-1), OAF (sails; -1), Limited Maneuverability (-¾), Cannot Move Backwards (-¼)	0
3	<i>Full Rig:</i> +10 BODY; Partial Coverage (sails only; -2)	0
10	<i>Full Rig:</i> x3 masts (total of 3)	0
-12	<i>Water Vehicle:</i> Ground Movement -6" (0" total)	
14	<i>Thirty-Two-Pounders:</i> RKA 3d6, Increased Maximum Range (2,500"; +½); OIF Bulky (cannons; -1), Real Weapon (-¼), Extra Time (1 Turn to load and fire; -1¼), Limited Arc Of Fire (one hex row, same horizontal level; -1), 12 Charges (-¼)	[12]
25	<i>Thirty-Two Pounders:</i> 23 more Thirty-Two-Pounders (total of 24)	[12]
9	<i>Eighteen-Pounders:</i> RKA 2d6, Increased Maximum Range (2,000"; +½); OIF Bulky (cannons; -1), Real Weapon (-¼), Extra Time (1 Turn to load and fire; -1¼), Limited Arc Of Fire (one hex row, same horizontal level; -1), 12 Charges (-¼)	[12]
25	<i>Eighteen-Pounders:</i> 29 more Eighteen-Pounders (total of 30)	[12]
5	<i>Swivel Guns:</i> RKA 1d6; OIF Bulky (-1), Real Weapon (-¼), <i>Extra Time</i> (Extra Phase to load and fire; -¾), 12 Charges (-¼)	[12]
20	<i>Swivel Guns:</i> 11 more Swivel Guns (total of 12)	[12]
26	<i>Large Boat's Anchor:</i> 70 STR, Reduced Endurance (0 END; +½); OIF Bulky (-1), Partial Coverage (-2)	0

Total Abilities & Equipment Cost: 126
Total Vehicle Cost: 208

Value Disadvantages

25	Distinctive Features: Warship (Not Concealable; Causes Extreme Reaction [fear])
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Total Disadvantage Points: 25
Total Cost: 183/5 = 36

Cost Additional Vehicles

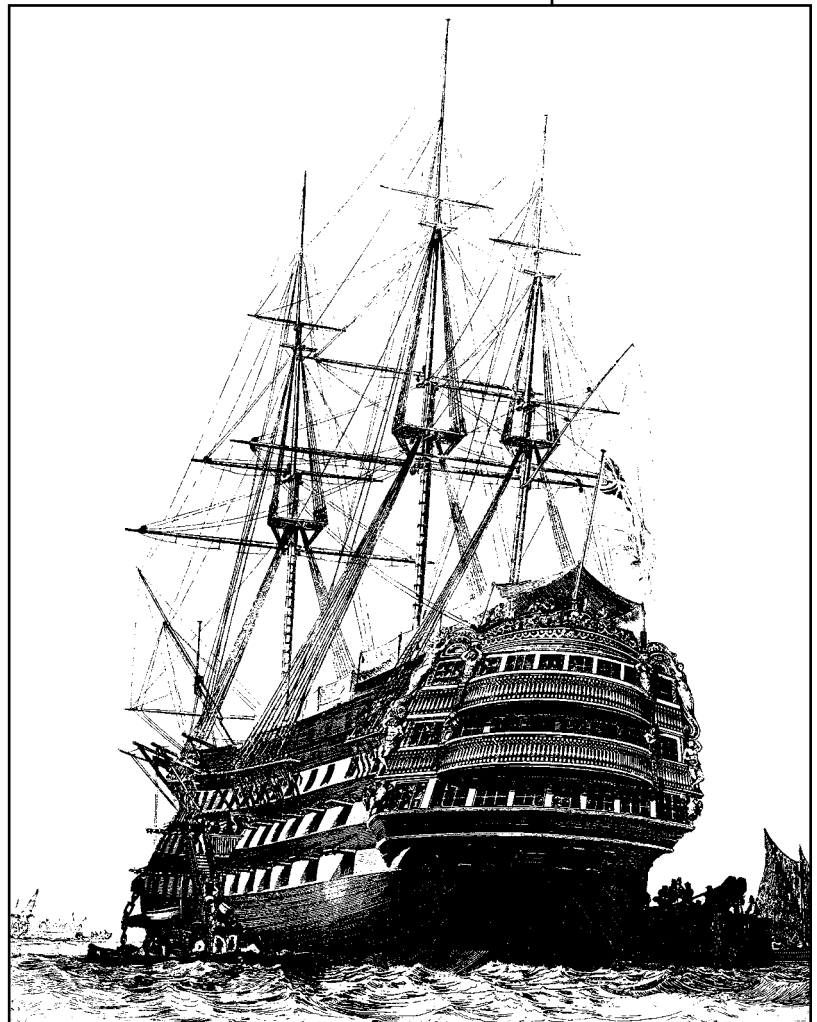
8	Lifeboats: Eight (use Canoe, page 61)
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Description: This character sheet represents a galleon, a large sailing vessel built by various European powers in the sixteenth and seventeenth centuries. It derives from an earlier type of vessel, the carrack. Mainly a warship, it was also used for exploration; it's closely associated, in the minds of many, with pirate adventures on the Spanish Main, and holds full of doubloons and treasures from the Americas.

A typical galleon has a square stern with a narrow poop deck and a forecastle that ends at the stem rather than projecting forward over the water. Made of heavy wood, it weighs about 400-550 tons and can carry up to 400 tons of cargo. It carries a full rig of sail, typically on three masts (but sometimes four on later, larger versions), and can reach a maximum speed of about six knots. With good weather, a journey by galleon from Spain to the Americas took around two months.

For military purposes, this galleon mounts 24 thirty-two-pound cannon (12 along each side), 30 eighteen-pound cannon (15 along each side), and twelve swivel guns (six forward, six aft). The latter are small guns, also known as "murderers," mounted on swivels and used mainly against enemy crew.

With a little research and a few modifications, you can easily adapt this write-up to represent other types of ships, including carracks, caravels, and even the man-o'-wars of the Revolutionary period.



SPEEDBOAT

Val	Char	Cost	Notes
6	Size	30	4" x 2"; -6 KB; -4 DCV
40	STR	0	Lift 6,400 kg; 8d6 HTH [0]
18	DEX	24	OCV: 6/DCV: 6
16	BODY	0	
3	DEF	2	Does Not Protect Some Occupants (-¼)
4	SPD	12	Phases: 3, 6, 9, 12
			Total Characteristic Cost: 68

Movement: Ground: 0"/0"
Swimming: 20"/40"

Abilities & Equipment

Cost	Power	END
8	<i>Propeller-Drive Watercraft:</i> Swimming +18" (20" total); Surface Only (-1), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0), Side Effects (propeller does KA 1d6 to anyone coming in contact with bottom stern of vehicle, occurs automatically, only affects environment around vehicle; -¼) [1cc]	
-12	<i>Water Vehicle:</i> Ground Movement -6" (0" total)	
15	<i>Large Boat's Anchor:</i> 40 STR, Reduced Endurance (0 END; +½); OIF Bulky (-1), Partial Coverage (-2) 0	

Skills

2 Maneuverable: +1 with Swimming

Total Abilities & Equipment Cost: 13

Total Vehicle Cost: 81

Value Disadvantages

None (or chosen by player)

Total Disadvantage Points: 0

Total Cost: 81/5 = 16

Description: This character sheet represents any one of numerous models of relatively small, high-performance speedboats found in modern waters. Although intended primarily for recreation, they are sometimes put to commercial uses, including illicit ones such as smuggling. It can achieve speeds of about 60 miles per hour; many speedboats, including racing models, can go much faster than that.

ZODIAC F-470 CRRC

Val	Char	Cost	Notes
3	Size	15	2" x 1"; -3 KB; -2 DCV
35	STR	10	Lift 3,200 kg; 7d6 HTH [0]
15	DEX	15	OCV: 5/DCV: 5
13	BODY	0	
2	DEF	0	Does Not Protect Some Occupants (-¼)
3	SPD	5	Phases: 4, 8, 12
			Total Characteristic Cost: 45

Movement: Ground: 0"/0"
Swimming (rowed): 6"/12"
Swimming (motor): 9"/18"

Abilities & Equipment

Cost	Power	END
1	<i>Rowed Watercraft:</i> Swimming +4" (6" total); Surface Only (-1), OAF (oars; -1), <i>Costs Endurance</i> (rower's END; -½) 1	
5	<i>Eight Oars:</i> x2 oars (total of 8) 0	
3	<i>Motorized Watercraft:</i> Swimming +7" (9" total); Surface Only (-1), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0), Side Effects (propeller does KA 1d6 to anyone coming in contact with bottom stern of vehicle, occurs automatically, only affects environment around vehicle; -¼) [1cc]	
-12	<i>Water Vehicle:</i> Ground Movement -6" (0" total)	

Total Abilities & Equipment Cost: -3

Total Vehicle Cost: 42

Value Disadvantages

None

Total Disadvantage Points: 0

Total Cost: 42/5 = 8

OPTIONAL EQUIPMENT

Cost	Option
6	<i>Armorplate Package:</i> +6 DEF; OIF Bulky (-1), Does Not Protect Some Occupants (-¼), <i>Extra Time</i> (40 seconds to activate; -¾) 0

Description: The Zodiac F-470 CRRC (Combat Rubber Raiding Craft) is a small inflatable watercraft used by the United States elite forces. It weighs about 120 kg without a motor or fuel, and can carry up to eight soldiers in full gear. When its motor would make too much noise, the occupants can row it.

One option for the Zodiac is a system of inflatable bulletproof armor that creates a semi-rigid "bulkhead" around the boat that rises up to 18 inches above the sides of the boat (thus giving the occupants more cover than normal, too). It takes about 40 seconds to inflate the armor.

CRUISE SHIP

Val	Char	Cost	Notes
21	Size	105	125" x 64"; -21 KB; -14 DCV
100	STR	-15	Lift 25 ktons; 20d6 HTH [0]
8	DEX	-6	OCV: 3/DCV: 3
31	BODY	0	
5	DEF	7	Does Not Protect Some Occupants (-¼)
2	SPD	2	Phases: 6, 12
			Total Characteristic Cost: 93

Movement: Ground: 0"/0"
Swimming: 16"/32"

Abilities & Equipment

Cost	Power	END
4	<i>Propeller-Drive Watercraft:</i> Swimming +14" (16" total); Surface Only (-1), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0), Limited Maneuverability (-¾), Side Effects (propeller does KA 2d6 to anyone coming in contact with bottom stern of vehicle, occurs automatically, only affects environment around vehicle; -¾) [1cc]	
-12	<i>Water Vehicle:</i> Ground Movement -6" (0" total)	
37	<i>Large Boat's Anchor:</i> 100 STR, Reduced Endurance (0 END; +½); OIF Bulky (-1), Partial Coverage (-2)	0

Total Abilities & Equipment Cost: 29
Total Vehicle Cost: 122

Value Disadvantages

None

Total Disadvantage Points: 0

Total Cost: 122/5 = 24

Cost Additional Vehicles

- 41 *Lifeboats:* 250 (use Canoe, page 61, but make it large enough to carry up to 10 people).
- 10 *Elevators* (page 167).

Description: For many travelers, the ultimate in a luxurious vacation is a cruise ship. A typical cruise ship is about 750-900 feet long, with a beam of about 80-120 feet, and can maintain a cruising speed of around 20-30 knots. It's specially designed for a smooth ride so the passengers aren't disturbed by rough waters, except for during the worst storms. Its crew of 800 to 1,000 work hard to ensure that all the passengers have a good time.

With slight modifications, such as increased Size and/or STR, you can use this writeup for various modern-day freighters and tankers.

SPRUANCE-CLASS DESTROYER

Val	Char	Cost	Notes
19	Size	95	80" x 40"; -19 KB; -12 DCV
105	STR	0	Lift 50 ktons; 21d6 HTH [0]
10	DEX	0	OCV: 3/DCV: 3
33	BODY	4	
9	DEF	17	Does Not Protect Some Occupants (-¼)
3	SPD	10	Phases: 4, 8, 12
			Total Characteristic Cost: 126

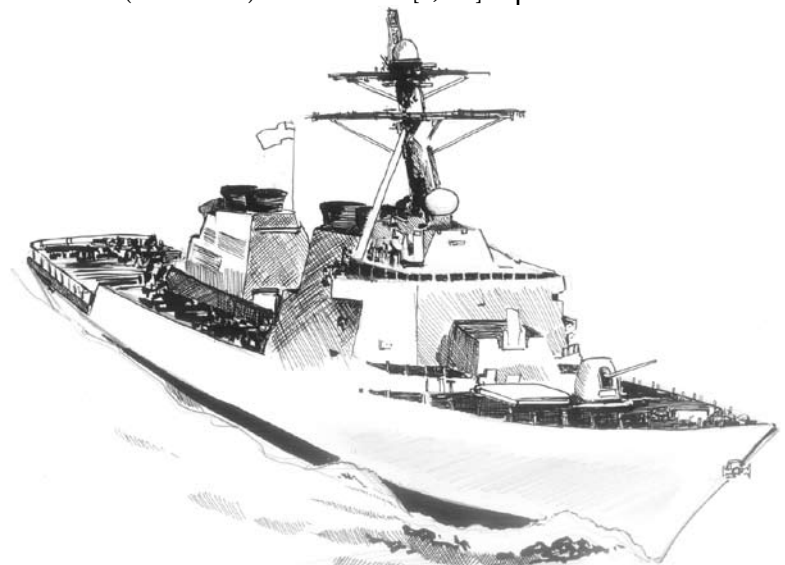
Movement: Ground: 0"/0"
Swimming: 17"/34"

Abilities & Equipment

Cost	Power	END
Propulsion Systems		
4	<i>Propeller-Driven Military Vessel:</i> Swimming +15" (17" total); Surface Only (-1), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0), Limited Maneuverability (-¾), Side Effects (propeller does KA 2d6 to anyone coming in contact with bottom stern of vehicle, occurs automatically, only affects environment around vehicle; -¾) [1cc]	
-12	<i>Water Vehicle:</i> Ground Movement -6" (0" total)	

Tactical Systems

- 165 *20mm Mark 15 Phalanx CIWS:* Multipower, 165-point reserve, 1,550 Charges for entire reserve (+1); all OIF Bulky (-1) [1,550]
- 7u 1) *Attack Mode:* RKA 4d6, Autofire (10 shots; +1), Armor Piercing (+½), +1 Increased STUN Multiplier (+¼); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (360 Degrees above ship; -¼)
- 1u 2) *Defense Mode:* Missile Deflection (all physical projectiles), Range (+1); OIF Bulky (-1), Requires 10 Charges Per Use (-¾)
- 5 *20mm Mark 15 Phalanx CIWS:* 1 more Phalanx (total of two) [1,550]



144	<i>Mark 5 Guns</i> : RKA 8d6, Indirect (can be arced over some intervening obstacles; +¼), +1 Increased STUN Multiplier (+¼), Increased Maximum Range (9,650', or about 12 miles; +½), 1,200 Charges (+1); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (360 Degrees above ship; -¼) [1,200]	
5	<i>Mark 5 Guns</i> : Another Mark 5 Gun (total of two) [1,200]	
58	<i>12.7mm Machine Guns</i> : RKA 3d6, Autofire (10 shots; +1), +1 Increased STUN Multiplier (+¼), 1,000 Charges (+1); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (360 Degrees above ship; -¼) [1,000]	
10	<i>12.7mm Machine Guns</i> : 3 more MGs (total of four) [1,000]	
41	<i>SLQ-32 Electronic Countermeasures System</i> : Change Environment 80" radius, -6 to Radio Group Perception Rolls, Reduced Endurance (0 END; +½); OIF Bulky (-1) 0	
65	<i>Phalanx Targeting Systems</i> : Tactical Computer (page 162) for Phalanx (includes IR Sensors and 360 Radar options) 0	
5	<i>Phalanx Targeting Systems</i> : A Tactical Computer (page 162) for the second Phalanx 0	
Operations Systems		
5	<i>Communications Systems</i> : HRRP (Radio Group); OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½) 0	
17	<i>Radar Systems</i> : Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+18 versus Range Modifier); OIF Bulky (-1), Affected As Sight Group As Well As Radio Group (-½) 0	
9	<i>Sonar Systems</i> : Active Sonar (Hearing Group), Increased Arc Of Perception (360 Degrees), Telescopic (+12 versus Range Modifier); OIF Bulky (-1), Only Usable Underwater (-1), Affected As Sight Group As Well As Hearing Group (-½) 0	
14	<i>IR Sensing Systems</i> : Infrared Perception (Sight Group), Increased Arc Of Perception (360 Degrees), Telescopic (+18 versus Range Modifier); OIF Bulky (-1) 0	
63	<i>Fire Control System</i> : Detect Unauthorized/Uncontrolled Fires 14-; Only Within Affected Area (20" x 20" zone; -2) plus Dispel Fire Powers 20d6, all Fire powers simultaneously (+2); Only Within Affected Area (20" x 20" zone; -2), 16 Charges (-0) 0/[16]	
15	<i>Fire Control System</i> : 7 more Fire Control Systems (total of 8) 0/[16]	
37	<i>Large Boat's Anchor</i> : 100 STR, Reduced Endurance (0 END; +½); OIF Bulky (-1), Partial Coverage (-2) 0	
2	<i>Heavy Anchor Chain</i> : +10 BODY; OIF Bulky (-1), Partial Coverage (-2) 0	

Skills

25	<i>Advanced Targeting Systems</i> : +5 with Ranged Attacks
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Total Abilities & Equipment Cost: 685**Total Vehicle Cost: 811****Value Disadvantages**

25	Distinctive Features: US Navy Destroyer (Not Concealable; Causes Extreme Reaction [fear])
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Total Disadvantage Points: 25**Total Cost: 786/5 = 157****Cost Additional Vehicles**

36	<i>Lifeboats</i> : 100 (use Canoe, page 61)
30	<i>Mark 29 Sea Sparrow Missile Launcher</i> : 1 Sea Sparrow Missile (see page 131)
15	<i>Mark 29 Sea Sparrow Missile Launcher</i> : 7 more Sea Sparrows (total of 8)
30	<i>Mark 141 Harpoon Missile Launchers</i> : 1 Harpoon Missile (use Sparrow, page 131)
15	<i>Mark 141 Harpoon Missile Launchers</i> : 7 more Harpoons (total of 8)
30	<i>Mark 41 VLS With Tomahawk Missiles</i> : 1 Tomahawk Missile (use Sparrow, page 131)
30	<i>Mark 41 VLS With Tomahawk Missiles</i> : 60 more Tomahawks (total of 61)
20	<i>Mark 32 Torpedo Launchers</i> : 1 12.8 inch torpedo (use Mark 48, page 133)
15	<i>Mark 32 Torpedo Launchers</i> : 5 more 12.8 inch torpedoes (total of 6)
59	<i>Two SH-60B LAMPS Mk III helicopters</i> (use Apache, page 79, but remove most of the weapons, for a final cost of 54 points).

Description: Manufactured from 1975 to 1981, the Spruance-class Destroyer is approximately 563 feet long, with a 55-foot beam and a fully-loaded weight of 9,250 tons. It has an upper speed of about 32.5 knots, and a crew of 330-400.

Standard armaments on the Spruance include: one eight-tube Mark 29 missile launcher loaded with Sea Sparrow missiles; two four-tube Mark 141 missile launchers, both loaded with Harpoon missiles; two three-tube Mark 32 torpedo launchers with 12.8 inch torpedoes; two 20mm Mark 15 Phalanx CIWS chain guns (each capable of independent targeting of threats and incoming attacks); and two Mark 5 five-inch guns capable of firing up to 20 shells per minute at targets up to 12 miles away. Additional armament varies; this Spruance has a Mark 41 VLS (Vertical Launch System) with 61 Tomahawk SSMs (surface-to-surface missiles) (it could contain VLASROC anti-submarine missiles, or a mixture of both) and four 12.7mm machine guns. The various guns have a limited arc of fire, in that they can fire at targets above (or at a certain distance from) the ship. However, given their range and power, they allow the ship to strike at targets deep within enemy territory.

The Spruance's defenses are also formidable. In addition to its armored hull, it has a potent SLQ-32 ECM package to jam or interfere with enemies' targeting radars, and the Phalanx system functions in large part as a point defense system.

NIMITZ-CLASS AIRCRAFT CARRIER

Val	Char	Cost	Notes
22	Size	110	160" x 80"; -22 KB; -14 DCV
120	STR	0	Lift 400 ktons; 24d6 HTH [0]
10	DEX	0	OCV: 3/DCV: 3
40	BODY	8	
12	DEF	24	Does Not Protect Some Occupants (-¼)
2	SPD	0	Phases: 6, 12
Total Characteristic Cost: 142			

Movement: Ground: 0"/0"
Swimming: 23"/46"

Abilities & Equipment

Cost Power END

6	<i>Propeller-Driven Military Vessel:</i>	Swimming +21" (23" total); Surface Only (-1), Limited Maneuverability (-1), Side Effects (propeller does KA 2d6 to anyone coming in contact with bottom stern of vehicle, occurs automatically, only affects environment around vehicle; -¾)	0
-12	<i>Water Vehicle:</i>	Ground Movement -6" (0" total)	
165	<i>20mm Mark 15 Phalanx CIWS:</i>	Multipower, 165-point reserve, 1,550 Charges for entire reserve (+1); all OIF Bulky (-1)	[1,550]
7u	1) <i>Attack Mode:</i>	RKA 4d6, Autofire (10 shots; +1), Armor Piercing (+½), +1 Increased STUN Multiplier (+¼); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (360 Degrees above ship; -¼)	
1u	2) <i>Defense Mode:</i>	Missile Deflection (all physical projectiles), Range (+1); OIF Bulky (-1), Requires 10 Charges Per Use (-¾)	
10	<i>20mm Mark 15 Phalanx CIWS:</i>	2 more Phalanxes (total of three)	[1,550]
65	<i>Phalanx Targeting Systems:</i>	Tactical Computer (page 162) for Phalanx (includes IR Sensors and 360 Radar options)	0
10	<i>Phalanx Targeting Systems:</i>	Targeting Computers (page 162) for the other Phalanxes	0
5	<i>Communications Systems:</i>	HRRP (Radio Group); OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½)	0
17	<i>Radar Systems:</i>	Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+18 versus Range Modifier); OIF Bulky (-1), Affected As Sight Group As Well As Radio Group (-½)	0
9	<i>Sonar Systems:</i>	Active Sonar (Hearing Group), Increased Arc Of Perception (360 Degrees), Telescopic (+12 versus Range Modifier); OIF Bulky (-1), Only Usable Underwater (-1), Affected As Sight Group	0
14	<i>IR Sensing Systems:</i>	Infrared Perception (Sight Group), Increased Arc Of Perception (360 Degrees), Telescopic (+18 versus Range Modifier); OIF Bulky (-1)	0
10	<i>Nuclear Reactor Shielding:</i>	+10 DEF, Partial Coverage (covers a total 80 hex area; -2)	0
1	<i>Nuclear Reactor Shielding:</i>	Life Support	

	(Safe Environment: High Radiation); Partial Coverage (covers a total 80 hex area; -2)	0	
63	<i>Fire Control System:</i>	Detect Unauthorized/Uncontrolled Fires 14-; Only Within Affected Area (20" x 20" zone; -2) plus Dispel Fire Powers 20d6, all Fire powers simultaneously (+2); Only Within Affected Area (20" x 20" zone; -2), 16 Charges (-0)	0/[16]
25	<i>Fire Control System:</i>	31 more Fire Control Systems (total of 32)	0/[16]
45	<i>Huge Boat's Anchor:</i>	120 STR, Reduced Endurance (0 END; +½); OIF Bulky (-1), Partial Coverage (-2)	0
2	<i>Heavy Anchor Chain:</i>	+10 BODY; OIF Bulky (-1), Partial Coverage (-2)	0
11	<i>Launch Assist/Arrest System:</i>	+9 Size; Only For Air Vehicle Takeoff/Landing Purposes (-2), Requires A Combat Piloting Roll (by pilots taking off or landing; -1/2), No Figured Characteristics (-1/2)	0

Skills

25	<i>Advanced Targeting Systems:</i>	+5 with Ranged Attacks
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Total Abilities & Equipment Cost: 479
Total Vehicle Cost: 621

Value Disadvantages

25	<i>Distinctive Features:</i>	US Navy Aircraft Carrier (Not Concealable; Causes Extreme Reaction [fear])
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Total Disadvantage Points: 25
Total Cost: 596/5 = 119

Cost Additional Vehicles

46	<i>Lifeboats:</i>	300 (use Canoe, page 61)
30	<i>Mark 29 Sea Sparrow Missile Launcher:</i>	1 Sea Sparrow Missile (page 131)
20	<i>Mark 29 Sea Sparrow Missile Launcher:</i>	15 more Sea Sparrows (total of 16)
30	<i>RAM Mark 31 SAM Systems:</i>	1 RAM missile (use Sparrow, page 131)
30	<i>RAM Mark 31 SAM Systems:</i>	41 more RAM missiles (total of 42)
97	<i>Mixed complement of 62 fighters</i>	(use Hornet, page 77).
69	<i>Eight SH-60B LAMPS Mk III helicopters</i>	(use Apache, page 79, but remove most of the weapons, for a final cost of 54 points).

Description: Built during the period 1984-2002, the Nimitz-class aircraft carrier is the most advanced such vessel in the world, and the largest warship ever built. Its two nuclear reactors and four steam turbines can move it at speeds exceeding 30 knots, an amazing feat considering that it weighs just a little under 100,000 tons when fully loaded. Its nuclear engines give it unlimited range, freed from the need to refuel (though the ship does have to receive resupply of aviation fuel, ammunition, and other consumables). It has a crew of over 5,600.

A typical Nimitz-class vessel has a complement of 70 aircraft, including F-14B Tomcats, F/A-18C Hornets, EA-6B Prowlers, E-2C Hawkeyes, SH60F

Seahawk helicopters, and others. It can launch up to four of its aircraft per minute, if necessary. It also has Mark 29 missile launchers to fire Sea Sparrows, three Phalanx CIWS systems, and two RAM Mark 31 surface-to-air missile systems.

LOS ANGELES-CLASS NUCLEAR SUBMARINE

Val	Char	Cost	Notes
17	Size	85	50" x 25"; -17 KB; -11 DCV
95	STR	0	Lift 12.5 ktons; 19d6 HTH [0]
14	DEX	12	OCV: 5/DCV: 5
30	BODY	3	
10	DEF	24	
3	SPD	6	Phases: 4, 8, 12
			Total Characteristic Cost: 130

Movement: Ground: 0"/0"
Swimming: 17"/34"

Abilities & Equipment

Cost	Power	END
7	<i>Propeller-Driven Military Vessel:</i> Swimming +15" (17" total); Limited Maneuverability (-½), Side Effects (propeller does KA 2d6 to anyone coming in contact with bottom stern of vehicle, occurs automatically, only affects environment around vehicle; -¾)	0
-12	<i>Water Vehicle:</i> Ground Movement -6" (0" total)	
75	<i>Anechoic Coating And Equipment Mounts:</i> Change Environment 50" radius, -6 to Hearing Group Perception Rolls, Reduced Endurance (0 END; +½)	0
11	<i>Submersible: Life Support (Self-Contained Breathing:</i> Safe Environment: High Pressure)	0
5	<i>Communications Systems:</i> HRRP (Radio Group); OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½)	0
13	<i>Periscope:</i> Clairsentience (Sight Group), Reduced Endurance (0 END; +½); OIF Bulky (-1), Limited Range (8"; -¼)	0
11	<i>Active Sonar Arrays:</i> Active Sonar (Hearing Group), Increased Arc Of Perception (360 Degrees), Telescopic (+8 versus Range Modifier); OIF Bulky (-1), Affected As Sight Group As Well As Hearing Group (-½)	0
8	<i>Passive Sonar Arrays:</i> +4 PER with Hearing Group; OIF Bulky (-1) plus Ultrasonic Perception (Hearing Group); OIF Bulky (-1) plus Telescopic (+4 versus Range Modifier for Hearing Group); OIF Bulky (-1)	0
15	<i>Surface-Search Radar Systems:</i> Radar (Radio Group), Increased Arc Of Perception (360 Degrees), Telescopic (+18 versus Range Modifier); Does Not Work Underwater (-1), Affected As Sight Group As Well As Radio Group (-½)	0
14	<i>IR Sensing Systems:</i> Infrared Perception (Sight Group), Increased Arc Of Perception (360 Degrees), Telescopic (+18 versus Range Modifier); OIF Bulky (-1)	0

10	<i>Nuclear Reactor Shielding:</i> +10 DEF, Partial Coverage (covers a total 80 hex area; -2)	0
1	<i>Nuclear Reactor Shielding:</i> Life Support (Safe Environment: High Radiation); Partial Coverage (covers a total 80 hex area; -2)	0
63	<i>Fire Control System:</i> Detect Unauthorized/Uncontrolled Fires 14-; Only Within Affected Area (20" x 20" zone; -2) plus Dispel Fire Powers 20d6, all Fire powers simultaneously (+2); Only Within Affected Area (20" x 20" zone; -2), 16 Charges (-0)	0/[16]
25	<i>Fire Control System:</i> 31 more Fire Control Systems (total of 32)	0/[16]

Skills

25 *Advanced Targeting Systems:* +5 with Ranged Attacks

Total Abilities & Equipment Cost: 271

Total Vehicle Cost: 401

Value Disadvantages

25 Distinctive Features: US Navy Attack Submarine (Not Concealable; Causes Extreme Reaction [fear])

Total Disadvantage Points: 25

Total Cost: 376/5 = 75

Cost Additional Vehicles

20	<i>Lifeboats:</i> 20 (use Canoe, page 61, but make it large enough to carry 20 people)
20	<i>Mark 48 ADCAP Torpedoes:</i> 1 Mark 48 ADCAP (page 133)
25	<i>Mark 48 ADCAP Torpedoes:</i> 21 more ADCAPs (total of 22)
70	<i>Tomahawk Missile Launchers:</i> 1 Tomahawk Land Attack Missile (nuclear) (use Nuclear Space Missile, page 132, without the MegaScaling)
20	<i>Tomahawk Missile Launchers:</i> 11 more Tomahawks (total of 12)

Description: The most powerful and advanced submarine currently fielded by the U.S. Navy, the nuclear-powered Los Angeles-class is a key component of America's overall defense strategy. Subs of the class carry twelve Tomahawk Land Attack Missiles, armed with conventional or nuclear warheads and able to strike targets up to 1,400 miles away. They also have four torpedo tubes from which they can launch Mark 48 ADCAP torpedoes.

Los Angeles-class subs have crews of about 125-150. They spend most of their time underwater, and can dive to depths of 1,480 feet (450 meters). Below that, water pressure damages and eventually crushes them. (See *Star Hero*, pages 283-85, for more information.)



4 THE WILD BLUE YONDER AIRCRAFT

Since early humans first saw birds and insects winging their way through the air, man has wanted to fly. The Wright Brothers made that dream a reality at Kitty Hawk, North Carolina in 1903, and since then more and more people have had the chance to take to the skies. In the modern world, every day thousands of people criss-cross the globe in airplanes

and helicopters. Adventure heroes pilot fighter planes, maneuver powerful attack helicopters through narrow gorges, use hanggliders to infiltrate an enemy's stronghold silently, and take fabulous journeys on enchanted flying carpets. This chapter discusses the different types of air vehicles and how to build them, and provides twelve examples to get you started.

AIR VEHICLE BASICS



SIZE, MASS, AND WINGSPAN

Determining the Size of an air Vehicle can be a little tricky, since they're often oddly-shaped, with narrow bodies and enormous wings. As mentioned on page 8, you should either use the Vehicle's length, or its mass, to determine its Size in most cases; don't worry about how "wide" its wingspan makes it.

To build an air vehicle, you need to know how it remains aloft and propels itself through the air. That tells you the best way to build a particular vehicle, including the Movement Power most appropriate for it.

AIR VEHICLE MOVEMENT POWERS

In almost all cases, air Vehicles are built with Flight, though a few, such as gliders, use Gliding instead. Regardless of what powers you build an air vehicle with, characters use Combat Piloting to operate them in crisis conditions.

Flight

Flight is the most common Movement Power for aircraft. It's used for airplanes, helicopters, blimps, science fiction hovercars, mecha that can convert themselves into jetfighters, enchanted flying ships, and many other types of vehicles. The Methods Of Flight section, below, discusses the major ways you can make a vehicle fly, and how to simulate them in game terms.

Vehicles with Flight have no stall velocity or other special restrictions on their Flight. Thus, their flight is effectively momentumless — they can hover in place, fly straight upward or downward, and so

forth. (They cannot fly sideways unless they take the *Sideways Maneuverability* Advantage.) However, characters often apply Limitations, such as *Stall Velocity* or *Limited Maneuverability*, to their Vehicles' Flight to make it "realistic" for the type of Vehicle envisioned.

The *Usable Underwater* Advantage (*Hero System 5th Edition, Revised*, page 178) is rarely used for Vehicles, but it's not necessarily inappropriate, assuming special effects justify it. For example, a high-tech spy might have a "flying car" that converts to a mini-submarine.

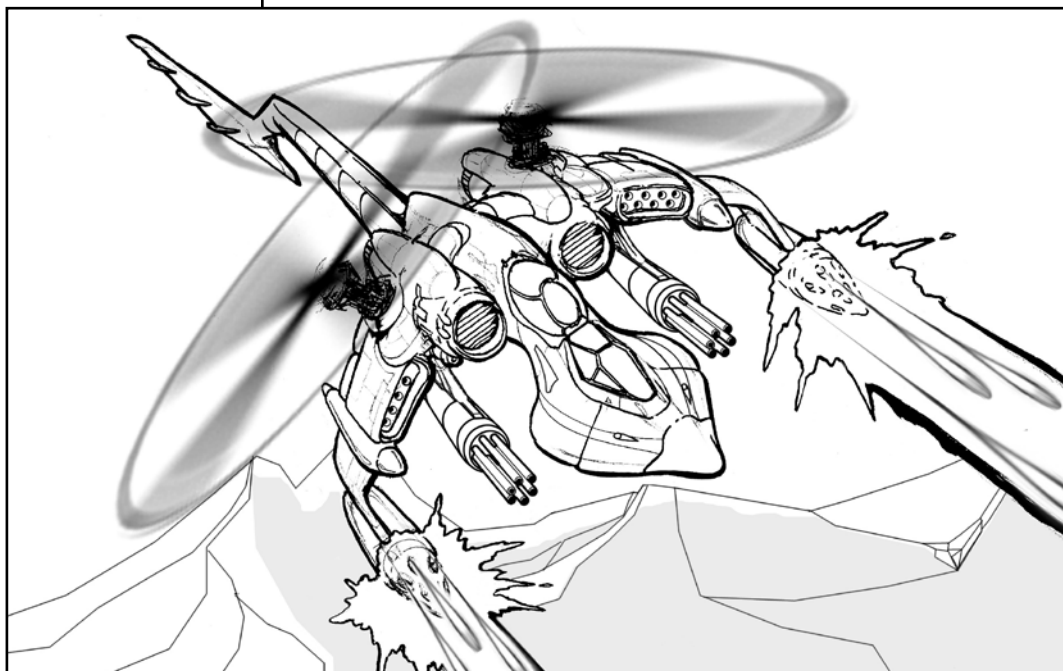
Vehicles with Flight remain subject to their normal Turn Mode if they want to fly upward or downward — they can't make a 90-degree turn and immediately start flying straight up or straight down (though ceasing to fly and plummeting to the ground is a pretty close approximation of the latter). Instead, they turn upward or downward gradually, just as if they were turning to the side. That's why planes flying toward the ground (and getting a velocity boost from gravity; see page 364 of the *Hero System 5th Edition, Revised*) often have trouble "pulling out of a dive" in time to avoid hitting the ground.

Flying Vehicles that need to taxi and take off (see below) usually keep their free 6" of Ground Movement. Helicopters and similar Vehicles sell back their Ground Movement to 0". Flying Vehicles of all sorts usually sell back their free 2" of Swimming, too, unless they want the ability to land on bodies of calm water.

Effect Of The Wind

A flying Vehicle may have an easier or harder time flying based on the direction and strength of the wind.

If the wind is behind the Vehicle, it provides some extra "push" or speed. At the GM's discretion, consult the Sailing Speed Table (page 57) for wind speeds. Half of the wind's speed in inches per Segment adds to the aircraft's Flight, with the restriction that in no case can the aircraft go faster than its maximum inches of Flight (however, it can reduce the number of inches of Flight it would normally



use [and pay END for], and allow the wind to make up the difference). The Control Roll penalty for high winds applies too, if the Vehicle has to make any such rolls.

If the wind is in front of the Vehicle, it can slow it down considerably. Again, use the Sailing Table, but in this case subtract half the wind's inches per Segment from the aircraft's Flight. The Control Roll penalty applies, if the Vehicle has to make any such rolls.

If the wind is from some other direction, it has no effect on movement. However, the Control Roll penalty applies, if the Vehicle has to make any such rolls.

LIMITATIONS FOR VEHICULAR FLIGHT

The following Limitations apply to vehicles' Flight generally. Chapter One discusses many others appropriate Power Modifiers.

Stall Velocity (-¼, -½)

Stall Velocity means a flying Vehicle has to maintain a certain airspeed or risk stalling. This means it cannot slow down below a certain threshold, move backwards, hover in place, move straight up or down, or the like. Instead, the vehicle may "stall" if it's not flying quickly enough to exceed its stall velocity. (This does not prevent the vehicle from slowing down to land; any flying vehicle can safely do that.)

If the Stall Velocity is half the vehicle's maximum Combat Movement velocity, then this is a -¼ Limitation. If the Stall velocity equals the vehicle's Combat Movement velocity, then this is a -½ Limitation (such a vehicle could only stay airborne by making Full Moves every Phase or moving at Noncombat velocities).

A stalled vehicle is at ½ DCV and begins to fall normally. A skilled pilot (one with Combat Piloting) can attempt to pull out of a stall by succeeding with a Combat Piloting roll. The GM may impose penalties to the roll based on how fast and far the vehicle has fallen... and in any event, given that flying Vehicles have a Turn Mode, if the vehicle doesn't pull out of the dive by a certain point, it won't have room to do so (see page 367 of the *Hero System 5th Edition, Revised*).

Takeoff/Landing (-1)

A flying Vehicle with this -1 Limitation requires a significant amount of smooth, level ground to get airborne or land (if the Vehicle hasn't sold back its Swimming, it can also do this on a relatively calm body of water, such as a large lake). It's an almost universal Limitation for airplanes, but not necessary for helicopters, VTOL (vertical takeoff and landing) jets, or aerial hovercraft.

A Vehicle with this Limitation needs a number of inches of smooth, level ground equal to its maximum Noncombat Flight velocity times half its Size (round down) to takeoff or land without difficulty. In that situation, unless there's some sort of emergency or crisis, a pilot doesn't have to make any sort of Skill Roll to take off or land. If it has less space than this, or the ground isn't as smooth and level as it ideally should be, the pilot has to make a

TAKEOFF AND LANDING TABLE

Landing Strip Length	Combat Piloting Penalty
75-99% of required length	-1
50-74% of required length	-3
25-49% of required length	-6
Less than 25% of required length	-10
Landing Strip Condition	Combat Piloting Penalty
Rough ground	-2
Very rough ground	-4
Incredibly rough ground	-8
Mildly steep/slanted	-1
Steep/slanted	-2
Very steep/slanted	-4
Prevailing Weather	Combat Piloting Penalty
Rain	-1
Strong Rain	-2
Snow/Ice	-4

All listed penalties are cumulative. For example, the penalty for landing on a rough strip 60% of the required length that's also mildly slanted imposes a -6 penalty.

A failed landing or takeoff roll usually means the Vehicle crashes (either into the ground, or into a nearby obstacle), particularly during a landing. However, it may just mean the Vehicle cannot take off at this time, or has to try another approach.

Combat Piloting roll to take off or land successfully (see accompanying table).

Taking off or landing requires a number of Phases equal to the Vehicle's SPD. This does not qualify for an *Extra Time* Limitation; it's part of the overall value of the Limitation.

Gliding

In some cases, air Vehicles are built with Gliding. In addition to literal gliders (that is, lightweight airplanes without engines) and fantasy vehicles towed by flying beasts, other types of fixed-wing aircraft may buy a little Gliding so they don't immediately start to crash if their Flight runs out of fuel.

Riding Thermals

As the *Hero System 5th Edition, Revised* notes on page 182, a Gliding character — or Vehicle — usually has little difficulty gaining altitude by riding thermals (updrafts of hot air). As a general guideline, in most cases a Gliding Vehicle can gain ½" of altitude by taking a Full Phase Action to do so. If thermals are less common or strong, the Vehicle may climb more slowly (¼" per Full Phase Action, for example), or have to make a DEX Roll to ride the thermals properly.

PARACHUTES

Characters also use the Gliding Power to build parachutes:

Gliding 6" (6 Active Points); OAF (-1), Limited Movement (character cannot gain altitude, and must move at least 12" downward for every 1" forward; -½), 1 Recoverable Continuing Charge (lasts until character hits the ground or chute is fouled; -¾). Total cost: 2 points.

METHODS OF FLIGHT

There are five main ways to make a vehicle fly: propellers; jet engines; rotors; wings; and antigravity. Absent the existence and use of magic, they all require a motor or engine of some sort, and so usually take the *Fuel Charges* Limitation. Additionally, in settings featuring large flying creatures, it might

JET ENGINE TYPES

Modern aircraft use several different types of jet engines. They include:

Turbojet: The simplest type of jet engine, a turbojet uses a compressor (a device like a large fan) to compress the air the engine takes in. A burner combines a small amount of fuel with the high-pressure compressed air and ignites it to create a jet exhaust. On its way out the back of the engine, the exhaust passes over a turbine, which powers the compressor.

Turbofan: In a turbofan engine, the core engine components (compressor, burner, turbine) have a fan in front, and an additional turbine at the back. Some incoming air goes through the compressor as on a turbojet, but some passes through the fan and “bypasses” the compressor, creating additional thrust and making the engine highly fuel-efficient. A turbofan engine with a high bypass ratio allows for very fast flight.

Turboprop: Often used on low-speed transports, cargo transports, and small commercial planes, turboprop engines have a propeller in front of the jet engine casing. The exhaust from the turboprop’s turbojet engine is relatively low, so the propeller provides additional thrust.

Afterburning Turbojet: This engine is similar to a normal turbojet, but includes an afterburner to replace the exhaust energy after the turbine takes it away. It does this by injecting fuel into the exhaust. This type of engine is used on many supersonic aircraft, such as jetfighters or the Concorde.

be possible to build towed flying vehicles; for these, you can use the same rules for towing water or ground vehicles.

All of these methods generate thrust to overcome the drag of moving an object through the air. But that alone is not enough to fly. All methods of flight also require a way to generate lift to overcome the vehicle’s weight (*i.e.*, the force of gravity). This depends, to a large extent, on the aerodynamic properties of the vehicle’s body. Propellers and jet engines won’t get a vehicle airborne at all if it isn’t properly shaped and configured, and has the proper control surfaces, to generate lift. For airplanes, the wings are mainly what generates lift; for helicopters, it’s the rotors. You don’t have to buy “aerodynamic shape” as a game element, however; it’s assumed to be part of a Vehicle bought with Flight.

PROPELLERS

Propellers work like large, powerful fans. They pull air through them and back over the body of the vehicle, generating thrust and also moving the air past the wings to generate lift. The shape and angle of the propeller also helps the pilot control the vehicle. They work best for smaller airplanes, or as a supplement for jet engines. To create a vehicle with propellers, buy Flight, with the *Fuel Charges* (fuel needed to keep the engine running), *Takeoff/Landing*, and *Side Effects* Limitations. The latter refers to the dangerous propellers, which can harm people or objects if they hit them. (Remember the fistfight scene between Indiana Jones and the bald German soldier at the airfield in *Raiders Of The Lost Ark*?) This typically means KA 1d6 or 2d6 to anyone who comes into contact with the appropriate part of the vehicle, automatically occurs when Flight is in use, and only affects the environment around vehicle. If the propeller is large enough, the KA may cover an Area Of Effect (Radius).

A Vehicle that has propeller-based Flight has a number of propellers up to its Size divided by 5. If it wants more (perhaps as a safeguard, to ensure it remains airborne even if some are destroyed), it can double its number of propellers for each +5 Character Points.

JET ENGINES

First developed during World War II, jet engines (or gas turbines) work much like rocket engines. They burn fuel and oxygen to create an exhaust of hot gases that projects backward, thus propelling the vehicle forward. Typically, jet engines are hung in pods beneath an aircraft’s wings (as on commercial jets), or are built into the body of the plane (as with many jetfighters). Because jet engines require oxygen from the air, they won’t operate in space, underwater, or in atmospheres which lack oxygen or are too thin. (Normally this is only a -0 Limitation, not even worth listing on a Vehicle’s character sheet, but in some games, it may qualify as a -¼ Limitation.) Additionally, they sometimes suck in small objects that come too close to their front side (such as songbirds), which may damage or destroy the engine.

To create a vehicle with jet engines, buy Flight, with the *Fuel Charges* (jet fuel needed to keep the engine running), *Takeoff/Landing*, and *Side Effects* (the dangerously hot exhaust can hurt people or objects) Limitations. The Side Effect is typically a KA 1d6 or 2d6 to anyone or anything up to 3” behind the engine, automatically occurs when Flight is in use, and only affects the environment around the vehicle. If the jet exhaust is large enough, the KA may cover an Area Of Effect (Line).

A Vehicle that has jet engine-based Flight has a number of jet engines up to its Size divided by 5. If it wants more (perhaps as a safeguard, to ensure it remains airborne even if some are destroyed), it can double its number of jet engines for each +5 Character Points.

ROTORS

A rotor is, roughly speaking, a large propeller turned parallel to the ground. In essence, it’s a wing (or series of wings) that spins itself to provide lift, instead of having an engine thrust it forward. Because this spin tends to make the vehicle itself spin in the opposite direction once it’s in the air, the vehicle needs a long boom (or “tail”) with a second rotor, set perpendicular to the ground and usually aligned with the body of the vehicle, to counteract the main rotor’s spin and keep it stable.

A vehicle with rotors (*i.e.*, a helicopter) is much more maneuverable than an airplane or other vehicle with the *Stall Velocity* Limitation. It can hover, spin in 360 degrees, move backwards and sideways, and so forth. It should take the *No Turn Mode* and *Sideways Maneuvering* Advantages. It can also come to a stop/hover fairly quickly; they often buy improved deceleration ability (page 23).

In addition to those two Advantages, rotor-based Flight should take the *Fuel Charges* and *Side Effects* Limitations. The latter refers to the rotors, which endanger anyone who comes near the helicopter from the wrong angles. Typically rotors create a Side Effect that’s a KA 2d6, Area Of Effect (up to a 6” Radius) around the center point of the vehicle, automatically occurs when Flight is in use, and only affects environment around Vehicle (typically this is worth -¾).

A Vehicle that has rotor-based Flight has two rotors, as indicated above. If it wants more (perhaps as a safeguard, to ensure it remains airborne even if some are destroyed), it can double its number of rotor pairs for each +5 Character Points.

WINGS

Some settings feature aircraft built with wings that flap like a bird’s — ornithopters. While not necessarily scientifically plausible, this certainly makes the vehicles distinctive. Similarly, settings with living vehicles might include some that fly like gigantic avians or insects.

An ornithopter would have more maneuverability than an airplane, but less than a helicopter, and does not require a landing strip. You can build this sort of flight as Flight, Fuel Charges (if motorized), Side Effects (the wings are heavy enough, and move

fast enough, to cause serious injury if they hit someone). Sideways Maneuverability would not be appropriate, but the Vehicle could take the *Cannot Move Backwards* (-¼) Limitation instead of Stall Velocity. It might even buy some Gliding, so that if it loses power, it simply banks its wings and glides to safety.

ANTIGRAVITY

Antigravity is discussed on page 38 for ground vehicles. In some science fiction settings, antigrav technology is powerful enough to allow for full-fledged flight, rather than just hovering a few feet off the ground. “Hoverplanes” are fast, maneuverable, and safer than other types of aircraft. Additionally, they usually have self-contained power sources, so they don’t apply the *Fuel Charges* Limitation. You can build them with Flight, No Turn Mode, Sideways Maneuverability (+½). Many have Skill Levels with Flight as well.



OTHER PARTS OF AN AIR VEHICLE

Besides its means of getting off the ground, an air vehicle needs plenty of other systems and devices to make flying safe, efficient, and comfortable. Some of the major devices and systems found in many air vehicles (primarily airplanes), and how you might make use of them in your game, include:

Cockpit: Where the pilot or pilots sit and the controls of the aircraft are located.

Control Surfaces: Movable parts of the wings and stabilizers that allow the pilot to control the vehicle’s movement. They include the ailerons, elevators, flaps, rudder, slats, and spoilers. Improved or enhanced control surfaces might provide Skill Levels with Flight.

Fuselage: The main body of the craft, the section to which the manufacturer attaches the other parts. In a passenger airplane, the fuselage is mainly filled with seats; in a cargo plane, with cargo; in a fighter, with engines, weapons, and related electronic systems. To improve the fuselage, buy more BODY (and sometimes DEF).

Stabilizers: The tailfins, vertical and horizontal structures at the rear of the plane that include control surfaces (the rudder and elevators) to control the vehicle’s movement. Some jetfighters have stabilators, stabilizers that can move as a whole. Again, improved stabilizers are usually represented as Skill Levels with Flight.

AIR VEHICLE EVERYVEHICLE EQUIPMENT

Air Vehicles have the following types of Every-vehicle Equipment described for ground vehicles: Battery; Clock; Headlights (or equivalent); Heater/ Air Conditioner; Internal Lights; Radio (if more advanced communications equipment is not installed); Seat Belts; Signal Lights (the external anti-collision and position lights, running lights, and the like); Windshield Wipers. Additionally, it has these other types of Everyvehicle Equipment:

Air Vehicle Sensors: These include the altimeter, engine performance monitors, fuel gauge, vertical speed indicator, and the like. (Detect Vehicle Performance And Use Information 16-; OIF Bulky (-1); total cost: 6 points.)

Flight Recorder: The so-called “black box”; see page 21.

Locks: Most air vehicles have at least some locks to prevent theft, though some (such as some helicopters) may not have doors to lock. Additionally, in many areas (including the United States), commercial airliners cannot legally have external locks; they interfere with rescues in the event of an emergency. (Nor do they have ignition keys.)

Navigation Instruments: Aircraft need compasses, GPS trackers, and other instruments to stay on course — after all, it’s not as if they can follow road signs. (Bump Of Direction, with the Requires A Navigation Roll Limitation, if appropriate.)

Pressurization: Vehicles intended for high-altitude flying, including commercial airliners, have to be sealed and pressurized. (Life Support (Self-Contained Breathing; Safe Environments: Intense Cold, Low Pressure); total cost: 14 points.)

AIR VEHICLE SUMMARY TABLE

Here’s a quick-reference table for how to build various common types of aircraft.

Airplanes: Flight, Fuel Charges, Side Effects, Stall Velocity, Takeoff/Landing, and Limited Maneuverability (if appropriate)

Airships (Blimps): Flight, Fuel Charges, Side Effects, Limited Maneuverability

Balloons: Flight 1”, Only To Go Straight Up (-1), plus Limitations similar to Sailed (page 57), to reflect the fact that a balloon is at the mercy of the winds.

Helicopters: Flight, No Turn Mode, Sideways Maneuverability (+½), Fuel Charges, Side Effects; often have Increased Deceleration

Hovercraft, Aerial: Flight, No Turn Mode, Sideways Maneuverability (+½)

Ornithopters: Flight, Fuel Charges, Side Effects, Cannot Move Backwards

SAMPLE AIR VEHICLES



The rest of this chapter contains twelve sample air vehicles, ranging from World War I-era fighters to superhero-style aerotechnology, both as a resource for players and GMs and as examples if you want something to review before building your own aircraft.



FLYING CARPET

Val	Char	Cost	Notes
2	Size	10	1.6" x .8"; -2 KB; -1 DCV
20	STR	0	Lift 400 kg; 4d6 HTH [0]
23	DEX	39	OCV: 8/DCV: 8
12	BODY	0	
3	DEF	2	Does Not Protect Occupants (-½)
4	SPD	7	Phases: 3, 6, 9, 12
			Total Characteristic Cost: 58

Movement: Ground: 0"/0"
Flight: 30"/60"

Abilities & Equipment

Cost	Power	END
105	<i>Enchanted Flight:</i> Flight 30", No Turn Mode (+¼), Sideways Maneuverability (+½)	
-12	<i>Can Only Fly:</i> Ground Movement -6" (0" total)	
-2	<i>Can Only Fly:</i> Swimming -2" (0" total)	

Total Abilities & Equipment Cost: 91

Total Vehicle Cost: 149

Value Disadvantages

5	Physical Limitation: Cannot Do HTH Damage (Infrequently, Slightly Impairing)
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Total Disadvantage Points: 5

Total Cost: 144/5 = 29

Description: Myths, legends, and fantasy literature describe many enchanted devices that grant the power of flight. The best-known of these is the flying carpet, a staple of Arabian folklore. Fast, maneuverable, and comfortable, it's the ultimate conveyance for many *Fantasy Heroes*. However, the GM may call for STR Rolls to find out if the riders can hang on when the carpet makes any fast, sudden moves, has to fly upside down or sideways, or the like.

If you want, you can make the flying carpet bigger so it can carry more people (regardless of how big it gets, it should retain the Physical Limitation that it can't hurt people in HTH combat; it's still just a relatively flimsy object). You can also shave off some inches of Flight if the carpet's too fast for your campaign. You could even give it an INT and EGO so it becomes as much an NPC as a Vehicle.

You can also use this writeup for a witch's broomstick and similar "flight objects."

SOPWITH F.1 CAMEL

Val	Char	Cost	Notes
4	Size	20	2.5" x 1.25"; -4 KB; -2 DCV
30	STR	0	Lift 1,600 kg; 6d6 HTH [0]
15	DEX	15	OCV: 5/DCV: 5
14	BODY	0	
2	DEF	0	
3	SPD	5	Phases: 4, 8, 12
			Total Characteristic Cost: 40

Movement: Ground: 6"/12"
Flight: 19"/76"

Abilities & Equipment

Cost	Power	END
Propulsion Systems		
17	<i>Propeller-Driven Biplane:</i> Flight 19", x4 Noncombat; 1 Continuing Fuel Charge (easily-obtained fuel; 2 Hours; -0), Side Effects (KA 1d6 to anyone who comes into contact with the propeller, automatically occurs when Flight is in use, only affects environment in front of vehicle; -¼), Stall Velocity (10"; -¼), Takeoff/Landing (-1) [1cc]	
-2	<i>Can Only Fly:</i> Swimming -2" (0" total)	
Tactical Systems		
13	<i>Twin Vickers Machine Guns:</i> RKA 1d6+1, Autofire (4 shots; +½), 250 Charges (+1); OAF Bulky (-1½), Real Weapon (-¼), Limited Arc Of Fire (0 degrees forward, same horizontal level; -1) [250]	

Skills

2 *Highly Maneuverable:* +1 with Flight

Total Abilities & Equipment Cost: 30
Total Vehicle Cost: 70

Value Disadvantages

25 Distinctive Features: Warplane (Not Concealable; Causes Extreme Reaction [fear])

Total Disadvantage Points: 25
Total Cost: 45/5 = 9

Description: Making its combat debut in July, 1917, the Sopwith Camel biplane was credited with 1,294 air combat victories by the end of World War I, by far the most attributed to any type of airplane. Although unstable and difficult to handle (making it dangerous for inexperienced operators), with a trained pilot behind the stick it was capable of highly-responsive maneuvering, including a fast right turn.

The Camel gets its name from the "hump" on the top of its forward fuselage, which holds twin Vickers .303 machine guns, synchronized to fire without destroying the propeller. (These fire together, and so are bought as a single weapon.) The body is made of wood, with light alloy panels forward; the 8.5 meter-long wings are fabric-covered wood. When fully loaded it weighs about 650 kg.

AIRSHIP (ZEPPELIN)

Val	Char	Cost	Notes
18	Size	90	64" x 32"; -18 KB; -12 DCV
85	STR	-15	Lift 3.2 ktons; 17d6 HTH [0]
10	DEX	0	OCV: 3/DCV: 3
29	BODY	0	
4	DEF	6	
2	SPD	0	Phases: 6, 12
			Total Characteristic Cost: 81

Movement: Ground: 0"/0"
Flight: 14"/112"

Abilities & Equipment

Cost	Power	END
19	<i>Motorized Lighter-Than-Air Vehicle:</i> Flight 14", x8 Noncombat; 1 Continuing Fuel Charge (easily-obtained fuel; 3 Days; -0), Side Effects (KA 1d6 to anyone who comes into contact with the propeller, automatically occurs when Flight is in use, only affects environment near propellers; -¼), Cannot Move Backwards (-¼), Limited Maneuverability (-½) [1cc]	
-12	<i>Can Only Fly:</i> Ground Movement -6" (0" total)	
-2	<i>Can Only Fly:</i> Swimming -2" (0" total)	
2	<i>Carriage:</i> +2 DEF; Partial Coverage (carriage only; -2)	0

Total Abilities & Equipment Cost: 7
Total Vehicle Cost: 88

Value Disadvantages

15 Physical Limitation: if interior gas catches fire, the whole vehicle is destroyed (Infrequently, Fully Impairing)

Total Disadvantage Points: 15
Total Cost: 73/5 = 15

Description: An airship, better known as a "blimp" or a "zeppelin," is an unusual vehicle. It consists of a large rigid, semi-rigid, or non-rigid helium- or hydrogen-filled balloon with a small carriage mounted beneath. The helium balloon lifts the carriage, and propellers on the back of the carriage provide forward thrust. Solid tailfins and rudders on the aft end allow for steering. While not very maneuverable, an airship can hover, and it travels at about 80 miles per hour.

This character sheet is an example of a large, rigid zeppelin of the 1930s, such as the ill-fated *Hindenburg*. It weighs about 400,000 pounds, contains about 200,000 cubic meters of highly-flammable hydrogen, and is approximately 120 meters long (the *Hindenburg* itself, at 245 meters long, was the largest object ever to fly). The carriage is about 30-35 meters long. It can carry up to 72 passengers, and makes the trans-Atlantic voyage in as little as 50-60 hours.

Semi-rigid (such as the *Norge*) or non-rigid (such as the Goodyear blimp) airships would have slightly less DEF and BODY, since they lack an internal metal frame.

MITSUBISHI A6M2 "ZERO" FIGHTER

Val	Char	Cost	Notes
6	Size	30	4" x 2"; -6 KB; -4 DCV
40	STR	0	Lift 6,400 kg; 8d6 HTH [0]
16	DEX	18	OCV: 5/DCV: 5
16	BODY	0	
3	DEF	3	
3	SPD	4	Phases: 4, 8, 12

Total Characteristic Cost: 55

Movement: Ground: 6"/12"
Flight: 37"/148"

Abilities & Equipment**Cost Power****Propulsion Systems**

- 32 *Propeller-Driven Fighter:* Flight 37", x4 Noncombat; 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0), Side Effects (KA 1d6 to anyone who comes into contact with the propeller, automatically occurs when Flight is in use, only affects environment in front of vehicle; -¼), Stall Velocity (18"; -¼), Takeoff/Landing (-1) [1cc]
- 2 *Can Only Fly:* Swimming -2" (0" total)

Tactical Systems

- 41 *Type 99 Cannons:* RKA 4d6, Autofire (5 shots; +½), +1 Increased STUN Multiplier (+¼), 60 Charges (+½); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (0 degrees forward, same horizontal level; -1)[60]
- 5 *Type 99 Cannons:* Another Type 99 Cannon (total of 2) [60]
- 15 *Twin Type 97 Machine Guns:* RKA 1d6+1, Autofire (5 shots; +½), 500 Charges (+1); OIF Bulky (-1), Real Weapon (-¼),

Limited Arc Of Fire (0 degrees forward, same horizontal level; -1) [250]

Skills

- 4 *Highly Maneuverable:* +2 with Flight; Limited Use (see text; -0)

Total Abilities & Equipment Cost: 95

Total Vehicle Cost: 150

Value Disadvantages

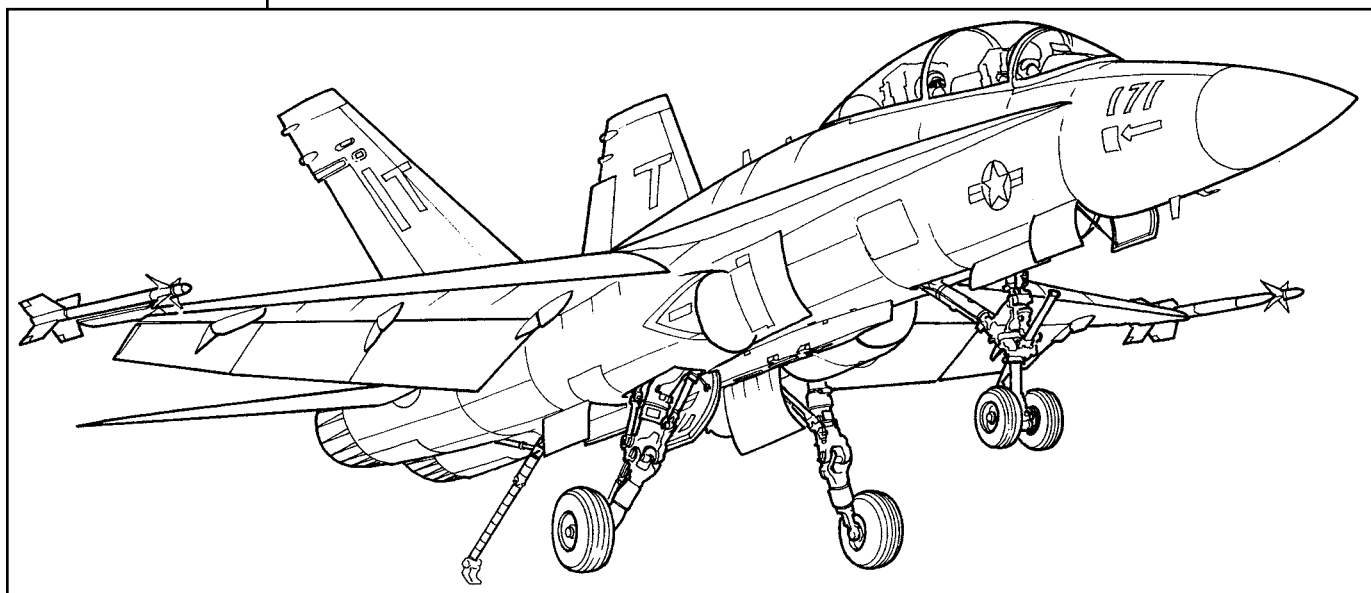
- 25 *Distinctive Features:* Warplane (Not Concealable; Causes Extreme Reaction [fear])

Total Disadvantage Points: 25

Total Cost: 125/5 = 25

Description: Making its combat debut in China in August 1940, the A6M2 Rei-Sen, or "Zero" as it was better known due to its "Type 0" designation, became one of Japan's main fighters during World War II. Lightweight (it weighs 2,410 kg fully loaded, and lacked self-sealing tanks, armor, and even a radio), it had a maximum speed of 331 miles per hour and a range of over 1,100 miles. It mounted two 20mm Type 99 cannons (one per wing), and twin nose-mounted Type 97 synchronized machine guns.

While the Zero could out-turn any Allied fighter, it was not without its weaknesses. Besides its lack of armor, it performed poorly at high altitudes, and was much less maneuverable at speeds above 205 miles per hour (23", x4 Noncombat) (it cannot use its Movement Skill Levels in this situation). By the end of the War, the A6M2, and the many variants that followed, were relatively easy prey for Allied fighters.

END

MCDONNELL-DOUGLAS F/A-18C HORNET

Val	Char	Cost	Notes
9	Size	45	8" x 4"; -9 KB; -6 DCV
55	STR	0	Lift 50 tons; 11d6 HTH [0]
23	DEX	39	OCV: 8/DCV: 8
20	BODY	1	
6	DEF	12	
5	SPD	17	Phases: 3, 5, 8, 10, 12

Total Characteristic Cost: 114

Movement: Ground: 6"/12"
Flight: 35"/280"
MegaFlight: 1"

Abilities & Equipment

Cost Power **END**

Propulsion Systems

- 29 *Jet Fighter:* Multipower, 80-point reserve; all Side Effects (-1¼), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0) for entire Multipower [1cc]
- 2u 1) *Standard Flight:* Flight 35", x8 Non-combat; Side Effects (KA 2d6, 7" Line behind engines, automatically occurs when Flight is in use, only affects environment around vehicle; -1¼), Stall Velocity (17"; -¼), Takeoff/Landing (-1)
- 1u 2) *Mach Speed Flight:* Flight 1", MegaScale (1" = 1 km; +¼); Side Effects (KA 2d6, 7" Line behind engines, automatically occurs when Flight is in use, only affects environment around vehicle; -1¼), Cannot Take Off Or Land At This Speed (-0)
- 2 *Cannot Swim:* Swimming -2" (0" total)

Tactical Systems

- 60 *20mm M61A Cannon:* RKA 4d6, Autofire (10 shots; +1), +1 Increased STUN Multiplier (+¼), 570 Charges (+1); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (0 degrees forward, same horizontal level; -1) [570]
- 36 *Electronic Countermeasures:* Suppress Radar 6d6, Area Of Effect (8" Radius; +1¼), MegaArea (1" = 1 km; +¼), Reduced Endurance (0 END; +½); OIF Bulky (-1), No Range (-½) 0
- 44 *Electronic Counter-Countermeasures:* Suppress Electronic Warfare 8d6, any Power one at a time (+¼), Increased Maximum Range (6,250", or about 7.5 miles; +½), No Range Modifier (+½), Reduced Endurance (0 END; +½); OAF Bulky (-1½) 0

Operations Systems

- 14 *Hughes APG-73 Radar:* Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+10 versus Range Modifier); OIF Bulky (-1), Affected As Sight Group As Well As Radio Group (-½) 0
- 5 *Forward-Looking Infrared System:* Infrared Perception (Sight Group) 0
- 5 *Radar Warning Receiver:* Detect Detection By Radar 16- (Radio Group); OIF Bulky (-1) 0
- 4 *Communications System:* Radio

Perception/Transmission (Radio Group); OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½)0

Personnel Systems

- 6 *Ejection Seat:* Telekinesis (26 STR); OIF Bulky (-1), Affects Whole Object (-¼), No Range (-½), Only To Throw Target Straight Up (-2), 1 Recoverable Charge (-1¼) [1rc]
- 14 *Sealed Environment:* Life Support (Self-Contained Breathing; Safe Environments: Intense Cold, Low Pressure/Vacuum) 0

Skills

- 6 *Digital Control-By-Wire Flight System:* +3 with Flight
- 15 *Targeting Systems:* +3 with Ranged Combat

Total Abilities & Equipment Cost: 239

Total Vehicle Cost: 353

Value Disadvantages

- 25 *Distinctive Features:* US Air Force Fighter (Not Concealable; Causes Extreme Reaction [fear])

Total Disadvantage Points: 25

Total Cost: 328/5 = 66

Cost Additional Vehicles

- 30 *AIM-120 AMRAAM Missiles:* Use AIM-7 Sparrow (page 131)
- 20 *AIM-120 AMRAAM Missiles:* 9 more AMRAAMs (total of 10)
- 30 *AIM-9 Sidewinder Missiles:* Use AIM-7 Sparrow (page 131)
- 5 *AIM-9 Sidewinder Missiles:* 1 more Sidewinder (total of 2)

Description: Debuting in 1987, the F/A-18C Hornet is a variant of the F/A-18A/B which entered service in the early 1980s. It incorporates major improvements in avionics and computers to complement the Hughes APG-73 radar (successor to the APG-65, the world's first radar with a programmable signal processor) and "glass cockpit" screens that replace conventional dials and switches.

The Hornet's powerful twin jet engines allow it to reach speeds of approximately Mach 1.7 at high altitudes (or Mach 1.01 at sea level), and it has an operational ceiling of 50,000 feet. It comes equipped with a six-barreled M61A cannon and a load of missiles and bombs that varies depending on mission profile. Unlike the F-15 and F-16, the cannon is located in the nose (rather than at the wing root). A Hornet has one pilot.

LOCKHEED C-130H HERCULES

Val	Char	Cost	Notes
12	Size	60	16" x 8"; -12 KB; -8 DCV
60	STR	-10	Lift 100 tons; 12d6 HTH [0]
10	DEX	0	OCV: 3/DCV: 3
25	BODY	3	
5	DEF	9	
2	SPD	0	Phases: 6, 12
			Total Characteristic Cost: 62

Movement: Ground: 6"/12"
Flight: 16"/512"

Abilities & Equipment

Cost	Power	END
13	<i>Jet Military Cargo Transport:</i> Flight 16", x32 Noncombat; Side Effects (KA 2d6, 7" Line behind engines and also propeller on front of engines, automatically occurs when Flight is in use, only affects environment around vehicle; -1¼), Stall Velocity (8"; -¼), Takeoff/Landing (-1), 1 Continuing Fuel Charge (easily-obtained fuel; 1 Day; -0) [1cc]	
-2	<i>Cannot Swim:</i> Swimming -2" (0" total)	
12	<i>Radar System:</i> Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+6 versus Range Modifier); OIF Bulky (-1), Affected As Sight Group As Well As Radio Group (-½)	0
14	<i>Sealed Environment:</i> Life Support (Self-Contained Breathing; Safe Environments: Intense Cold, Low Pressure/Vacuum)	0

Total Abilities & Equipment Cost: 37

Total Vehicle Cost: 99

Value Disadvantages

None

Total Disadvantage Points: 0

Total Cost: 99/5 = 20

Description: The C-130 family of large military cargo transports entered service in the 1950s. The C-130H was first delivered in 1975. It weighs approximately 73,000 pounds empty, and can carry about 100,000 pounds of cargo at the most (80,000 pounds' worth is the preferred limit). Fully loaded it has a top speed of 386 miles per hour and a service ceiling of 23,000 feet, and a range of nearly 2,500 miles. It can be modified for aerospace rescue and recovery, or for refueling helicopters. It normally has no weapons, but in the modern world, where the ability to transport an army to where it needs to be is of great tactical importance, the C-130H plays an important role.

LOCKHEED F-117A NIGHTHAWK**STEALTH FIGHTER**

Val	Char	Cost	Notes
10	Size	50	10" x 5"; -10 KB; -6 DCV
60	STR	0	Lift 100 tons; 12d6 HTH [0]
18	DEX	24	OCV: 6/DCV: 6
20	BODY	0	
6	DEF	12	
4	SPD	12	Phases: 3, 6, 9, 12
			Total Characteristic Cost: 98

Movement: Ground: 6"/12"
Flight: 16"/512"

Abilities & Equipment

Cost	Power	END
Propulsion Systems		
13	<i>Jet Fighter:</i> Flight 16", x32 Noncombat; Side Effects (KA 2d6, 7" Line behind engines, automatically occurs when Flight is in use, only affects environment around vehicle; -1¼), Stall Velocity (8"; -¼), Takeoff/Landing (-1), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0) [1cc]	
-2	<i>Cannot Swim:</i> Swimming -2" (0" total)	

Tactical Systems

44	<i>Internal Weapons Carriage:</i> RKA 4d6, Explosion (-1 DC/2"; +¼), Increased Maximum Range (2,625"; +¼); OIF Bulky (bomb launcher; -1), Real Weapon (-¼), Dropped (-½), 14 Charges (-0) [14]	
34	<i>Radar-Absorbing Shape/Coating:</i> Change Environment 10" radius, -8 to Radio Group Perception Rolls, Reduced Endurance (0 END; +½); No Range (-½), Self Only (-½) 0	
23	<i>Infrared-Reducing Exhausts:</i> Change Environment 10" radius, -4 to Infrared Perception Rolls, Reduced Endurance (0 END; +½); No Range (-½), Self Only (-½) 0	
36	<i>Electronic Countermeasures:</i> Suppress Radar 6d6, Area Of Effect (8" Radius; +1¼), MegaArea (1" = 1 km; +¼), Reduced Endurance (0 END; +½); OIF Bulky (-1), No Range (-½) 0	
44	<i>Electronic Counter-Countermeasures:</i> Suppress Electronic Warfare 8d6, any Power one at a time (+¼), Increased Maximum Range (6,250", or about 7.5 miles; +½), No Range Modifier (+½), Reduced Endurance (0 END; +½); OAF Bulky (-1½) 0	

Operations Systems

14	<i>Radar Systems:</i> Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+10 versus Range Modifier); OIF Bulky (-1), Affected As Sight Group As Well As Radio Group (-½) 0	
5	<i>Infrared Acquisition And Designation System:</i> Infrared Perception (Sight Group) 0	
5	<i>Radar Warning Receiver:</i> Detect Detection By Radar 16- (Radio Group); OIF Bulky (-1) 0	
4	<i>Communications System:</i> Radio Perception/	

Transmission (Radio Group); OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½) 0

Personnel Systems

- 6 *Ejection Seat*: Telekinesis (26 STR); OIF Bulky (-1), Affects Whole Object (-¼), No Range (-½), Only To Throw Target Straight Up (-2), 1 Recoverable Charge (-1¼) [1rc]
- 14 *Sealed Environment*: Life Support (Self-Contained Breathing; Safe Environments: Intense Cold, Low Pressure/Vacuum) 0

Total Abilities & Equipment Cost: 240
Total Vehicle Cost: 338

Value Disadvantages

- 25 *Distinctive Features*: US Air Stealth “Fighter” (Not Concealable; Causes Extreme Reaction [fear])

Total Disadvantage Points: 25
Total Cost: 313/5 = 63

Description: In development since the 1970s, the F-117A made its official public debut in January 1991 as one of the featured weapons of Operation Desert Storm. With a body shaped and coated to absorb or suppress radar energy, rather than deflect it back, and engine modifications to significantly reduce its heat output and IR signature, it was the world’s first true “stealth” aircraft. Nighthawks flew nearly 7,000 combat hours during Desert Storm, and not one combat hit or detection by radar was reported.

Although often referred to as a “fighter,” the F-117A is really more of a strike aircraft — it sneaks close to the target, unleashes its payload, and then returns to home base. It’s not as maneuverable as a true fighter, and would be no match for one that spotted and engaged it.

The F-117A has an internal weapons carriage that can be loaded with a variety of bombs. A typical payload includes two each of Mark 61, Mark 84, GBU-10, GBU-12, GBU-27, BLU 109, and WCMD bombs. It has no guns or air-to-air missiles.

The F-117A uses a control-by-wire flight system; without this system and related avionics, it’s virtually unflyable. It has one pilot.

**AH-64 APACHE LONGBOW
 ATTACK HELICOPTER**

Val	Char	Cost	Notes
8	Size	40	6.4” x 3.2”; -8 KB; -5 DCV
42	STR	-8	Lift 8,000 kg; 10d6 HTH [0]
23	DEX	39	OCV: 8/DCV: 8
20	BODY	2	
12	DEF	30	
4	SPD	7	Phases: 3, 6, 9, 12
			Total Characteristic Cost: 110

Movement: Ground: 0”/0”
 Flight: 25”/100”

Abilities & Equipment

Cost Power END

Propulsion Systems

- 40 *Rotor-Based Flight*: Flight 25”, x4 Non-combat, Increased Deceleration (8” per hex), No Turn Mode (+¼), Sideways Maneuverability (+½); 1 Continuing Fuel Charge (easily-obtained fuel; 3 Hours; -0), Side Effects (KA 2d6, Area Of Effect (6” Radius) around the vehicle, automatically occurs when Flight is in use, only affects environment around Vehicle; -1¾) [1cc]
- 12 *Only Flies*: Ground Movement -6” (0” total)
- 2 *Only Flies*: Swimming -2” (0” total)

Tactical Systems

- 81 *30mm M230 Chain Gun*: RKA 4½d6, Autofire (10 shots; +1), Armor Piercing (+½), +1 Increased STUN Multiplier (+¼), 1,200 Charges (+1); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (0 degrees forward, same horizontal level; -1) [1,200]
- 35 *Hellfire Missile Racks*: RKA 4d6, Armor Piercing (x2; +1), Explosion (+½); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (0 degrees forward, same horizontal level; -1), 4 Charges (-1) [4]
- 5 *Hellfire Missile Racks*: Another Hellfire rack (total of 2) [4]
- 31 *FFAR Rocket Pods*: RKA 3d6, Armor Piercing (+½), Explosion (+½), 19 Charges (+¼); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (0 degrees forward, same horizontal level; -1) [19]
- 5 *FFAR Rocket Pods*: Another Rocket Pod (total of 2) [19]
- 2 *Armored Crash Seat*: +10 PD; OIF Bulky (-1), Only To Protect Occupants Against Damage From Crashes (-2) 0
- 2 *Armored Crash Seat*: Another Armored Crash Seat (total of 2) 0
- 19 *Infrared Jammer/Suppressor*: Change Environment 8” radius, -4 to Infrared Perception Rolls, Reduced Endurance (0 END; +½); No Range (-½), Self Only (-½) 0
- 21 *Radar Jammer*: Change Environment 8” radius, -4 to Radio Group Perception Rolls, Reduced Endurance (0 END; +½); No Range (-½), Self Only (-½) 0
- 8 *Chaff Dispenser*: Darkness to Sight and Radio Groups 1” radius, MegaArea (1” =

100"; +¼); OIF Bulky (-1), Real Weapon (-¼), 12 Charges (-¼) [12]

Operations Systems

- 18 *Millimeter-Wave Radar*: Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+10 versus Range Modifier), Difficult To Dispel (+¼); OIF Bulky (-1), Affected As Sight Group As Well As Radio Group (-½) 0
- 1 *Millimeter-Wave Radar*: +2 PER with Radar, Difficult To Dispel (+¼); OIF Bulky (-1) 0
- 5 *Infrared Systems*: Infrared Perception (Sight Group) 0
- 5 *Radar Warning Receiver*: Detect Detection By Radar 16- (Radio Group); OIF Bulky (-1) 0
- 4 *Communications System*: Radio Perception/Transmission (Radio Group); OIF Bulky (-1),

Affected As Hearing Group As Well As Radio Group (-¼) 0

Personnel Systems

- 14 *Sealed Environment*: Life Support (Self-Contained Breathing; Safe Environments: Intense Cold, Low Pressure/Vacuum) 0

Skills

- 4 *Highly Maneuverable*: +2 with Flight
- 20 *Targeting Systems*: +4 with Ranged Combat

Total Abilities & Equipment Cost: 306

Total Vehicle Cost: 416

Value Disadvantages

- 25 *Distinctive Features*: US Army Attack Helicopter (Not Concealable; Causes Extreme Reaction [fear])

Total Disadvantage Points: 25

Total Cost: 391/5 = 78

Description: First used in combat in Panama in 1989, the Apache has become an important part of the Army's arsenal. It has a crew of two (one pilot, one gunner/observer) and can reach speeds of about 145 miles per hour with a service ceiling of 20,000 feet. It can carry a maximum load of 8,006 kg.

Thanks to its distinctive stub wings, the Apache can carry a lot of firepower. A typical load for its primary mission (basic anti-armor) would include 8 AM-114 Hellfire air-to-surface missiles and an M230 30mm chain gun. In other configurations, it might also have air-to-air missiles or two FFAR 19-round rocket pods. The Longbow variant includes a difficult-to-jam millimeter-wave radar that allows the Apache to attack radar-emitting targets.



BOEING 747-400

Val	Char	Cost	Notes
15	Size	75	32" x 16"; -15 KB; -10 DCV
85	STR	0	Lift 3.2 ktons; 17d6 HTH [0]
10	DEX	0	OCV: 3/DCV: 3
25	BODY	0	
5	DEF	9	
3	SPD	10	Phases: 4, 8, 12
			Total Characteristic Cost: 94

Movement: Ground: 6"/12"
Flight: 11"/176"

Abilities & Equipment

Cost	Power	END
9	<i>Commercial Jetliner:</i> Flight 11", x16 Non-combat; Side Effects (KA 1½d6, 6" Line behind engines, automatically occurs when Flight is in use, only affects environment around vehicle; -1¾), Stall Velocity (5"; -¼), Takeoff/Landing (-1), 1 Continuing Fuel Charge (easily-obtained fuel; 12 Hours; -0)	[1cc]
-2	<i>Only Flies: Swimming</i> -2" (0" total)	
11	<i>Radar:</i> Radar (Radio Group), Increased Arc Of Perception (360 Degrees), Telescopic (+8 versus Range Modifier); OIF Bulky (-1), Affected As Sight Group As Well As Radio Group (-½)	0
4	<i>Communications System:</i> Radio Perception/Transmission (Radio Group); OIF Bulky (-1), Affected As Hearing Group As Well As Radio Group (-¼)	0
14	<i>Sealed Environment:</i> Life Support (Self-Contained Breathing; Safe Environments: Intense Cold, Low Pressure/Vacuum)	0

Total Abilities & Equipment Cost: 36
Total Vehicle Cost: 130

Value Disadvantages

None

Total Disadvantage Points: 0

Total Cost: 130/5 = 26

Description: The largest class of passenger jet aircraft available today — so large it has a second level of passenger seating! — the Boeing 747-400 can carry up to 660 passengers in some models. It weighs 244,033 kg when empty, and has a maximum takeoff weight of 394,625 kg. It has a cruising speed of 580 miles per hour, and a two- or three-person flight crew.

LEARJET 31A

Val	Char	Cost	Notes
8	Size	40	6.4" x 3.2"; -8 KB; -5 DCV
42	STR	-8	Lift 8,000 kg; 10d6 HTH [0]
18	DEX	24	OCV: 6/DCV: 6
18	BODY	0	
4	DEF	6	
3	SPD	2	Phases: 4, 8, 12
			Total Characteristic Cost: 64

Movement: Ground: 6"/12"
Flight: 15"/480"

Abilities & Equipment

Cost	Power	END
17	<i>Commercial Jetliner:</i> Flight 15", x32 Non-combat; Side Effects (KA 1d6, 4" Line behind engines, automatically occurs when Flight is in use, only affects environment around vehicle; -¾), Stall Velocity (5"; -¼), Takeoff/Landing (-1), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0)[1cc]	
-2	<i>Only Flies: Swimming</i> -2" (0" total)	
10	<i>Radar:</i> Radar (Radio Group), Increased Arc Of Perception (360 Degrees), Telescopic (+6 versus Range Modifier); OIF Bulky (-1), Affected As Sight Group As Well As Radio Group (-½)	0
4	<i>Communications System:</i> Radio Perception/Transmission (Radio Group); OIF Bulky (-1 , Affected As Hearing Group As Well As Radio Group (-¼)	0
14	<i>Sealed Environment:</i> Life Support (Self-Contained Breathing; Safe Environments: Intense Cold, Low Pressure/Vacuum)	0

Total Abilities & Equipment Cost: 43
Total Vehicle Cost: 107

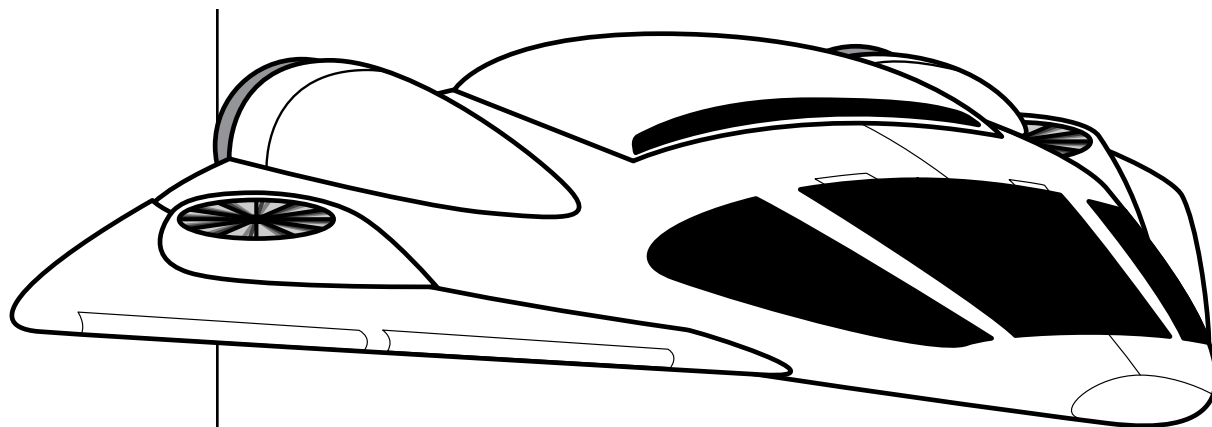
Value Disadvantages

None

Total Disadvantage Points: 0

Total Cost: 107/5 = 21

Description: The Learjet 31A, manufactured by Bombardier Aerospace, is a top-of-the-line corporate jet, used to ferry high-paid executives and valued clients around. Designed for comfort and speed, it cruises at about 525 miles per hour and can fly as high as 50,000 feet. It's about 14 meters long, with a wingspan of roughly the same length, and has a maximum takeoff weight of about 7,500 kg.

**SUPERJET**

Val	Char	Cost	Notes
8	Size	40	6.4" x 3.2"; -8 KB; -5 DCV
50	STR	0	Lift 25 tons; 10d6 HTH [0]
25	DEX	45	OCV: 8/DCV: 8
18	BODY	0	
12	DEF	30	
5	SPD	15	Phases: 3, 5, 8, 10, 12
			Total Characteristic Cost: 130

Movement: Ground: 6"/12"
Flight: 27"/108"
MegaFlight: 10"
Swimming: 20"/40"

Abilities & Equipment

Cost	Power	END
Propulsion Systems		
21	<i>Rocket Engines:</i> Multipower, 59-point reserve; all Side Effects (-1¼)	
2u	1) Standard Flight Mode: Flight 27"; x4 Noncombat; Side Effects (KA 2d6, 7" Line behind engines, automatically occurs when Flight is in use, only affects environment around vehicle; -1¼)	0
1u	2) Afterburner Flight Mode: Flight 10", MegaScale (1" = 1 km; +¼); Side Effects (KA 2d6, 7" Line behind engines, automatically occurs when Flight is in use, only affects environment around vehicle; -1¼)	0
7	<i>Underwater Mode:</i> Swimming +18" (20" total); Side Effects (KA 2d6, 7" Line behind engines, automatically occurs when Swimming is in use, only affects environment around vehicle; -1½)	0
Tactical Systems		
36	<i>Starboard Forward Blaster:</i> RKA 3d6, Armor Piercing (+½), 64 Charges (+½); OIF Bulky (-1), Limited Arc Of Fire (60 degrees forward; -½)	[64]
36	<i>Electronic Countermeasures:</i> Suppress Radar 6d6, Area Of Effect (8" Radius; +1¼), MegaArea (1" = 1 km; +¼), Reduced Endurance (0 END; +½); OIF Bulky (-1), No Range (-½)	0
44	<i>Electronic Counter-Countermeasures:</i> Suppress Electronic Warfare 8d6, any Power	

one at a time (+¼), Increased Maximum Range (6,250", or about 7.5 miles; +½), No Range Modifier (+½), Reduced Endurance (0 END; +½); OAF Bulky (-1½) 0

Operations Systems

16	<i>Radar Array:</i> Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+14 versus Range Modifier); OIF Bulky (-1), Affected As Sight Group As Well As Radio Group (-½)	0
5	<i>Communications System:</i> HRRP; OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½)	0

Personnel Systems

19	<i>Sealed Environment:</i> Life Support (Self-Contained Breathing; Safe Environments: Intense Cold, Intense Heat, High Pressure, High Radiation, Low Pressure/Vacuum)	0
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Skills

6	<i>Highly Maneuverable:</i> +3 with Flight
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Total Abilities & Equipment Cost: 193**Total Vehicle Cost: 323****Value Disadvantages**

None (or chosen by players)

Total Disadvantage Points: 0**Total Cost: 323/5 = 65**

Description: This character sheet represents a typical "team transport" for a group of superheroes (or villains). It's intended more for speed and utility than combat, so it only mounts one weapon, a powerful blaster. (A villain team might add more weapons.) Able to fly at approximately 400 miles per hour normally, if necessary it can activate its afterburners and reach speeds of 9,000 miles per hour. Its advanced VTOL systems allow it to land without an airstrip, and even hover in place if necessary. Its miniaturized fusion power system frees it from the need for refueling; annual power systems maintenance is all it requires.

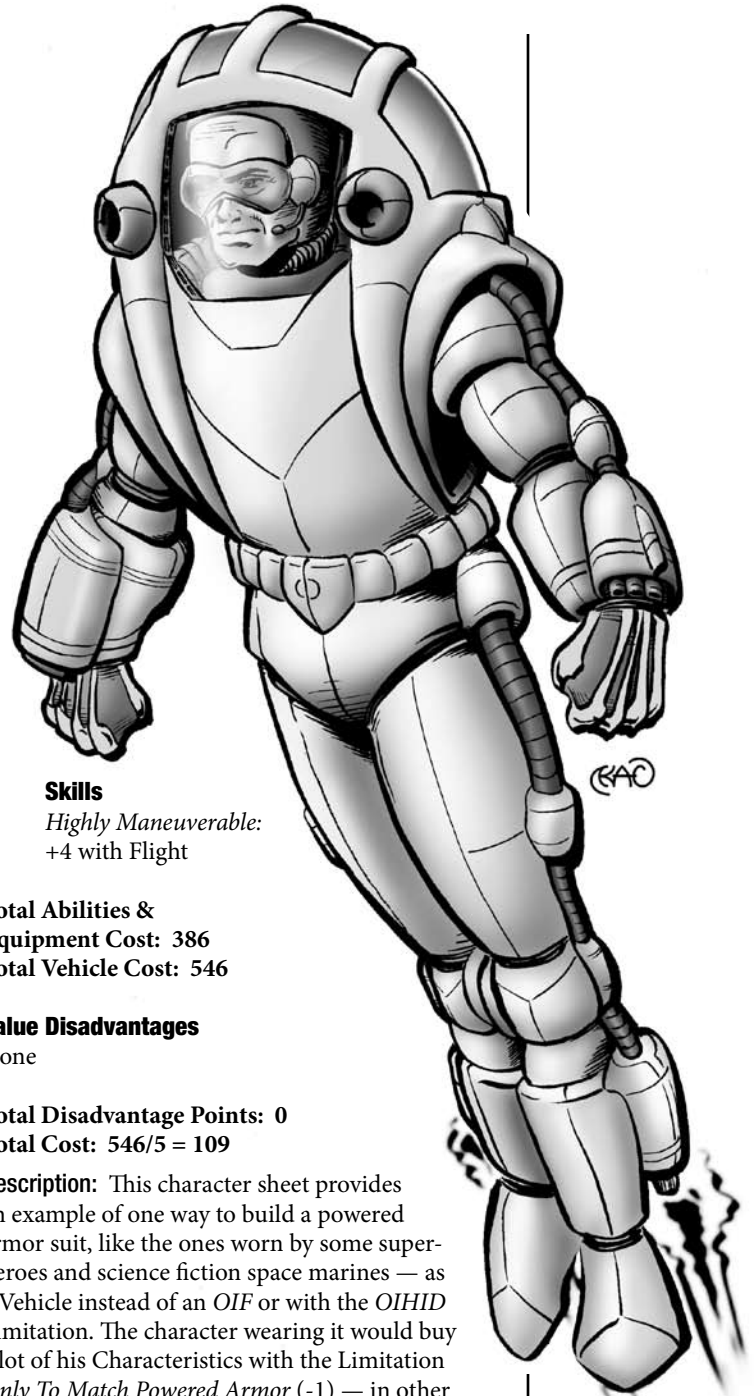
POWERED ARMOR SUIT

Val	Char	Cost	Notes
0	Size	0	1" x .5"; -0 KB; -0 DCV
50	STR	40	Lift 25 tons; 10d6 HTH [0]
23	DEX	39	OCV: 8/DCV: 8
20	BODY	10	
20	DEF	54	Hardened (+¼); Personal Defense (-¼)
5	SPD	17	Phases: 3, 5, 8, 10, 12
			Total Characteristic Cost: 160

Movement: Ground: 9"/18"
Flight: 25"/200"

Abilities & Equipment

Cost	Power	END
60	<i>Boot-Jets:</i> Flight 25", x8 Noncombat	0
6	<i>Leg Servos:</i> Ground Movement +3" (9" total)	0
70	<i>Power Battery:</i> Endurance Reserve (200 END, 50 REC)	0
60	<i>Onboard Weaponry:</i> Multipower, 60-point reserve	
6u	1) Gauntlet Blasters: EB 12d6	6
6u	2) Gauntlet Lasers: RKA 4d6	6
6u	3) Stunner Ray: Drain STUN 4d6, Ranged (+½)	6
6u	4) Flare Projector: Sight Group Flash Attack 12d6	6
6u	5) Energy Net: Entangle 6d6, 6 DEF	6
37	<i>Shoulder-Mounted Guided Missile Racks:</i> RKA 4d6, Armor Piercing (+½), Explosion (+½), Indirect (always launched from same point, but can arc around obstacles; +½); OIF Bulky (-1), 3 Charges (-1¼), <i>Extra Time</i> (Extra Phase; -¾)	[3]
5	<i>Shoulder-Mounted Guided Missile Racks:</i> Another Missile Rack (total of 2)	[3]
29	<i>Force Screen Projector:</i> Force Wall (10 PD/10 ED, 5" long); Increased Endurance Cost (x3 END; -1)	18
19	<i>Sealed Environment:</i> Life Support (Self-Contained Breathing; Safe Environments: Intense Cold, Intense Heat, High Pressure, High Radiation, Low Pressure/Vacuum)	0
5	<i>Vision Systems:</i> Infrared Perception (Sight Group)	0
5	<i>Vision Systems:</i> Ultraviolet Perception (Sight Group)	0
10	<i>Vision Systems:</i> Increased Arc Of Perception (360 Degrees) for Sight Group	0
21	<i>Vision Systems:</i> +14 versus Range Modifier for Sight Group	0
16	<i>Radar Array:</i> Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+14 versus Range Modifier); OIF Bulky (-1), Affected As Sight Group As Well As Radio Group (-½)	0
5	<i>Communications System:</i> HRRP; OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½)	0



Skills
8 *Highly Maneuverable:* +4 with Flight

Total Abilities & Equipment Cost: 386
Total Vehicle Cost: 546

Value Disadvantages
None

Total Disadvantage Points: 0
Total Cost: 546/5 = 109

Description: This character sheet provides an example of one way to build a powered armor suit, like the ones worn by some superheroes and science fiction space marines — as a Vehicle instead of an OIF or with the OIHID Limitation. The character wearing it would buy a lot of his Characteristics with the Limitation *Only To Match Powered Armor* (-1) — in other words, things like his DEX and SPD wouldn't be much different from human normal most of the time, but when he's in the suit, his abilities match the suit's (because it's cybernetically keyed to him, and he's trained in it extensively). This makes it easier to calculate CV, determine initiative, and so forth.

Buying armor as a Vehicle can potentially be abusive, since it's something like buying all of a character's powers and abilities with a -4 Limitation due to the 1-for-5 Character Point cost of a Vehicle. The GM should examine any such Vehicle carefully before allowing it in play.



5 DESTINATION, SPACE: STARSHIPS

More than any other genre, science fiction tends to involve vehicles — spacecraft, to be precise. The adventurers of SF can't get from planet to planet at faster than the speed of light without a trusty star cruiser, or overthrow the Galactic Tyrant without some small but agile spacefighters to attack his powerful Stellar Battleship.

Starships can function in literally thousands of ways, based on the nature and sophistication of the technology in the setting. This chapter reviews the options and provides suggestions for simulating them using the *Hero System* rules. Gamers interested in even more information about science fiction technology, space, and related subjects should refer to *Star Hero*.

SPACE VEHICLE BASICS



Space vehicles (and related vehicles found in science fiction) are usually built with one or more of three Movement Powers: Flight; Faster-Than-Light Travel; or Extra-Dimensional Movement. Almost all of them have at least a few inches of Flight for minor maneuvering, and most have much more than that. See the section on Propulsion Systems, below, for further information.

SPACE VEHICLE TYPES

Spaceships in science fiction are usually classified by size, range, purpose, or a combination of the three. In this book, “starship” refers specifically to ships capable of interstellar travel while “spacecraft” or “space vehicle” means anything that can travel in space.

Size is of course a relative term — one setting’s giant spaceship may be middle-sized or small in a different *Star Hero* campaign. In general, larger vehicles are more durable and self-sufficient than small ones, allowing them to go on longer voyages.

Range often relates to size; larger vehicles can travel further and stay in space longer. Range classification is particularly important if interstellar travel requires a different drive system than interplanetary voyages.

Purpose is considerably broader than size. There are dozens of potential roles for spacecraft. People mostly use civilian ships to move things from place to place. Freighters are ships carrying general freight, often in large container modules. Bulk carriers are freighters carrying homogeneous cargoes like grain or hydrogen in large quantities. Passenger liners transport passengers in varying degrees of comfort, ranging from luxury liners to tightly-packed colony transports or refugee ships. Tugs are ships with powerful motors designed to move other spacecraft, unpowered barges, or similar massive objects.

Science and exploration ships learn things in space. Scout ships venture into unknown space, often spending years on a mission. Research vessels come equipped with laboratories to study specific planets or phenomena. Support vessels are mobile repair and resupply ships. A few long-range exploration ships combine aspects of all three.

Warships are any kind of spaceship designed for combat. They can be broadly categorized into battle craft (which fight other space vehicles) and attack craft (which attack planets and similar targets). Large warships (battleships or dreadnoughts) carry massive armor and powerful defense screens, along with weapons that can blast through the protection of enemy ships. Smaller ones (destroyers or frigates) tend to rely on speed and stealth for defense, and mount the most powerful weapons they can fit on board. Fighters are small ships, often with a single pilot and no passengers, designed to harass and attack larger ships or dogfight with enemy fighters. Carriers are a way to combine these concepts: a big, well-protected mother ship and a squadron of fast, expendable combat units. Cruisers or patrol ships are warships not designed to fight other combat units — they tend to be fast, long-range vessels intended for commerce raiding and peacetime law enforcement.

In game universes with “hyperspace” or some other dimension accessible from our own, there may be the equivalent of submarines — spacecraft which lurk “outside space” and appear suddenly to attack. Cloaking devices or other invisibility gadgets allow the same style of operation.



TELEPORTATION AND EXTRA-DIMENSIONAL MOVEMENT

In some settings, Vehicles can use Teleportation or Extra-Dimensional Movement to move around. This is most common in *Star Hero* games, but it occasionally occurs in some superhero games, and even a few high-powered *Fantasy Hero* campaigns.

A Vehicle that can use these Powers can automatically move itself and as much as it can carry inside itself (*i.e.*, as much as it can carry with its STR) without paying for any Increased Mass Adders. If it buys such Adders, the first one doubles the amount the Vehicle can carry based on its STR; additional Adders double that amount, and so on.

Military ships also include equivalents of various civilian ship types. Tenders are a kind of support ship, usually supporting small independent warships like cruisers or a destroyer squadron. Assault transports are military passenger liners, carrying troops and landing craft for planetary assault operations. Spy ships are military versions of scouts or research vessels, dedicated to gathering information about enemy operations and capabilities.

Combining size and role produces a dazzling variety of ship types, which can be as broad or narrow as the GM wishes. In campaigns with lots of specialized ship types, the classifications will be precise and detailed; in worlds where all spacecraft can do a little of everything, classifications will be simpler. Space Opera campaigns sometimes borrow terms from the Age of Sail for the proper swashbuckling feel: “Star Galleons” for the big ships, “Clippers” for rapid passenger liners, and “Caravels” for smaller vessels. If ships come in a few distinct classes, they may simply be named for the prototype ship (the same way the British battleship “Dreadnought” gave her name to an entire type of warship).

VEHICLE CHARACTERISTICS

Space vehicles come in just about any shape and size you can imagine. As usual, when choosing

a Size for an oddly-configured Vehicle, choose Size based on the Vehicle’s most important dimension (typically Length) or its mass — whichever seems most appropriate.

The STR and BODY of a spacecraft usually depend solely on its Size, but this varies. Spacecraft in general often have more BODY than listed, since they have to survive the rigors of space. Tugs, freighters, carriers, and the like usually have much greater STR than normal, because their whole *raison d’être* is to haul large, heavy things around.

Spacecraft usually need lots of DEF — 5 points or more — because of those same rigors of space. Military vessels often have even more.

POWER SYSTEMS

The first thing to consider when building a spacecraft is power. Unlike most Vehicles, spacecraft typically do not buy all their systems so that they cost no END — instead, they build most (if not all) systems to cost END, and then provide power through one of several methods. The bigger the ship, the more power it needs. See page 153 for more information on different types of power systems.

PROPULSION SYSTEMS

Propulsion systems are the devices used to move spacecraft around, whether puttering along between a planet and its moon or zipping across the Galaxy at many times the speed of light. Moving through space typically involves the Powers *Flight* or *Faster-Than-Light Travel*, though in some cases Teleportation or Extra-Dimensional Movement may be involved (with their special effect being “really fast flight,” dimensional portals, or the like).

Acceleration

Given the incredibly high velocities at which spacecraft move, acceleration and its effects could become an issue in your *Star Hero* game. Many GMs prefer not to clutter a game session with these concerns; they assume ship technology and/or the crew automatically takes care of any problems. On the other hand, some Hard SF gamers like to pay close attention to these issues and devise realistic solutions to them.

In game terms, 1 G (one gravity) of acceleration equals 5” of Flight... roughly speaking. Since the *Hero System* uses SPD and Phases to determine when vehicles move, what really matters is a vehicle’s velocity per Turn. One G of acceleration actually amounts to 60” Flight per Turn. For a vehicle with SPD 12, or for the natural force of gravity which acts every Segment, 1 G therefore does equal 5” Flight. On the other hand, a ship with SPD 3 needs to fly 20” per Phase (either 20” Combat Movement, or 10” with a standard Noncombat Movement multiple) to achieve 1 G acceleration.



As the text below describes the different methods of normal propulsion used in science fiction settings, it offers suggestions for the maximum speeds attainable with various engines. These represent “average” figures for “average-sized” engines and spacecraft with “average” SPDs. In reality, the amount of thrust an engine can generate, and thus the maximum speed it can attain, depends not only on the type of engine, but on the relationship of the power/size of the engine to the size/mass of the spacecraft.

Engine ratings are also chosen to reflect their usefulness in combat. That’s the main situation in which gamers need to determine precisely how fast and maneuverable a ship is; the rest of the time, knowing a ship’s exact velocity is usually unimportant. Typically, the more advanced an engine, the more efficient it should be at moving a spacecraft around in combat, and the more maneuverability it should provide. Therefore, more advanced engines, such as fusion drives and antimatter drives, allow for faster normal Flight relative to engines like chemical rockets.

G FORCES

High rates of acceleration or deceleration, or abruptly sharp turns, can put a lot of extra gravitational or centrifugal force on a character in a vehicle. This doesn’t happen very often in everyday life, but when space travel or vehicular combat are involved, it can happen repeatedly. For ease of game play, most GMs assume spacecraft have Everyvehicle Equipment to counteract or “dampen” G forces on the occupants, but you can account for them more precisely if you want. See *Star Hero*, page 186, for more information.

OPTIONAL REALISTIC SPACE ACCELERATION RULES

In space, acceleration is constant — as long as a vessel keeps generating thrust in some fashion, it keeps moving faster and faster. That doesn’t work well in the *Hero System*, where movement rates are fixed. A *Hero System* Vehicle with Flight 10” moves at Flight 10” every Phase, not Flight 10” the first Phase, Flight 20” the second Phase, and so on. While not realistic, this is much easier for gaming purposes.

If you want to simulate realistic (Newtonian) acceleration with rules, you can use a variant of the *Cumulative Advantage*. Instead of buying up the total effect, you buy up the inches of Flight — each +¼ Advantage after the first doubles the number of inches of Flight the Vehicle can attain. The upper limit of the Cumulative is as fast as the ship can go; this may represent a limit on its fuel supply, its equipment, its structural integrity, or the like. (For even greater realism, establish a flat cost for the *Cumulative Advantage* for Flight, but impose no upper limit, other than just under the speed of light. The only other restriction would be how much fuel the ship had; it has to stop accelerating when it runs out of fuel.)

The acceleration for a ship using Cumulative Flight increases constantly — it adds its inches of Flight each Phase until it reaches the maximum. In the example above, the ship would fly at a rate of 10” the first Phase, 20” its second Phase, 30” its third Phase, and so on until it reaches 2,000”. The GM may rule that a ship adds velocity at a slower rate, such as inches per Turn.

The drawback to this is that the ship can’t decelerate any more quickly — it can only remove velocity at the same rate it adds velocity. That usually means ships have to start braking at roughly the halfway point to their destination. Vehicles using these optional rules cannot apply the *Increased Acceleration/Deceleration Adders* to their Flight. This form of acceleration only works in the vacuum of space; if a ship can enter atmospheres, it uses normal movement rules in them.

None of the propulsion systems described in this book use these optional rules.

Normal Propulsion

“Normal propulsion” refers to engines and drives which move spacecraft in normal space at slower-than-light speeds. In the *Hero System* there are two ways to represent normal spacecraft movement. The first is the Hard Science path, using rocket motors and following Newtonian mechanics. The second is the grand tradition of Space Opera, in which spacecraft behave like fighter planes and the objections of science purists are drowned out by the whooshing of engines in vacuum.

Despite the fact that they involve powerful rockets, generally spacecraft do not take a “dangerous exhaust” Side Effect for their Flight (or other Movement Powers). Space rocket exhaust so rarely has any repercussions during the game that at best it’s usually a -0 Limitation. But GMs can certainly allow characters to take it for their Vehicles if appropriate.

DELTA-V

The main currency of realistic space travel is “delta-V;” or how much change in velocity a spacecraft’s engines can impart to it with a given load of fuel. This is important because velocity determines what orbit a spacecraft follows, whether it can escape from a given planet’s gravity well, and how fast it can make the transit to another world.

In *Hero System* terms, this is best represented by using the ship’s movement as its delta-V: if a spacecraft has Flight 12”, it can change its velocity by 12” per Phase. This assumes rockets use Non-combat Movement whenever possible, throttling down to “battle speed” only when maneuvering and evading becomes important. This converts to kilometers per second by dividing total Move per Turn by 6000. For really high-speed rockets, the MegaScale Advantage simplifies calculation — buy the final delta-V as *MegaScale Flight* and then apply the *Extra Time Limitation* to get the time needed for a “full burn” (*i.e.*, to burn the fuel and accelerate the vessel to full speed).

VASIMR ROCKET

This is a real-world space propulsion system, developed for near-future Mars missions. It is popular among space engineers because it combines the relatively high thrust of a thermal rocket with the efficiency of an ion drive. It can't do both at once, but can switch between modes.

Flight 30" (60 Active Points); 1 Continuing Fuel Charge (easily-obtained fuel; 1 Month; -0). Total cost: 60 points.

SOLAR SAIL

This is a typical solar sail, built using the optional space acceleration rules (the vehicle with the sail is assumed to have SPD 2).

Flight 1", Cumulative (+½), Increased Cumulative Inches (x900,000, or 900,000"; +5), Reduced Endurance (0 END; +½) (14 Active Points); OIF Bulky Fragile (-1¼), Requires Solar Proximity (use full inches within 1 AU of a star, halve the inches of Flight for each AU beyond that; -½). Total cost: 5 points.

ROCKETS

In the real world, the only way to make yourself move in space is by Newton's Third Law: for every action there is an equal and opposite reaction. Rockets make use of this by throwing their exhaust away at high speed, imparting an equal momentum to the rocket in the opposite direction. Solar sails take the opposite approach — they catch fast-moving particles streaming out from the Sun, and thereby gain momentum in the same direction.

Realistically, rockets are likely to remain the most popular method of getting around in normal space: they're compact, powerful, and allow people to move relatively heavy loads. They come in several types.

Chemical Rockets

These are the oldest, and still the most common, form of normal space propulsion. They burn chemicals in energetic reactions to produce thrust. Chemical rockets come in two main types: solid-fuel and liquid-fuel. Solid-fuel rockets contain energetic solid compounds like gunpowder, which burn once ignited. They are simple and dependable, but can't be turned off once lit. This makes them most suitable as boosters or missiles. In *Hero System* terms, you can represent a solid-fuel rocket as Flight with 1 Continuing Charge; typically the Charge Never Recovers.

Liquid-fuel rockets combine chemicals like liquid hydrogen and oxygen, or kerosene and oxygen. Unlike solid rockets, pilots can throttle them down, or switch them on and off. In *Hero System* terms, you can simulate liquid-fuel rockets with Fuel Charges.

Chemical rockets intended for manned spaceflights usually cannot exceed 180" per Turn (3 G), since more would endanger the passengers. Chemical rockets for unmanned craft can attain velocities of 420" per Turn (7 G).

A rough guideline for the size of chemical rockets depends on acceleration. High-acceleration rockets (like the ones used to boost off Earth or other planets) take up about 1 hex times the required delta-V in kilometers per second, per hex (5 tons) of payload (defined as everything that isn't the rocket motor or fuel). This means chemical boosters are really big — a Saturn moon rocket was as tall as a skyscraper, for example.

Thermal Rockets

Thermal rockets take a fluid fuel (usually hydrogen gas) and superheat it. As the fuel gets hot it expands, and this produces thrust. Thermal thrust usually isn't enough to lift a rocket off a planet, but the rocket has good fuel efficiency, making this a favored choice for future interplanetary missions. Of course, thermal rockets need a heat source.

Nuclear thermal rockets direct the fuel through a compact nuclear fission reactor. This provides a lot of heat, but unfortunately both the reactor and the exhaust pose a radiation hazard. In *Hero System* terms, Nuclear Thermal rockets have up to 60" Flight per Turn with a Side Effect (automatic Change Environment to increase radiation levels; -¼).

Solar thermal rockets focus sunlight directly onto the fuel heating chamber with giant mirrors. This is more efficient than a solar-powered electrothermal rocket, but it drops off in effectiveness as the intensity of sunlight decreases. The large mirrors are also fragile and bulky. Solar thermal propulsion is up to 6" per Turn Flight (0.1 G) bought with the Limitations *OAF Bulky Fragile* and *Requires Solar Proximity* (use full inches within 1 AU of a star, halve the inches of Flight for each AU beyond that; -½).

All thermal rockets are bulky, taking up at least 2 hexes each, and use about ½ hex of fuel per hex of payload per kilometer per second of delta-V. Low-thrust rockets either buy Flight at low velocities to simulate a long slow burn, or else buy MegaScale Flight with a lot of *Extra Time*.

Ion and Plasma Rockets

These highly efficient rocket motors use extremely tiny amounts of fuel, but accelerate it to tremendous speeds using electrical or magnetic fields. The motors are fairly compact, but they do need lots of power. Ion motors can only manage very low accelerations — no more than 1" Flight per Turn (0.017 G). Plasma rockets can get up to 30" Flight per Turn (0.5 G). Fuel use for ion motors is very efficient; they need about 1 hex of fuel for up to 20 hexes of vehicle. Plasma rockets need more: about 1/5 of the vehicle hexes per kilometer per second of delta-V.

RUBBER SCIENCE ROCKETS

Science fiction writers have come up with a variety of space propulsion systems using technology that doesn't exist yet. They range from things which may fly in a few years to completely imaginary technologies.

Fusion Rockets

If you have fusion power, then a fusion reactor with a nozzle on one end is a pretty effective rocket. Thrust would be high, at least as good as nuclear-thermal rockets and probably better. Fuel consumption would rival VASIMR or ion drives. Fusion rockets are extremely common in science fiction.

Realistically, a fusion rocket can reach velocities of 180" per Turn for manned flights and 420" per Turn for unmanned ships; in *Space Opera* and the like, they can go much faster. Fuel requirement is 1/100 of the ship's hexes per kilometer per second of delta-V.

Antimatter Rockets

For real oomph, drop a pellet of antimatter in your fuel and stand back. Since antimatter releases staggering amounts of energy, exhaust velocities are very high and so thrust and fuel economy reach amazing levels. This is probably the most powerful rocket possible. However, the drive itself may be fairly large because of shielding requirements (assume ¼ of vehicle hexes), not to mention expensive to run. In game terms it can reach just about any level of STL acceleration; the issue is how much G force the crew and contents of the ship can withstand.

Reactionless Drives

These completely blow the laws of conservation of energy out of the water, and are entirely Rubber Science. A reactionless drive moves the ship in a given direction without squirting anything out the back. Their convenience makes them popular in science fiction games — no worrying about fuel consumption. Reactionless drives are pretty compact (1/10 of vehicle hexes), but do use a lot of power. They can have as many inches of Flight per Turn as you want.

SPACE SAILS

Rockets need so much fuel because they accelerate by shooting stuff out the back. But instead of shooting stuff out at high speeds, a spacecraft can try catching stuff that's already moving fast. That's what a sail does.

Space sails come in three varieties. Solar sails ride the solar wind — the pressure of light and particles streaming out from the Sun. Obviously this wind isn't very strong, so sails must be huge and delicate to carry even a small payload. The advantage is that they can accelerate indefinitely, building up speed over long periods. Solar sails could be used for unmanned cargo hauling within the Solar System, especially on trips out to the giant planets. A sail ship could also keep going, aiming for Proxima Centauri or some other nearby star. It would take a while — top speed for a solar sail would be around 300 kilometers per second (1.8 million inches per Turn), or 1,000 years per light-year. Sails have about 1 hex of payload per square kilometer of sail.

A second sail design starts with the basic solar sail and adds a huge laser built on Mercury or the Moon. The laser shines on the sail, boosting it as it flies outward. The laser would have to be gigantic, but it doesn't have to be mobile and is entirely re-usable. Laser-boosted sails could reach 1 percent of the speed of light, making star probes or trips to the Oort Cloud possible.

The final type of sail is a "plasma sail." Instead of a thin sheet of silvery plastic, a plasma sail is a web of wires and a bubble of hydrogen. The wires carry power to turn the hydrogen into a plasma, which is contained by the magnetic field generated by current flowing through the wires. The advantage is that the sail itself is lighter, and can interact with the Sun's magnetic field for extra thrust and maneuverability — but at the cost of requiring an on-board source of power.

ROCKETS TO THE STARS

To reach other stars, you don't need a faster-than-light starship; all you really need is one of the rockets described above and a whole lot of fuel. It may take a while, though. Chemical and thermal rockets can't really power a ship to anything above 1 percent of the speed of light (3,000 kilometers per second [18 million inches per Turn]). Even that would take a gargantuan ship and a long time to accelerate a tiny payload on its way. At 1 percent of the speed of light, a probe to Alpha Centauri would take more than 400 years to make the trip — which suggests it would be better to wait for someone to invent a faster rocket.

Fusion and antimatter rockets would be able to reach speeds on the order of 10 percent of lightspeed (30,000 kilometers per second [180 million inches per Turn]). That would put Alpha Centauri within reach for an unmanned probe. Humans traveling at those speeds would need some way to pass the decades in flight. There are two possibilities:

Generation Ships

Who cares how long it takes? Launch a large self-contained space colony at the stars, and entire generations can grow up and grow old before the ship reaches its destination. By the time Humans can launch something big at thousands of kilometers per second, they should have solved the problems of maintaining a self-contained environment for decades. Generation ships would carry populations of hundreds or thousands (carefully chosen for genetic diversity), and everything a colony might need, because it's going to be a one-way trip.

The two main problems with generation ships are: why go, and why stop? Why go — why expend the unimaginable sums to build and launch a generation starship when nobody alive at the launch lives to see its arrival? One possible reason is a terrible calamity which promises to make the home planet uninhabitable. It has to be a calamity which can't be solved by the kind of effort needed to launch a starship. Perhaps a black hole or neutron star is due to pass through the Solar System, disrupting orbits and flinging homeworld into its sun or deep space.

Why stop — if the starship is comfortable and has everything the crew needs for long-term survival, why should they bother stopping at the target system for the tedious job of colonizing a planet? After generations in space, they might prefer life aboard ship. Of course, the crew may not have any say in the matter, if the ship is controlled by a computer system following instructions programmed by the ship's builders. Or the natural Human (Venusian, Denebian...) inclination to explore new places might make the inhabitants want to get off the ship.

Hibernation

Bears do it, brine shrimp do it, why not Humans? If a way could be found to put the crew into stasis, the whole project of interstellar travel is greatly simplified. Crewmembers in hibernation (sometimes referred to as "cold sleep") use less life support, don't get bored, don't die of old age before the trip is over, and don't care how long the journey takes. With hibernation equipment and a sufficiently long-lived power supply, ships could take decades or centuries to travel between stars. Hibernation is a fairly common means of interstellar flight in Low SF settings.

Hibernation Unit: This is a one-person "cold sleep pod." It requires external power, but so little that it can run for decades without maintenance — the need for power is a special effect, not an END cost.

BUSSARD RAMJETS

For a time in the 1960s it seemed the stars might be easy to reach after all. Aerospace engineer Robert Bussard envisioned a fusion rocket which would use magnetic "scoops" to collect interstellar hydrogen for fuel. A Bussard ramjet would thus be a slower-than-light starship with no need for fuel tanks, and could accelerate almost arbitrarily close to lightspeed. Time dilation would make voyages seem quick to the people on board, allowing expeditions to nearby stars.

Only it doesn't really work that way. Scooping up even the thin hydrogen of interstellar space means friction, and the friction goes up with speed. The maximum velocity for a ramjet would be about 12 percent of the speed of light — not bad, certainly, but not fast enough for easy interstellar travel. If some rubber science method could be devised to negate friction, the Bussard ramjet is the way to go.

In *Hero System* terms, a Bussard drive is FTL Travel at the speed of light, with the *Extra Time* Limitation to reflect the time required to boost up to full speed (at least a year, assuming acceleration is limited to 1 G).

Life Support (Longevity: age at one-eighth normal rate) (3 Active Points); OIF Immobility (-1½). Total cost: 1 points.

Faster-Than-Light Propulsion

All faster-than-light (FTL) travel is currently beyond the laws of physics as Humans understand them. This means GMs are free to select their FTL drives on the basis of how they affect the campaign structure (see *Star Hero*, pages 190-92, for more information).

Some of the star-drives commonly seen in science fiction include:

WARP DRIVE

The FTL drive made famous by Star Trek, a warp drive works by distorting (“warping,” so to speak) the space-time continuum in ways that allow the ship to propel itself at superluminal speeds. Similar to warp drives are “folded space drives,” which compress the distance the ship travels as it moves. The ship moves at a modest speed, but covers great distances because the drive “shrinks” the space in front of it.

Warp drives usually allow starships to interact with the rest of the universe, though slower-than-light weapons aren’t very useful against a ship in warp drive. Warp drives aren’t usually limited by natural conditions, but sometimes depend on rare elements. Distorting space requires a lot of energy (and the faster you go, the more energy you need). This means warp travel is fairly expensive for all but the most advanced and affluent Space Opera civilizations.

Movement with a warp drive is non-Newtonian — the ship moves forward while the drive is on, and stops when the drive is shut off. Navigation is fairly simple: the crew can look out of the cockpit window and see where it’s going. Warp drive units in fiction are often bulky, requiring as much as half the total hexes of the ship.

Warp Drive: This is a typical warp drive engine, able to drive its ship at the rate of one light-year per day.

FTL Travel (1 LY per day) (28 Active Points); Costs Endurance (-½), Increased Endurance Cost (x10; -4). Total cost: 5 points.

HYPERDRIVE

Hyperdrive works by going “around” normal space, through another universe or dimension where distances are shorter. The exact nature of “hyperspace” is up to the GM — it can be a featureless void, or a universe of its own with bizarre natural laws (and possibly inhabitants). There may be different “levels” of hyperspace allowing faster travel with greater risk or energy expenditure. Hyperspace may be easily navigable, or ships could instantly become lost without a beacon to follow (and communications equipment to follow it with). It may have no planets or inhabitants, or it could be the realm of bizarre creatures whose very appearance drives Humans insane.

Navigating in hyperspace can be tricky. Often the ship emerges only generally near the target system,

and hazards in hyperspace itself may push the starship off course. Gamemasters may require characters to buy Navigation (Hyperspace) to find their way, or may forbid them to have any such Skill, forcing them to rely on established beacons or landmarks.

Hyperdrive usually requires a large pulse of energy when entering and leaving hyperspace. Some types of hyperdrive need a large fixed portal (like a star gate; see below) to enter or leave hyperspace (and usually beacons to guide ships between portals). This naturally makes the portals very important and well-protected locations, but makes it possible for any spaceship to venture into hyperspace. Movement while in hyperspace itself can be Newtonian, or subject to whatever bizarre natural laws exist in the alternate dimension.

If hyperspace is generally empty and featureless, posing few threats to ships or characters, you can build hyperdrives as MegaScaled Teleportation with the *Extra Time* Limitation. If hyperspace is a “real place,” then hyperdrive is a combination of Extra-Dimensional Movement and FTL Travel (or, in some cases, MegaScale Teleportation).

Hyperdrives are usually fairly bulky systems requiring a lot of power. Assume the hyperdrive takes up about one-fourth of the ship’s total space.

Hyperdrive: This is basic hyperdrive, built on the assumption that nothing noteworthy happens to ships or people in hyperspace. It has a range of up to 10 light-years.

Teleportation 10”, MegaScale (1” = 1 light-year; +3½) (90 Active Points); Extra Time (1 Week for a full journey, or a little more than 1 LY per day; -4½), Increased Endurance Cost (x5 END; -2). Total cost: 12 points.

Hyperspace Engine: This is a form of hyperspace travel used in settings where hyperspace itself has features and possible dangers. Characters need to use Navigation (Hyperspace) to find their way while there.

Extra-Dimensional Movement (any location in hyperspace, corresponding to the location in normal space where the ship enters) (total cost: 25 points) plus FTL Travel (1 LY per day) (28 Active Points); Costs Endurance (-½), Increased Endurance Cost (x10; -4), Only In Hyperspace (-1) (total cost: 4 points). Total cost: 29 points.

JUMP DRIVE

The jump drive lets starships “jump” instantaneously from one star system to another, whether by quantum tunneling, converting the ship to tachyons, or some other rubber science method. Navigating with a jump drive is very difficult — a mistake can send the ship to the wrong star system, or possibly to deep space. Really serious errors could catapult a jump ship across the Galaxy, or back in time, or into an alternate dimension. A more practical concern is fuel; if a ship jumps to a place where it cannot refuel, it may not have enough energy left to make more jumps!

You can build jump drives using MegaScaled Teleportation. Jump drives can be compact devices (about 1/10 of ship's hexes), but require a lot of power.

Jump Drive: A standard jump drive, suitable for most ships.

Teleportation 5", MegaScale (1" = 10 light-years; +3¾) (47 Active Points); Extra Time (1 Turn; -1¼), Increased Endurance Cost (x10 END; -4), Requires A Navigation (Space) Roll (-½). Total cost: 7 points.

STAR GATES AND WORMHOLES

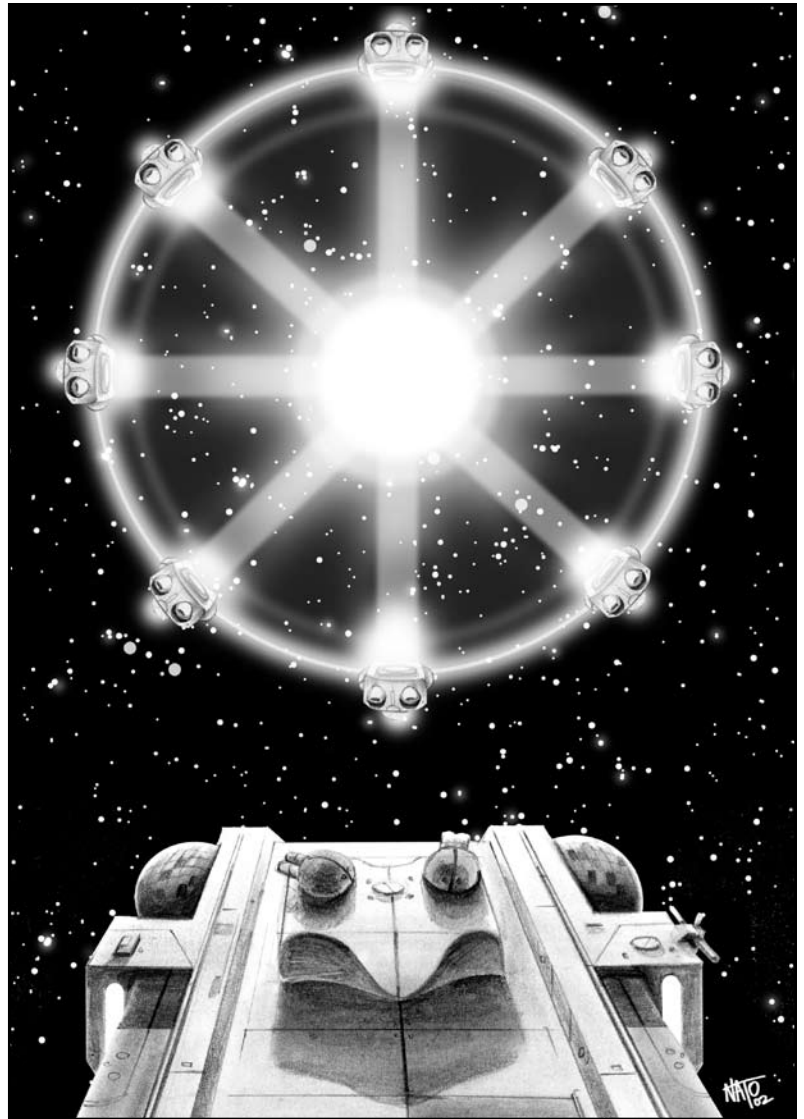
These are FTL drives which are outside the ship itself. Star Gates are immense portals, either into Hyperspace or linking distant systems through a form of Teleportation. Wormholes are as-yet-undiscovered natural holes in space connecting places light-years apart. Navigating a wormhole or star gate may be about as hard as navigating a railroad (the gate leads where it leads, and you either go through or you don't), or it may require tricky flying through hyperspace. Gates may be the only way to travel — in which case they must be moved to other star systems aboard slower-than-light ships — or they may be only a supplement to other drives.

However they work, stargates and wormholes instantly become places of vital importance. Control of a portal means control of all traffic along that route; depending on the layout of the system, dozens of worlds could depend on a single gateway.

Star Portal: This is a gateway through a safe hyperspace; ships must go to other gates. The gates, built by some ancient civilization and not fully understood by Humans, are irreplaceable and heavily guarded. Only one ship can enter the portal at a time, and it has to be small enough to fit through. Ships themselves don't have to pay for this "engine" at all; the gates are maintained by an appropriate authority (which taxes and regulates them as it sees fit).

Teleportation 10", MegaScale (1" = 1 light-year; +3½), Area Of Effect (3,500" Radius; +2¾), Usable As Attack (does not work on ships with incompatible drives or certain types of energy sources; works on masses of up to 800 mtons; +9¼) (330 Active Points); OAF Immobile (-2), Independent (-2), Extra Time (1 Week for a full journey, or a little more than 1 LY per day; -4½), Increased Endurance Cost (x5 END; -2), Only To Fixed Locations (-½), Gate (-½), Only One Ship Can Use Portal Per Segment (-¼) (total cost: 26 points) plus 1 Floating Fixed Location (any other portal, chosen at the time of use) (5 Active Points); OAF Immobile (-2) (total cost: 2 points). Total cost: 28 points.

Wormhole: This is the same as the Star Portal, but without the OAF Limitation; the Independent Limitation reflects the fact that the persons controlling the wormhole can't stop it from shifting, collapsing, or temporarily closing. Additionally, the Fixed Location does not "float." Total cost: 32 points.



INERTIALESS DRIVE

The big limitation to faster-than-light travel in Einsteinian space is that mass increases with velocity. Consequently the energy to accelerate approaches infinity the closer you get to the speed of light. Novelist E. E. "Doc" Smith came up with one way around that problem: if your ship can be made "massless" or "inertialess" then it can cruise right through the speed of light and keep on accelerating. (How does that work? Good question.) Inertialess drives are simply the FTL Travel Power. They tend to occupy about a quarter of the ship, but can also be used as a normal Flight drive.

Cost Inertialess Drive

- 13 *Inertialess Drive:* Multipower, 45-point reserve; all Costs Endurance (-½), Increased Endurance Cost (x5 END; -2)
- 1u 1) FTL Mode: FTL Travel (1 LY per Hour); Costs Endurance (-½), Increased Endurance Cost (x5 END; -2)
- 1u 2) Spaceflight Mode: Flight 10", MegaScale (1" = 1,000 km, can scale down to 1" = 1 km; +1¼); Costs Endurance (-½), Increased Endurance Cost (x5 END; -2), Only Works In Space (-½)

Total cost: 15 points

PROBABILITY DRIVE

First made famous in Douglas Adams's *Hitchhiker's Guide to the Galaxy* series, a probability drive alters the laws of chance to the point where the odds that the ship will spontaneously hop to its destination become good. Amazingly, this isn't as crazy as it sounds; Hard SF maven David Brin used a similar drive as one method of FTL travel in his "Uplift" books. Probability drives are MegaScaled Teleportation, sometimes with a Side Effect of Unluck or Change Environment.

OTHER SPACE VEHICLE SYSTEMS

In addition to power and propulsion systems, space vehicles usually have the following types of systems:

Weapons: Beam weapons (such as lasers and plasma cannons) and missiles.

Defenses: Armor, force screens, point defense lasers, stealth systems, and the like.

Communications Systems: Ways to communicate with homeworld. These are usually simulated with HRRP, sometimes with MegaScale or Increased Maximum Range to expand the transmitting range (see *Star Hero*, page 55).

Sensors: The Vehicle's eyes and ears. Usually bought as a Variable Power Pool.

Personnel Systems: Life support, artificial gravity, crew quarters, entertainment, and medical facilities.

See Chapter Seven of this book, or pages 194-204 of *Star Hero*, for examples.

SPACE VEHICLE EVERYVEHICLE EQUIPMENT

Space Vehicles have the following types of Everyvehicle Equipment described for ground vehicles: Battery; Clock; Headlights (or equivalent); Heater/Air Conditioner; Internal Lights; Seat Belts (or a high-tech equivalent); and Signal Lights (the external anti-collision and position lights, running lights, and the like). Additionally, it has these other types of Everyvehicle Equipment:

Airlocks: See page 25.

Docking Connections: Most ships need a way to attach themselves — "dock" — with other ships, space stations, and the like. That allows personnel to travel back and forth, workers to transfer cargo and consumables to and from the ship, and so on. (The Vehicle's Life Support with Partial Coverage (-2)).

In most settings and situations, docking a ship to another ship or a station is a routine piloting task requiring no Skill Roll. In unusual or emergency situations, such as when a ship's docking systems are damaged, the GM may require a Combat Piloting roll at -2 (or worse), with failure causing both docking objects to suffer Move Through damage at 0" velocity.

Gamemasters may, if they wish, expand this list. Since every space Vehicle needs extensive life support systems; these could be turned into Everyvehicle Equipment. So could basic sensors (HRRP, Radar).



SAMPLE SPACE VEHICLES



The rest of this chapter contains eight sample space vehicles, ranging from small, short-range fighters to time machines, both as a resource for players and GMs and as examples if you want something to review before building your own spacecraft. These examples do not all come from the same setting, or use the same technology; they're just a random assortment of vehicles from the annals of science fiction.

SPACE YACHT

Val	Char	Cost	Notes
10	Size	50	10" x 5"; -10 KB; -6 DCV
60	STR	0	Lift 100 tons; 12d6 HTH [0]
14	DEX	12	OCV: 5/DCV: 5
20	BODY	0	
6	DEF	12	
3	SPD	6	Phases: 4, 8, 12
			Total Characteristic Cost: 80

Movement: Ground: 0"/0"
 Flight: 40"/320"
 FTL: 64 LY/year (1 LY/week)

Abilities & Equipment

Cost Power END

Power Systems

60	<i>Fusion Power Plant:</i> Endurance Reserve (150 END, 150 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼)	0
16	<i>Auxiliary Power:</i> Endurance Reserve (40 END, 40 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼)	0

Propulsion Systems

60	<i>Warpflight Engine:</i> Multipower, 90-point reserve; all <i>Costs Endurance</i> (-½)	
6u	1) Standard Flight: Flight 40", x8 Noncombat; <i>Costs Endurance</i> (-½)	9
1u	2) Warpflight: FTL Travel (64 LY/year); <i>Costs Endurance</i> (-½), <i>Extra Time</i> (requires 1 Minute to engage engine, but engine thereafter does not require <i>Extra Time</i> ; -¾), Requires A PS: Fusion Engine Operation Roll (-¼)	2
-12	<i>Spaceflight Only:</i> Ground Movement -6" (0" total)	
-2	<i>Spaceflight Only:</i> Swimming -2" (0" total)	

Tactical Systems

24	<i>Omnipurpose Laser:</i> Multipower, 67-point reserve; all OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (60 Degrees forward; -½)	
2u	1) Distant Shot: RKA 2d6, Autofire (5 shots;	

	+½), MegaRange (1" = 10 km, can scale down to 1" = 1 km; +¾); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (60 Degrees forward; -½)	7
2u	2) Close-Range Shot: RKA 2d6, Autofire (5 shots; +½); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (60 Degrees forward; -½)	4
16	<i>Force Shield:</i> Force Wall (8 PD/12 ED; 10" long); OIF Bulky (shield generators; -1), Self Only (-½), Restricted Shape (one-fourth of "bubble" around ship; -¼), <i>Extra Time</i> (1 minute to re-erect Force Wall after it collapses; -1½)	7
10	<i>Force Shield:</i> 3 more Force Shields (total of 4; each covers one-fourth of the ship)	

Operations Systems

46	<i>Sensor And Communication Systems:</i> Variable Power Pool, 40 base + 20 control cost; OIF Bulky (-1), Only For Senses And Communications (-1), <i>Costs Endurance</i> (-½)	var
70	<i>Long-Range Sensors:</i> MegaScale (1 light-year per Active Point, can scale down to 1 km per Active Point; +3½) for any Sensor Pool Sense; OIF Bulky (-1)	var
7	<i>Long-Range Sensors:</i> +10 versus Range for Radio Group; OIF Bulky (-1)	0
3	<i>Navigation Computer:</i> +4 to Navigation (Space) roll; OAF Bulky (-1½)	0
17	<i>Internal Monitors:</i> Clairsentience (Sight And Hearing Groups), Mobile Perception Point, Multiple Perception Points (up to eight at once); OAF Immobile (-2), Perception Point Cannot Move Through Solid Objects (-0)	5

Personnel Systems

12	<i>Life Support:</i> Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); <i>Costs Endurance</i> (-½)	2
6	<i>Backup Life Support:</i> Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); Only Within Affected Area (2.5" x 1.25" chamber; -2), 1 Continuing Fuel Charge (easily replaced from sources outside the ship; 1 Month; -0)	[1cc]
10	<i>Backup Life Support:</i> 3 more Backup Life Support chambers (total of 4)	
3	<i>Food Supplies:</i> Life Support (Diminished Eating: no need to eat); 1 Continuing Fuel	

- Charge (easily replaced from sources outside the ship; 1 Year; -0) [1cc]
- 15 *Artificial Gravity*: Telekinesis (20 STR), Selective (+½); OIF Bulky (-1), Only To Pull Objects Straight Down To The Floor (-1) 3

Total Abilities & Equipment Cost: 372

Total Vehicle Cost: 452

Value Disadvantages

None

Total Disadvantage Points: 0

Total Cost: 452/5 = 90

Description: This character sheet represents a typical civilian spacecraft owned and used by a relatively well-to-do citizen (or any citizen, in a post-economic interstellar society). Although it's built for fairly short jaunts, and won't stand up to significant abuse, it's a comfortable, even luxurious, way to travel around the galaxy near one's homeworld.

You can easily adapt this ship for use as a small military vessel, pirate ship, or the like by improving the tactical systems a bit. Add inches of Flight and a few more upgrades, and it becomes a space racing sloop, fit for the Tour de Orion.



SCIENTIFIC SURVEYOR

Val	Char	Cost	Notes
9	Size	45	8" x 4"; -9 KB; -6 DCV
55	STR	0	Lift 50 tons; 11d6 HTH [0]
12	DEX	6	OCV: 4/DCV: 4
19	BODY	0	
7	DEF	15	
3	SPD	8	Phases: 4, 8, 12
			Total Characteristic Cost: 74

Movement: Ground: 0"/0"
Flight: 40"/320"
FTL: 500 LY/year (1 LY/day)

Abilities & Equipment

Cost Power END

Power Systems

- 80 *Fusion Power Plant*: Endurance Reserve (200 END, 200 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼) 0
- 24 *Auxiliary Power*: Endurance Reserve (60 END, 60 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼) 0

Propulsion Systems

- 60 *Warpflight Engine*: Multipower, 90-point reserve; all *Costs Endurance* (-½)
- 6u 1) Standard Flight: Flight 40", x8 Noncombat; *Costs Endurance* (-½) 9
- 1u 2) Warpflight: FTL Travel (500 LY/year); *Costs Endurance* (-½), *Extra Time* (requires 1 Minute to engage engine, but engine thereafter does not require *Extra Time*; -¾), Requires A PS: Fusion Engine Operation Roll (-¼) 2
- 12 *Spaceflight Only*: Ground Movement -6" (0" total)
- 2 *Spaceflight Only*: Swimming -2" (0" total)

Tactical Systems

- 45 *Surveying/Prospecting Laser*: Multipower, 101-point reserve; all OIF Bulky (-1), Real Weapon (-¼)
- 4u 1) Distant Shot: RKA 3d6, Armor Piercing (+½), MegaRange (1" = 10 km, can scale down to 1" = 1 km; +¾); OIF Bulky (-1), Real Weapon (-¼) 10
- 3u 2) Close-Range Shot: RKA 3d6, Armor Piercing (+½); OIF Bulky (-1), Real Weapon (-¼) 7
- 22 *Force Shield*: Force Wall (14 PD/18 ED; 8" long); OIF Bulky (shield generators; -1), Self Only (-½), Restricted Shape (one-fourth of "bubble" around ship; -¼), *Extra Time* (1 minute to re-erect Force Wall after it collapses; -1½) 9
- 10 *Force Shield*: 3 more Force Shields (total of 4; each covers one-fourth of the ship)

Operations Systems

- 69 *Sensor And Communication Systems*: Variable Power Pool, 60 base + 30 control cost; OIF Bulky (-1), Only For Sensor And Communications (-1), Costs Endurance (-½) var

- 70 *Long-Range Sensors:* MegaScale (1 light-year per Active Point, can scale down to 1 km per Active Point; +3½) for any Sensor Pool Sense of up to 40 Active Points; OIF Bulky (-1) var
- 7 *Long-Range Sensors:* +10 versus Range for Radio Group; OIF Bulky (-1) 0
- 3 *Navigation Computer:* +4 to Navigation (Space) roll; OAF Bulky (-1½) 0
- 17 *Internal Monitors:* Clairsentience (Sight And Hearing Groups), Mobile Perception Point, Multiple Perception Points (up to eight at once); OAF Immobile (-2), Perception Point Cannot Move Through Solid Objects (-0) 5
- 60 *Laboratories:* 60 points' worth of laboratories (owner's choice)

Personnel Systems

- 12 *Life Support:* Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); *Costs Endurance* (-½) 2
- 6 *Backup Life Support:* Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); Only Within Affected Area (2.5" x 1.25" chamber; -2), 1 Continuing Fuel Charge (easily replaced from sources outside the ship; 1 Month; -0) [1cc]
- 10 *Backup Life Support:* 3 more Backup Life Support chambers (total of 4)
- 3 *Food Supplies:* Life Support (Diminished Eating: no need to eat); 1 Continuing Fuel Charge (easily replaced from sources outside the ship; 1 Year; -0) [1cc]
- 15 *Artificial Gravity:* Telekinesis (20 STR), Selective (+½); OIF Bulky (-1), Only To Pull Objects Straight Down To The Floor (-1) 3

Total Abilities & Equipment Cost: 513

Total Vehicle Cost: 587

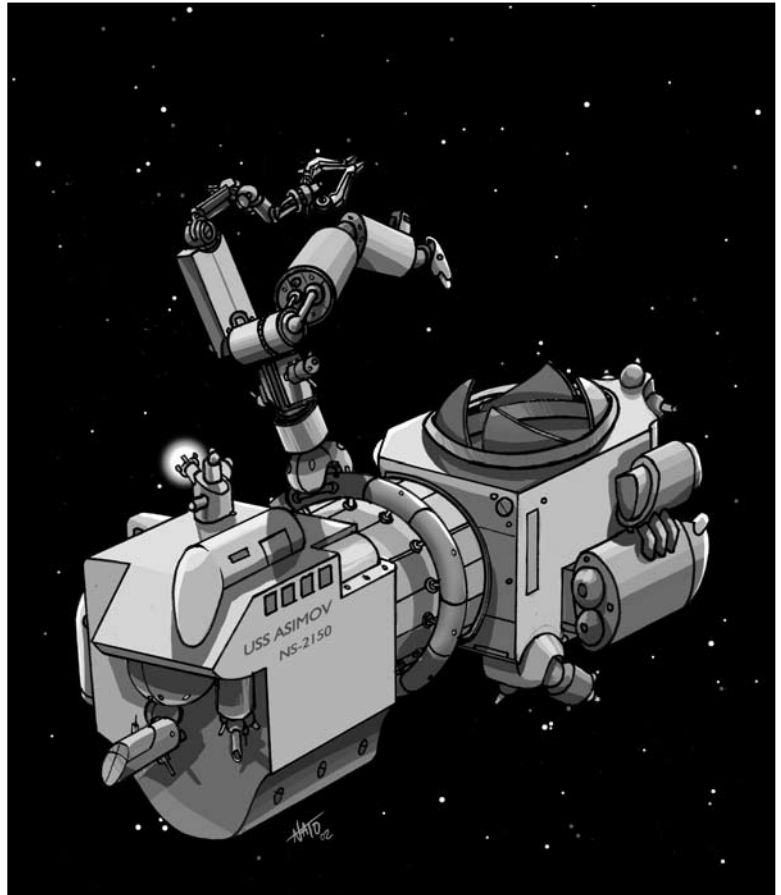
Value Disadvantages

None (or to be chosen by players)

Total Disadvantage Points: 0

Total Cost: 587/5 = 117

Description: This ship, built using many of the same components and systems as the Space Yacht, is a science vessel dedicated to surveying systems and planets for useful resources and phenomena of scientific interest. It comes equipped with numerous laboratory facilities, advanced sensors, and a surveying/prospecting laser designed to cut samples from asteroids and the like (but able to serve as a functional weapon in the event of trouble). It can get by with a crew of one, but typically has four to eight people aboard.



SPACE MERCHANTMAN

Val	Char	Cost	Notes
18	Size	90	64" x 32"; -18 KB; -12 DCV
100	STR	0	Lift 25 ktons; 20d6 HTH [0]
10	DEX	0	OCV: 3/DCV: 3
30	BODY	2	
7	DEF	15	
2	SPD	0	Phases: 6, 12
			Total Characteristic Cost: 107

Movement: Ground: 0"/0"
 Flight: 20"/80"
 MegaTeleportation: 50 LY

Abilities & Equipment

Cost	Power	END
Power Systems		
48	<i>Fusion Power Plant:</i> Endurance Reserve (120 END, 120 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼)	0
12	<i>Auxiliary Power:</i> Endurance Reserve (30 END, 30 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼)	0
Propulsion Systems		
7	<i>Jump Drive:</i> Teleportation 5", MegaScale (1" = 10 light-years; +3¾); <i>Extra Time</i> (1 Minute; -1½), <i>Increased Endurance Cost</i> (x10 END; -4), Requires A Navigation (Space) Roll (-½)	50
30	<i>In-System Maneuvering Thrusters:</i> Flight 20", x4 Noncombat; <i>Costs Endurance</i> (-½)	4
-12	<i>Spaceflight Only:</i> Ground Movement -6" (0" total)	

-2 *Spaceflight Only*: Swimming -2" (0" total)

Tactical Systems

10 *Starship Force Shield*: Force Field (10 PD/20 ED); OIF Bulky (shield generators; -1), Ablative (-1) 3

Operations Systems

46 *Sensor And Communication Systems*: Variable Power Pool, 40 base + 20 control cost; OIF Bulky (-1), Only For Senses And Communications (-1), Costs Endurance (-½) var

70 *Long-Range Sensors*: MegaScale (1 light-year per Active Point, can scale down to 1 km per Active Point; +3½) for any Sensor Pool Sense; OIF Bulky (-1) var

7 *Long-Range Sensors*: +10 versus Range for Radio Group; OIF Bulky (-1) 0

2 *Navigation Computer*: +2 to Navigation (Space) roll; OAF Bulky (-1½) 0

17 *Internal Monitors*: Clairsentience (Sight And Hearing Groups), Mobile Perception Point, Multiple Perception Points (up to eight at once); OAF Immobile (-2), Perception Point Cannot Move Through Solid Objects (-0) 5

Personnel Systems

12 *Life Support*: Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); *Costs Endurance* (-½) 2

6 *Backup Life Support*: Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); Only Within Affected Area (2.5" x 1.25" chamber; -2), 1 Continuing Fuel Charge (easily replaced from sources outside the ship; 1 Month; -0) [1cc]

10 *Backup Life Support*: 3 more Backup Life Support chambers (total of 4)

3 *Food Supplies*: Life Support (Diminished Eating: no need to eat); 1 Continuing Fuel Charge (easily replaced from sources outside the ship; 1 Year; -0) [1cc]

15 *Artificial Gravity*: Telekinesis (20 STR), Selective (+½); OIF Bulky (-1), Only To Pull Objects Straight Down To The Floor (-1) 3

13 *Holographic Entertainment Chamber*: Sight, Hearing, and Touch Group Images, -3 to PER Rolls, Increased Size (16" radius; +1); OIF Immobile (-1½), Only Within Defined Area (16" radius chamber; -2) 6

Total Abilities & Equipment Cost: 294

Total Vehicle Cost: 401

Value Disadvantages

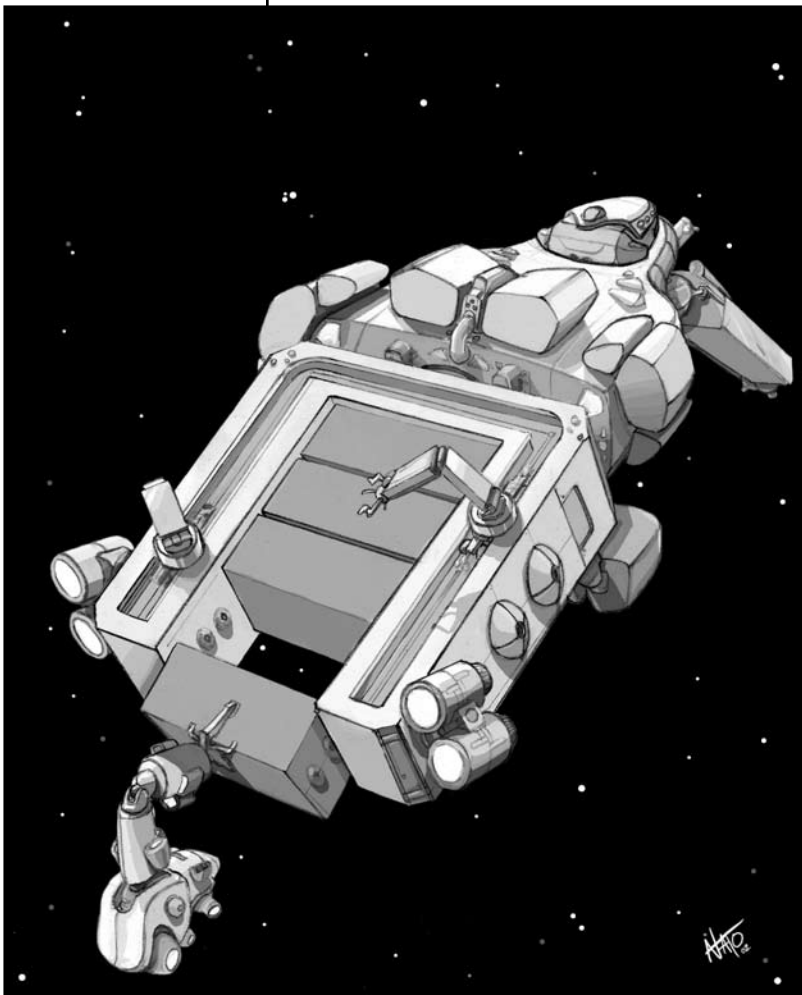
10 Physical Limitation: Cannot Enter Atmospheres (Infrequently, Greatly Impairing)

Total Disadvantage Points: 10

Total Cost: 391/5 = 78

Description: This vessel is a large "merchantman," or cargo carrier designed to travel from one isolated system to another using its jump drive. It consists of a U-shaped frame into which massive cargo containers fit. When the captain buys or sells in bulk, he simply adds or removes the appropriate container.

Because it typically travels between relatively peaceful, well-settled systems, the Merchantman has no weapons and relatively weak defenses. On the other hand, it comes equipped with a holo-chamber to help the crew pass the time on the long flights from the jump point to planetary orbit.



SPACE PIRATE VESSEL

Val	Char	Cost	Notes
12	Size	60	16" x 8"; -12 KB; -8 DCV
70	STR	0	Lift 400 tons; 14d6 HTH [0]
18	DEX	24	OCV: 6/DCV: 6
25	BODY	3	
10	DEF	24	
4	SPD	12	Phases: 3, 6, 9, 12
Total Characteristic Cost: 123			

Movement: Ground: 0"/0"
 Flight: 30"/240"
 Hyperspace FTL: 500 LY/year
 (1 LY/day)

Abilities & Equipment

Cost	Power	END
Power Systems		
80	<i>Fusion Power Plant:</i> Endurance Reserve (200 END, 200 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼)	0
24	<i>Auxiliary Power:</i> Endurance Reserve (60 END, 60 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼)	0
Propulsion Systems		
5	<i>Hyperspace Engine:</i> Extra-Dimensional Movement (any location in hyperspace, corresponding to the location in normal space where the ship enters); <i>Increased Endurance Cost</i> (x10 END; -4)	20
6	<i>Hyperspace Engine:</i> FTL Travel (1 LY per day); <i>Costs Endurance</i> (-½), <i>Increased Endurance Cost</i> (x5 END; -2), Only In Hyperspace (-1)	15
47	<i>Realspace Flight:</i> Flight 30", x8 Noncombat; <i>Costs Endurance</i> (-½)	7
-12	<i>Spaceflight Only:</i> Ground Movement -6" (0" total)	
-2	<i>Spaceflight Only:</i> Swimming -2" (0" total)	
Tactical Systems		
49	<i>Combat Lasers:</i> Multipower, 135-point reserve; all OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (60 Degrees forward; -½)	
5u	1) Distant Shot: RKA 4d6, Autofire (5 shots; +½), MegaRange (1" = 10 km, can scale down to 1" = 1 km; +¾); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (60 Degrees forward; -½)	13
3u	2) Close-Range Shot: RKA 4d6, Autofire (5 shots; +½); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (60 Degrees; -½)	7
15	<i>Combat Lasers:</i> 5 more Combat Lasers (total of 6; one per side)	7
22	<i>Primary Force Shield:</i> Force Wall (10 PD/14 ED; 18" long); OIF Bulky (shield generators; -1), Self Only (-½), Restricted Shape (one-fourth of "bubble" around ship; -¼), <i>Extra Time</i> (1 minute to re-erect Force Wall after it collapses; -1½)	9
10	<i>Primary Force Shield:</i> 3 more Primary Force Shields (total of 4; each covers one-fourth of the ship)	9

9	<i>Secondary Force Shield:</i> Force Field (10 PD/16 ED); OIF Bulky (shield generators; -1), Ablative (-1)	3
14	<i>Point Defense Laser System:</i> Missile Deflection (all physical projectiles), Range (+1), MegaRange (1" = 1 km; +¼); OIF Bulky (-1), <i>Costs Endurance</i> (-½)	3
29	<i>Weapons Reserve Power:</i> Endurance Reserve (60 END, 60 REC); OIF Bulky (-1), Only Powers Ship's Weapons (-¼)	0

Operations Systems

46	<i>Sensor And Communication Systems:</i> Variable Power Pool, 40 base + 20 control cost; OIF Bulky (-1), Only For Senses And Communications (-1), <i>Costs Endurance</i> (-½)	var
70	<i>Long-Range Sensors:</i> MegaScale (1 light-year per Active Point, can scale down to 1 km per Active Point; +3½) for any Sensor Pool Sense; OIF Bulky (-1)	var
7	<i>Long-Range Sensors:</i> +10 versus Range for Radio Group; OIF Bulky (-1)	0
3	<i>Navigation Computer:</i> +4 to Navigation (Space) roll; OAF Bulky (-1½)	0
17	<i>Internal Monitors:</i> Clairsentience (Sight And Hearing Groups), Mobile Perception Point, Multiple Perception Points (up to eight at once); OAF Immobile (-2), Perception Point Cannot Move Through Solid Objects (-0)	5

Personnel Systems

12	<i>Life Support:</i> Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); <i>Costs Endurance</i> (-½)	2
6	<i>Backup Life Support:</i> Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); Only Within Affected Area (2.5" x 1.25" chamber; -2), 1 Continuing Fuel Charge (easily replaced from sources outside the ship; 1 Month; -0)	[1cc]
10	<i>Backup Life Support:</i> 3 more Backup Life Support chambers (total of 4)	
3	<i>Food Supplies:</i> Life Support (Diminished Eating: no need to eat); 1 Continuing Fuel Charge (easily replaced from sources outside the ship; 1 Year; -0)	[1cc]
15	<i>Artificial Gravity:</i> Telekinesis (20 STR), Selective (+½); OIF Bulky (-1), Only To Pull Objects Straight Down To The Floor (-1)	3

Total Abilities & Equipment Cost: 493

Total Vehicle Cost: 616

Value Disadvantages

10	Physical Limitation: Cannot Enter Atmospheres (Infrequently, Greatly Impairing)
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Total Disadvantage Points: 10

Total Cost: 606/5 = 121

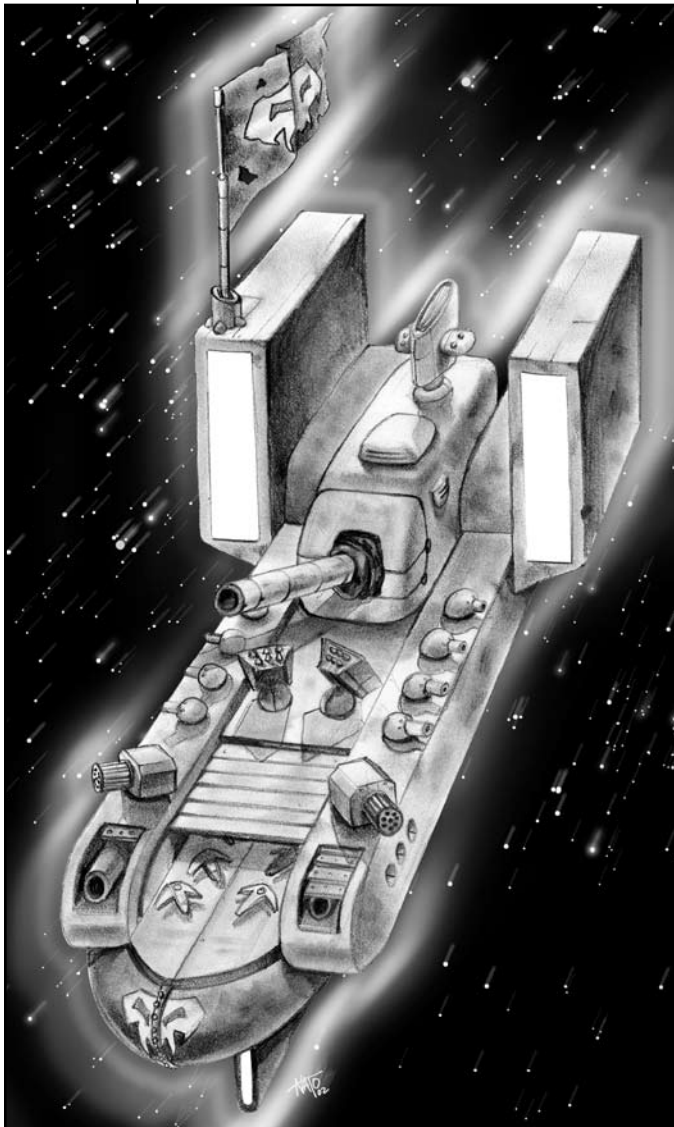
Cost Additional Vehicles

- 50 Space Missiles: Use AIM-7 Sparrow (page 131)
 20 Space Missiles: 11 more Space Missiles (total of 12)

Description: This character sheet represents a hyperdrive-based vessel that's been taken over by pirates (or perhaps mercenaries) and adapted for raiding or combat. It may once have been a trading vessel, or a system patrol frigate, or the like, but it's been retrofitted with multiple Combat Lasers, a point-defense system, powerful defense shields, and other systems intended solely for quasi-military purposes.

Typically the Pirate Vessel lurks near common hyperspace gate points, in either hyperspace or normal space, and ambushes unwary trading ships. If equipped with a stealth system (such as a cloaking screen) or hypersensors capable of scanning normal space from hyperspace, it becomes an even greater threat.

With a few adaptations and improved systems, you can use this write-up to represent many different types of small military starships.

**WARP FIGHTER**

Val	Char	Cost	Notes
7	Size	35	5" x 2.5"; -7 KB; -4 DCV
45	STR	0	Lift 12.5 tons; 9d6 HTH [0]
25	DEX	45	OCV: 8/DCV: 8
17	BODY	0	
8	DEF	18	
4	SPD	5	Phases: 3, 6, 9, 12
			Total Characteristic Cost: 103

Movement: Ground: 0"/0"
 Flight: 50"/400"
 FTL: 8,000 LY/year (1 LY/hour)

Abilities & Equipment

Cost Power END

Power Systems

- 60 *Antimatter Power Plant:* Endurance Reserve (150 END, 150 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼) 0
 12 *Auxiliary Power:* Endurance Reserve (30 END, 30 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼) 0

Propulsion Systems

- 73 *Antimatter Warp Engine:* Multipower, 110-point reserve; all *Costs Endurance* (-½)
 7u 1) Standard Flight: Flight 50", x8 Noncombat; *Costs Endurance* (-½) 11
 1u 2) Warp Flight: FTL Travel (1 LY/hour); *Costs Endurance* (-½), *Increased Endurance Cost* (x10 END; -4), Requires A PS: Antimatter Warp Engine Operation Roll (-¼) 40
 -12 *Spaceflight Only:* Ground Movement -6" (0" total)
 -2 *Spaceflight Only:* Swimming -2" (0" total)

Tactical Systems

- 49 *Combat Lasers:* RKA 3d6, Autofire (5 shots; +½), Increased Maximum Range (11,250", or about 14 miles; +½), No Range Modifier (+½), Reduced Endurance (½ END; +½); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (60 Degrees forward; -½) 5
 10 *Combat Lasers:* 2 more Combat Lasers (total of 3; one to port, one to starboard) 11
 14 *Force Shield:* Force Wall (8 PD/12 ED; 6" long); OIF Bulky (shield generators; -1), Self Only (-½), Restricted Shape (one-fourth of "bubble" around ship; -¼), *Extra Time* (1 minute to re-erect Force Wall after it collapses; -1½) 8
 10 *Force Shield:* 3 more Primary Force Shields (total of 4; each covers one-fourth of the ship) 9

Operations Systems

- 46 *Sensor And Communication Systems:* Variable Power Pool, 40 base + 20 control cost; OIF Bulky (-1), Only For Senses And Communications (-1), *Costs Endurance* (-½) var
 70 *Long-Range Sensors:* MegaScale (1 light-year per Active Point, can scale down to

- 1 km per Active Point; +3½ for any Sensor Pool Sense; OIF Bulky (-1) var
- 7 *Long-Range Sensors*: +10 versus Range for Radio Group; OIF Bulky (-1) 0
- 3 *Navigation Computer*: +4 to Navigation (Space) roll; OAF Bulky (-1½) 0

Personnel Systems

- 12 *Life Support*: Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); *Costs Endurance* (-½) 2
- 15 *Artificial Gravity*: Telekinesis (20 STR), Selective (+½); OIF Bulky (-1), Only To Pull Objects Straight Down To The Floor (-1) 3

Skills

- 6 *Highly Maneuverable*: +3 with Flight

Total Abilities & Equipment Cost: 381

Total Vehicle Cost: 484

Value Disadvantages

- 25 *Distinctive Features*: FTL-capable fighter (Not Concealable; Causes Extreme Reaction [fear])

Total Disadvantage Points: 25

Total Cost: 459/5 = 91

Description: This large-sized fighter differs from its smaller brethren because it has FTL flight capability. While not capable of sustained FTL travel, it can participate in system-to-system raids and the like. For longer journeys it travels in the hangar of a carrier.

With its crew of four (one pilot, three gunners) and three powerful Combat Lasers with excellent range, the Warp Fighter is a force to be reckoned with on the space battlefield — particularly when it flies in squadrons or wings. Some governments equip it with missiles as well. However, its lack of rear, dorsal, or ventral weapons can be a definite liability in some situations.

MILITARY CRUISER

Val	Char	Cost	Notes
25	Size	125	320" x 160"; -25 KB; -16 DCV
135	STR	0	Lift 3.2 mtons; 27d6 HTH [0]
18	DEX	24	OCV: 6/DCV: 6
40	BODY	5	
15	DEF	49	Hardened (+¼)
3	SPD	2	Phases: 4, 8, 12
Total Characteristic Cost: 205			

Movement: Ground: 0"/0"
Flight: 20"/2,500"

Abilities & Equipment

Cost	Power	END
600	<i>Antimatter Power Plant</i> : Endurance Reserve (1,500 END, 1,500 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼)	0
120	<i>Auxiliary Power</i> : Endurance Reserve (300 END, 300 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼)	0
49	<i>Reserve Batteries</i> : Endurance Reserve (100 END, 100 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0

Propulsion Systems

35	<i>Antimatter Propulsion</i> : Flight 20", x125 Noncombat; <i>Costs Endurance</i> (-½), Limited Maneuverability (-½)	7
-12	<i>Spaceflight Only</i> : Ground Movement -6" (0" total)	
-2	<i>Spaceflight Only</i> : Swimming -2" (0" total)	

Tactical Systems

175	<i>Plasma Cannon</i> : Multipower, 525-point reserve, all OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (One Hex Row forward; -¾)	
9u	1) Distant Shot: RKA 10d6, Armor Piercing (+½), MegaScale (1" = 1 km; +¼); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (One Hex Row; -¾)	26
15u	2) Close-Range Shot: RKA 10d6, Area Of Effect (1,440" Line; +2), Armor Piercing (+½); OIF Bulky (-1), No Range (-½), Real Weapon (-¼), Limited Arc Of Fire (One Hex Row forward; -¾)	52
76	<i>Plasma Guns</i> : Multipower, 210-point reserve, all OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (60 Degrees; -½)	
8u	1) Distant Shot: RKA 8d6, Armor Piercing (+½), MegaScale (1" = 1 km; +¼); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (60 Degrees; -½)	21
6u	2) Close-Range Shot: RKA 8d6, Armor Piercing (+½); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (60 Degrees; -½)	18
25	<i>Plasma Guns</i> : 31 more Plasma Guns (total of 32)	
100	<i>Intense Interferiation Field</i> : Darkness to Radio Group 10" radius, MegaArea (1" = 1 million km; +1¾), MegaRange (1" = 10 million km; +2), Reduced Endurance (½ END; +¼); OAF Bulky (-1½)	23

- 56 *ECCM: Suppress Electronic Warfare* 8d6, any two Powers simultaneously (+½), MegaRange (1" = 10 million km; +2); OAF Bulky (-1½) 14
- 176 *Primary Force Shield: Force Wall* (30 PD/30 ED; 300" long); OIF Bulky (shield generators; -1), Self Only (-½), Restricted Shape (one-fourth of "bubble" around ship; -¼), *Extra Time* (1 minute to re-erect Force Wall after it collapses; -1½) 75
- 10 *Primary Force Shield: 3 more Primary Force Shields* (total of 4; each covers one-fourth of the ship)
- 14 *Point Defense Laser System: Missile Deflection* (all physical projectiles), Range (+1), MegaRange (1" = 1 km; +¼); OIF Bulky (-1), *Costs Endurance* (-½) 3
- 40 *Weapons Reserve Power: Endurance Reserve* (100 END, 100 REC); OIF Immobile (-1½), Only Powers Ship's Weapons (-¼) 0

Operations Systems

- 114 *Sensor And Communication Systems: Variable Power Pool*, 100 base + 50 control cost; OIF Bulky (-1), Only For Senses And Communications (-1), *Costs Endurance* (-½) var
- 87 *Long-Range Sensors: MegaScale* (1 light-year per Active Point, can scale down to 1 km per Active Point; +3½) for any Sensor Pool Sense of up to 50 Active Points; OIF Bulky (-1) var
- 15 *Long-Range Sensors: +20 versus Range* for Radio Group; OIF Bulky (-1) 0
- 3 *Enhanced Sensors/Communications: +4* to Systems Operation roll; OAF Bulky (-1½)
- 20 *Internal Monitors: Clairvoyance* (Sight And Hearing Groups), 4x Range (1,000"), Mobile Perception Point, Multiple Perception Points (up to eight at once); OAF Immobile (-2), Perception Point Cannot Move Through Solid Objects (-0) 6
- 54 *Forward Tractor Beam: Telekinesis* (100 STR); OIF Bulky (projector; -1), Affects Whole Object (-¼), Limited Arc Of Fire (60 Degrees forward; -½) 15
- 5 *Aft Tractor Beam: 1 more Tractor Beam* (total of 2; this one fires 60 Degrees aft)

Personnel Systems

- 12 *Life Support: Life Support* (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); *Costs Endurance* (-½) 2
- 6 *Backup Life Support: Life Support* (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); Only Within Affected Area (40" x 20" chamber; -2), 1 Continuing Fuel Charge (easily replaced from sources outside the ship; 1 Month [i.e., 105,000 man-days]; -0) [1cc]
- 15 *Backup Life Support: 7 more Backup Life Support areas* (total of 8)
- 3 *Food Supplies: Life Support* (Diminished

Eating: no need to eat); 1 Continuing Fuel Charge (easily replaced from sources outside the ship; 1 Year [i.e., 3,500 man-years]; -0) [1cc]

- 15 *Artificial Gravity: Telekinesis* (20 STR), Selective (+½); OIF Bulky (-1), Only To Pull Objects Straight Down To The Floor (-1) 3
- 3 *Backup Artificial Gravity: Telekinesis* (5 STR); OIF Bulky (-1), Only To Pull Objects Straight Down To The Floor (-1) 1
- 18 *Medical Facilities: Paramedics 14- and SS: Medicine 14-* 0

Skills/Laboratories

- 20 *Tactical Systems: +6* with Ranged Combat; *Costs Endurance* (-½) 3
- 3 *Navigation Computer: +4* to Navigation (Space) roll; OAF Bulky (-1½) 0
- 13 Computer Programming 14-
- 13 Cryptography 14-
- 13 Demolitions 14-
- 13 Electronics 14-
- 13 Mechanics 14-
- 15 Weaponsmith (Firearms, Missiles & Rockets, Incendiary Weapons, Energy Weapons) 14-
- 100 Other laboratories (defined by GM or player)

Total Abilities & Equipment Cost: 2,073

Total Vehicle Cost: 2,278

Value Disadvantages

- 25 *Distinctive Features: powerful military starship* (Not Concealable; Causes Extreme Reaction [fear])
- 10 *Physical Limitation: Cannot Enter Atmospheres* (Infrequently, Greatly Impairing)

Total Disadvantage Points: 35

Total Cost: 2,243/5 = 449

Cost Additional Vehicles

- 70 *Antimatter Missiles: Use Nuclear Space Missile* (page 132)
- 15 *Antimatter Missiles: 7 more Antimatter Missiles* (total of 8)

Description: This character sheet represents a military capital ship from a setting where FTL travel is accomplished by means of star portals (see page 91). Thus, it has no FTL engines of its own, just normal propulsion systems.

The Military Cruiser's main weapons are plasma guns. Its forward plasma cannon can project a wide plasma beam nearly two miles long, and it has 32 lesser plasma guns spaced equidistantly around its hull. It also carries eight antimatter explosive missiles (equivalent to the Nuclear Space Missile on page 132). It also carries potent electronic warfare systems, powerful tractor beam projectors, and a wide variety of laboratory and manufacturing facilities. It has a crew of 2,200.

STAR RAVAGER

Val	Char	Cost	Notes
30	Size	150	1,000" x 500"; -30 KB; -20 DCV
160	STR	0	Lift 100 mtons; 32d6 HTH [0]
14	DEX	12	OCV: 5/DCV: 5
50	BODY	10	
20	DEF	67	Hardened (+¼)
3	SPD	6	Phases: 4, 8, 12
Total Characteristic Cost: 245			

Movement: Ground: 0"/0"
 Flight: 30"/960"
 FTL: 8,000 LY/year (1 LY/hour)

Abilities & Equipment

Cost	Power	END
800	<i>Biofusion Power Plant:</i> Endurance Reserve (2,000 END, 2,000 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼)	0
240	<i>Auxiliary Power:</i> Endurance Reserve (600 END, 600 REC); OIF Immobile (-1½), Only Powers Electrical Devices (-¼)	0
98	<i>Reserve Batteries:</i> Endurance Reserve (200 END, 200 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0

Propulsion Systems

40	<i>Biofusion Propulsion:</i> Flight 30", x32 Noncombat; <i>Costs Endurance</i> (-½), Limited Maneuverability (-½)	8
6	<i>Spacewarp Drive:</i> FTL Travel (1 LY/hour); <i>Costs Endurance</i> (-½), <i>Increased Endurance Cost</i> (x10 END; -4), Requires A	
-12	<i>Spaceflight Only:</i> Ground Movement -6" (0" total)	40
-2	<i>Spaceflight Only:</i> Swimming -2" (0" total)	

Tactical Systems

49	<i>Forward Biochemical Laser Cannon:</i> Multipower, 247-point reserve, all OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (One Hex Row forward; -¾), <i>Increased Endurance Cost</i> (x5 END; -2)	
5u	1) Distant Shot: RKA 6d6, Armor Piercing (x2; +1), Penetrating (+½), MegaScale (1" = 1 km; +¼); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (One Hex Row; -¾), <i>Increased Endurance Cost</i> (x5 END; -2)	125
4u	2) Close-Range Shot: RKA 6d6, Armor Piercing (x2; +1), Penetrating (+½); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (One Hex Row; -¾), <i>Increased Endurance Cost</i> (x5 END; -2)	110
49	<i>Biochemical Laser Guns:</i> Multipower, 135-point reserve, all OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (60 Degrees; -½)	
5u	1) Distant Shot: RKA 4d6, Armor Piercing (+½), Penetrating (+½), MegaScale (1" = 1 km; +¼); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (60 Degrees; -¾)	13
4u	2) Close-Range Shot: RKA 4d6, Armor	

	Piercing (+½), Penetrating (+½); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (60 Degrees; -½)	12
20	<i>Biochemical Laser Guns:</i> 15 more Biochemical Laser Guns (total of 16)	
240	<i>Electronic Warfare Systems:</i> Variable Power Pool, 200 base + 100 control cost; OAF Bulky (-1½)	var
299	<i>K'rl Envelope:</i> Force Wall (40 PD/40 ED; 500" long); OIF Bulky (shield generators; -1), Self Only (-½), Restricted Shape (one-eighth of "bubble" around ship; -¼), Extra Time (1 Turn to re-erect Force Wall after it collapses; -1¼)	112
15	<i>K'rl Envelope:</i> 7 more K'rl Envelopes (total of 8; each covers one-eighth of the ship)	
14	<i>Point Defense Laser System:</i> Missile Deflection (all physical projectiles), Range (+1), MegaRange (1" = 1 km; +¼); OIF Bulky (-1), <i>Costs Endurance</i> (-½)	3
6	<i>Organic Self-Repair:</i> Healing 1d6 (Regeneration, 1 BODY per 5 Minutes), Reduced Endurance (0 END; +½), Persistent (+½); <i>Extra Time</i> + <i>Increased Time Increment</i> (1 BODY/5 Minutes; -1¾), Self Only (-½)	0

Operations Systems

114	<i>Sensor And Communication Systems:</i> Variable Power Pool, 100 base + 50 control cost; OIF Bulky (-1), Only For Senses And Communications (-1), <i>Costs Endurance</i> (-½)	var
87	<i>Long-Range Sensors:</i> MegaScale (1 light-year per Active Point, can scale down to 1 km per Active Point; +3½) for any Sensor Pool Sense of up to 50 Active Points; OIF Bulky (-1)	var
15	<i>Long-Range Sensors:</i> +20 versus Range for Radio Group; OIF Bulky (-1)	0
3	<i>Enhanced Sensors/Communications:</i> +4 to Systems Operation roll; OAF Bulky (-1½)	
20	<i>Internal Monitors:</i> Clairsentience (Sight And Hearing Groups), 4x Range (1,000"), Mobile Perception Point, Multiple Perception Points (up to eight at once); OAF Immobile (-2), Perception Point Cannot Move Through Solid Objects (-0)	6
54	<i>Forward Tractor Beam:</i> Telekinesis (100 STR); OIF Bulky (projector; -1), Affects Whole Object (-¼), Limited Arc Of Fire (60 Degrees forward; -½)	15
5	<i>Aft Tractor Beam:</i> 1 more Tractor Beam (total of 2; this one fires 60 Degrees aft)	

Personnel Systems

12	<i>Life Support:</i> Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); <i>Costs Endurance</i> (-½)	2
6	<i>Backup Life Support:</i> Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); Only Within Affected Area (40" x 20" chamber; -2), 1	

- Continuing Fuel Charge (easily replaced from sources outside the ship; 1 Month [*i.e.*, 105,000 man-days]; -0) [1cc]
- 15 *Backup Life Support*: 7 more Backup Life Support areas (total of 8)
- 3 *Food Supplies*: Life Support (Diminished Eating: no need to eat); 1 Continuing Fuel Charge (easily replaced from sources outside the ship; 1 Year [*i.e.*, 3,500 man-years]; -0) [1cc]
- 15 *Artificial Gravity*: Telekinesis (20 STR), Selective (+½); OIF Bulky (-1), Only To Pull Objects Straight Down To The Floor (-1) 3
- 3 *Backup Artificial Gravity*: Telekinesis (5 STR); OIF Bulky (-1), Only To Pull Objects Straight Down To The Floor (-1) 1
- 18 *Medical Facilities*: Paramedics 14- and SS: Medicine 14- 0
- Skills/Laboratories**
- 20 *Tactical Systems*: +6 with Ranged Combat; *Costs Endurance* (-½) 3
- 3 *Navigation Computer*: +4 to Navigation (Space) roll; OAF Bulky (-1½) 0
- 13 Computer Programming 14-
- 13 Cryptography 14-
- 13 Demolitions 14-
- 13 Electronics 14-
- 13 Mechanics 14-
- 15 Weaponsmith (Firearms, Missiles & Rockets, Incendiary Weapons, Energy Weapons) 14-

100 Other laboratories (defined by GM or player)

Total Abilities & Equipment Cost: 2,453

Total Vehicle Cost: 2,698

Value Disadvantages

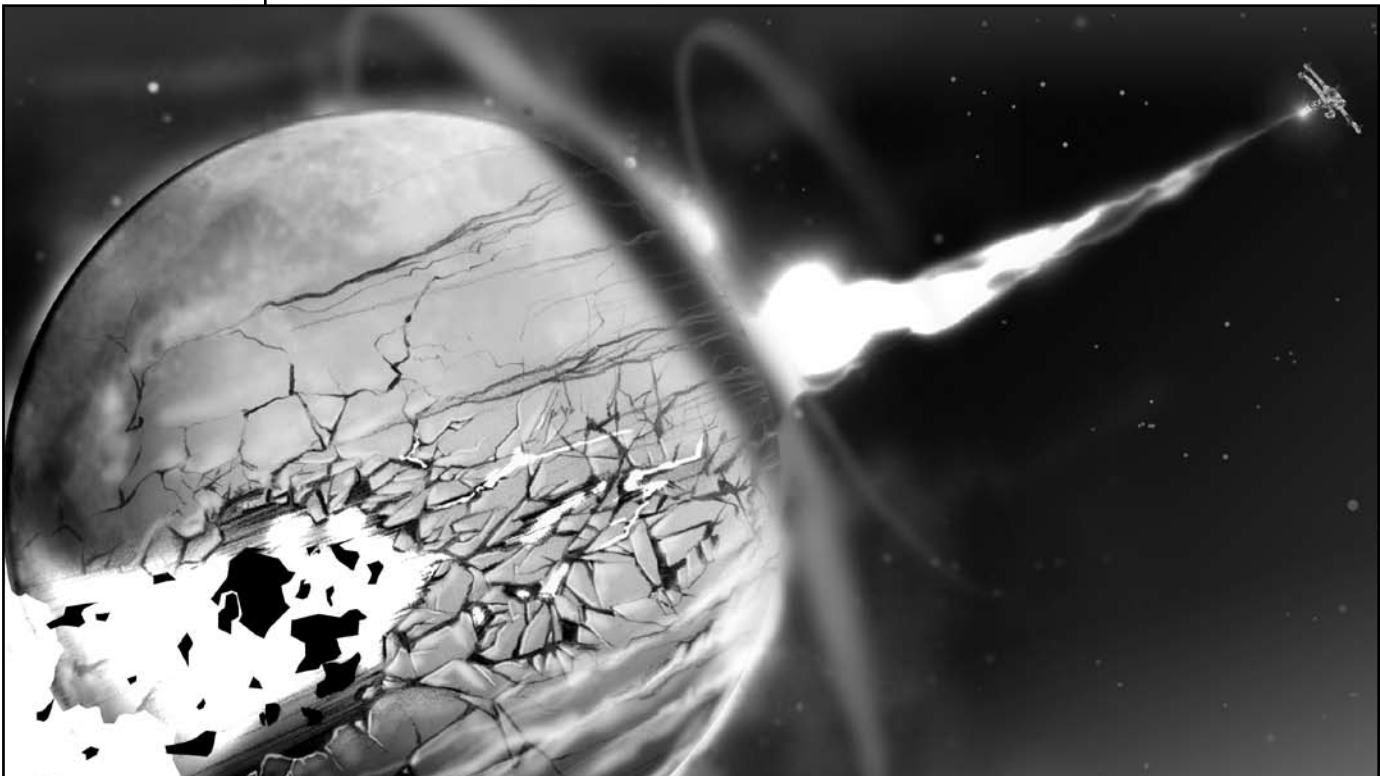
- 25 Distinctive Features: powerful military starship (Not Concealable; Causes Extreme Reaction [fear])
- 10 Physical Limitation: Cannot Enter Atmospheres (Infrequently, Greatly Impairing)

Total Disadvantage Points: 35

Total Cost: 2,663/5 = 533

Description: A Star Ravager is the largest type of military starship fielded by the K'rl, a mysterious species of highly advanced aliens who supposedly live on the galactic rim. Their technology is quasi-organic, a bizarre melding of living tissue and electronics that even the most intelligent Human scientists cannot fully comprehend. K'rl ships seem eerily "alive," as if they were enormous space-creatures rather than manufactured vessels; they even have the ability to heal themselves!

A Star Ravager looks, to Human eyes, something like a cross between a gigantic lamprey and a leprous vine. Its weaponry, including a fearsome Forward Cannon, projects strange energy beams Human scientists have dubbed "biochemical lasers"; even a single shot can inflict significant damage on a starship. Ordinary starship defense screens and armor have markedly less effect against K'rl weapons than they do against other species's attacks.



CHRONOPORTATION BOX

Val	Char	Cost	Notes
4	Size	20	2.5" x 1.25"; -4 KB; -2 DCV
30	STR	0	Lift 1,600 kg; 6d6 HTH [0]
5	DEX	-15	OCV: 2/DCV: 2
14	BODY	0	
30	DEF	105	Hardened (+¼)
2	SPD	5	Phases: 6, 12
			Total Characteristic Cost: 115

Movement: Ground: 0"/0"
 Teleportation: 30"/962"
 MegaTeleportation: 1"
 Extra-Dimensional Movement

Abilities & Equipment

Cost	Power	END
160	<i>Bigger Inside Than Outside:</i> +16 Size, Invisible Power Effects (Fully Invisible from the outside; +1)	0
77	<i>Chronoportation Matrix:</i> Extra-Dimensional Movement (any physical location, any date up to 50 Billion years in the future or the past)	0
80	<i>Spatial Transporter Matrix:</i> Multipower, 80-point reserve	
8u	1) <i>Nearspace Transport:</i> Teleportation 30", x32 Noncombat	0
2u	2) <i>Farspace Transport:</i> Teleportation 1", MegaScale (anywhere within Reality, can scale back to 1" = 1 km; +10¼)	0
40	<i>Disguise Mode:</i> Shape Shift (Sight, Hearing, Touch, Radio, and Smell/Taste Groups, four predefined shapes [see text]), Reduced Endurance (0 END; +½)	0

Skills

55	<i>Bigger Inside Than Outside:</i> +11 DCV	
43	<i>Locked Up Tight:</i> Lockpicking 30-	0

Total Abilities & Equipment Cost: 465

Total Vehicle Cost: 580

Value Disadvantages

None (or to be chosen by players)

Total Disadvantage Points: 0

Total Cost: 580/5 = 116

Description: The Wardens of Time, a mysterious, secretive race of aliens who claim to be "charged with responsibility for preserving all Time and Space," developed these vehicles uncounted years ago to allow them to "patrol" Reality more easily. A Chronoportation Box allows its pilot to travel wherever he wants throughout both space and



time; one minute he's on Earth in the year 1809 A.D. to see Abraham Lincoln born; the next he's on Rigel VII in 21344 A.D. to prevent a renegade scientist from overthrowing the Rigellian government. (Note: The Box makes use of the expanded rules for time travel on pages 233-35 of *Star Hero*.)

Thanks to the Wardens' ultra-advanced mastery of dimensional engineering, Chronoportation Boxes are much larger on the inside than they look from the outside. They're just as heavy and sturdy as a vehicle of Size 20 (they have -20 Knockback, 110 STR, and 30 BODY), but remain as hard to hit in combat as a Size 4 craft (thanks to their DCV Levels).

In its ordinary form, a Chronoportation Box looks like a large, multi-faceted, iridescent obelisk. Since this would tend to make the Box "stick out" in most times and places, it has a limited ability to alter its exterior form to any of four other shapes: a large rock; a statue; a dense thicket of plants and small trees; and a small building.



6 AND I'LL FORM THE HEAD: MECHA

Although previous chapters discuss both ground vehicles and vehicles from science fiction, a specific type of science fiction ground vehicle — the mech — deserves a chapter of its own due to its place of prominence in many gaming campaigns. A mech (plural, mecha) is

an enormous vehicle, usually humanoid, equipped not only with legs and arms but all sorts of powerful weaponry. Built primarily as combat vehicles, they stride across crater-scarred battlefields on dozens of alien worlds, looking for enemy mecha to destroy. This chapter discusses the different types of mecha and how to build them, and provides four examples to get you started.

MECHA BASICS



Mecha are ground vehicles, so you may wish to consider some of the issues and rules discussed in Chapter Two when building one. However, mecha also differ from standard ground vehicles in some significant ways (including the fact that a mech's "Length" is actually its height).

MECH TYPES

Though there are nearly as many types of mecha as there are writers (and gamers) who create them, most fall into a few specific categories.

Humanoid: The most familiar and common type of mech has a humanoid form — a torso, two legs, two arms (sometimes more), and a "head." In essence it's a gigantic combat robot requiring an operator (who usually sits in a cockpit in the "head" or "chest").

Bestial: Built to resemble an animal of some sort, this type of mech could look like a gigantic mechanical dog, lion, bear, praying mantis, or even squirrel. It generally gets around on four legs (or more, if the animal it resembles has more), giving it greater stability than a Humanoid or Ostrich mech. Bestial mecha don't normally have arms (unless their beast form is simian), but may have some other means of manipulation — jaws, a tongue, or even a telekinesis projector.

MECHA LIMBS TABLE

Mech's Height (hexes)	Recommended Ground Movement	Reach
1	+0"	0"
1.25	+1-2"	1"
1.6	+3-4"	1"
2	+5-6"	1"
2.5	+7-8"	2"
3.2	+9-10"	2"
4	+11-12"	2"
5	+13-14"	4"
6.4	+15-16"	4"
8	+17-18"	4"
10	+19-20"	8"
12.5	+21-22"	8"
16	+23-24"	8"
20	+25-26"	16"
25	+27-28"	16"
32	+29-30"	16"
40	+31-32"	32"
50	+33-34"	32"
64	+35-36"	32"

...and so on.

Ostrich: Some mecha are two-legged, but lack arms; they usually have spherical or ovoid torsos. The operator rides in the torso, which is usually bristling with weapons and sensors. The legs, like those of a real bird, are usually jointed to bend backwards, and designed for speed rather than energy-efficiency.

Hybrid: The "hybrid mech" is a combination of a mech and another type of vehicle. For example, a vehicle might get around on tracks like a tank, but have an upright torso and arms like a Humanoid mech.

Multiformer: In some settings, mecha can change their exterior configuration between different types of mecha, or even different types of Vehicles. In fiction, most mecha with this ability have a Humanoid mech as at least one form. See below for more information about shape-altering mecha.

MECH MOVEMENT

Mecha use Ground Movement as their primary mode of movement. Since they usually have legs (see below), their Ground Movement is more like a normal character's Running than any other type of vehicular movement. It should include the *No Turn Mode (+¼)* Advantage, and it allows a mecha to move more or less as a character would — it can climb up many types of steep terrain, step over many obstacles, and so forth. Therefore it does not qualify for an *Only On Appropriate Terrain* Limitation. However, Fuel Charges is usually appropriate; mecha need engines to power their legs, and their engines need fuel.

A mecha's inches of Ground Movement depend on two things: its size and the speed with which it can move its legs. The Mecha Limbs Table lists the recommended amounts of Ground Movement for a mech based on its height; the speed of the legs varies from design to design.

Additionally, some mecha have other modes of movement. Many can Leap, though as Vehicles they get no inches of Leaping from their STR. Typically this represents either powerful "leg servos," or "jumpjets" built into the mech's "feet." A smaller number of mecha can actually fly, though this is more common in mecha that can alter their shape into aircraft.

LIMBS

Unlike other vehicles, mecha have limbs — legs, at the very least, and often arms as well. These

are simulated by taking the Power Extra Limbs for the mech. Most mecha have two legs and two arms, but they can have more if appropriate. The legs are, of course, how they move around (see above).

Mecha arms come in two basic types: manipulatory and non-manipulatory. Non-manipulatory arms serve as nothing more than weapons platforms, with blasters, rocket launchers, and many other types of weapons mounted to them. Manipulatory limbs have actual hands, which the mech uses to wield gigantic swords and other such weapons. Some Multiformer mecha can switch from one type of limb to another.

Of course, a mech's ability to manipulate objects with its hands depends partly on its size. Mecha's Extra Limbs should take the *Limited Manipulation* Limitation — a mech with metal hands large enough to cover the hood of a car usually has trouble trying to type on a human-sized keyboard! Some mecha even buy an *Area Of Effect Advantage* for their STR to represent their enormous hands; typically a One Hex area starting at 32" of height is appropriate. (See the character Gargantua, on pages 152-53 of *Conquerors, Killers, And Crooks*, for an example of this.)

A mech with arms automatically has a certain amount of reach based on its Size (height), as indicated by the Mech Limbs Table; it does not have to pay Character Points for this. A mech's reach does not affect the Range Modifier for its attacks, which you should still calculate from where the mech is standing.

MECH SKILLS

Because of their humanoid shape, most mecha can take Skills that other Vehicles cannot. For example, Acrobatics, Breakfall, and Martial Arts are all appropriate for mecha, unless the GM forbids them for some reason. Gamemasters may want to be careful about allowing a mech to take Martial Arts, though, since most of them are already quite strong and dangerous. At the very least, the GM may want to limit mecha to using their Martial Arts only against other mecha, or opponents of similar size (buildings, giant mutant dinosaurs, and the like).

OPERATING SKILLS

Typically, a character uses Combat Driving to operate a mech in crisis conditions. Combat Piloting is appropriate for mecha which can fly, but only when they're actually in flight.

For purposes of Transport Familiarity, mecha typically break down into three categories — Anthropomorphic (Humanoid and Ostrich mecha), Beast-Shaped (Bestial), and Hybrid/Shapeshifting (Hybrid and Multiformer). However, GMs in mech-oriented campaigns may want to devise much more elaborate TF schemes, if for no other reason than to differentiate characters a little.

MECH EQUIPMENT AND SYSTEMS

Besides limbs and various standard types of vehicular equipment (an engine, radar, weapons, and the like; see Chapter Seven), mecha have several unique or unusual systems. These include:

COMMUNICATIONS AND SENSORS

Mecha typically have Sensor & Communications Variable Power Pools, such as those described on page 159 for space vehicles. Less technologically advanced mecha may simply have to make do with a few select Senses (typically HRRP and Radar, possibly with MegaScale or Improved Maximum Range for the Transmit function).

COOLING SYSTEMS

In some settings, mecha have such powerful engines and weapons that overheating becomes a significant problem. Mech builders have to install cooling systems to keep their vehicles functioning properly. If a cooling system stops functioning for some reason, the mech overheats and begins to malfunction; eventually it stops operating altogether.

To simulate this in *Hero System* terms, you need two things. First, you need an engine or power plant defined as an Endurance Reserve. Typically, the Reserve is bought at such a level that the mech can operate in "patrol mode" (moving quickly but using few powered weapons) without any difficulty, but once it starts firing a lot of weapons, it quickly starts to use up power at a faster rate than it can easily replenish. The END in the Reserve represents not only the strength of the mech's engine, but the efficiency of its cooling systems; the less END it has, the more strain the cooling systems suffer, and the greater the negative effect of the heat the mech produces.

Second, the mech takes a *Dependence Disadvantage* on its cooling system: it's Dependent on keeping its Reserve's END at reasonably "full" levels. The Dependent substance is usually Very Common/Easy To Obtain (cooling fluids and lubricants), the mech suffers an Activation Roll 11- on its powers when the END in the Reserve reaches 25% or less of its maximum, and the mech suffers the effect every Phase it doesn't have the "substance." Thus, the value of the Disadvantage is usually 35 points.

Gamemasters may, if they wish, make the Dependence a little less rigid. Instead of a flat 11- Activation Roll at less than 25% power, perhaps at 40% power the mech gains an Activation Roll 14-. For every 5% below that, the roll decreases by 1 point (so that a mech at, say, 15% power has a 9- Activation Roll). At some point, the heat may become so overwhelming the mech suffers additional effects, such as damage or Incompetence.

A *Cooling System Dependence* is only appropriate if the mech actually stands a decent chance of spending so much END it will suffer heat problems on a relatively frequent basis. This may mean the mech should build all its weapons

so they cost END instead of using Charges. If the mech doesn't suffer Dependence-related problems often, the GM may reduce the value of the Limitation (to 0, if necessary).

LIFE SUPPORT

Thanks to the prevalence of nuclear, biological, and chemical weapons on the battlefields mecha fight on, most of them provide Life Support for their operators. In lower-tech settings, the operator may have to use his own personal breathing gear and survival suit instead.

SHAPE ALTERATION

In many mecha-oriented worlds, some or all types of mecha can change their form (in fact, sometimes this ability practically defines the setting). Referred to as “transforming,” “mechamorphing,” “reconfiguring,” or the like, this ability may be required for all mecha, secret technology only a few of them possess, or forbidden by the GM.

Typically, a shape-altering mech can change from one mech form to another (perhaps to alter its offensive or defensive capabilities), or from mech form to the form of another type of vehicle (often a jetfighter or the like). Most mecha have no more than two (or maybe three) forms, and usually the standard humanoid form counts as the true form. The cost for the alternate forms depends on their total cost, not their cost divided by 5.

A mech's alternate forms cannot be larger than it is, and typically cannot be more than three Size categories smaller. The GM may allow more “shrinking” than this if it seems appropriate and won't unbalance the game. Typically the Vehicle's STR, DEX, BODY, and SPD remain the same from form to form (and DEF rarely changes), unless the change in shape is radical.

If possible, a player creating a shape-altering mech should try to establish relationships between the major parts of each form. For example, if a humanoid mech can change into a helicopter form, the helicopter's rotor could become a sword in the humanoid form, while the rocket boosters that allow the humanoid mech to leap great distances become blasters for the helicopter. This has no particular game effect — it's just fun — but the GM may want to keep track of damage to a mech's systems and use that to determine how the damage carries over when the mech changes form. If the humanoid mech's jumpjets are reduced to half power by damage, then the helicopter form's blasters may only have half effect, too — after all, that's the system that took damage in the other form.

Shape-altering mecha should not take the *Instant Change Adder*. In fact, the *Extra Time* Limitation is often appropriate; so is *Concentration*.

COMBINING

Some types of mecha have the ability to merge, combining themselves into one much larger form with proportionately greater abilities. While this helps the good guys beat the bad guys, it can also serve to unbalance the campaign unless the GM handles it carefully.

In *Hero System* terms, you can define “combining” in several different ways, each with its own benefits and drawbacks. The GM should select the one best suited to his campaign and require all combining mechs to use that method (though some games may feature multiple methods). For purposes of this discussion, the smaller Vehicles that join together are the “component” Vehicles, and the larger vehicle they create when they combine is the “lead” Vehicle.

Duplication

You can use the *Duplication* Power to represent combining if you think of the component Vehicles as Duplicates and the lead Vehicle as the “original character.” The lead Vehicle is built the same as the component Vehicles, but has some additional abilities. Either it has extra points in powers as described under *Pooled Resources*, below, or it buys a *Multiform* with the Limitation that it can only “change shape” when no Duplicates exist. (Of course, with the latter method, no actual shape alteration takes place, though the combined Vehicle is larger than any single component; the *Multiform* is simply a way of representing the fact that the joined Vehicle is “greater than the sum of its parts” and thus has different [more powerful] abilities.)

In most cases, the component Vehicles (the Duplicates) are just junior versions of the lead Vehicle — they have the same abilities (or most of them), but at a lesser level of power — so they don't need the *Altered Duplicates Advantage*. If each component Vehicle has markedly different powers from the lead Vehicle, you need to apply that Advantage to the Duplication. At the GM's option, characters can apply other Duplication-specific Adders and Power Modifiers (such as *Easy Recommendation*), if appropriate.

The benefit to this method is that it's relatively easy to define and note on the character sheet. The drawback is that since the number of points on which a Duplicate is built is defined by the points the original form spends on the power, you can't improve the component Vehicles until more points are spent on the lead Vehicle to increase the points devoted to Duplication.

Multiform

In some campaigns, the GM may want to define combining with *Multiform*. Each of the component Vehicles is a true form which defines the lead Vehicle as its alternate form, and each of them take the Limitation, *Only When All Component Vehicles Are Present* (-1), on the *Multiform* power.

Instead of each component Vehicle paying for the entire cost of the *Multiform* itself, the GM may allow it to pay for only its proportional share of the lead Vehicle. For example, if five 200-point Vehicles combine to form one gigantic 600-point Vehicle with *Multiform*, then each of the five would be responsible for (600/5) 120 points' worth of the ability (before dividing by 5 or applying Limitations). But even if the GM allows proportional costing, all component Vehicles must be present and in good working order to form the lead Vehicle.

RESTRICTIONS ON COMBINING

In anime and other fictional representations of combining, forming the lead Vehicle is not a casual act, or something the characters do every time they go into combat. Instead, it's sort of a last-ditch strategy, something that typically takes place at the climax of the story, or during the final encounter with the bad guys. The lead Vehicle is so powerful the writers of these shows don't want to use it too soon, or it will spoil the story.

Unfortunately, gamers rarely show the same amount of restraint. Given access to a powerful weapon like a lead Vehicle, they're likely to want to use it in every single battle... and realistically, it's hard to tell them not to if there's no restriction on combining. Therefore, a GM who wants to keep combining a rare event, and who can't simply appeal to his players' better nature, has to restrict it using the rules. For example, you could:

- require combining powers to take a 1 Continuing Charge Limitation, with the Charge lasting for no more than a Minute.
- make combining take so much *Extra Time*, and *Concentration*, that characters will be reluctant to use it frequently.
- require the lead Vehicle to take a Physical Limitation, *Unstable*, that forces the component Vehicles' operators to spend a Half

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Phase to make Combat Driving rolls every Phase to keep it from coming apart.

Depending on the nature of combining and the technology available in the campaign, many other possibilities for restricting combining may exist.

For this type of combining, if one of the component Vehicles already has a Multiform for some reason, it cannot buy the combining Multiform with the usual “+5 Character Points doubles the number of forms” method. Instead, it must buy the combining Multiform separately, as a distinct power.

The benefit to this method is that each component Vehicle can be changed or improved on its own. The only restriction is that none of the components can change the points spent on Multiform separately; if the components want to make the lead Vehicle better, they must all “upgrade” their Multiform power at the same time.

Pooled Resources

With a “pooled resources” option, “combining into one bigger vehicle” is defined as the special effect for the enhancement of various powers and abilities possessed by the component Vehicles. The component Vehicles define what they want the lead Vehicle to be able to do, then they parcel that ability among themselves in some way, applying the Usable On Others Advantage so that they can add them together. When they “join together,” the components operate as if they’re a single unit; they don’t fly off in different directions, for example.

For example, suppose the component vehicles want the lead Vehicle to have a Mega-Laser Blast that does RKA 8d6. Four of them buy an RKA 3d6; one — the component responsible for controlling the Mega-Laser Blast — buys an RKA 4d6. The other four also buy RKA +1d6, Usable By Other (+¼), Must Remain Joined To Primary Component (-2). (A GM who wanted to encourage this might even allow the components to dispense with Usable By Other.) That way, when all the components join together, the component responsible for controlling the Mega-Laser Blast can project the desired 8d6 attack.

The possibilities for building pooled resource abilities are practically limitless. The lead Vehicle could have better Characteristics (sort of like an Aid Array from page 119 of *The Ultimate Martial Artist*), stronger attacks, faster modes of movement, or improved defenses. It might even have some abilities that none of the component Vehicles could use individually. Some systems might work one way on a component Vehicle, but differently as part of the lead Vehicle. For example, the components’ blasters might be defined as Energy Blasts, but when they combine they become powerful enough to be RKAs; you can simulate this by constructing these systems as Multipowers.

The benefits to this method are twofold. First, it doesn’t require all the components to be present, it just means fewer components have less power when joined — if only three are available in the above example, they can project just an RKA 6d6. However, the component responsible for controlling any given system (the one with the RKA 4d6 in the above example) does have to be present for that system to function. At the GM’s option, you can change the *Must Remain Joined To Primary Component* Limitation to *Must Remain Joined To Another*

Component (-1), meaning that any component could add his extra effect to any other component. Second, as with Multiform, each component Vehicle can be changed or improved on its own.

Vehicles Bought By The Lead Vehicle

With the GM’s permission, you can simulate combining by building the lead Vehicle normally, then having it buy the components as subordinate Vehicles (see the *Vehicles Perk* on page 20). It would take a Physical Limitation representing the fact that its powers would diminish, and eventually become completely unusable, as it “released” component Vehicles or separated into all of its parts (and that, if it’s destroyed, so are all the components). When all components are separated, the lead Vehicle would effectively cease to exist; it couldn’t be attacked, moved, or the like. This is similar to the Pooled Resources option, above.

General Guidelines

Regardless of how you define combining, a few general guidelines apply.

First, when component Vehicles combine to create a lead Vehicle, you can consider each component (and its operator) a “crewmember” of the lead Vehicle. If you’re using the “Complex Vehicle Actions” method of Vehicle combat (page 172), then each component could make attacks or perform other Actions in combat — it just can’t split off and act on its own, separately from the greater whole.

Second, except in particularly fantastic campaigns, the mass of the lead Vehicle should be as close as possible to the combined mass of the component Vehicles, and the Characteristics, powers, and abilities of the lead Vehicle should relate to, and often be proportional to, the powers and abilities of the component Vehicles. Typically, either the lead Vehicle splits its overall power up more or less equally among all its components, or each major system is “given” to a particular component. Sometimes it’s a bit of both, with one component getting the lion’s share of a particular ability, and the other components getting lesser versions of that same ability.

Third, if the components each have Computers, the lead Vehicle should have one as well. As a rule of thumb, the lead Vehicle’s Computer should have a base INT (and, if appropriate, EGO) equal to the highest INT among its components’ Computers, with +3-5 INT (and EGO) for each component after the first.

Fourth, the GM may want the act of combining (or splitting apart) to take some time and effort. If the ability is built with a single Power, you can represent this by applying Limitations such as *Extra Time* or *Concentration*; if it involves multiple powers, a Physical Limitation may work better for this purpose.

Fifth, special rules or guidelines may apply when component Vehicles, or the lead Vehicle, suffer damage in combat. See page 216.

SAMPLE MECHA



The rest of this chapter contains four sample mecha, including one that can alter its shape and one that can combine, both as a resource for players and GMs and as examples if you want something to review before building your own mecha.

M78 “BLACK SCORPION” MECH

Val	Char	Cost	Notes
10	Size	50	10" x 5"; -10 KB; -6 DCV
60	STR	0	Lift 100 tons; 12d6 HTH [0]
20	DEX	30	OCV: 7/DCV: 7
25	BODY	5	
18	DEF	48	
4	SPD	10	Phases: 3, 6, 9, 12
			Total Characteristic Cost: 143

Movement: Ground: 26"/52"

Abilities & Equipment

Cost	Power	END
Power Systems		
29	<i>Power Plant:</i> Endurance Reserve (60 END, 60 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0
5	<i>Auxiliary Power:</i> Endurance Reserve (10 END, 10 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0
Propulsion Systems		
4	<i>Mech Limbs:</i> Extra Limbs (5 — two legs, two arms, tail); Limited Manipulation (-¼)	0
23	<i>Mech Limbs:</i> Running +20" (26" total); Costs Endurance (-½), No Turn Mode (-¼)	4
Tactical Systems		
78	<i>Chain Gun:</i> RKA 3d6, Armor Piercing (+½), Autofire (10 shots; +1), 250 Charges (+1); OIF Bulky (-1)	[250]
54	<i>Flamegun:</i> RKA 3d6, Area Of Effect (9" Cone; +1), Armor Piercing (+½), 64 Charges (+½); OIF Bulky (-1), No Range (-½)	[64]
67	<i>Tail Grenade Launcher:</i> RKA 2d6, Area Of Effect (One Hex; +½), Armor Piercing (+½), Autofire (5 shots; +1½), 250 Charges (+1); OIF Bulky (-1)	[250]
45	<i>Rocket-Launched Bombs Pod:</i> RKA 3d6, Explosion (-1 DC/2"; +¾), Indirect (can arc attack over intervening obstacles; +¼); OIF Bulky (-1), 16 Charges (-0)	[16]
5	<i>Polarized Viewscreen:</i> Sight Group Flash Defense (10 points); Only Protects Versus Exterior Flashes Against Interior Personnel (-1)	0

Operations Systems		
15	<i>Mech Sensors:</i> Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+12 versus Range Modifier); OIF Bulky (-1), Costs Endurance (-½)	4
2	<i>Nightsight System:</i> Infrared Perception (Sight Group); OIF Bulky (-1), Costs Endurance (-½)	1
2	<i>Nightsight System:</i> Ultraviolet Perception (Sight Group); OIF Bulky (-1), Costs Endurance (-½)	1
4	<i>360 View System:</i> Increased Arc Of Perception (360 Degrees) for Sight Group; OIF Bulky (-1), Costs Endurance (-½)	1
4	<i>Mech Communications System:</i> HRRP; OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½), Costs Endurance (-½)	1

Personnel Systems		
6	<i>Ejection Seat:</i> Telekinesis (26 STR); OIF Bulky (-1), Affects Whole Object (-¼), No Range (-½), Only To Throw Target Straight Up (-2), 1 Recoverable Charge (-1¼)	[1rc]
11	<i>Life Support:</i> Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat); Costs Endurance (-½)	2

Skills		
6	<i>Tactical Computer:</i> +3 with Mech Weapons; OIF Bulky (-1), Costs Endurance (-½)	1

Total Abilities & Equipment Cost: 347

Total Vehicle Cost: 490

Value Disadvantages

None (or to be chosen by the player)

Total Disadvantage Points: 0

Total Cost: 490/5 = 98

Description: Sleek, fast, and deadly, the M78 Black Scorpion is a common sight on the battlefield, easily distinguished from other mecha because of its tail-like fifth limb. The tail is normally positioned above the left shoulder so it can function as a grenade launcher, but it's also useful in HTH Combat. Besides the grenade launcher, the M78 comes equipped with a chain gun firing APFSDS ammunition, a flamegun, and a right shoulder-mounted rocket pod.

A Black Scorpion's operator sits in a cockpit located just below the mech's "head." The cockpit

has a bulletproof glass screen in front of it, allowing the operator to see the battlefield with his own eyes in addition to his instruments (the screen is polarized to protect him from blinding glare). The cockpit is hermetically sealed, has its own air supply, and comes equipped with an ejection seat in the event of an emergency.

M1012-J PANTHAMECH

Val	Char	Cost	Notes
11	Size	55	12.5" x 6.4"; -11 KB; -7 DCV
60	STR	-5	Lift 100 tons; 12d6 HTH [0]
20	DEX	30	OCV: 7/DCV: 7
30	BODY	9	
15	DEF	39	
4	SPD	10	Phases: 3, 6, 9, 12
			Total Characteristic Cost: 138

Movement: Ground: 28"/56"
Leaping: 20"/40"

Abilities & Equipment

Cost	Power	END
Power Systems		
20	<i>Power Plant:</i> Endurance Reserve (60 END, 40 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0
5	<i>Auxiliary Power:</i> Endurance Reserve (10 END, 10 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0
Propulsion Systems		
4	<i>Mech Limbs:</i> Extra Limbs (4 — four legs); Limited Manipulation (-¼)	0
25	<i>Mech Limbs:</i> Running +22" (28" total); <i>Costs Endurance</i> (-½), No Turn Mode (-¼)	4
13	<i>Leaping Servos:</i> Leaping 20" (20" total); <i>Costs Endurance</i> (-½)	2
Tactical Systems		
67	<i>Jaws:</i> HKA 3d6 (5 ½d6 with STR), Armor Piercing (+½)	7
60	<i>Claws:</i> HKA 2d6 (4d6 with STR), Armor Piercing (x2; +1)	6
37	<i>Eye Laserbeams:</i> RKA 4d6, Increased Maximum Range (1,500"; +¼); OIF Bulky (-1)	7
5	<i>Hardened Sensor/Commo Systems:</i> Radio Group Flash Defense (10 points); OIF Bulky (-1)	0
Operations Systems		
15	<i>Mech Sensors:</i> Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+12 versus Range Modifier); OIF Bulky (-1), <i>Costs Endurance</i> (-½)	4
2	<i>Nightsight System:</i> Infrared Perception (Sight Group); OIF Bulky (-1), <i>Costs Endurance</i> (-½)	1
2	<i>Nightsight System:</i> Ultraviolet Perception (Sight Group); OIF Bulky (-1), <i>Costs Endurance</i> (-½)	1
4	<i>360 View System:</i> Increased Arc Of Perception (360 Degrees) for Sight Group;	

	OIF Bulky (-1), <i>Costs Endurance</i> (-½)	1
4	<i>Mech Communications System:</i> HRRP; OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½), <i>Costs Endurance</i> (-½)	1

Personnel Systems

6	<i>Ejection Seat:</i> Telekinesis (26 STR); OIF Bulky (-1), Affects Whole Object (-¼), No Range (-½), Only To Throw Target Straight Up (-2), 1 Recoverable Charge (-1¼) [1rc]	
11	<i>Life Support:</i> Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat); <i>Costs Endurance</i> (-½)	2

Skills

6	<i>Tactical Computer:</i> +3 HTH; OIF Bulky (-1), <i>Costs Endurance</i> (-½)	1
15	Agile: +3 DCV	

Total Abilities & Equipment Cost: 301

Total Vehicle Cost: 439

Value Disadvantages

None (or to be chosen by player)

Total Disadvantage Points: 0

Total Cost: 439/5 = 88

Description: The M1012-J Panthamech is a Bestial mech in the shape of a gigantic hunting cat (though it has no tail). The operator rides in an internal cockpit with no independent view; he can only watch the battlefield through his instruments.

The Panthamech's slashing claws, crushing jaws, and agility make it a fearsome foe in HTH combat, but it's less effective at range — it can only project laser beams from its eyes. Its other weakness is its relatively poor-quality engine; although it's supercharged to provide more power than it otherwise could, it can quickly use up that reserve and find itself starved for power in a long battle.



TRANSMATRON

Val	Char	Cost	Notes
13	Size	65	20" x 10"; -13 KB; -8 DCV
75	STR	0	Lift 800 tons; 15d6 HTH [0]
18	DEX	24	OCV: 6/DCV: 6
35	BODY	12	
15	DEF	39	
4	SPD	12	Phases: 3, 6, 9, 12
Total Characteristic Cost: 152			

Movement: Ground: 32"/64"

Abilities & Equipment

Cost Power END

Power Systems			
44	<i>Power Plant:</i>	Endurance Reserve (90 END, 90 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0
10	<i>Auxiliary Power:</i>	Endurance Reserve (20 END, 20 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0

Propulsion Systems

4	<i>Mech Limbs:</i>	Extra Limbs (4 — two legs, two arms); Limited Manipulation (-¼)	0
30	<i>Mech Limbs:</i>	Running +26" (32" total); <i>Costs Endurance</i> (-½), No Turn Mode (-¼)	5

Tactical Systems

45	<i>Right Palm Blaster:</i>	RKA 6d6; OIF Bulky (-1)	9
5	<i>Left Palm Blaster:</i>	Another Palm Blaster (total of 2)	9
7	<i>Power Blast:</i>	RKA +2d6 (to Right Palm Blaster); OIF Bulky (-1), Increased Endurance Cost (x5 END; -2)	15
24	<i>Shoulder-Mounted Rockets (Right Shoulder):</i>	RKA 3d6, Armor Piercing (+½), Explosion (+½); OIF Bulky (-1), <i>Costs Endurance</i> (-½), 3 Charges (-1¼)	[3]/9
5	<i>Shoulder-Mounted Rockets (Left Shoulder):</i>	Another set of Rockets (total of 2)	[3]/9
10	<i>Force Shield:</i>	Force Field (20 PD/20 ED); OIF Bulky (shield generators; -1), Ablative (-1), <i>Increased Endurance Cost</i> (x3 END; -1)	12

Operations Systems

30	<i>Transmatron Mode Activate!:</i>	Multiform (assume 396-point HTH Combat Form or 276-point Jetfighter Form); <i>Extra Time</i> (takes 1 Turn to change forms; -1¼), <i>Costs Endurance</i> (only to change forms; -½)	8
16	<i>Mech Sensors:</i>	Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+14 versus Range Modifier); OIF Bulky (-1), <i>Costs Endurance</i> (-½)	4
2	<i>Nightsight System:</i>	Infrared Perception (Sight Group); OIF Bulky (-1), <i>Costs Endurance</i> (-½)	1
2	<i>Nightsight System:</i>	Ultraviolet Perception (Sight Group); OIF Bulky (-1), <i>Costs Endurance</i> (-½)	1
4	<i>Mech Communications System:</i>	HRRP;	

OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½), *Costs Endurance* (-½) 1

Personnel Systems

11	<i>Life Support:</i>	Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat); <i>Costs Endurance</i> (-½)	2
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Skills

8	<i>Tactical Computer:</i>	+4 with Mech Weapons; OIF Bulky (-1), <i>Costs Endurance</i> (-½)	1
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Total Abilities & Equipment Cost: 260

Total Vehicle Cost: 409

Value Disadvantages

None (or to be chosen by player)

Total Disadvantage Points: 0

Total Cost: 409/5 = 82

TRANSMATRON — HTH COMBAT FORM

Val	Char	Cost	Notes
13	Size	65	20" x 10"; -13 KB; -8 DCV
75	STR	0	Lift 800 tons; 15d6 HTH [0]
18	DEX	24	OCV: 6/DCV: 6
35	BODY	12	
15	DEF	49	Hardened (+¼)
4	SPD	12	Phases: 3, 6, 9, 12
Total Characteristic Cost: 162			

Movement: Ground: 32"/64"

Abilities & Equipment

Cost Power END

Power Systems			
44	<i>Power Plant:</i>	Endurance Reserve (90 END, 90 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0
10	<i>Auxiliary Power:</i>	Endurance Reserve (20 END, 20 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0

Propulsion Systems

4	<i>Mech Limbs:</i>	Extra Limbs (4 — two legs, two arms); Limited Manipulation (-¼)	0
30	<i>Mech Limbs:</i>	Running +26" (32" total); <i>Costs Endurance</i> (-½), No Turn Mode (-¼)	5

Tactical Systems

75	<i>Chainsword:</i>	HKA 5d6 (7d6+1 with STR), Armor Piercing (+½), Penetrating (+½); OIF Bulky (-1)	15
12	<i>Shield:</i>	+10 DEF, Hardened (+¼); OIF Bulky (-1), Activation Roll 14- (-½), <i>Costs Endurance</i> (-½)	4
10	<i>Force Shield:</i>	Force Field (20 PD/20 ED); OIF Bulky (shield generators; -1), Ablative (-1), <i>Increased Endurance Cost</i> (x3 END; -1)	12

Operations Systems

16	<i>Mech Sensors:</i>	Radar (Radio Group),	
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- Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+14 versus Range Modifier); OIF Bulky (-1), Costs Endurance (-½) 4
- 2 *Nightsight System: Infrared Perception* (Sight Group); OIF Bulky (-1), Costs Endurance (-½) 1
- 2 *Nightsight System: Ultraviolet Perception* (Sight Group); OIF Bulky (-1), Costs Endurance (-½) 1
- 4 *Mech Communications System: HRRP*; OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½), *Costs Endurance* (-½) 1

Personnel Systems

- 11 *Life Support: Life Support* (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat); *Costs Endurance* (-½) 2
- Skills
- 8 *Tactical Computer: +4 HTH*; OIF Bulky (-1), *Costs Endurance* (-½) 1

Total Abilities & Equipment Cost: 228

Total Vehicle Cost: 390

Value Disadvantages

None (or to be chosen by player)

Total Disadvantage Points: 0

Total Cost: 390

TRANSMATRON — JETFIGHTER FORM

Val	Char	Cost	Notes
10	Size	50	10" x 5"; -10 KB; -6 DCV
60	STR	0	Lift 100 tons; 12d6 HTH [0]
23	DEX	39	OCV: 8/DCV: 8
25	BODY	5	
10	DEF	24	
4	SPD	7	Phases: 3, 6, 9, 12

Total Characteristic Cost: 125

Movement: Ground: 6"/12"
Flight: 35"/280"
MegaFlight: 1"

Abilities & Equipment

- | | | |
|-------------|--------------|------------|
| Cost | Power | END |
|-------------|--------------|------------|
- Propulsion Systems**
- 29 *Jet Fighter: Multipower*, 80-point reserve; all Side Effects (-1¼), 1 Continuing Fuel Charge (easily-obtained fuel; 6 Hours; -0) for entire Multipower [1cc]
 - 2u 1) Standard Flight: Flight 35", x8 Non-combat; Side Effects (KA 2d6, 7" Line behind engines, automatically occurs when Flight is in use, only affects environment around vehicle; -1¼), Stall Velocity (17"; -¼), Takeoff/Landing (-1)
 - 1u 2) Mach Speed Flight: Flight 1", MegaScale (1" = 1 km; +¼); Side Effects (KA 2d6, 7" Line behind engines, automatically occurs when Flight is in use, only affects

- environment around vehicle; -1¼)
- 2 *Cannot Swim: Swimming* -2" (0" total)

Tactical Systems

- 30 *Right Wing Blaster: RKA 4d6*; OIF Bulky (-1) 9
- 5 *Left Wing Blaster: Another Wing Blaster* (total of 2) 9
- 28 *Rockets: RKA 3d6*, Armor Piercing (+½), Explosion (+½); OIF Bulky (-1), Costs Endurance (-½), 6 Charges (-¾) [6]/9
- 5 *Force Shield: Force Field* (10 PD/10 ED); OIF Bulky (shield generators; -1), Ablative (-1), *Increased Endurance Cost* (x3 END; -1) 6

Operations Systems

- 16 *Mech Sensors: Radar* (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+14 versus Range Modifier); OIF Bulky (-1), Costs Endurance (-½) 4
- 2 *Nightsight System: Infrared Perception* (Sight Group); OIF Bulky (-1), Costs Endurance (-½) 1
- 2 *Nightsight System: Ultraviolet Perception* (Sight Group); OIF Bulky (-1), Costs Endurance (-½) 1
- 4 *Mech Communications System: HRRP*; OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½), Costs Endurance (-½) 1

Personnel Systems

- 6 *Ejection Seat: Telekinesis* (26 STR); OIF Bulky (-1), Affects Whole Object (-¼), No Range (-½), Only To Throw Target Straight Up (-2), 1 Recoverable Charge (-1¼) [1rc]
- 12 *Life Support: Life Support* (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); *Costs Endurance* (-½) 2

Skills

- 4 *Highly Maneuverable: +2* with Flight
- 8 *Tactical Computer: +4* with Mech Weapons; OIF Bulky (-1), *Costs Endurance* (-½) 1

Total Abilities & Equipment Cost: 152

Total Vehicle Cost: 277

Value Disadvantages

None (or to be chosen by player)

Total Disadvantage Points: 0

Total Cost: 277

Description: The Transmatron is a mech with the ability to alter its form. Its normal form is a humanoid mech armed with a variety of ranged weapons, but it can assume two other shapes: a chainsword-wielding warrior suitable for HTH Combat; and a supersonic jet for fast travel.

SHINING WARRIOR EPSILON

SQUADRON EPSILON HOVERFIGHTER

Val	Char	Cost	Notes
9	Size	45	8" x 4"; -9 KB; -6 DCV
50	STR	-5	Lift 25 tons; 10d6 HTH [0]
24	DEX	42	OCV: 8/DCV: 8
24	BODY	5	
10	DEF	30	Hardened (+¼)
4	SPD	6	Phases: 3, 6, 9, 12
Total Characteristic Cost: 123			

Movement: Ground: 6"/12"
Flight: 30"/120"

Abilities & Equipment

Cost	Power	END
Power Systems		
37	<i>Power Plant:</i> Endurance Reserve (75 END, 75 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0
7	<i>Auxiliary Power:</i> Endurance Reserve (15 END, 15 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0

Propulsion Systems

76	<i>Hoverflight:</i> Flight 30", x4 Noncombat, No Turn Mode (+¼), Sideways Maneuverability (+½); <i>Costs Endurance</i> (-½)	11
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Tactical Systems

30	<i>Dorsal Turreted Blaster:</i> Multipower, 67-point reserve; all OIF Bulky (-1), Limited Arc Of Fire (360 Degrees dorsally; -¼)	
3u	1) Standard Mode: EB 12d6; OIF Bulky (-1), Limited Arc Of Fire (360 Degrees dorsally; -¼)	6
3u	2) Power Mode: RKA 3d6, Armor Piercing (+½); OIF Bulky (-1), Limited Arc Of Fire (360 Degrees dorsally; -¼)	7
5	<i>Ventral Turreted Blaster:</i> Another Turreted Blaster (located ventrally; total of 2)	

Operations Systems

7	<i>Shining Warrior Epsilon:</i> Multiform (assume form of Shining Warrior Epsilon, a 517-point Vehicle [see below], each Hoverfighter pays one-fifth of the cost); Only When All Component Vehicles Are Present (-1), <i>Extra Time</i> (takes 1 Turn to combine; -½), <i>Costs Endurance</i> (only to combine; -½)	2
16	<i>Mech Sensors:</i> Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+14 versus Range Modifier); OIF Bulky (-1), <i>Costs Endurance</i> (-½)	4
2	<i>Nightsight System:</i> Infrared Perception (Sight Group); OIF Bulky (-1), <i>Costs Endurance</i> (-½)	1
2	<i>Nightsight System:</i> Ultraviolet Perception (Sight Group); OIF Bulky (-1), <i>Costs Endurance</i> (-½)	1
4	<i>360 View System:</i> Increased Arc Of Perception (360 Degrees) for Sight Group;	

4	OIF Bulky (-1), <i>Costs Endurance</i> (-½)	1
	<i>Mech Communications System:</i> HRRP;	
	OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½), <i>Costs Endurance</i> (-½)	1

Personnel Systems

6	<i>Ejection Seat:</i> Telekinesis (26 STR); OIF Bulky (-1), Affects Whole Object (-¼), No Range (-½), Only To Throw Target Straight Up (-2), 1 Recoverable Charge (-¼) [1rc]	
12	<i>Life Support:</i> Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); <i>Costs Endurance</i> (-½)	2

Skills

8	<i>Highly Maneuverable:</i> +4 with Flight	
13	<i>Tactical Systems:</i> +4 with Ranged Combat; <i>Costs Endurance</i> (-½)	1

Total Abilities & Equipment Cost: 235

Total Vehicle Cost: 358

Value Disadvantages

None (or to be chosen by player)

Total Disadvantage Points: 0

Total Cost: 359/5 = 72

Cost Additional Vehicles

30	<i>Epsilon Missiles:</i> One Epsilon Missile (use Sparrow, page 131)	
15	<i>Epsilon Missiles:</i> 7 more Epsilon Missiles (total of 8)	

SHINING WARRIOR EPSILON (COMBINED FORM)

Val	Char	Cost	Notes
11	Size	55	12.5" x 6.4"; -11 KB; -7 DCV
65	STR	0	Lift 200 tons; 13d6 HTH [0]
20	DEX	30	OCV: 7/DCV: 7
48	BODY	27	
15	DEF	49	Hardened (+¼)
4	SPD	10	Phases: 3, 6, 9, 12
Total Characteristic Cost: 171			

Movement: Ground: 28"/56"
Flight: 10"/80"

Abilities & Equipment

Cost	Power	END
Power Systems		
49	<i>Power Plant:</i> Endurance Reserve (100 END, 100 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0
10	<i>Auxiliary Power:</i> Endurance Reserve (20 END, 20 REC); OIF Bulky (-1), Only Powers Electrical Devices (-¼)	0

Propulsion Systems

4	<i>Mech Limbs:</i> Extra Limbs (4 — two legs, two arms); Limited Manipulation (-¼)	0
25	<i>Mech Limbs:</i> Running +22" (28" total); <i>Costs Endurance</i> (-½), No Turn Mode (-¼)	4

7 *Bootjets*: Flight 10", x8 Noncombat; Costs Endurance (-½), Increased Endurance Cost (x3 END; -1), Side Effects (KA 2d6, 7" Line behind engines, automatically occurs when Flight is in use, only affects environment around vehicle; -1¼) 9

Tactical Systems

37 *Left Palm Blaster*: Multipower, 75-point reserve; all OIF Bulky (-1)
 4u 1) *Standard Mode*: EB 15d6; OIF Bulky (-1) 7
 4u 2) *Power Mode*: RKA 5d6; OIF Bulky (-1) 7
 5 *Right Palm Blaster*: Another Palm Blaster (total of 2)
 37 *Epsilon Eyebeams*: Telekinesis (50 STR); OIF Bulky (-1) 7
 24 *Blazing Energy Sword*: HKA 4d6 (8d6 with STR); Cannot Use Either Palm Blaster While Using Sword (-½), Increased Endurance Cost (x3 END; -1) 18

Operations Systems

16 *Mech Sensors*: Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+14 versus Range Modifier); OIF Bulky (-1), Costs Endurance (-½) 4
 2 *Nightsight System*: Infrared Perception (Sight Group); OIF Bulky (-1), Costs Endurance (-½) 1
 2 *Nightsight System*: Ultraviolet Perception (Sight Group); OIF Bulky (-1), Costs Endurance (-½) 1
 4 *360 View System*: Increased Arc Of Perception (360 Degrees) for Sight Group; OIF Bulky (-1), Costs Endurance (-½) 1
 4 *Mech Communications System*: HRRP; OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½), Costs Endurance (-½) 1

Personnel Systems

12 *Life Support*: Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); Costs Endurance (-½) 2

Skills

21 *Targeting Systems*: +4 with All Combat; Costs Endurance (-½) 3
 15 *Agile*: +3 DCV

Total Abilities & Equipment Cost: 282

Total Vehicle Cost: 457

Value Disadvantages

None (or to be chosen by player)

Total Disadvantage Points: 0

Total Cost: 457

Cost Additional Vehicles

30 *Epsilon Missiles*: One Epsilon Missile (use Sparrow, page 131)
 30 *Epsilon Missiles*: 39 more Epsilon Missiles (total of 40)

Description: Squadron Epsilon is a team of five bold heroes, each with his own hoverfighter able to attain speeds of about 350 miles per hour. Equipped with powerful blasters and Epsilon Missiles, the Epsilon Hoverfighter is a highly maneuverable fighting craft. However, sometimes even five Epsilon Hoverfighters aren't enough to oppose some of the menaces Squadron Epsilon confronts. In times of extreme crisis, the five of them can join together to form Shining Warrior Epsilon, a larger unified vehicle with even more powerful weapons, including a telekinetic beam and a blazing energy sword. Four of the Hoverfighters form the body and limbs of Shining Warrior Epsilon; the fifth forms the head and acts as lead operator for the vehicle. Although not as swift or agile as the Hoverfighters, Shining Warrior Epsilon more than makes up for the lack with power.



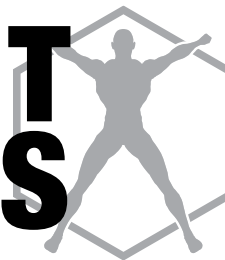
7 POWER EVERYTHING: VEHICLE EQUIPMENT

Vehicles need all sorts of systems and equipment to make them function properly. The most important of these — the movement-related systems — were discussed in earlier chapters. This chapter describes, and provides dozens of examples for, other types of vehicular equipment: weapons, defenses, movement-enhancing devices, sensors, computers, and more. Using this chapter, you can quickly outfit a vehicle

with all sorts of things to improve its performance and make it more fun in game play. If you don't like a system as it's presented, modifying it to suit yourself is an easy matter.

A lot of the equipment in this chapter is oriented toward ground vehicles, which are the most common type seen in most gaming campaigns. Adapting them to other types of vehicles is usually just a matter of altering the special effects and tweaking the write-up a little.

EQUIPMENT RULES



The following rules apply to vehicular equipment in general. As always, GMs should feel free to modify these rules to suit particular campaigns, or situations within a campaign.

VEHICLE DESIGN AND FOCUS

Most equipment aboard a Vehicle is built with the *Focus* Limitation (plus *Bulky*, as usual for vehicular equipment) (see also page 29). If the *Focus* is *Inaccessible*, that means it's not only difficult to move, but difficult to disable — just shutting it off at one point on the Vehicle isn't necessarily going to stop it from functioning throughout the Vehicle, because the Vehicle has backup systems or some other method of maintaining that system even if a particular part of the Vehicle gets damaged or disabled. It takes 1 Turn of effort to disable/break such a system throughout the Vehicle. Typically the Vehicle's DEF protects the system, but this may depend on special effects, the type of attack used, and so forth.

An Accessible vehicle system also probably isn't easy to move (though it may be, depending upon the nature of technology in the setting). However, it's easy to deprive the Vehicle (and its crew) of the use of that system, whether by reprogramming it, damaging it, or some other method. Depending on special effects and the circumstances, the system may or may not be protected by the Vehicle's DEF. For example, a radio inside a car may be easy to remove or destroy when you're in the car (making it Accessible), but would still get the benefit of the Vehicle's DEF against attacks from outside the car.

Unless the GM prefers otherwise, Vehicle equipment uses the standard rules for Durability (*Hero System 5th Edition, Revised*, pages 293-94) to determine whether a particular attack stops a *Focus* from functioning. At the GM's option, characters may define a particular system as *Unbreakable*, with the special effect being not that it's totally undamageable, but that it's so diffused throughout the Vehicle, has so many backup systems, or is otherwise so protected that only massive amounts of damage to the Vehicle as a whole can destroy or disable it. (See also page 188.)

Vehicle systems built without *Focus* are usually so diffuse (as described above), or so intrinsically a part of the Vehicle, that they don't qualify for the Limitation — characters cannot normally destroy or disable them without doing the same to the entire Vehicle. A Vehicle's *Movement* is the

most common example. But don't forget the special effects involved; even without a *Focus* Limitation on a system, an invader or crazed crewmember may be able to damage or disable a system by attacking its access panels, causing it to overload, or the like.

USE OF VEHICULAR EQUIPMENT

When a Vehicle buys equipment, you must consider whether that equipment can be used just by the Vehicle itself, just by the operator (and/or occupants) of the Vehicle, or by both. This issue arises primarily in campaigns using the *Complex Vehicle Actions* rules (page 172), since the *Simple* method considers the Vehicle and occupants as a single unit able to take just one action.

In most cases, a Vehicle's equipment is intended for the use of the operator and/or occupants, even though it's bought as part of the Vehicle. For example, a Vehicle's inherent Skill Levels with movement, its radio, and its artificial gravity field are all meaningless to it (unless it can operate itself somehow) — they can only be used by the people in the Vehicle. This is a natural and automatic function of vehicular equipment; it does not require the *Usable On Others* Advantage, even if the equipment could be used by multiple characters at once.

For some types of equipment, the Vehicle's designer, perhaps with help from the GM, needs to decide whether only one operator/occupant can use a piece of equipment at any given time, or multiple characters can use it (or, more appropriately in some situations, take advantage of the benefits it provides). For most types of equipment, the answer is fairly obvious based on common sense. If a Vehicle only has a single radio, then only one character at a time can use it; if it has *Movement* Skill Levels, then only the operator can decide whether to use them (and how). In other cases, a ruling from the GM may be required.

In some cases, a Vehicle's equipment only affects its operator/occupants, never the Vehicle itself. For example, a Vehicle with *Teleportation* can normally Teleport itself and anyone or anything inside it. But a vehicle might have a *Teleportation Platform* for use by the crew. Obviously, this sort of system does not allow the Vehicle itself to Teleport. In most cases GMs can control this situation through the simple application of common sense, but if necessary, they may require Vehicle designers to apply a -0 Limitation, *Only Affects*

Passengers/Crew, to any such equipment.

AREA-AFFECTING ABILITIES

Some Vehicle powers or abilities are designed to affect the entire Vehicle and/or its crew. The main examples are life support systems (Life Support) and artificial gravity (Telekinesis). In this case, the Vehicle buys the appropriate Power for itself, and the ability then applies within the entire Vehicle automatically — the Area Of Effect Advantage is not required. (The GM may, of course, make exceptions to this in the interest of preserving game balance; for example, an Aid that affects everyone on a large starship should probably have Area Of Effect.)

However, in the case of Powers with inherent area-affecting aspects (such as Change Environment, Darkness, and Images), if a Vehicle wants the Power to affect the entire Vehicle, it must buy it to a sufficient size to cover the Vehicle's largest dimension (typically Length), with the Limitations *No Range* (-½) and *Self Only* (-½), if appropriate. In this case, the Power remains confined to the Vehicle; the area does not expand outside the Vehicle to fill its normal radius. Also unlike normal area-affecting Powers, in this case the area of effect moves with the Vehicle at all times.

Example: *The Shadow*, a scout/spy starship of Size 6 (4" x 2"), wants to have a hull built and shaped to make the Vehicle harder to detect with sensors. It buys this as *Change Environment* to impose penalties to the *Radio Sense Group*, with the *No Range* and *Self Only* Limitations. It must buy the *Change Environment* to cover a 4" radius area (since 4" is its longest dimension), but that does not mean it has a 1" area of *Change Environment* to either side — the effect remains confined to the 4" x 2" Vehicle. The *Change Environment* effect moves with it at all times.

If the Vehicle wants an inherently area-affecting Power that doesn't apply to the entire Vehicle (such as a small *Change Environment* affect to make one room colder than normal), it just buys the Power to affect an area smaller than the entire Vehicle; typically it cannot take a *Partial Coverage* Limitation for the Power. This sort of area of effect likewise moves with the Vehicle as it moves.

DEFENSES VERSUS EXTERIOR EFFECTS

Some Vehicle equipment is designed not to protect the Vehicle itself, but to protect the operator/occupants against external phenomena. A polarized windshield is the best example; it provides



Sight Group Flash Defense for any Vehicle occupant against a Sight Group Flash originating outside the Vehicle... but it has no effect against a Sight Group Flash used within the Vehicle. You can represent this by applying a Limitation, *Only Protects Versus Exterior [Effect] Against Interior Personnel* (-1), to the Defense Power (or, if appropriate, other powers).

If a Defense Power doesn't have that Limitation, or a similar one, typically it applies throughout the Vehicle. For example, if a Vehicle provides Mental Defense, and one character inside the Vehicle attacks another with an Ego Attack, the Mental Defense protects the target, even if there's no obstacle or wall between him and his attacker. If appropriate, the GM should apply common sense, dramatic sense, and considerations of game balance when adjudicating these situations; even if the Mental Defense supposedly applies throughout the Vehicle, it probably makes no sense to apply it to a victim who's standing right next to his attacker.

REDUNDANT AND BACKUP EQUIPMENT

Vehicles often have multiple "copies" of the same system or piece of equipment. Sometimes this is for safety reasons (as with life support), at other times for convenience.

You can represent redundant or "backup" equipment in several ways. The simplest is to apply the rule from page 456 of the *Hero System 5th Edition, Revised* — for every +5 points, a Vehicle can have up to double the number of a particular piece of equipment. (If the piece of equipment costs less than 5 points, it may be cheaper for the Vehicle to simply buy it multiple times at its regular cost.) The drawback to this is the additional items have to be identical to the original one purchased. Furthermore, the additional points are bought separately from the main power, and Power Modifiers do not apply to them.

At the GM's option, a Vehicle can apply the +5 points method to create redundant systems for things it doesn't ordinarily assign a point cost to. For example, for each +5 points, a Vehicle could have

up to double its standard number of control systems — that way, if one driver or pilot becomes incapacitated, another can easily operate the Vehicle without having to switch places or the like.

Second, a Vehicle can buy extra BODY for a system with the *Partial Coverage* Limitation. The special effect in this case is that the extra BODY represents a reserve or backup system that activates as soon as the original system is destroyed.

Third, a Vehicle can simply buy multiple versions of the same type of system. This is often done with, for example, power systems (Endurance Reserve). Vehicles using this method sometimes apply a *Trigger* Advantage to the secondary system, so that it activates automatically when a certain condition (typically the destruction or failure of the first system) occurs.

An additional benefit to the first and third methods is that they make more “spare parts” available for repairs. A Vehicle that has just one Laser Cannon is in trouble if the Cannon’s destroyed. But if a Vehicle has four Laser Cannons, each one badly damaged, a character with the right Skills and enough time may be able to take parts from all of them to build one or two functioning Cannons.

EQUIPMENT MASS AND VOLUME

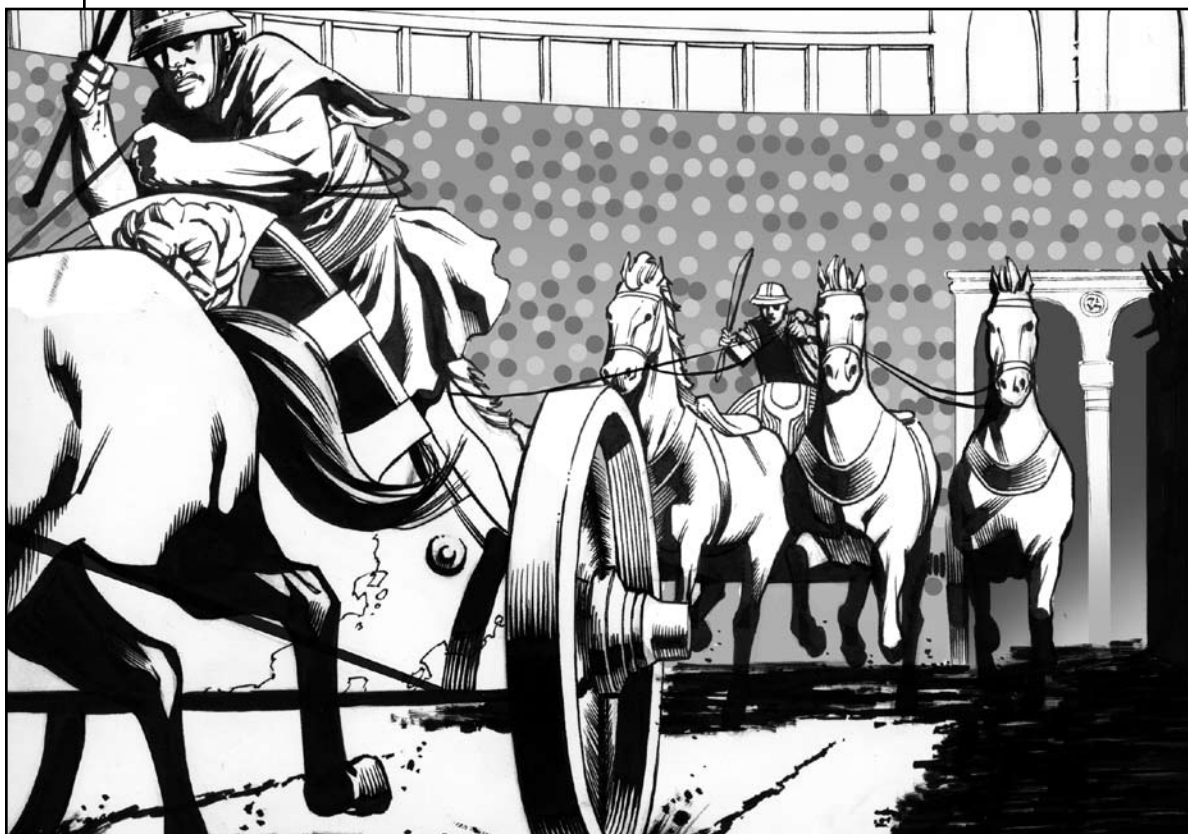
The *Hero System* rules make no provision for the mass or volume of equipment (vehicular or otherwise). In some genres or settings, the engine for a Vehicle may occupy half of the Vehicle’s interior space; in others, it takes up a single hex. This is all just a matter of dramatic realism within the context

of a game; it doesn’t involve any Advantages, Limitations, or other game elements. As long as a character’s equipment isn’t so “unrealistic” as to make the GM cry foul, everything’s fine.

However, some gamers want more precision than that. In that case, it’s up to the GM to devise a reasonable set of rules for calculating the mass and volume of equipment, based on the technological standards of his campaign. Many such rules use the Active Points the system is built with as a starting point. For example, perhaps you decide that weapons, defenses, propulsion systems, and power systems all have a mass of 2 kg per Active Point and a volume of .5 cubic hexes per 5 Active Points. On the other hand, sensors, communications systems, miscellaneous electronic devices, and the like have a mass of 1 kg per 5 Active Points, and a volume of .2 cubic hexes per 5 Active Points.

Since Advantages often represent more advanced (and thus smaller and lighter weight) technology, and some Limitations (such as *Activation Roll*, *Concentration*, and *Extra Time*) reflect earlier, cruder, and bulkier technology, some mass and volume calculation systems reverse their role in the Active Point calculation — they multiply the Base Points in the Power by the Limitations, rather than the Advantages, then divide by the Advantages. That way two devices built with the same Power, but representing different levels of technological advancement, have different “Active Point” totals for purposes of determining their mass and volume.

The text in this book sometimes offers suggestions about the mass and volume of certain systems or types of equipment. These are just that — suggestions and guidelines, nothing more. Feel free to ignore or change them if you prefer other figures.



WEAPONS



In many campaigns, a Vehicle's weapons are among the most important systems on it. When characters fight a war against a fearsome enemy, the size and number of the guns on their ship dictate their strategy and tactics; a car duelist in a post-apocalyptic wasteland has to make sure he has weapons on every side of his automobile so he can fight packs of cannibal bikers that try to surround him and run him off the road.

Many of the weapons in this section do not have the *Limited Arc Of Fire* Limitation, because it's possible to design them so they don't suffer from that restriction (for example, by putting a weapon in a rotating turret). However, it's often an appropriate Limitation, so you should add it if necessary.

If a weapon has Charges, typically the occupants can re-load it from inside the Vehicle. If they must go outside to reload, and going outside is likely to be dangerous, the GM may allow an additional $-\frac{1}{4}$ Limitation for the Charges.

WEAPON MASS AND VOLUME

Typically weapons occupy a volume of .5 to 1 cubic hex per 5-10 Active Points, and have a mass of up to 2 kg per Active Point. As always, the GM may vary this as he sees fit.

NUMBER OF WEAPONS

Since the *Hero System* has no hard-and-fast rules about equipment size or the like, technically a Vehicle can mount as many weapons as its owner can pay for. Realistically, though, this often makes no sense, and GMs should forbid it. Many vehicles (such as motorcycles) are too small, or too oddly configured, to mount more than a few weapons; others can't take the weight, or don't have many acceptable mounting points.

Gamemasters who want a rule of thumb for how many weapons a Vehicle can have should use a Vehicle's Size as a guideline. In some campaigns, maybe a Vehicle can only mount one weapon per point of Size — or two weapons, or what have you. This may vary from vehicle type to vehicle type (for example, perhaps ground vehicles and ships can carry more weapons than aircraft). In any event, extra weapons bought through the +5 point rule count as individual weapons — for example, if a Vehicle buys a Laser Cannon, and then pays 15 points for a total of eight Laser Cannons, it has mounted a total of eight weapons. At the GM's option, a Vehicle can up to double the number of weapons it can mount for +5 Character Points per doubling.

Accuracy Aids

Although not strictly weapons, these devices improve the accuracy of a Vehicle's weaponry, making them de facto offensive systems.

Gyroscopic Stabilization: Gyroscopic stabilization compensates for a Vehicle's movement, thus allowing the weapon to better track and lock on a target. It's not bought as a Focus to minimize costs, but should be treated as a typical vehicular Focus as a special effect.

+3 OCV with one Vehicle Weapon. Total cost: 6 points.

Targeting Computer: This combat computer improves the accuracy of every weapon on the Vehicle thanks to its dedicated target identification and tracking software.

Basic Targeting Computer: +2 with Ranged Combat (10 Active Points); OIF Bulky (-1), Costs Endurance ($-\frac{1}{2}$). Total cost: 4 points.

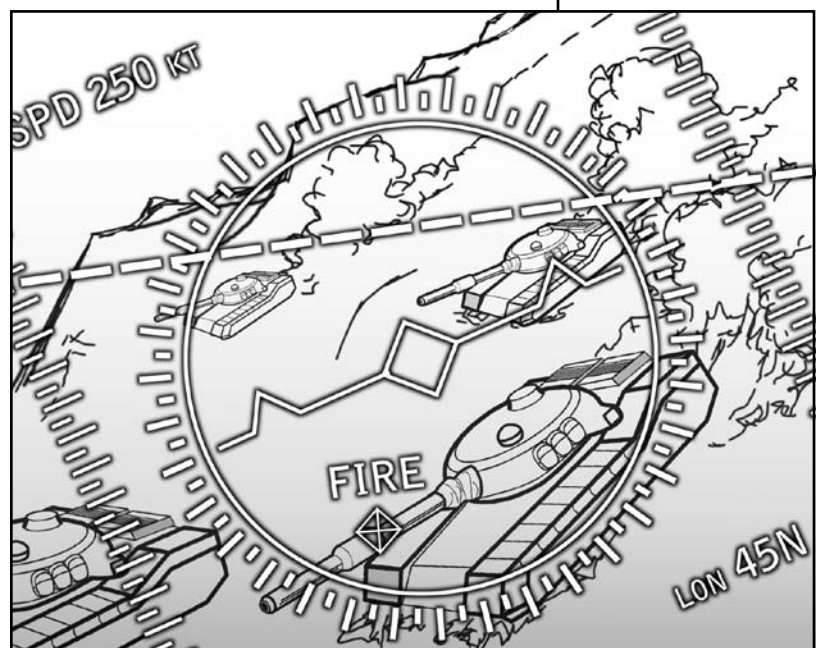
Improved Targeting Computer: +3 with Ranged Combat (15 Active Points); OIF Bulky (-1), Costs Endurance ($-\frac{1}{2}$). Total cost: 6 points.

Advanced Targeting Computer: +4 with Ranged Combat (20 Active Points); OIF Bulky (-1), Costs Endurance ($-\frac{1}{2}$). Total cost: 8 points.

CONCEALING WEAPONS

Most weapons are built as Obvious Foci, since their presence and purpose are plain to anyone who perceives them. However, sometimes Vehicles don't want to have obvious weapons — perhaps they want to sneak into someplace looking like an ordinary car or ship, or they need to hide their weapons so they can surprise their enemies.

Concealing vehicular weapons usually means buying them as Inobvious Foci, rather than Obvious. This may involve hiding the weapon behind a moving panel, making it look like an ordinary object, or the like. A close inspection (and a successful Concealment roll) by a character usually reveals the weapon's presence, but in most cases the weapon can't be perceived until the Vehicle's operator activates it.



Enhanced Targeting Computer: +5 with Ranged Combat (25 Active Points); OIF Bulky (-1), Costs Endurance (-½). Total cost: 10 points.

Military-Grade Targeting Computer: +6 with Ranged Combat (30 Active Points); OIF Bulky (-1), Costs Endurance (-½). Total cost: 12 points.

Targeting Laser: This device is a small laser that attaches to (or integrates with) a weapon. It “paints” the target with a laser dot, and its sensors then aim the weapon where the dot is. It uses its own battery rather than the vehicle’s power; the battery has enough power for about an hour of continuous operation (consider it to have 1 Continuing Fuel Charge for 1 Hour). It’s subject to the same restrictions as laser weapons (see below).

+3 OCV with one Vehicle Weapon. Total cost: 6 points.

Anti-Personnel Weapons

Vehicles don’t always attack other vehicles. Sometimes a vehicle operator needs to attack people (or entire crowds), often with non-lethal weaponry, to make them go away. When a villain hypnotizes a mob of innocent civilians to attack the heroes, non-lethal weapons are a must!

Capturefoam Projector: This weapon sprays a thick stream of liquid that rapidly hardens, trapping anyone in the affected area.

Entangle 4d6, 4 DEF, Area Of Effect (4” Radius; +1), 30 Charges (+¼) (90 Active Points); OIF Bulky (-1), Real Weapon (-¼), Limited Range (20”; -¼). Total cost: 36 points.

Capturefoam Grenade Launcher Option: Add *Autofire (3 shots; +¼) and increase Charges to 60 (additional +¼) (110 Active Points); get rid of Limited Range. Total cost: 49 points.*

Knockout Gas Grenade Launcher: This weapon fires canisters that release clouds of sleep-inducing gas when they contact the ground or any other hard surface.

EB 5d6, NND (defense is Life Support [Self-Contained Breathing]; +1), Autofire (2 shots; +¼), 25 Charges lasting 1 Turn each (removed by winds or rain; +¾) (75 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 33 points.

Rapid-Fire Option: Increase *Autofire to 4 shots (additional +¼) and Charges to 60 (additional +¼) (87 Active Points). Total cost: 39 points.*

Net Cannon: This weapon shoots large nets made of nylon and/or steel mesh. Most models can only hold two net shells at a time.

Entangle 5d6, 5 DEF, Entangle And Character Both Take Damage (+¼), Area Of Effect (12” Radius; +1¼) (125 Active Points); OIF Bulky (-1), Real Weapon (-¼), 2 clips of 2 Charges each (-1¼). Total cost: 36 points.

Expanded Clips Option: Change to 2 clips of 8 Charges each (-¼). Total cost: 50 points.

Sonic/Microwave Discomfitter: These weapons disperse crowds by making people uncomfortable or sick. The sonic version uses infrasound and ultrasound to induce feelings of vertigo and illness; lengthy exposure may cause victims to vomit or lose control of their bowels. The microwave version heats the victim’s skin to the point where he’s extremely uncomfortable, but not burned (though extended exposure may result in mild tissue burns).

Sonic Discomfitter: *Drain CON 1d6, Area Of Effect (12” Radius; +1½), Continuous (+1), Ranged (+½) (40 Active Points); OIF Bulky (-1), Real Weapon (-¼) (total cost: 18 points) plus Drain DEX 1 point, Area Of Effect (12” Radius; +2), Continuous (+1), Ranged (+½) (13 Active Points); OIF Bulky (-1), Real Weapon (-¼) (total cost: 6 points). Total cost: 24 points.*

Microwave Discomfitter: *EB 1 point, NND (defense is resistant ED covering entire body; +1), Area Of Effect (16” Radius; +2), Continuous (+1), Ranged (+½) (11 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 5 points.*

Tear Gas Grenade Launcher: This weapon fires canister of gas that blind people by causing intense tearing, which also inflicts mild pain.

Sight Group Flash Attack 4d6, Area Of Effect (8” Radius; +1¼), Autofire (3 shots; +¼), 30 Continuing Charges of 1 Turn each (removed by winds or rain; +¾) (65 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 29 points.

Beam Weapons

Beam weapons tend to be the most common type of Vehicle armament in many games, because they’re easy for gamers to use. In a setting using “rubber science,” you can define them as just about any type of energy; most of the examples below assume some reasonable effort to be “realistic.”

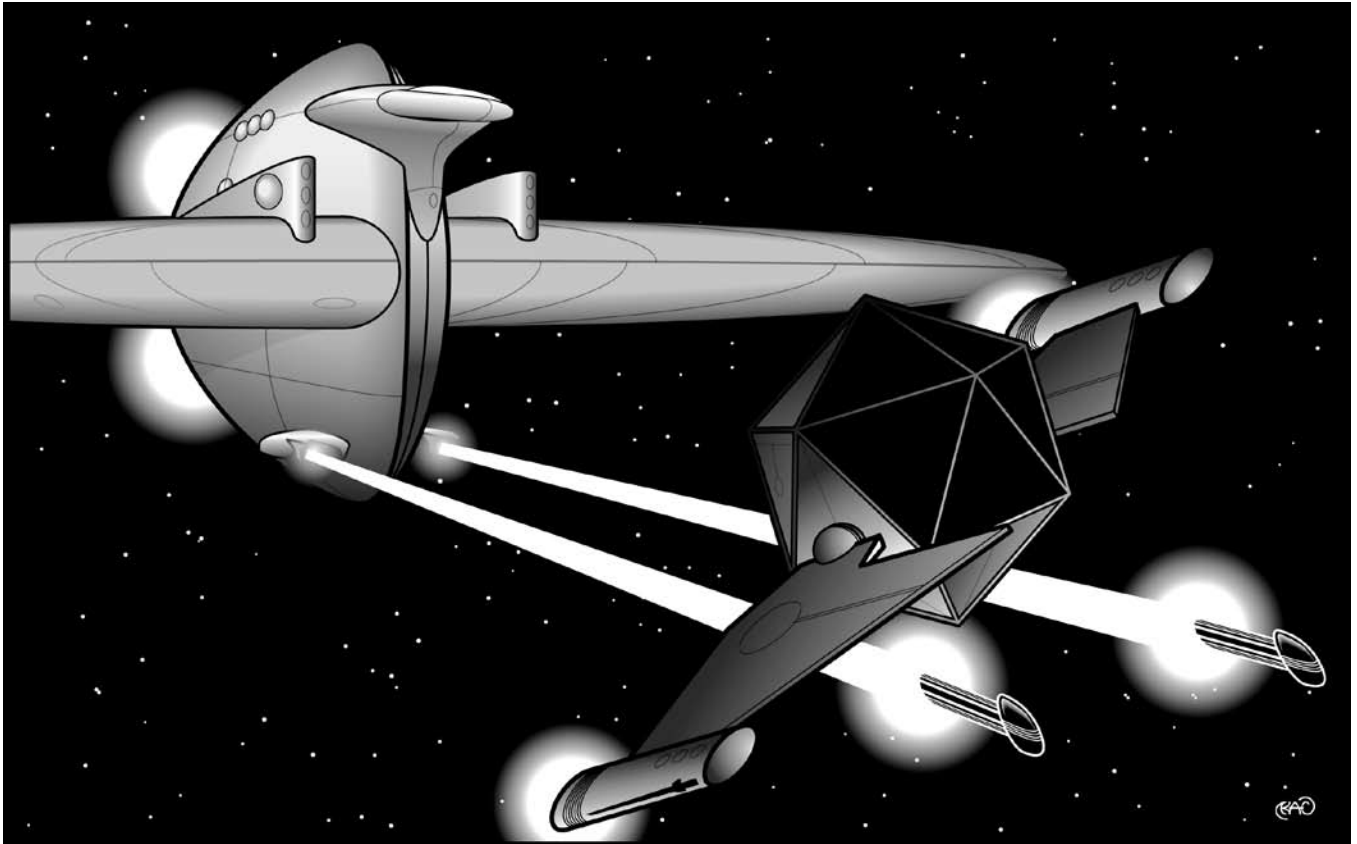
BLASTERS

“Blasters” are a popular vehicular weapon in many genres (particularly science fiction and superheroes). They give the Vehicle an energy weapon, without having to worry about defining what the energy actually is. (If you want to define a specific special effect, consider these plasma weapons; see below.)

Standard Blaster: A typical blaster suitable for just about any vehicle.

Light Standard Blaster: *RKA 2d6 (30 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 13 points.*

Medium Standard Blaster: *RKA 3d6 (45 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 20 points.*



Heavy Standard Blaster: *RKA 4d6, Area Of Effect (One Hex; +½) (90 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 40 points.*

Superheavy Standard Blaster: *RKA 5d6, Area Of Effect (One Hex; +½) (112 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 50 points.*

Mega-Blaster: This blaster's beam of intense energy causes a tremendous explosion when it hits the target.

Light Mega-Blaster: *RKA 2d6, Explosion (+½) (45 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 20 points.*

Medium Mega-Blaster: *RKA 3d6, Explosion (+½) (67 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 30 points.*

Heavy Mega-Blaster: *RKA 4d6, Explosion (-1 DC/2"; +¾) (105 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 47 points.*

Superheavy Mega-Blaster: *RKA 4d6, Explosion (-1 DC/3"; +1) (120 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 53 points.*

Pulse Blaster: Rather than firing a beam of energy, this blaster projects a series of intense energy bursts.

Light Pulse Blaster: *RKA 2d6, Autofire (5 shots; +½) (45 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 20 points.*

Medium Pulse Blaster: *RKA 3d6, Autofire (5 shots; +½) (67 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 30 points.*

Heavy Pulse Blaster: *RKA 4d6, Autofire (5 shots; +½) (90 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 40 points.*

Superheavy Pulse Blaster: *RKA 5d6, Autofire (5 shots; +½) (112 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 50 points.*

LASERS

Lasers emit beams of coherent light, in which all the light waves are in phase with one another. They are perfectly straight, and remain tightly concentrated over long distances. Higher-powered lasers use more energetic photons, like ultraviolet light, x-rays, or gamma rays.

As weapons, lasers do damage by suddenly superheating the surface of whatever they hit. The energies are modest, but concentrated into so tiny an area that they cause significant damage. Solid materials melt and shatter, and living tissue burns. More powerful lasers pierce better, and x-rays do additional damage from radiation effects. In combat, lasers are useful because it's difficult to detect where they were fired from (they only show up in the air if smoke or other particulates render them visible), there is no recoil, and they can fire as long as the power holds out.

The main limitation for lasers (as with any directed-energy weapon) is power. Early optical lasers use chemical reactions for sudden bursts of energy; later ultraviolet ones are powered by advanced capacitors. Most laser weapons have built-in laser sights, using a low-power beam to paint a spot on the target before firing.

In game terms, vehicular lasers are Killing Attacks, often with the Beam Limitation. Ultraviolet

lasers are Armor Piercing, and X-Ray or Gamma-Ray lasers are Armor Piercing and Penetrating. Optical and ultraviolet lasers are blocked by smoke and steam (reflected by a Limitation, since these phenomena are common); X-ray and gamma ray lasers are not, but special anti-laser aerosols do interfere with them normally.

In many games, generic energy beam weapons are often called “lasers” even though they don’t act like them. They’re particularly common in *Star Hero* games, where the Vehicles have lots of power and need attacks that can function over extremely long ranges.

Standard Laser: A typical laser weapon for use by non-space vehicles.

Light Standard Laser: RKA 2d6, Armor Piercing (+½) (45 Active Points); OIF Bulky (-1), Real Weapon (-¼), Blocked By Smoke Or Steam (-¼), Beam (-¼). Total cost: 16 points.

Medium Standard Laser: RKA 3d6, Armor Piercing (+½) (67 Active Points); OIF Bulky (-1), Real Weapon (-¼), Blocked By Smoke Or Steam (-¼), Beam (-¼). Total cost: 24 points.

Heavy Standard Laser: RKA 4d6, Armor Piercing (+½) (90 Active Points); OIF Bulky (-1), Real Weapon (-¼), Blocked By Smoke Or Steam (-¼), Beam (-¼). Total cost: 33 points.

Superheavy Standard Laser: RKA 5d6, Armor Piercing (+½) (112 Active Points); OIF Bulky (-1), Real Weapon (-¼), Blocked By Smoke Or Steam (-¼), Beam (-¼). Total cost: 41 points.

Gatling Laser: A Standard Laser modified for automatic fire. It often comes equipped with its own battery due to its enormous power requirements.

Light Gatling Laser: RKA 2d6, Armor Piercing (+½), Autofire (5 shots; +½) (60 Active Points); OIF Bulky (-1), Real Weapon (-¼), Blocked By Smoke Or Steam (-¼), Beam (-¼). Total cost: 22 points.

Medium Gatling Laser: RKA 3d6, Armor Piercing (+½), Autofire (5 shots; +½) (90 Active Points); OIF Bulky (-1), Real Weapon (-¼), Blocked By Smoke Or Steam (-¼), Beam (-¼). Total cost: 33 points.

Heavy Gatling Laser: RKA 4d6, Armor Piercing (+½), Autofire (10 shots; +1) (150 Active Points); OIF Bulky (-1), Real Weapon (-¼), Blocked By Smoke Or Steam (-¼), Beam (-¼). Total cost: 54 points.

Superheavy Gatling Laser: RKA 5d6, Armor Piercing (+½), Autofire (10 shots; +1) (187 Active Points); OIF Bulky (-1), Real Weapon (-¼), Blocked By Smoke Or Steam (-¼), Beam (-¼). Total cost: 68 points.

Broad-Beam Laser: A Standard Laser modified to fire a much wider beam, one capable of hitting multiple targets with a single shot in many situations.

Light Broad-Beam Laser: RKA 2d6, Armor Piercing (+½), Area Of Effect (72” Line, 3”

wide; +2) (105 Active Points); OIF Bulky (-1), No Range (-½), Blocked By Smoke Or Steam (-¼), Real Weapon (-¼). Total cost: 35 points.

Medium Broad-Beam Laser: RKA 3d6, Armor Piercing (+½), Area Of Effect (104” Line, 3” wide; +2) (157 Active Points); OIF Bulky (-1), No Range (-½), Blocked By Smoke Or Steam (-¼), Real Weapon (-¼). Total cost: 52 points.

Heavy Broad-Beam Laser: RKA 4d6, Armor Piercing (+½), Area Of Effect (144” Line, 3” wide; +2) (210 Active Points); OIF Bulky (-1), No Range (-½), Blocked By Smoke Or Steam (-¼), Real Weapon (-¼). Total cost: 70 points.

Superheavy Broad-Beam Laser: RKA 5d6, Armor Piercing (+½), Area Of Effect (176” Line, 3” wide; +2) (262 Active Points); OIF Bulky (-1), No Range (-½), Blocked By Smoke Or Steam (-¼), Real Weapon (-¼). Total cost: 87 points.

Space Combat Laser: Designed for use against lightly-armored starships and satellites rather than heavily-protected warships. It doesn’t get the Blocked By Smoke Or Steam Limitation, because those phenomena are so rare in space.

Cost Space Combat Laser

- 90 Space Combat Laser: Multipower, 202-point reserve; all OIF Bulky (-1), Real Weapon (-¼)
- 9u 1) Distant Shot: RKA 6d6, Autofire (5 shots; +½), MegaRange (1” = 10 km, can scale down to 1” = 1 km; +¾); OIF Bulky (-1), Real Weapon (-¼)
- 6u 2) Close-Range Shot: RKA 6d6, Autofire (5 shots; +½); OIF Bulky (-1), Real Weapon (-¼)

Total cost: 105 points.

Superheavy Space Combat Laser: A major military space laser capable of punching through heavy armor at a range of up to one light-second.

Cost Superheavy Space Combat Laser

- 167 Superheavy Space Combat Laser: Multipower, 375-point reserve; all OIF Bulky (-1), Real Weapon (-¼)
- 17u 1) Distant Shot: RKA 10d6, Autofire (5 shots; +½), MegaRange (1” = 100 km, can scale down to 1” = 1 km; +1); OIF Bulky (-1), Real Weapon (-¼)
- 10u 2) Close-Range Shot: RKA 10d6, Autofire (5 shots; +½); OIF Bulky (-1), Real Weapon (-¼)

Total cost: 194 points.

OTHER BEAMS

Other types of beam weapons suitable for Vehicles include:

Ion Cannon: Ion cannons fire a beam of ionized gas at the target, doing damage by heat, impact, and secondary electrical effects. They are very close to the cinematic blasters, such as those seen in the *Star Wars* movies, in terms of special effects. The ionized beam does glow brightly as it fires, and the

bolts, while fast, do not travel at the speed of light. They bypass vehicular armor, but are useless against force fields. Another disadvantage is that ion beams need both a supply of gas (usually argon or neon) to ionize and a power supply; most ion guns use special cartridges which are not compatible with other energy weapons or electrical devices.

Cost Ion Cannon

- 87 *Ion Cannon*: Multipower, 195-point reserve; all OIF Bulky (-1), Real Weapon (-¼)
- 9u 1) *Distant Shot*: RKA 4d6, NND (defense is ED Force Field or Force Wall; +1), Does BODY (+1), MegaScale (1" = 1 km; +¼); OIF Bulky (-1), Real Weapon (-¼)
- 8u 2) *Close-Range Shot*: RKA 4d6, NND (defense is ED Force Field or Force Wall; +1), Does BODY (+1); OIF Bulky (-1), Real Weapon (-¼)

Total cost: 104 points.

Plasma Cannon: Also known as a Fusion Beam, this weapon derives from fusion power technology. It generates a tiny fusion reaction which releases superhot plasma; the gun then directs this plasma at the target via magnetic fields. The plasma spreads quickly over a wide area, which gives it a large area effect but limits the weapon's range. Plasma cannons use deuterium pellets, similar to those used in fusion rockets, as their fuel — in pre-fusion societies the weapons cannot be refueled. Assuming portable fusion generators are possible at all, plasma weapons don't involve any major violations of the laws of physics.

Cost Plasma Cannon

- 42 *Plasma Cannon*: Multipower, 94-point reserve; all OIF Bulky (-1), Real Weapon (-¼)
- 4u 1) *Distant Shot*: RKA 5d6, MegaScale (1" = 1 km; +¼); OIF Bulky (-1), Real Weapon (-¼)
- 3u 2) *Close-Range Shot*: RKA 5d6; OIF Bulky (-1), Real Weapon (-¼)

Total cost: 49 points.

Bombs

In vehicular combat, bombs are explosive shells dropped by aircraft to hit targets beneath them (typically on the ground). Some are guided solely by the vehicle operator's aim when he releases them; others, such as the American military's Paveway series of Precision Guided Munitions (PGMs), have simple guidance systems that refine their descent toward the target.

In game terms, bombs are RKA Explosions with the Dropped (page 30) Limitation. The time required for the bomb to hit depends on how high the aircraft is flying and the effect of gravity; use the Falling Table (*Hero System 5th Edition, Revised*, page 434) to determine the time.

Small Bomb (less than 1,000 pounds): RKA 3d6, Explosion (+½) (67 Active Points); OIF Bulky (bomb launcher; -1), Dropped (-½), Real Weapon



(-¼), 6 Charges (-¾). Total cost: 19 points.

Penetrator Option: Add *Armor Piercing* (+½) (90 Active Points). Total cost: 26 points.

Multiple-Bomb Load Option: Add *Autofire* (5 shots; +½) and increase *Charges* to 60 (+½) (112 Active Points). Total cost: 41 points.

Multiple Penetrator Bomb Load Option: Add *Armor Piercing* (+½) and *Autofire* (5 shots; +½) and increase *Charges* to 60 (+½) (135 Active Points). Total cost: 49 points.

Medium Bomb (1,000-1,999 pounds): RKA 4d6, Explosion (-1 DC/2"; +¾) (105 Active Points); OIF Bulky (bomb launcher; -1), Real Weapon (-¼), Dropped (-½), 6 Charges (-¾). Total cost: 30 points.

Penetrator Option: Add *Armor Piercing* (+½) (135 Active Points). Total cost: 39 points.

Multiple-Bomb Load Option: Add *Autofire* (5 shots; +½) and increase *Charges* to 60 (+½) (165 Active Points). Total cost: 60 points.

Multiple Penetrator Bomb Load Option: Add *Armor Piercing* (+½) and *Autofire* (5 shots;



+½) and increase Charges to 60 (+½) (195 Active Points). Total cost: 71 points.

Large Bomb (2,000 pounds or more): RKA 6d6, Explosion (-1 DC/2"; +¾) (157 Active Points); OIF Bulky (bomb launcher; -1), Real Weapon (-¼), Dropped (-½), 6 Charges (-¾). Total cost: 45 points.

Penetrator Option: Add Armor Piercing (+½) (202 Active Points). Total cost: 58 points.

Multiple-Bomb Load Option: Add Autofire (5 shots; +½) and increase Charges to 60 (+½) (247 Active Points). Total cost: 90 points.

Multiple Penetrator Bomb Load Option: Add Armor Piercing (+½) and Autofire (5 shots; +½) and increase Charges to 60 (+½) (292 Active Points). Total cost: 106 points.

Cannons

The sailing ships of old armed themselves with cannons — essentially, unrifled heavy metal tubes using gunpowder explosions to propel cannonballs, chains, or other types of “shot” at enemy ships and crew. Cannons had extensive range (though they weren’t necessarily accurate at long distances), but could only fire through specific apertures cut into the ship’s hull, and took a long time to load and fire. They were rated in “pounds,” meaning the weight of the shot the gun fired. Thus, a twelve-pounder fires smaller cannonballs, and does less damage, than a 32-pounder.

Swivel Gun: A small cannon, easy for one or two people to reload and fire, mounted on a swivel so that it can fire in any direction.

RKA 1d6 (15 Active Points); **OIF Bulky** (-1), **Real Weapon** (-¼), **Extra Time** (Extra Phase to load and fire; -¾), 12 Charges (-¼). Total cost: 5 points.

Small Cannon (1-8 Pounds): RKA 1d6+1, Increased Maximum Range (2,000"; +½) (30 Active Points); **OIF Bulky** (cannons; -1), **Real Weapon** (-¼), **Extra Time** (1 Turn to load and fire; -1¼), **Limited Arc Of Fire** (one hex row, same horizontal level; -1), 12 Charges (-¼). Total cost: 6 points.

Medium Cannons (9-18 Pounds): RKA 2d6, Increased Maximum Range (2,000"; +½) (45 Active Points); **OIF Bulky** (cannons; -1), **Real Weapon** (-¼), **Extra Time** (1 Turn to load and fire; -1¼), **Limited Arc Of**

Fire (one hex row, same horizontal level; -1), 12 Charges (-¼). Total cost: 9 points.

Large Cannons (19-42 Pounds): RKA 3d6, Increased Maximum Range (2,500"; +½) (67 Active Points); **OIF Bulky** (cannons; -1), **Real Weapon** (-¼), **Extra Time** (1 Turn to load and fire; -1¼), **Limited Arc Of Fire** (one hex row, same horizontal level; -1), 12 Charges (-¼). Total cost: 14 points.

Heavy Cannons (43+ Pounds): RKA 5d6, Increased Maximum Range (1,875"; +¼) (94 Active Points); **OIF Bulky** (cannons; -1), **Real Weapon** (-¼), **Extra Time** (1 Turn to load and fire; -1¼), **Limited Arc Of Fire** (one hex row, same horizontal level; -1), 12 Charges (-¼). Total cost: 20 points.

Dropped Weapons

Ground vehicles often come equipped with devices that drop dangerous substances or weapons behind them to foil pursuers. They’re typically bought to cover a given area behind the Vehicle; rather than making this a true radius (circle), the GM can, in the interest of “realism,” make the area more square- or cone-shaped, if appropriate.

See also the Smoke Generator on page 25.

Caltrop Dropper: This weapon drops sharp, four-pronged spikes onto the road to puncture a pursuer’s tires. A deft driver can make a Combat Driving roll (at a penalty equal to the Vehicle’s DCV penalty) to avoid the spikes.

RKA 1d6, **Area Of Effect** (10" Cone; +1), **Armor Piercing** (+½), **Continuous** (+1), **Uncontrolled** (removable by spending a Full Phase to sweep them aside; +½) (60 Active Points); **OIF Bulky** (-1), **Real Weapon** (-¼), **Activation Roll 14** (-½), **No Range** (-½), **Limited Arc Of Fire** (60 Degrees behind vehicle, only on same hori-

zontal level; $-\frac{3}{4}$), 4 Charges (-1), Only Affects Characters Moving On The Ground ($-\frac{1}{4}$), Combat Driving Roll Cancels Effect (see text; $-\frac{1}{4}$), Automatically Targets Hit Location (tires; -0). Total cost: 11 points.

Caltrop Projector Option: Remove No Range and change Limited Arc Of Fire to 180 Degrees behind vehicle, only on same horizontal level ($-\frac{1}{2}$). Total cost: 13 points.

Gluedropper: This weapon drops a puddle of glue-like substance that fouls the wheels of a pursuing vehicle. Each puddle lasts for 1 Turn (after which it's spread out and hardened too much to remain effective) or until one vehicle drives into it.

Entangle 4d6, 6 DEF, Area Of Effect (5" Radius; +1) (100 Active Points); OIF Bulky (-1), Real Weapon ($-\frac{1}{4}$), 2 Continuing Charges lasting 1 Turn each (removed by having any one vehicle or three people move through it; -1), No Range ($-\frac{1}{2}$), Limited Arc Of Fire (60 Degrees behind vehicle, only on same horizontal level; $-\frac{3}{4}$), Only Affects Vehicles/Characters Moving On The Ground ($-\frac{1}{4}$). Total cost: 21 points.

Minelayer: This device drops a group of mines behind the vehicle; any vehicle or person moving through the covered area may run over one, causing an explosion. When the mini-minefield is first created, it has an Activation Roll of 14-; this represents the likelihood that anyone or anything moving through the covered area will hit and trigger a mine. Every time one of the mines is triggered, reduce the Activation Roll by 1. When it reaches 7-, all the mines have exploded and the attack no longer has any effect.

RKA 1d6, Armor Piercing ($+\frac{1}{2}$), Explosion ($+\frac{1}{2}$), Continuous (+1), Uncontrolled (removable by spending a Turn to move the mines aside; $+\frac{1}{2}$) (52 Active Points); OIF Bulky (-1), Activation Roll 14- ($-\frac{1}{2}$), Real Weapon ($-\frac{1}{4}$), 4 Charges (-1), No Range ($-\frac{1}{2}$), Limited Arc Of Fire (60 Degrees behind vehicle, only on same horizontal level; $-\frac{3}{4}$), Only Affects Characters Moving On The Ground ($-\frac{1}{4}$), Automatically Makes A Low Shot Against Vehicle (-0). Total cost: 10 points.

Mine Projector Option: Remove No Range and change Limited Arc Of Fire to 180 Degrees behind vehicle, only on same horizontal level ($-\frac{1}{2}$). Total cost: 11 points.

Oil/Ice Slick Sprayer: This weapon creates a pool of slick oil or quick-freezing ice behind the vehicle; anyone who enters the affected area has to succeed with a Combat Driving roll (or DEX Roll, if walking) or lose control of his vehicle (or fall down). Snow tires (page 41) may provide some benefit against an ice slick; on the other hand, an oil slick is usually easier to remove.

Change Environment 8" Cone, -4 to all DEX-based Rolls to move on/through (27 Active

Points); OIF Bulky (-1), Real Weapon ($-\frac{1}{4}$), No Range ($-\frac{1}{2}$), Limited Arc Of Fire (60 Degrees behind vehicle, only on same horizontal level; $-\frac{3}{4}$), Only Affects Characters Moving On The Ground ($-\frac{1}{4}$), 4 Charges (-1). Total cost: 6 points

Flaming Oil Option: This weapon drops an oil slick and sets it on fire. It has the same effect as a minelayer.

Slick Projector Option: Remove No Range and change Limited Arc Of Fire to 180 Degrees behind vehicle, only on same horizontal level ($-\frac{1}{2}$). Total cost: 7 points.

Electronic Warfare Systems

Electronic warfare refers to the practice of jamming, fooling, misdirecting, and otherwise interfering with an enemy's sensors and electronic signals. This inhibits his ability to communicate with his allies, control his probes, and locate targets. Of course, one vehicle's electronic countermeasures (ECM) can be neutralized by another's electronic counter-countermeasures (ECCM); see page 137.

In game terms, there are several ways to represent electronic warfare. The simplest is for crewmembers on both vehicles to use their Systems Operation Skills in a Skill Versus Skill Contest, with the victor being the one who successfully neutralized (or avoided the neutralization attempted by) his opponent.

Vehicles desiring more advanced ECM systems can create them with Powers. To generate an area of interference that hinders (but doesn't necessarily stop) sensing or communicating, use Change Environment (with combat effects that penalize *Systems Operation*). Creating an area of totally impenetrable interference requires Darkness, or perhaps Suppress. Fooling or confusing an enemy vehicle's sensors usually requires Images. Dispel, Drain, and Flash also work well for ECM. Vehicles sometimes apply the *Personal Immunity Advantage* so they can perceive through their own interference, but this should be rare; it can cause too many game balance problems in vehicle combat situations.

Anti-Sensor EMP Generator: This weapon projects an intense electromagnetic pulse specifically attuned to destroy sensors and communication systems.

Dispel Sensors/Communications 20d6, all Sensor/Communications powers simultaneously (+2), Area Of Effect (320" Radius; +2), Increased Maximum Range (7,500", or about 9 miles; $+\frac{1}{4}$) (315 Active Points); OAF Bulky ($-1\frac{1}{2}$). Total cost: 126 points.

Space Vehicle Option: *Dispel Sensors/Communications 20d6, all Sensor/Communications powers simultaneously (+2), Area Of Effect (32" Radius; +1), MegaArea (1" = 1 km; $+\frac{1}{4}$), MegaRange (1" = 10 million km; +2) (375 Active Points); OAF Bulky ($-1\frac{1}{2}$). Total cost: 150 points.*

Chaff Generator: This weapon fires a shell which scatters reflective particles through a large area, blocking sight and radar in that region.

Darkness to Sight and Radio Groups 1" radius, MegaArea (1" = 100"; +¼) (25 Active Points); OIF Bulky (-1), Real Weapon (-¼), 12 Charges (-¼). Total cost: 10 points.

Space Vehicle Option: *Increase Darkness to 3" radius, and MegaArea to 1" = 1 km, and add MegaRange (1" = 1 km; +¼) (50 Active Points). Total cost: 20 points.*

Small Intense Interferiation Field Option: *Get rid of the 12 Charges for the Space Vehicle Option. Total cost: 22 points.*

Interferiation Field: A space vehicle with this technology can generate an energy field that inhibits the use of sensors and communications.

Change Environment 16" radius, -4 to Systems Operation rolls, MegaArea (1" = 1 million km; +1¼), MegaRange (1" = 10 million km; +2) (161 Active Points); OAF Bulky (-1½). Total cost: 64 points.

Intense Interferiation Field: This energy field is similar to the standard interferiation phenomenon, but is much stronger.

Darkness to Radio Group 10" radius, MegaArea (1" = 1 million km; +1¼), MegaRange (1" = 10 million km; +2) (475 Active Points); OAF Bulky (-1½). Total cost: 190 points.

Radar Blinder: This device generates a pulse of energy that temporarily blinds enemy sensors and communications systems.

Radio Group Flash 10d6, Area Of Effect (96" Radius; +2), Increased Maximum Range (3,750", or about 4.5 miles; +¼) (162 Active Points); OAF Bulky (-1½). Total cost: 65 points.

Space Vehicle Option: *Radio Group Flash 10d6, Area Of Effect (16" Radius; +1), MegaArea (1" = 1 km; +¼), MegaRange (1" = 10 million km; +2) (212 Active Points); OAF Bulky (-1½). Total cost: 85 points.*

Radar Jammer: This device blocks radar within a large region centered on the Vehicle. The enemy can easily tell there's something there generating the jamming field, but it's impossible for him to locate/target with his radar. The downside is, the Vehicle generating the field can't use its own radar, either, until it moves out of the affected area.

Suppress Radar 8d6, Area Of Effect (10" Radius; +1¼), MegaArea (1" = 1 km; +¼) (100 Active Points); OIF Bulky (-1), No Range (-½). Total cost: 40 points.

Radar Spoofing: This system attempts to fool enemy radar by creating false images to confuse targeting systems.

Radio Group Images, -5 to PER Rolls, 1" radius, MegaArea (1" = 1 km; +¼) (31 Active Points); OIF Bulky (-1), No Range (-½), Set Effect (up to 6 images of the target vehicle; -1), Limited Effect (Radar only; -¼). Total cost: 8 points.

Sensor Ghosts: A clever character can use his vehicle's systems to generate false images of other vehicles, thus making an enemy think, for example, that more vehicles are present than there really are. The trickery quickly falls apart if the enemy can get close enough to observe the affected area visually.

Radio Group Images, -5 to PER Rolls, Increased Size (16" radius; +1), MegaArea (1" = 1 km; +¼), MegaRange (1" = 100"; +¼) (62 Active Points); OAF Bulky (-1½). Total cost: 25 points.

Space Vehicle Option: *Radio Group Images, -5 to PER Rolls, Increased Size (16" radius; +1), MegaArea (1" = 1 million km; +1¼), MegaRange (1" = 10 million km; +2) (144 Active Points); OAF Bulky (-1½). Total cost: 58 points.*

Grenade Launchers

Versatile and powerful, grenade launchers are an excellent weapon for many Vehicles. A Vehicle could even buy a Multipower of grenades, defined as a single launcher with multiple ammunition feeds.

Anti-Vehicular Grenade Launcher: This launcher fires grenades designed to project a burst of shrapnel able to pierce light vehicular armor.

RKA 1½d6, Area Of Effect (One Hex; +½) (37 Active Points); OIF Bulky (-1), Real Weapon (-¼), 12 Charges (-¼). Total cost: 15 points.

Autofire Option: *Add Autofire (5 shots; +½) and increase Charges to 40 (+½) (62 Active Points). Total cost: 27 points.*

Anti-Vehicular AP Grenade Launcher: Although similar to standard anti-vehicular grenades, these grenades are more powerful, and explode in razor-sharp slivers that make them even more likely to penetrate armor.

RKA 2d6, Area Of Effect (One Hex; +½), Armor Piercing (+½) (60 Active Points); OIF Bulky (-1), Real Weapon (-¼), 12 Charges (-¼). Total cost: 24 points.

Autofire Option: *Add Autofire (5 shots; +½) and increase Charges to 40 (+½) (90 Active Points). Total cost: 40 points.*

Smoke Grenade Launcher: These grenades create clouds of thick, roiling smoke that makes it impossible to see. Each cloud remains in place for about a minute, unless wind, rain, or the like removes it.

Darkness to Sight Group 4" radius (40 Active Points); OIF Bulky (-1), Real Weapon (-¼), 6 Charges lasting 1 Minute each (removed by winds or rain; -0). Total cost: 18 points.

Autofire Option: Add Autofire (5 shots; +½) and increase Charges to 40 lasting 1 Minute each (+1) (100 Active Points). Total cost: 44 points.

Guns

These weapons project a physical object directly at the target through some means, causing damage through kinetic impact, explosions, or the like. In addition to normal gunpowder-based guns, they include gauss guns, or railguns, which use magnetic force to hurl metal slugs long distances at tremendous speeds.

Guns typically fire solid metal slugs, sometimes shaped for extra armor-piercing effect. However, if they're large enough, or the technology is sophisticated enough, they could launch explosive shells, nuclear warheads, smart homing missiles, or anything else which can survive hundreds of Gs of acceleration.

FIREARMS

Machine Guns: These are vehicle-mounted automatic-fire weapons with high rates of fire and high ammunition capacity.

Light Machine Gun (7.62mm): RKA 2d6+1, Autofire (5 shots; +½), +1 Increased STUN Multiplier (+¼), 500 Charges (+1) (96 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 43 points.

AP Ammo Option: Add Armor Piercing (+½) (114 Active Points). Total cost: 51 points.

Medium Machine Gun (12.7mm): RKA 3d6, Autofire (10 shots; +1), +1 Increased STUN Multiplier (+¼), 750 Charges (+1) (146 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 65 points.

AP Ammo Option: Add Armor Piercing (+½) (169 Active Points). Total cost: 75 points.

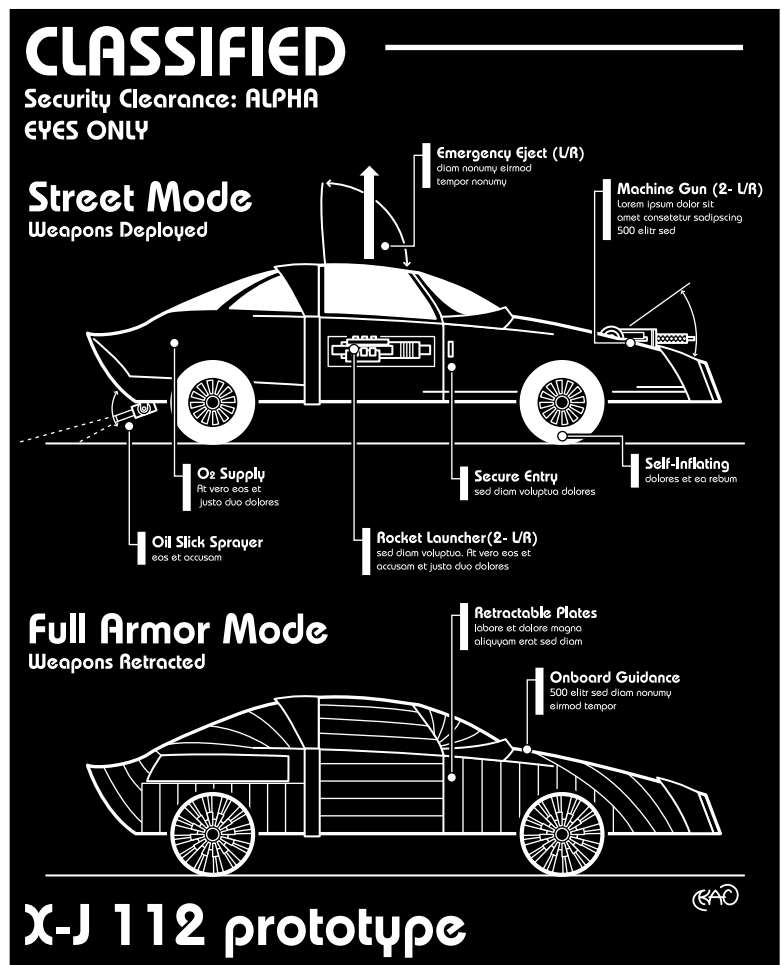
Heavy Machine Gun/Light Autocannon (20mm): RKA 4d6, Autofire (10 shots; +1), +1 Increased STUN Multiplier (+¼), 750 Charges (+1) (195 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 87 points.

AP Ammo Option: Add Armor Piercing (+½) (225 Active Points). Total cost: 100 points.

Very Heavy Machine Gun/Autocannon (25mm): RKA 4d6+1, Autofire (10 shots; +1), +1 Increased STUN Multiplier (+¼), 1,000 Charges (+1) (211 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 94 points.

AP Ammo Option: Add Armor Piercing (+½) (244 Active Points). Total cost: 108 points.

Tank Guns: These large and heavy cannons are similar to the ones mounted on tanks. Only vehicles as big and sturdy as a tank can mount and use them.



X-J 112 prototype

Light Tank Gun (76mm): RKA 7d6, Indirect (can be arced over some intervening obstacles; +¼), +1 Increased STUN Multiplier (+¼), Increased Maximum Range (2,000"; +¼), 50 Charges (+½) (236 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 105 points

85-90mm Option: Increase damage to 7d6+1 (247 Active Points). Total cost: 110 points.

Explosive Shell Option: Add Explosion (+½) (289 Active Points). Total cost: 128 points.

Medium Tank Gun (100-105mm): RKA 7 ½d6, Indirect (can be arced over some intervening obstacles; +¼), +1 Increased STUN Multiplier (+¼), Increased Maximum Range (2,000"; +¼), 50 Charges (+½) (259 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 115 points

Explosive Shell Option: Add Explosion (+½) (316 Active Points). Total cost: 140 points.

Heavy Tank Gun (115-120mm): RKA 8d6, Indirect (can be arced over some intervening obstacles; +¼), +1 Increased STUN Multiplier (+¼), Increased Maximum Range (2,000"; +¼), 50 Charges (+½) (270 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 120 points

Explosive Shell Option: Add Explosion (+½) (330 Active Points). Total cost: 147 points.

GAUSS WEAPONS

Space Railgun: A typical space vehicle-mounted railgun of average size and range.

RKA 6d6, Armor Piercing (+½), Increased Maximum Range (x75, or 50,000", or 62 miles; +¾) (202 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 90 points.

Planetary Kinetic Bombarder: This massive weapon is used to attack planets rather than vehicles. It launches a large metal rod which impacts at roughly five times the speed of sound, devastating a wide area. A variant simply bombards a world with large asteroids, which is often enough to wipe out all life on that planet. Either type requires *Extra Time* for the missile to hit the target, if fired from beyond 50,000" range — but it's not as if a planet can Dodge.

RKA 10d6, Explosion (+½), MegaArea (1" = 1 km; +¼), Increased Maximum Range (x25, or 32,750", or about 41 miles; +½) (337 Active Points); OIF Bulky (-1), Real Weapon (-¼), Extra Time (missile travels at 50,000" [62 miles] per Segment; -0), 12 Charges (-¼). Total cost: 135 points.

Asteroidal Bombardment Variant: *RKA 15d6, Explosion (+½), MegaArea (1" = 100 km; +¾), Increased Maximum Range (x25, or 63,250", or about 79 miles; +½) (619 Active Points); OIF Bulky (-1), Real Weapon (-¼), Extra Time (missile travels at 50,000" [62 miles] per Segment; -0), 12 Charges (-¼). Total cost: 248 points.*

Incendiary Weapons

These weapons involve fire or heat of some sort. They have the advantage of continuing to burn the target after the initial attack (a minor Continuous, Uncontrolled, 0 END, Sticky RKA Linked to the main attack).

Flamethrower: This is a typical vehicle-mounted flame projector — a terrifying weapon, particularly when used against personnel.

Light Flamethrower: *RKA 2d6, Area Of Effect (12" Line; +1) (60 Active Points); OIF Bulky (-1), Real Weapon (-¼), No Range (-½), 12 Charges (-¼) (total cost: 20 points) plus RKA 1 point, Continuous (+1), Uncontrolled (lasts until flammable material affected by RKA 2d6 is consumed, or a Full Phase is spent putting out the flames; +½), Reduced Endurance (0 END; +½), Sticky (anyone or anything flammable touching the victim also catches on fire; +½) (17 Active Points); OIF Bulky (-1), Linked (-½) (total cost: 7 points). Total cost: 27 points.*

Fireball Option: *Substitute 3" Radius for 12" Line, remove No Range. Total cost: 31 points*

Cone Option: *Substitute 7" Cone for 12" Line. Total cost: 27 points.*

Enhanced Heat Option: *Add Armor Piercing to RKA 2d6 (75 Active Points, 25 Real Points for it). Total cost: 32 points.*

Medium Flamethrower: *RKA 3d6, Area Of Effect (18" Line; +1) (90 Active Points); OIF Bulky (-1), Real Weapon (-¼), No Range (-½), 12 Charges (-¼) (total cost: 30 points) plus RKA 1 point, Continuous (+1), Uncontrolled (lasts until flammable material affected by RKA 3d6 is consumed, or a Full Phase is spent putting out the flames; +½), Reduced Endurance (0 END; +½), Sticky (anyone or anything flammable touching the victim also catches on fire; +½) (17 Active Points); OIF Bulky (-1), Linked (-½) (total cost: 7 points). Total cost: 37 points.*

Fireball Option: *Substitute 5" Radius for 18" Line, remove No Range. Total cost: 43 points*

Cone Option: *Substitute 10" Cone for 18" Line. Total cost: 37 points.*

Enhanced Heat Option: *Add Armor Piercing to RKA 3d6 (112 Active Points, 37 Real Points for it). Total cost: 44 points.*

Heavy Flamethrower: *RKA 4d6, Area Of Effect (24" Line; +1) (120 Active Points); OIF Bulky (-1), Real Weapon (-¼), No Range (-½), 12 Charges (-¼) (total cost: 40 points) plus RKA 1 point, Continuous (+1), Uncontrolled (lasts until flammable material affected by RKA 4d6 is consumed, or a Full Phase is spent putting out the flames; +½), Reduced Endurance (0 END; +½), Sticky (anyone or anything flammable touching the victim also catches on fire; +½) (17 Active Points); OIF Bulky (-1), Linked (-½) (total cost: 7 points). Total cost: 47 points.*

Fireball Option: *Substitute 6" Radius for 24" Line, remove No Range. Total cost: 55 points*

Cone Option: *Substitute 13" Cone for 24" Line. Total cost: 47 points.*

Enhanced Heat Option: *Add Armor Piercing to RKA 4d6 (150 Active Points, 50 Real Points for it). Total cost: 57 points.*

Heat Ray: Sometimes known as the "Martian Special," this weapon projects a searing beam of heat that cuts through metal like a hot knife through butter. If it touches anything flammable, that object bursts into flame and keeps burning until it's consumed or the fire is put out.

RKA 5d6, Armor Piercing (+½), Penetrating (+½) (150 Active Points); OIF Bulky (-1), Real Weapon (-¼) (total cost: 67 points) plus RKA 1 point, Continuous (+1), Uncontrolled (lasts until flammable material affected by RKA 5d6 is consumed, or a Full Phase is spent putting out the flames; +½), Reduced Endurance (0 END; +½), Sticky (anyone or anything flammable touching the victim also catches on fire; +½) (17 Active Points); OIF Bulky (-1), Linked (-½) (total cost: 7 points). Total cost: 74 points.

Incendiary Grenade Launcher: A standard grenade launcher, armed with grenades filled with thermite, white phosphorus, or other incendiary substances.

RKA 2d6, Armor Piercing (+½), Area Of Effect (5" Radius; +1) (75 Active Points); OIF Bulky (-1), Real Weapon (-¼), 12 Charges (-¼) (total cost: 30 points) plus RKA 1 point, Continuous (+1), Uncontrolled (lasts until flammable material affected by RKA 2d6 is consumed, or a Full Phase is spent putting out the flames; +½), Reduced Endurance (0 END; +½), Sticky (anyone or anything flammable touching the victim also catches on fire; +½) (17 Active Points); OIF Bulky (-1), Linked (-½) (total cost: 7 points). Total cost: 37 points.

Autofire Option: Add Autofire (5 shots; +½) and increase Charges to 40 (+½) (105 Active Points; total cost for grenade burst 47 points). Total cost: 54 points.

Mecha Weapons

Mecha are combat vehicles, and as such come heavily laden with weapons. Most rely on ranged attacks: long-range beam weapons, missile launchers, autocannons, and the like. In addition to the weapons listed elsewhere in this section, here are a few other weapons associated primarily with mecha.

RANGED MECHA WEAPONS

Most mecha Ranged weapons are just the blasters and missiles listed elsewhere in this section, sometimes scaled up in damage or effect because of the mech's size.

Blazing Eyebeams: The mech can project beams of searing light from its "eyes."

RKA 4d6 (60 Active Points); OIF Bulky (-1), 4 Charges (-1), Real Weapon (-¼) (total cost: 18 points) plus Sight Group Flash 4d6, Area Of Effect (4" Radius; +1¼) (45 Active Points); OIF Bulky (-1), 4 Charges (-1), Linked (-½), Real Weapon (-¼) (total cost: 12 points). Total cost: 30 points.

Flying Fist: A mech with this power can launch its fist like a missile. Magnetic beams in the mech bring it back so it can re-attach to the mech's arm, but during the return trip it can be attacked as an OAF.

Cost Flying Fist

- 29 *Flying Fist:* EB 14d6, Double Knockback (+¾) (122 Active Points); OAF Bulky (-1½), Lockout (mech cannot use right hand until Charge is recovered; -½), 1 Recoverable Charge (-1¼)
- 15 *Fist Recovery System:* Telekinesis (30 STR) (45 Active Points); OIF Bulky (-1), Only To Retrieve Flying Fist (-1)

Total cost: 44 points.

Gigantic Laser Rifle: This is an enormous laser weapon carried in a mech's hands and fired the same way a normal infantryman would fire an assault rifle. It's an OAF, but only someone as large and strong as the mech wielding it is likely to be able to snatch it away from its owner.

Cost Gigantic Laser Rifle

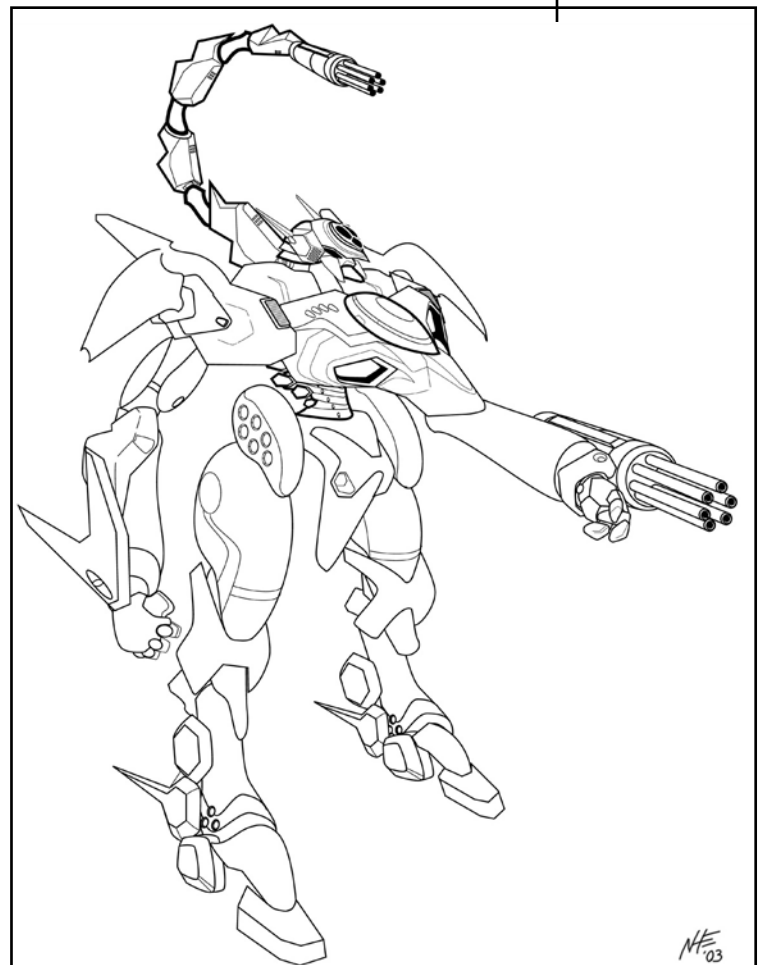
- 67 *Gigantic Laser Rifle:* Multipower, 105-point reserve, 125 Charges for entire Multipower (+¾); all OAF Bulky (-1½), Real Weapon (-¼)
- 4u 1) *Single-Shot Mode:* RKA 4d6, Armor Piercing (+½), Increased Maximum Range (x5, or 2,250"; +¼); OAF Bulky (-1½), Real Weapon (-¼)
- 3u 2) *Automatic Shot Mode:* RKA 4d6, Autofire (3 shots; +¼); OAF Bulky (-1½), Real Weapon (-¼)
- 3u 3) *Wide-Beam Mode:* RKA 3d6, Area Of Effect (20" Cone; +1¼); OAF Bulky (-1½), No Range (-½), Real Weapon (-¼)
- 7 *Rifle Butt:* HA +4d6; OAF Bulky (-1½), Hand-To-Hand Attack (-½)

Total cost: 84 points

MECHA MELEE WEAPONS

In some settings, mecha engage in titanic hand-to-hand battles with immense swords and other such weapons, such as the ones described below. Like the Gigantic Laser Rifle above, they're often bought as OAFs, but can be converted to OIFs if they're permanently attached to the mech.

Blazing Energy Sword: A fiery blade of energy, able to cut through even the strongest mech's defenses with a good blow.



HKA 3d6 (up to 6d6 with STR), Armor Piercing (+½) (67 Active Points); OAF Bulky (-1½), Real Weapon (-¼). Total cost: 24 points.

Buzzsaw: This weapon, a gigantic circular saw, attaches to the back of a mech's hand. Even the slightest touch is dangerous.

HKA 4d6, Autofire (3 shots; +¼), Armor Piercing (+½) (105 Active Points); OIF Bulky (-1), No STR Bonus (-½), Real Weapon (-¼). Total cost: 38 points.

Chainsword: This fearsome weapon is a gigantic, razor-sharp chainsaw in the form of a sword. Even a glancing contact with the "blade" can cut huge gouges out of an enemy mech.

HKA 5d6 (up to 10d6 with STR), Armor Piercing (+½), Penetrating (+½) (150 Active Points); OAF Bulky (-1½), Real Weapon (-¼). Total cost: 54 points.

Jaws And Claws: Bestial mecha often have enormous technological equivalents of animals' natural weaponry.

Jaws: *HKA 3d6 (up to 6d6 with STR), Armor Piercing (+½). Total cost: 67 points.*

Claws: *HKA 2d6 (up to 4d6 with STR), Armor Piercing (x2; +1). Total cost: 60 points.*

Piledriver: This weapon, mounted on a mech's arm, augments its natural punching strength.

HA +10d6 (50 Active Points); OIF Bulky (-1), Real Weapon (-¼), Hand-To-Hand Attack (-½). Total cost: 18 points.

Power Mace: Possessing even more raw power than a Blazing Energy Sword, a Power Mace lacks that weapon's ability to slice through armor with ease.

HKA 4d6 (up to 8d6 with STR) (60 Active Points); OAF Bulky (-1½), Real Weapon (-¼). Total cost: 22 points.

Rams

It's been observed that the most powerful weapon a person owns is his car — given its mass and speed, it can become deadly if it crashes into something. Some combat-oriented vehicles take advantage of this fact by building special attachments onto the frame or hull to enhance the damage done by a deliberate impact. A Greek birem's ram, a high-tech automobile's impact-augmenting front bumper, or a pirate starship's arrowhead-shaped forward hull are all examples.

In *Hero System* terms, you can define a ram in one (or both) of two ways. First, it can simply provide Hand-To-Hand Attack dice for use with Move Throughs. Second, if it extends out significantly beyond its own Vehicle's hull or body, a ram might count as Stretching only for purposes of causing

Move Through Damage. In either case, a ram is so solidly and inherently part of the overall Vehicle that it rarely, if ever, qualifies as a Focus.

Short Ram: *HA +4d6 (20 Active Points); Hand-To-Hand Attack (-½), Only With Move Throughs (-½). Total cost: 10 points.*

Long Ram: *Stretching 1", Reduced Endurance (0 END; +½) (7 Active Points); Always Direct (-¼), No Noncombat Stretching (-¼), Only To Cause Damage With Move Throughs (-½), No Velocity Damage (-¼). Total cost: 3 points.*

Rockets And Missiles

Rockets and missiles are warheads that propel themselves into a target. The simplest missiles use nothing but the force of their impact to damage the foe, but most mount explosive warheads. In most cases vehicular rockets and missiles are short-range weapons, though some can launch against targets thousands of miles away.

MISSILES AS RANGED KILLING ATTACKS

In *Hero System* terms, you can design missiles and rockets in two ways. The simplest is as RKAs with the *Increased Maximum Range* Advantage and the *Extra Time* Limitation. The *Extra Time* represents how long it takes the missile to reach its target; it can range from an Extra Segment to several minutes (depending on the distance to the target and the missile's speed). It's up to the GM whether to allow a Vehicle that's launched an *Extra Time* missile to make other attacks while waiting for it to hit its target. Alternately, designers can simply not take the *Extra Time* Limitation, and assume for ease of game play that any missile reaches its target in the same Segment it's launched.

Other appropriate Advantages for this sort of missile are *Area Of Effect* (particularly *One Hex Accurate*), *Armor Piercing*, *Explosion*, *Indirect* (attack originates at same point every time, but can strike target from any angle; +½), *No Range Modifier*, and *Penetrating*. Because they can twist and turn themselves in mid-flight, they rarely take the *Limited Arc Of Fire* Limitation, though this might be appropriate for direct short-range missiles.

Here are a few examples of this sort of missile:

Rocket Pod: A twelve-chambered rocket pod, arranged four by three, designed for installation on a mech's shoulder, the side of a large ground vehicle, or the like.

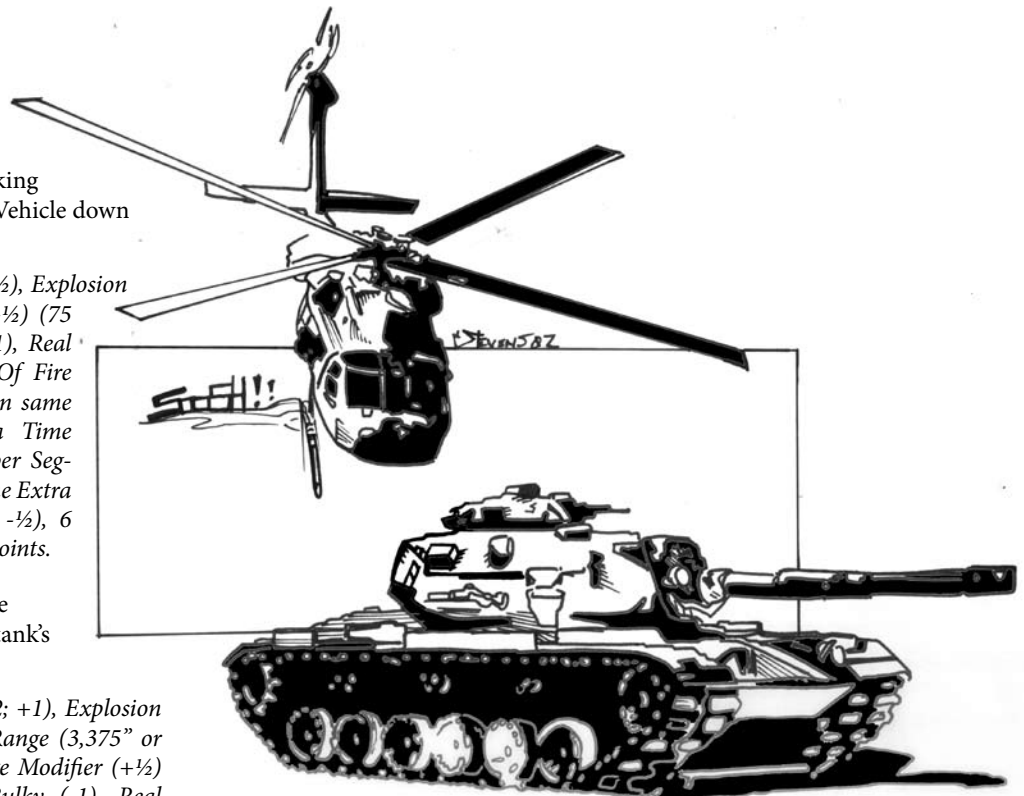
RKA 3d6, Explosion (+½), Increased Maximum Range (2,800" or about 3.5 miles; +¼), Indirect (attack originates at same point every time, but can strike target from any angle; +½), No Range Modifier (+½) (124 Active Points); OIF Bulky (-1), Real Weapon (-¼), Extra Time (travels at the rate of 250" per Segment, taking a minimum of one Extra Segment to reach its target; -½), 12 Charges (-¼). Total cost: 41 points.

Rocket Rack: A rack of six mini-rockets. Typically installed on the shoulder of a mech, the roof or hood of a car, or the like, it provides an extra bit of firepower without taking up much space or weighing the Vehicle down too much.

RKA 2d6, Armor Piercing (+½), Explosion (+½), No Range Modifier (+½) (75 Active Points); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (180 Degrees forward, only on same horizontal level; -½), Extra Time (travels at the rate of 120" per Segment, taking a minimum of one Extra Segment to reach its target; -½), 6 Charges (-¾). Total cost: 19 points.

Tankbuster Missile: A single large missile, designed to penetrate a tank's armor and kill its crew.

RKA 3d6, Armor Piercing (x2; +1), Explosion (+½), Increased Maximum Range (3,375" or about 4 miles; +¼), No Range Modifier (+½) (146 Active Points); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (180 Degrees forward; -¼), Extra Time (travels at the rate of 200" per Segment, taking a minimum of one Extra Segment to reach its target; -½), 6 Charges (-¾). Total cost: 39 points.



10	BODY	-2	
2	DEF	0	
6	SPD	30	Phases: 2, 4, 6, 8, 10, 12
			Total Characteristic Cost: 58

Movement: Ground: 0"/0"
Flight: 40"/1,280"

MISSILES AS VEHICLES

The more complex, but more "realistic," way to define a missile or rocket is to make it a small Vehicle (or Automaton) itself. It's equipped with Flight engines, sensors, whatever other systems it needs, and a No Range attack with 1 Charge which Never Recovers (and destroys the Vehicle). Their guidance comes from a remote operator (which can be cut off with interference, a Physical Limitation), or an onboard computer (which means the builder has to buy Senses for it). In most cases it's not necessary to buy the computer separately (just assume the missile has INT 10), but the most sophisticated missiles do need a separate computer. They have the Physical Limitation, *Can Be Missile Deflected By Vehicle* (Frequently, Greatly Impairing; 15 points), to reflect the fact that point defenses (see page 141) can destroy them before they impact their target. In some cases GMs may also allow characters to Missile Deflect them, based on special effects, game balance, and other considerations. They also have the Physical Limitation, *Costs Firing Vehicle 10 END To Fire* (Frequently, Slightly Impairing; 10 points), to represent the END cost of launching them at a target.

Here are two examples of this sort of missile:

AIM-7 SPARROW

Val	Char	Cost	Notes
2	Size	10	1.6" x .8"; -2 KB; -1 DCV
10	STR	-10	Lift 100 kg; 2d6 HTH
20	DEX	30	OCV: 7/DCV: 7

Abilities & Equipment

Cost	Power	END
57	<i>Engine:</i> Flight 40", x32 Noncombat; 1 Continuing Fuel Charge (easily-obtained fuel; 1 Minute; -¾)	[1cc]
-12	<i>Only Flies:</i> Running -6" (0" total)	
-2	<i>Only Flies:</i> Swimming -2" (0" total)	
27	<i>Explosive Warhead:</i> RKA 5d6, Area Of Effect (One Hex Accurate; +½), Armor Piercing (+½); No Range (-½), 1 Charge which Never Recovers (-4)	[1]
10	<i>Electronic Countermeasures:</i> Radio Group Flash Defense (10 points)	0
7	<i>Electronic Countermeasures:</i> Power Defense (15 points); Only Versus Electronic Jamming (-1)	0
18	<i>Targeting Radar:</i> Radar (Radio Group), Discriminatory, Analyze, Telescopic (+12 versus Range); OIF Bulky (-1)	0
5	<i>Communications Systems:</i> Radio Perception/Transmission (Radio Group); OIF Bulky (-1)	0

Skills

12	<i>Homing Sensors:</i> +6 OCV with Explosive Warhead
10	<i>Maneuverable:</i> +2 DCV

Total Abilities & Equipment Cost: 132
Total Vehicle Cost: 190

Value Disadvantages

- 15 Physical Limitation: Can Be Missile Deflected By Vehicle (Frequently, Greatly Impairing)
- 10 Physical Limitation: Costs Firing Vehicle 10 END To Fire (Frequently, Slightly Impairing)
- 15 Physical Limitation: Remote Guidance (enemy vehicles can interfere with or disable guidance system) (Infrequently, Fully Impairing)

Total Disadvantage Points: 40**Total Cost: 150/5 = 30**

Description: In service with the United States military for over 40 years, the AIM-7 Sparrow has been configured in numerous ways for numerous mission profiles. Over 40,000 have been manufactured, and it has seen combat on many battlefields. Its modern incarnations can reach speeds of Mach 4 (sometimes higher) and carry a warhead with 40 kg of high explosives. It's about 3.6 m long and 203 mm in diameter.

NUCLEAR SPACE MISSILE

Val	Char	Cost	Notes
0	Size	0	.5" x .5"; -0 KB; -0 DCV
10	STR	0	Lift 100 kg; 2d6 HTH
20	DEX	30	OCV: 7/DCV: 7
10	BODY	0	
5	DEF	9	
6	SPD	30	Phases: 2, 4, 6, 8, 10, 12
			Total Characteristic Cost: 69

Movement: Ground: 0"/0"
Flight: 40"/40,000"

Abilities & Equipment

Cost	Power	END
125	<i>Engine:</i> Flight 40", x1,000 Noncombat, Non-combat Acceleration/Deceleration (+1); 1 Continuing Fuel Charge (easily-obtained fuel; 1 Minute; -¾), Only In Space (-¼)	
-12	<i>Only Flies:</i> Running -6" (0" total)	
-2	<i>Only Flies:</i> Swimming -2" (0" total)	
109	<i>Nuclear Warhead:</i> RKA 20d6, Explosion (+½), MegaArea (1" = 10 km; +½); No Range (-½), 1 Charge which Never Recovers (-4)	[1]
15	<i>Electronic Counter-Countermeasures:</i> Radio Group Flash Defense (15 points)	0
7	<i>Electronic Counter-Countermeasures:</i> Power Defense (15 points); Only Versus Electronic Jamming (-1)	0
50	<i>Radar Array:</i> Multipower, 50-point reserve	
2u	1) <i>Close-Range Radar:</i> Radar (Radio Group), Discriminatory, Analyze	
5u	2) <i>Far-Range Radar:</i> Radar (Radio Group), Discriminatory, Analyze, MegaScale (1" = 100 km, can scale down to 1" = 1 km; +1)	
18	<i>Radar Enhancers:</i> +12 versus Range for Radio Group	
24	<i>Communications Systems:</i> HRRP (Radio Group), MegaScale (1" = 100 km, can scale down to 1" = 1 km; +1)	

Skills

- 20 *Homing Sensors:* +10 OCV with Nuclear Warhead
- 20 *Maneuverable:* +4 DCV
- 3 *Stealth Systems:* Stealth 13-

Total Abilities & Equipment Cost: 384**Total Vehicle Cost: 453****Value Disadvantages**

- 15 Physical Limitation: Can Be Missile Deflected By Vehicle (Frequently, Greatly Impairing)
- 10 Physical Limitation: Costs Firing Vehicle 10 END To Fire (Frequently, Slightly Impairing)
- 15 Physical Limitation: Remote Guidance (enemy vehicles can interfere with or disable guidance system) (Infrequently, Fully Impairing)

Total Disadvantage Points: 40**Total Cost: 413/5 = 83**

Description: This writeup represents a typical science fiction-style nuclear missile, suitable for use in space. It has a range of approximately 1,000 kilometers; beyond that point it runs out of fuel, and drifts in the direction it was last flying until it hits something (which usually triggers the explosion).

The goal of the person guiding the missile is to try to get right next to its target before detonating. If necessary the guider can detonate the warhead as long as a target is within range to be damaged.

Torpedoes

Torpedoes are just like rockets and missiles, except that they travel through the water (with Swimming) instead of through the air, and typically don't have as much speed or range. They're used by submarines to destroy ships, and vice-versa. Here's an example:

MARK 48 ADCAP TORPEDO

Val	Char	Cost	Notes
5	Size	25	3.2" x 1.6"; -5 KB; -3 DCV
10	STR	-25	Lift 100 kg; 2d6 HTH [0]
18	DEX	24	OCV: 6/DCV: 6
15	BODY	0	
4	DEF	6	
5	SPD	22	Phases: 3, 5, 8, 10, 12
			Total Characteristic Cost: 52

Movement: Ground: 0"/0"
Swimming: 17"/34"

Abilities & Equipment

Cost	Power	END
9	<i>Engine:</i> Swimming +15" (17" total); 1 Continuing Fuel Charge (easily-obtained fuel; 1 Minute; -¾)	[1cc]
-12	<i>Only Swims:</i> Running -6" (0" total)	
33	<i>Explosive Warhead:</i> RKA 8d6, Explosion (+½); No Range (-½), 1 Charge which Never Recovers (-4)	[1]
10	<i>Electronic Countermeasures:</i> Radio Group Flash Defense (10 points)	0
7	<i>Electronic Countermeasures:</i> Power Defense (15 points); Only Versus Electronic Jamming (-1)	0
18	<i>Targeting Sonar:</i> Active Sonar (Hearing Group), Discriminatory, Analyze, Telescopic (+12 versus Range); OIF Bulky (-1)	0
5	<i>Communications Systems:</i> Radio Perception/Transmission (Radio Group); OIF Bulky (-1)	0

Skills

10	<i>Homing Sensors:</i> +5 OCV with Explosive Warhead
10	<i>Maneuverable:</i> +2 DCV

Total Abilities & Equipment Cost: 90

Total Vehicle Cost: 142

Value Disadvantages

15	Physical Limitation: Can Be Missile
----	-------------------------------------

	Deflected By Vehicle (Frequently, Greatly Impairing)
10	Physical Limitation: Costs Firing Vehicle 10 END To Fire (Frequently, Slightly Impairing)
15	Physical Limitation: Remote Guidance (enemy vehicles can interfere with or disable guidance system) (Infrequently, Fully Impairing)

Total Disadvantage Points: 40

Total Cost: 102/5 = 20

Description: The Mark 48 ADCAP (Advanced Capability) torpedo, in use aboard many U.S. Navy submarines, is nearly six meters long, weighs 1,663 kg, and has a 293 kg warhead. It can maintain speeds of over 55 knots (63 miles per hour), has a range of about 23 miles, and can descend to a maximum depth of 760 meters. It's wire-guided, and uses passive/active acoustic homing methods.

Miscellaneous Weapons

Here are a few vehicular weapons that don't fit into any other category.

COLLISION TRIGGER

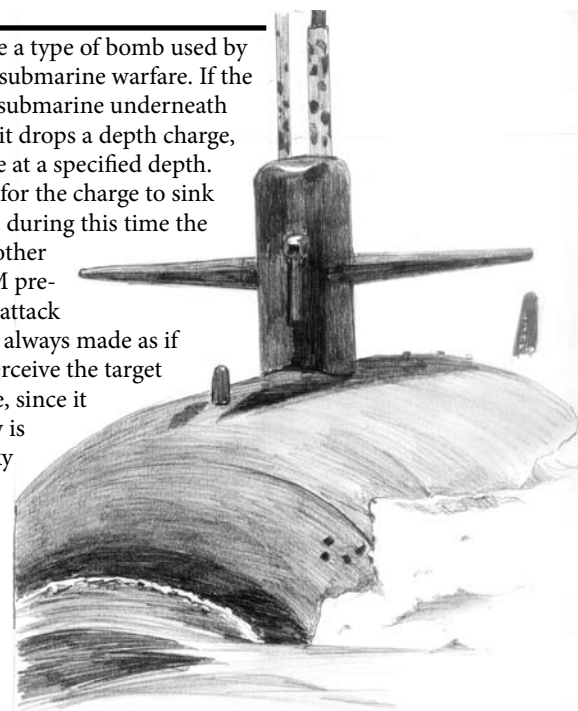
Installed on the bumpers or sides of a Vehicle, this device triggers a weapon to fire whenever the Vehicle impacts, or is impacted by, another vehicle or obstacle on that side. The designer specifies which side the trigger is installed on. Typically the trigger is Obvious (to scare off attackers) but Inaccessible (so enemies can't easily remove it).

Collision Trigger: Trigger (whenever a defined side or part of Vehicle impacts another physical object; +¼) for up to a 150 Active Point-power (37 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 16 points.

DEPTH CHARGES

Depth charges are a type of bomb used by ships engaged in anti-submarine warfare. If the ship believes there's a submarine underneath it (or at least nearby), it drops a depth charge, which is set to explode at a specified depth. It takes a few seconds for the charge to sink to the specified depth; during this time the ship can usually take other actions, unless the GM prefers to forbid this. An attack with a depth charge is always made as if the attacker cannot perceive the target with a Targeting Sense, since it can't — the ship's crew is just hoping to get lucky and have the depth charge explode close enough to the sub to damage it.

Depth Charge: RKA 3d6, Explosion (-1 DC/3"; +1), Trigger (specified depth;



+¼) (101 Active Points); OAF Bulky (-1½), Real Weapon (-¼), *Extra Time* (time it takes the charge to sink to the specified depth; minimum of 1 Turn; -1¼), 10 Charges (-¼). Total cost: 24 points.

PAINT SPRAYER

This weapon sprays a jet of thick, sticky, fast-drying paint onto the windshield of a vehicle, thus blocking the operator's view. Normal windshield wipers are ineffective against this paint until they've had a few seconds to work on it (*i.e.*, until the Flash's effects disappear); a vehicle needs a special windshield to avoid the effects (page 146). On the downside, the weapon's only effective if the attacker is close to his target, and the victim may be able to minimize the effects of the blockage (*i.e.*, suffer less than the full penalty for lack of a Targeting Sense) if he can lean out his window, or use a sensory device such as vehicular radar.

Paint Sprayer: Sight Group Flash Attack 8d6, NND (defense is special type of windshield, see page 146; +1) (80 Active Points); OIF Bulky (-1), Real Weapon (-¼), Limited Arc Of Fire (180 Degrees on a specific side of the vehicle, only on same horizontal level; -½), Limited Range (3"; -¼), 8 Charges (-½). Total cost: 23 points.

POWER DRAINER

This "rubber science" device projects a ray that creates an energy field which saps the power of engines, motors, fuel cells, and other such power sources.

Power Drainer: Drain REC 8d6, Ranged (+½) (120 Active Points); OIF Bulky (-1), Real Weapon (-¼), Only Works Versus REC Of Vehicular Endurance Reserves (-1½), 8 Charges (-½) (total cost: 28 points) plus Drain END 6d6, Ranged (+½) (90 Active Points); OIF Bulky (-1), Real Weapon (-¼),

Only Works Versus END Of Vehicular Endurance Reserves (-1½), Linked (-½), 8 Charges (-½) (total cost: 19 points). Total cost: 47 points.

TRACTOR BEAM

In settings where artificial gravity control technology exists, Vehicles often come equipped with tractor beams — generators able to project beams of gravitic force. Typically a Vehicle uses its tractor beam as a tool, to move obstacles out of the way or tow a disabled vehicle to a repair station. But it can become a potent weapon in combat, used to hurl objects at other vehicles, or "push" an enemy vehicle into a collision with an obstacle. Tractor beams are built as Telekinesis, usually with a high level of STR and the *Affects Whole Object* Limitation.

Tractor Beam: Telekinesis (60 STR) (90 Active Points); OIF Bulky (projector; -1), Affects Whole Object (-¼). Total cost: 40 points.

ULTRA-INTENSITY HEADLIGHTS

These headlights are modified so that at the flick of a switch, they go from normal luminosity to a brightness intense enough to blind the occupants of oncoming vehicles.

Cost Ultra-Intensity Headlights

- 45 *Ultra-Intensity Headlights:* Multipower, 90-point reserve; all OIF Bulky (-1)
- 1u 1) *Normal Luminosity:* Sight Group Images, Increased Size (8" Cone; +½), Reduced Endurance (0 END; +½); OIF Bulky (-1), Only To Create Light (-1), Limited Arc Of Use (60 Degrees forward, same horizontal level; -¾)
- 3u 2) *Blinding Brightness:* Sight Group Flash 8d6, Area Of Effect (18" Cone; +1¼); OIF Bulky (-1), No Range (-½), Real Weapon (-¼), Limited Arc Of Use (60 Degrees forward, same horizontal level; -¾)

WHEEL BLADES

Some Vehicles, including some types of chariots and cars outfitted for automobile duels, have long blades projecting out for a foot or two from the ends of their axles. Often jagged, these blades allow for lethal sideswipe attacks against people or vehicles.

Wheel Blades: HKA 1½d6 (up to 3d6+1 with STR and velocity), Reduced Endurance (0 END; +½) (37 Active Points); OIF Bulky (-1), Real Weapon (-¼), Must Perform A Move By To Use (-½). Total cost: 13 points.



DEFENSES



To keep attackers from vaporizing them with all this aggressive hardware, Vehicles need defenses.

TYPES OF DEFENSES

Realistically, there are three ways to defend a vehicle: armor to soak up damage; point defenses to stop missiles; and stealth to avoid being shot at. In games with abundant “rubber science,” Vehicles can also mount force shields, dimensional phase systems, cloaking devices, and the like. The defense systems presented below include examples from all of these categories.

HOW MUCH DEFENSE?

When determining the defenses for Vehicles in your campaign, keep the nature and type of weapons used in the setting in mind. Ideally, a Vehicle’s total defenses should protect against most damage, but not all of it. While large vehicles may be effectively immune to the attacks of smaller/weaker vehicles, and some vehicles tend to be fragile, two Vehicles of the same size and power should have the ability to damage each other. That doesn’t mean they can destroy each other with a single shot, but rather that a shot with an above-average damage roll should inflict at least a little damage on the target. The Vehicle’s size (*i.e.*, BODY) keeps it from being significantly damaged too quickly, but enough shots can, slowly but surely, blow it into chunks of debris.

For example, suppose the GM decides the average vehicle weapon in his campaign does RKA 6d6. That means, on the average, a roll of about 21 BODY, with a maximum of 36 BODY. The average powerful vehicle mounting this sort of weapon should therefore have a DEF in the range of about 16-24 — tough enough to keep from being too badly damaged by most shots, but not enough to be invulnerable. A bigger, more powerful vehicle might have more DEF; smaller, weaker ones (like scouts and fighters) probably have less.

Making a Vehicle’s defenses Ablative changes this calculation a little. Since ablating defense constitutes a form of “damaging” the target, GMs might allow much higher Ablative defenses than ordinary defenses.

DEFENSE MASS AND VOLUME

Typically defensive systems occupy a volume of 1-3 cubic hexes per 5-10 Active Points, and have a mass of up to 3 kg per Active Point (more for heavy armors). As always, the GM may vary this as he sees fit.

Armor

Armor — a thicker, stronger, and/or better-protected frame, body, or hull, in other words — is the simplest form of Vehicle defense. In game terms, this typically means buying more DEF for a Vehicle, though sometimes designers use Armor instead when the vehicle only wants defense against one type of attacks (Physical or Energy).

Vehicle designers need to worry about mass, which limits how much armor they can plate on — even science fiction technology can only reduce the weight of metal and plastic so much. As a rough guideline, maximum “realistic” DEF totals for Vehicles through the near future are 30-40 for ground vehicles, 15-20 for water vehicles and space vehicles, and 9-12 for air vehicles. Of course, in games with “rubber science,” such as many *Champions* and *Star Hero* games, this can change... and the magic of *Fantasy Hero* makes virtually anything possible.

Designers often optimize vehicular armor against the weapons they expect vehicles to face — if lasers are the standard weapon, then vehicles will have heavy ED and light PD, and perhaps even extra ED with the Limitation *Only Protects Against Lasers*. If railguns are the queen of battle, Vehicles’ ED will be light. Another common technique is to put very heavy armor on one side of a Vehicle, then keep that side facing the enemy.

ABLATIVE ARMOR

Often vehicular armor is ablative, boiling off as it gets hit. This is not only more realistic, but makes it a little cheaper.

Ablative Foam: A cheap way to get some temporary added protection from energy attacks, ablative foam sprays onto a Vehicle, forming a thick, flexible layer.

Armor (+8 ED), 3 Continuing Charges lasting 1 Hour each (removed by water or being shot off; +¼) (15 Active Points); OIF (-½), Ablative (-1). Total cost: 6 points.

Ablative Plating: These armored plates attach to a vehicle quickly and easily with explosive bolts. When attacks have shredded the armor, the operator can trigger the bolts to get rid of the remains, improving the vehicle’s aerodynamic profile.

+6 DEF (18 Active Points); OIF Bulky (-1), Ablative (-½). Total cost: 7 points.



DEFENSIVE COATINGS

It's possible to get some extra defense for a Vehicle based on the way it's painted or covered — not a lot, but in some battles, every little bit helps.

Anti-Laser Finish: By using special paints that give his Vehicle a distinctive mirror finish, a character can make his car or plane specially resistant to laser attacks. The nature and purpose of the coating is obvious, and may qualify as a Distinctive Feature in some settings.

Armor (+2 ED) (3 Active Points); Only Versus Lasers (-1), Visible (-¼). Total cost: 1 point.

Bulletproof Paint: It looks like ordinary vehicle paint — but in fact it helps the vehicle withstand gunfire!

Armor (+2 PD) (3 Active Points); Not Versus Collision Damage (-½). Total cost: 2 points.

TANK ARMOR

Tanks and other modern-day armored vehicles feature some amazing — and amazingly protective — types of armor. Some of them include:

Chobham Armor: Chobham armor protects advanced tanks, such as the M1A1 Abrams and its cousins. It consists of layers of different materials, mostly ceramics, plastics, and advanced metal alloys, with pockets of air between and/or among them. The layers are set together at odd angles to make it even more difficult for an attack to penetrate them. The ceramic layers absorb immense amounts of heat and physical impact, while the hot gases or metal pieces from the attack disperse in the open pockets of air within the armor. In game terms, Chobham armor typically provides DEF in the 20s or even 30s, depending on the underlying material it's attached to and the like. The DEF may

be Hardened, but does not have to be; this may depend more on the underlying material.

+24 DEF, Hardened (+¼). Total cost: 90 points.

Reactive Armor: Reactive armor is ordinary metal or steel armor, but with a steel box bolted onto the outside of it. The steel box contains explosives. Although strong enough to resist small arms fire, the box cannot withstand an anti-tank attack or shot from an enemy tank's main gun. When one hits, the explosives detonate, disrupting the "jet" of the shaped-charge attack and protecting the tank. To overcome this, weaponsmiths designed "tandem" war-

heads, with one shaped charge to remove the reactive armor, and another to penetrate the vehicle. Armorers responded with reactive armor that has two layers of explosive boxes.

In game terms, you can buy reactive armor as extra DEF with the *Ablative* (-½) Limitation. Typically it is not Hardened; it has no special extra effect against armor-piercing kinetic impact anti-tank weapons. The GM may want to keep track of which Hit Locations have lost their reactive armor, in case a second attack strikes that same location.

Reactive Armor: +8 DEF (24 Active Points); *Ablative* (-½). Total cost: 16 points.

Double-Layered Reactive Armor: +8 DEF (24 Active Points); *Ablative* (-½) (total cost: 16 points) **plus** +6 DEF (18 Active Points); *Ablative* (-½) (total cost: 12 points). Total cost: 28 points.

Electric Reactive Armor: Some research has been conducted into the idea of electric reactive armor — armor consisting of two metal plates, electrically charged, with an insulator in between. An incoming attack penetrates the plates, closes the circuit, and thus creates an intense electrical discharge that vaporizes the attack. Exactly how this would work, what attacks it would be effective against, and what would power it remains unclear, since the technology is not yet operational. But in *Hero System* terms, it would probably look something like this:

+15 DEF (45 Active Points); Costs Endurance (vehicle's power plant must keep the plates electrically charged; -½). Total cost: 30 points.

Disguise Systems

Technically a type of stealth system (page 145), disguise systems allow a Vehicle to change its shape, color, or other distinguishing characteristics so the operator and occupants can hide from searchers or infiltrate secured facilities.

Color Alteration Crystals: This system consists of special crystals imbedded in the paint of a vehicle. At the touch of a switch, the operator can send a mild electric current through the paint, causing the crystals to shift orientation and display a new color. The system comes with a palette of four-colors, which must be pre-selected when it's installed.

Shape Shift (Sight Group, four predefined shapes), Reduced Endurance (0 END; +½) (22 Active Points); IIF Bulky (-¾), Only Changes Vehicle's Color (-1), Extra Time (Full Phase; -½). Total cost: 7 points.

Easy-Remove Paint: The poor man's version of Color Alteration Crystals, this is simply a special type of paint applied to a vehicle. It comes off with a high-pressure wash (ordinary washing or rain don't affect it) or the application of a special chemical treatment. After it's removed, the special paint must be re-applied, which takes about 2-3 hours of work.

Shape Shift (Sight Group), Reduced Endurance (0 END; +½) (15 Active Points); 1 Recoverable Charge (must re-apply paint; -1¼), Extra Time (2-3 Hours to apply paint, and 1 Turn to remove it; -3), Only Changes Vehicle's Color (-1), Shifting Back To Normal Shape Requires Special Equipment/Processes (-½). Total cost: 2 points.

Holographic Field: The Vehicle can surround itself with a tight holographic field that makes it look like other Vehicles. Observant searchers can see through basic holo-disguise systems in some cases; more advanced systems can fool anyone's sight. But with either type of system, touching the vehicle, or searching it with Senses other than Sight, reveals the truth.

Basic Holographic Field: *Sight Group Images, -5 to PER Rolls, Increased Size (2.5" radius [assumes a 2.5" x 1.25" Vehicle]; +½) (37 Active Points); IIF Bulky (holofield generator; -¾), Set Effect (any vehicle of the same type, must be Vehicle's Size; -½). Total cost: 16 points.*

Foolproof Holographic Field: *Shape Shift (Sight Group, any vehicle of the same type and Size), Imitation, Instant Change (35 Active Points); IIF Bulky (holofield generator; -¾). Total cost: 20 points.*

IFF Alteration: Aircraft, space vehicles, and some other types of vehicles use "identify friend or foe" systems which broadcast electronic signals that identify them to other vehicles. Some vehicles have systems that allow them to alter this signal, creating an effective disguise in situations where the vehicle cannot be seen with the naked eye.

Shape Shift (Radio Group, any vehicle of the same type), Imitation (30 Active Points); IIF Bulky (-¾). Total cost: 17 points.

Rotating License Plates: A common trick for disguising cars in spy movies and the like is to have a system of rotating license plates with four options. While it won't fool a determined searcher, it's more than enough to keep the typical policeman off your trail.

Shape Shift (Sight and Touch Groups, four predefined shapes), Costs Endurance Only To Change Shape (+¼) (22 Active Points); IIF Bulky (-¾), Only Changes Vehicle's License Plate (-2). Total cost: 6 points.

Vehicle Disguise Kit: Given enough time to prepare, a character with the right materials can make his vehicle look like any similar type and size of vehicle.

Shape Shift (Sight and Touch Groups, any vehicle of the same type and Size), Imitation, Reduced Endurance (0 END; +½) (49 Active Points); OIF (disguise parts and supplies, machine and print shop; -½), Extra Time (1 Day or more to change shape, 1 Hour or more to change back; -4). Total cost: 9 points.

Electronic Counter-Countermeasures

Vehicles can counter electronic warfare systems (page 126) with ECCM (electronic counter-countermeasures).

Basic Electronic Counter-Countermeasures: When the enemy tries to jam your sensors or play other electronic tricks, you have the technology to counter his efforts.

Suppress Electronic Warfare 8d6, any Power one at a time (+¼), Increased Maximum Range (6,250", or about 7.5 miles; +½), No Range Modifier (+½) (90 Active Points); OAF Bulky (-1½). Total cost: 36 points.

Space Vehicle Option: *Suppress Electronic Warfare 8d6, any two Powers simultaneously (+½), MegaRange (1" = 10 million km; +2) (140 Active Points); OAF Bulky (-1½). Total cost: 56 points.*

System Hardening, Type I: The Vehicle's systems have special protection against many forms of electronic warfare.

Weak System Hardening: *Radio Group Flash Defense (5 points). Total cost: 5 points.*

Standard System Hardening: *Radio Group Flash Defense (10 points). Total cost: 10 points.*

Strong System Hardening: *Radio Group Flash Defense (15 points). Total cost: 15 points.*

Extremely Strong System Hardening: *Radio Group Flash Defense (20 points). Total cost: 20 points.*

System Hardening, Type II: Vehicles who want full protection against ECM include Type II hardening as well as Type I.

Weak System Hardening: *Power Defense (5 points) (5 Active Points); Only Versus Electronic Jamming (-1). Total cost: 2 points.*

Standard System Hardening: *Power Defense (10 points) (10 Active Points); Only Versus Electronic Jamming (-1). Total cost: 5 points.*

Strong System Hardening: *Power Defense (15 points) (15 Active Points); Only Versus Electronic Jamming (-1). Total cost: 7 points.*

Extremely Strong System Hardening: *Power Defense (20 points) (20 Active Points); Only Versus Electronic Jamming (-1). Total cost: 10 points.*



Fire Safety Systems

Attacks that disrupt electrical systems, generate heat, or involve incendiary weapons often start fires aboard a vehicle. Here are some devices designed to cope with the problem.

Fire Extinguishing System: This system detects and then extinguishes fire. In small Vehicles, the operator knows when a fire occurs and activates the system himself. Larger vehicles have automated fire detection devices, and multiple fire suppression systems to cover the whole Vehicle.

Dispel Fire Powers 12d6, all Fire powers simultaneously (+2) (108 Active Points); 8 Charges (-½). Total cost: 72 points.

Large Vehicle Option: *Detect Unauthorized/Uncontrolled Fires (INT Roll +5, using Vehicle's Computer, or 14- if no Computer) (total cost: 8 points); Only Within Affected Area (20" x 20" zone; -2) (total cost: 3 points) plus Dispel Fire Powers 20d6, all Fire powers simultaneously (+2) (180 Active Points); Only Within Affected Area (10" x 10" zone; -2), 16 Charges (-0) (total cost: 60 points). Total cost: 63 points.*

Fireproofing: The Vehicle has been generally fireproofed throughout, thus inhibiting the damage caused by and spread of fires.

Energy Damage Reduction, Resistant, 25% (15 Active Points); Only Works Against Fire (-½). Total cost: 10 points.

Force Shields

Force-fields in all their variations are the classic vehicle defense of Pulp and Space Opera science fiction (they sometimes occur in other genres, such as superheroes). From *Star Trek's* deflectors to the Langston Field of *The Mote In God's Eye*, vehicles surrounded by bubbles of energy have been shrugging off attacks capable of reducing them to confetti for decades.

A force shield is defined as either a Force Field or Force Wall. A Force Field is much cheaper, since a Vehicle has to make a Force Wall long enough to surround itself. (Alternately, a Vehicle may buy two or more Force Walls, each covering part of the Vehicle, but join them together to form a single "bubble" around the whole vehicle, as if they were a single Wall; that way you can arrange situations where one shield isn't functioning, but the others are.) On the other hand, the protection offered by the Force Wall is superior in many cases, because it stops attacks at some distance from the Vehicle itself. Even though the Power should have the *Self Only Limitation* — Vehicles rarely have the ability to surround other vehicles with force bubbles — Vehicles may, if they wish, make their Force Walls long enough that they surround not only the Vehicle, but a small amount of space as well. The *No Range Limitation* is not applied in case the GM wants to let the ship "extend" its shields on

occasion, but Vehicle designers could add it if they wanted to reduce the cost of force shields a little.

A Vehicle designer can make force shields Ablative, just like a Vehicle's armor. In this case, the -1 optional version of Ablative usually works best (see page 115 of the *Hero System 5th Edition, Revised*). Some Vehicles have different layers of shields — perhaps an outer Force Wall and an inner Force Field, or multiple nested Force Walls.

Ordinarily, an Ablative defense that's lost can only be recovered at the end of an adventure. That works fine for physical defenses like armor, but doesn't make quite as much sense for a force shield — in science fiction, a vehicle can often re-create a "collapsed" shield, just not immediately after it collapses (the shield-generating systems have to work back up to full charge, or the like). Gamemasters should allow a Vehicle to re-activate a "destroyed" Ablative force shield after a defined period of time has passed (typically 1 Minute, or 5 Minutes, or an Hour — any of which are an eternity in battle), unless the shield-generating equipment itself is damaged or destroyed. (At the GM's option, the value of Ablative may be $\frac{1}{4}$ less Limitation due to this change.) For Force Walls without Ablative, you can simulate this same effect with the *Extra Time* Limitation.

Vehicle Force Shield, Type I: A basic force shield, tuned against both physical and energy attacks.

Weak Type I Force Shield: *Force Field* (20 PD/20 ED) (40 Active Points); *OIF Bulky* (shield generators; -1), *Ablative* (-1). Total cost: 13 points.

Standard Type I Force Shield: *Force Field* (30 PD/30 ED) (60 Active Points); *OIF Bulky* (shield generators; -1), *Ablative* (-1). Total cost: 20 points.

Strong Type I Force Shield: *Force Field* (40 PD/40 ED) (80 Active Points); *OIF Bulky* (shield generators; -1), *Ablative* (-1). Total cost: 27 points.

Extremely Strong Type I Force Shield: *Force Field* (60 PD/60 ED) (120 Active Points); *OIF Bulky* (shield generators; -1), *Ablative* (-1). Total cost: 40 points.

Vehicle Force Shield, Type II: This shield offers an outer layer of protection. It's designed to provide one-fourth of a shield bubble surrounding a ship; the Vehicle should buy 3 more (for 10 points) to create a full shield.

Small Type II Force Shield, Weak: *Force Wall* (10 PD/10 ED; 25" long) (98 Active Points); *OIF Bulky* (shield generators; -1), *Self Only* ($-\frac{1}{2}$), *Restricted Shape* (one-fourth of "bubble" around vehicle; $-\frac{1}{4}$), *Extra Time* (1 Minute to re-erect Force Wall after it collapses; $-1\frac{1}{2}$). Total cost: 23 points.

Small Type II Force Shield, Standard: *Force Wall* (20 PD/20 ED; 25" long) (148 Active Points); *OIF Bulky* (shield generators; -1), *Self*

Only ($-\frac{1}{2}$), *Restricted Shape* (one-fourth of "bubble" around vehicle; $-\frac{1}{4}$), *Extra Time* (1 Minute to re-erect Force Wall after it collapses; $-1\frac{1}{2}$). Total cost: 35 points.

Small Type II Force Shield, Strong: *Force Wall* (30 PD/30 ED; 25" long) (198 Active Points); *OIF Bulky* (shield generators; -1), *Self Only* ($-\frac{1}{2}$), *Restricted Shape* (one-fourth of "bubble" around vehicle; $-\frac{1}{4}$), *Extra Time* (1 Minute to re-erect Force Wall after it collapses; $-1\frac{1}{2}$). Total cost: 47 points.

Small Type II Force Shield, Extremely Strong: *Force Wall* (40 PD/40 ED; 25" long) (248 Active Points); *OIF Bulky* (shield generators; -1), *Self Only* ($-\frac{1}{2}$), *Restricted Shape* (one-fourth of "bubble" around vehicle; $-\frac{1}{4}$), *Extra Time* (1 Minute to re-erect Force Wall after it collapses; $-1\frac{1}{2}$). Total cost: 58 points.

Average Type II Force Shield, Weak: *Force Wall* (10 PD/10 ED; 50" long) (148 Active Points); *OIF Bulky* (shield generators; -1), *Self Only* ($-\frac{1}{2}$), *Restricted Shape* (one-fourth of "bubble" around vehicle; $-\frac{1}{4}$), *Extra Time* (1 Minute to re-erect Force Wall after it collapses; $-1\frac{1}{2}$). Total cost: 35 points.

Average Type II Force Shield, Standard: *Force Wall* (20 PD/20 ED; 50" long) (198 Active Points); *OIF Bulky* (shield generators; -1), *Self Only* ($-\frac{1}{2}$), *Restricted Shape* (one-fourth of "bubble" around vehicle; $-\frac{1}{4}$), *Extra Time* (1 Minute to re-erect Force Wall after it collapses; $-1\frac{1}{2}$). Total cost: 47 points.

Average Type II Force Shield, Strong: *Force Wall* (30 PD/30 ED; 50" long) (248 Active Points); *OIF Bulky* (shield generators; -1), *Self Only* ($-\frac{1}{2}$), *Restricted Shape* (one-fourth of "bubble" around vehicle; $-\frac{1}{4}$), *Extra Time* (1 Minute to re-erect Force Wall after it collapses; $-1\frac{1}{2}$). Total cost: 58 points.

Average Type II Force Shield, Extremely Strong: *Force Wall* (40 PD/40 ED; 50" long) (298 Active Points); *OIF Bulky* (shield generators; -1), *Self Only* ($-\frac{1}{2}$), *Restricted Shape* (one-fourth of "bubble" around vehicle; $-\frac{1}{4}$), *Extra Time* (1 Minute to re-erect Force Wall after it collapses; $-1\frac{1}{2}$). Total cost: 70 points.

Large Type II Force Shield, Weak: *Force Wall* (10 PD/10 ED; 100" long) (248 Active Points); *OIF Bulky* (shield generators; -1), *Self Only* ($-\frac{1}{2}$), *Restricted Shape* (one-fourth of "bubble" around vehicle; $-\frac{1}{4}$), *Extra Time* (1 Minute to re-erect Force Wall after it collapses; $-1\frac{1}{2}$). Total cost: 58 points.

Large Type II Force Shield, Standard: *Force Wall* (20 PD/20 ED; 100" long) (298 Active Points); *OIF Bulky* (shield generators; -1), *Self Only* ($-\frac{1}{2}$), *Restricted Shape* (one-fourth of "bubble" around vehicle; $-\frac{1}{4}$), *Extra Time* (1 Minute to re-erect Force Wall after it collapses; $-1\frac{1}{2}$). Total cost: 70 points.

Large Type II Force Shield, Strong: *Force Wall (30 PD/30 ED; 100" long) (348 Active Points); OIF Bulky (shield generators; -1), Self Only (-½), Restricted Shape (one-fourth of "bubble" around vehicle; -¼), Extra Time (1 Minute to re-erect Force Wall after it collapses; -1½). Total cost: 82 points.*

Large Type II Force Shield, Extremely Strong: *Force Wall (40 PD/40 ED; 100" long) (398 Active Points); OIF Bulky (shield generators; -1), Self Only (-½), Restricted Shape (one-fourth of "bubble" around vehicle; -¼), Extra Time (1 Minute to re-erect Force Wall after it collapses; -1½). Total cost: 94 points.*

Enormous Type II Force Shield, Weak: *Force Wall (10 PD/10 ED; 200" long) (448 Active Points); OIF Bulky (shield generators; -1), Self Only (-½), Restricted Shape (one-fourth of "bubble" around vehicle; -¼), Extra Time (1 Minute to re-erect Force Wall after it collapses; -1½). Total cost: 105 points.*

Enormous Type II Force Shield, Standard: *Force Wall (20 PD/20 ED; 200" long) (498 Active Points); OIF Bulky (shield generators; -1), Self Only (-½), Restricted Shape (one-fourth of "bubble" around vehicle; -¼), Extra Time (1 Minute to re-erect Force Wall after it collapses; -1½). Total cost: 117 points.*

Enormous Type II Force Shield, Strong: *Force Wall (30 PD/30 ED; 200" long) (548 Active Points); OIF Bulky (shield generators; -1), Self Only (-½), Restricted Shape (one-fourth of "bubble" around vehicle; -¼), Extra Time (1*

Minute to re-erect Force Wall after it collapses; -1½). Total cost: 129 points.

Enormous Type II Force Shield, Extremely Strong: *Force Wall (40 PD/40 ED; 200" long) (598 Active Points); OIF Bulky (shield generators; -1), Self Only (-½), Restricted Shape (one-fourth of "bubble" around vehicle; -¼), Extra Time (1 Minute to re-erect Force Wall after it collapses; -1½). Total cost: 141 points.*

Improved Chassis/Hull

Some Vehicles have enhanced and strengthened bodies, hulls, frames, or the like, making them tougher and more durable than similar vehicles.

Improved Chassis/Hull: +2 DEF and +4 BODY.
Total cost: 10 points.

NBC Protection

Military vehicles designed to operate on battlefields where nuclear, biological, and/or chemical warfare might take place are often specially sealed and secured to protect the occupants from these effects. Of course, no modern Vehicle can withstand the effects of a nearby nuclear blast; the shielding in this case refers to protecting the Vehicle's occupants from radiation and the like. Many Vehicles with NBC Protection also have Type II System Hardening (Power Defense) to protect against electromagnetic pulses (EMPs).



NBC Protection: *Life Support (Self-Contained Breathing; Safe Environment: High Radiation; Immunity to chemical and biological warfare agents). Total cost: 22 points.*

Personnel Safety Systems

Since collisions often cause more harm to a vehicle's operator and passengers than to the vehicle itself, devices have been designed to protect vehicle occupants from harm.

Airbag: A rapid-inflation balloon that cushions an operator's or occupant's impact during a collision.

+10 PD (adds to standard seatbelt's PD) (10 Active Points); OIF Bulky (-1), Only To Protect Occupants Against Damage From Collisions (-2), 1 Charge (-2). Total cost: 2 points.

Improved Seatbelts: As discussed on page 42, standard seatbelts are Everyvehicle Equipment that provide +4 PD against collision damage. Improved passenger restraint systems increase that protection further... assuming a passenger buckles up.

+4 PD (adds to standard seatbelt's PD) (4 Active Points); OIF Bulky (-1), Only To Protect Occupants Against Damage From Collisions (-2). Total cost: 1 point.

Safety Seat: Designed for military vehicles, this seat not only provides excellent protection against collision damage, but is bulletproof.

+6 PD (adds to standard seatbelt's PD) (6 Active Points); OIF Bulky (-1), Only To Protect Occupants Against Damage From Collisions (-2) (total cost: 1 point) **plus** Armor (6 PD) (9 Active Points); OIF Bulky (-1), Partial Coverage (one passenger, 180 degrees behind him; -2) (total cost: 2 points). Total cost: 3 points.

Stasis Seat: Found in some science fiction settings, this is a chair with built-in stasis field technology. When danger threatens, the user activates it, becoming nearly invulnerable in the process. However, while inside, he's in stasis; he can't act (even to turn off the field) and is utterly unaware of his surroundings. He has to rely on his Vehicle's computer, or a comrade, to turn off the field and free him.

*Force Wall (100 PD/100 ED), Hardened (x3; +¾), Reduced Endurance (0 END; +½), Persistent (+½) (1,375 Active Points); OIF Bulky (-1), User In Stasis And Cannot Act (-2) (total cost: 344 points) **plus** Life Support: Total (including Longevity: Immortality) (50 Active Points); OIF Bulky (-1), User In Stasis And Cannot Act (-2), Linked (-½) (total cost: 11 points). Total cost: 355 points.*

Point Defenses

Point defenses stop incoming physical weapons (missiles and the like) before they damage the vehicle. Most use light machine guns, rapid-firing lasers, or railguns to destroy approaching missiles. Rather than engaging in a battle where the vehicle tries to do enough BODY damage to a missile to destroy it, it's best to define point defense systems as a form of Missile Deflection (as noted on page 131, missiles have a Physical Limitation that allows vehicle to Deflect them).

Often point defenses are completely automated, in which case it's the OCV of the Vehicle (or its Computer, if it has one) which determines whether a successful interception happens. Of course, that means the vehicle is using an Action to Deflect, which may keep it from moving that Phase. If a character, or a dedicated computer, operates the point defenses, they can function without requiring any Actions by the vehicle itself (assuming you're using the Complex Vehicle Actions rules).

Deflector Field: A force-field like energy shield that destroys/deflects incoming physical objects to keep the vehicle safe.

Missile Deflection (all physical projectiles) (15 Active Points); OIF Bulky (-1), Costs Endurance (-½). Total cost: 6 points.

Mark 15 Phalanx CIWS: Designed in the 1970s to protect U.S. Navy vessels from antiship missiles and like attacks, the Phalanx CIWS (Close-In Weapons System) is a totally self-contained, autonomous system that uses radar and infrared sensors to track incoming attacks. When it detects one, it opens fire with 20mm heavy-metal rounds; it usually fires in 60- or 100-round bursts. Current models have an ammunition capacity of 1,550.

In game terms, the Phalanx is a Multipower. It has a "defense mode" (Missile Deflection), and an "attack mode" in case it wants to literally try to shoot down incoming missiles (perhaps because its Missile Deflection failed) or attacking aircraft.

Cost Mark 15 Phalanx CIWS

- 165 20mm Mark 15 Phalanx CIWS:
Multipower, 165-point reserve, 1,550
Charges for entire reserve (+1); all OIF
Bulky (-1) [1,550]
- 7u 1) *Attack Mode:* RKA 4d6, Autofire
(10 shots; +1), Armor Piercing (+½), +1
Increased STUN Multiplier (+¼); OIF
Bulky (-1), Limited Arc Of Fire (360
Degrees above ship; -¼)
- 1u 2) *Defense Mode:* Missile Deflection (all
physical projectiles), Range (+1); OIF Bulky
(-1), Requires 10 Charges Per Use (-¾)
- 13 *Phalanx Targeting Systems:* Tactical
Computer (page 162) for Phalanx (includes
Infrared Perception (Sight Group) and
Radar (Radio Group))

Total cost: 186 points

Point Defense Lasers: An array of small, but powerful, lasers mounted all around a vehicle's hull for the purpose of destroying incoming missiles.

Missile Deflection (all physical projectiles), Range (+1) (30 Active Points); OIF Bulky (-1), Costs Endurance (-½). Total cost: 12 points.

Space Vehicle Option: *Missile Deflection (all physical projectiles), Range (+1), MegaRange (1" = 1 km; +¼) (34 Active Points); OIF Bulky (-1), Costs Endurance (-½). Total cost: 14 points. (This device may be built into a Multipower with normal-range Missile Deflection.)*

Psychic Screen

This system, installed throughout a Vehicle's hull or outer body, generates a field of "psychic static" that makes it difficult for exterior mental assaults to affect the Vehicle's occupants. However, the occupants can affect each other with Mental Powers normally... and if one of them tries to affect someone outside the Vehicle, he has to punch through the Psychic Screen.

Weak Psychic Screen: *Mental Defense (5 points) (5 Active Points); Only Protects Versus Exterior Mental Attacks Against Interior Personnel (-1). Total cost: 2 points.*

Standard Psychic Screen: *Mental Defense (10 points) (10 Active Points); Only Protects Versus Exterior Mental Attacks Against Interior Personnel (-1). Total cost: 5 points.*

Strong Psychic Screen: *Mental Defense (15 points) (15 Active Points); Only Protects Versus Exterior Mental Attacks Against Interior Personnel (-1). Total cost: 7 points.*

Extremely Strong Psychic Screen: *Mental Defense (20 points) (20 Active Points); Only Protects Versus Exterior Mental Attacks Against Interior Personnel (-1). Total cost: 10 points.*

Rollcage

A rollcage is a type of protective system designed for ground vehicles. It's a special frame of strengthened and reinforced metal alloy bars, intended to preserve the integrity of the vehicle's interior (and thus protect the passengers) in the event of a collision or a rollover (hence the name).

Rollcage: *+4 DEF (12 Active Points); Only To Protect Against Damage From Collisions, Rollovers, And The Like (-1). Total cost: 6 points.*

Security Systems

The following systems help ensure the security and safety of a Vehicle's occupants. (See also *Vehicle Locks* on page 18.)

STANDARD SECURITY

In general terms, Vehicles (particularly large ones, like aircraft carriers and starships) can represent their overall level of security by buying Security Systems using the Skills Power. If an intruder or thief fails to defeat the Vehicle in a Skill Versus Skill Contest with Security Systems, alarms go off, security teams respond, and so forth.

Basic Security: *Security Systems 11-. Total cost: 7 points.*

High Security: *Security Systems 14-. Total cost: 13 points.*

Advanced Security: *Security Systems 17-. Total cost: 19 points.*

Extremely Advanced Security: *Security Systems 20-. Total cost: 25 points.*

Ultra-Advanced Security: *Security Systems 23-. Total cost: 31 points.*

IDENTIFICATION SYSTEMS

On some large vehicles, access to highly secured areas depends on providing identification. Usually this involves scanning an identity card, or scanning something about the person requesting access (such as his fingerprints or DNA). The device compares what it detects to its database of authorized personnel to determine whether to grant access.



Card Scanner: *Detect Authorized Access Card 17- (Radio Group), Discriminatory, Analyze (21 Active Points); OIF Bulky (-1). Total cost: 10 points.*

DNA Scanner: *Detect DNA 17- (Radio Group), Discriminatory, Analyze (21 Active Points); OIF Bulky (-1). Total cost: 10 points.*

Fingerprint Scanner: *Detect Fingerprint 17- (Radio Group), Discriminatory, Analyze (21 Active Points); OIF Bulky (-1). Total cost: 10 points.*

Retina Scanner: *Detect Retina 17- (Radio Group), Discriminatory, Analyze (21 Active Points); OIF Bulky (-1). Total cost: 10 points.*

Voice Analyzer: *Detect Voice 17- (Hearing Group), Discriminatory, Analyze (21 Active Points); OIF Bulky (-1). Total cost: 10 points.*

SECURITY MONITORS

One of the easiest ways to maintain security on a large Vehicle is simply to watch areas of the ship where trouble might arise, or people who might cause trouble. The monitor system is controlled from a central security station, which dictates the maximum viewing range (though regardless of range, the system cannot create a perception point away from the Vehicle — only inside it and on the exterior of the frame/hull).

Clairsentience (Sight And Hearing Groups), Mobile Perception Point, Multiple Perception Points (up to eight at once), 8x Range (2,000") (65 Active Points); OAF Immobile (-2), Perception Point Cannot Move Through Solid Objects (-0), Perception Point Cannot Move Beyond Outer Side Of Vehicle (-0). Total cost: 22 points.

NONLETHAL SECURITY SYSTEMS

Here are a few security devices designed to foil intruders and thieves, but not kill them.

Anaesthetic Gas Projector: When activated by a Vehicle occupant, this device projects knockout gas into a large area (typically a single room).

Energy Blast 6d6, NND (defense is Life Support (Self-Contained Breathing); +1), Area Of Effect (12" Radius; +1¼) (97 Active Points); IIF Bulky (-¾), No Range (-½), Real Weapon (-¼), Only Within Defined Area (value varies, assume -2), 12 Charges (-¼). Total cost: 20 points.

Capturefoam Projector: When activated by a Vehicle occupant, this device projects a sticky, motion-impeding foam into a large area (typically a single room).

Entangle 6d6, 9 DEF, Area Of Effect (16" Radius; +1¼) (169 Active Points); IIF Bulky (-¾), No Range (-½), Real Weapon (-¼), Only Within Defined Area (value varies, assume -2), 12 Charges (-¼). Total cost: 36 points.

Intruder Stunner: Installed in doors and other secured objects, Intruder Zappers deliver a non-lethal electric shock to anyone who tries to get through the door without proper authorization or means of access (i.e., who fails a Lockpicking or Security Systems roll to covertly penetrate the door).

Energy Blast 12d6, NND (defense is insulated rED; +1), Trigger (failed Lockpicking or Security Systems roll; +¼) (135 Active Points); IIF Bulky (-¾), Real Weapon (-¼), No Range (-½), 6 Charges (-¾). Total cost: 41 points.

Seat Shackles: When a thief sits down in the operator's seat without having used proper authorization or means of access (i.e., after failing a Lockpicking or Security Systems roll to covertly gain access to the Vehicle's controls), strong steel bands lash out from inside the seat, trapping him.

Entangle 6d6, 8 DEF, Trigger (failed Lockpicking or Security Systems roll; +¼) (87 Active Points); IIF Bulky (-¾), Only Within Defined Area (operator's seat; -2), Real Weapon (-¼), 1 Recoverable Charge (device must be re-set for next use; -1¼). Total cost: 17 points.

LETHAL SECURITY SYSTEM

Anyone who tries to steal or infiltrate a Vehicle equipped with these deadly devices is probably going to regret it.

Cyanide Gas Projector: A lethal version of the Anaesthetic Gas Projector, designed to work over a smaller area to prevent accidental deaths.

RKA 4d6, NND (defense is appropriate Life Support [Immunity]; +1), Does BODY (+1), Area Of Effect (One Hex; +½) (210 Active Points); IIF Bulky (-¾), No Range (-½), Real Weapon (-¼), Only Within Defined Area (value varies, assume -2), 4 Charges (-1). Total cost: 38 points.

Intruder Fryer: A deadly version of the Intruder Stunner.

RKA 4d6, Trigger (failed Lockpicking or Security Systems roll; +¼) (75 Active Points); IIF Bulky (-¾), No Range (-½), Real Weapon (-¼), 6 Charges (-¾). Total cost: 23 points.

Security Laser: A small but deadly laser, typically controlled by a dedicated security computer.

RKA 2d6, Armor Piercing (+½), Autofire (2 shots; +¼), 32 Charges (+¼) (60 Active Points); OIF Bulky (-1), Real Weapon (-¼). Total cost: 27 points.

BRIGS AND VAULTS

A jail cell or similar restraint area on a large vehicle is known as a brig. A typical brig is defined as extra DEF and/or BODY, plus an advanced lock, all with the *Partial Coverage* Limitation. In campaigns with extremely advanced technology (such

as many *Champions* or *Star Hero* games), characters may be able to build brigs that can stop Desolidification, Teleportation, Mental Powers, or the like. See *Stronghold Cell Configurations* on page 45 of *Champions Universe* for a few examples.

A vault isn't really any different than a brig, except that it's intended to keep people out instead of keeping them in. Only very large vehicles can have vaults like those of a bank, because of the weight, but lots of vehicles can have a small armored compartment.

SELF-DESTRUCT SYSTEM

Many vehicles, particularly military ones, contain valuable technology or information. Rather than allow these things to fall into an enemy's hands, the crew activates a self-destruct system to blow the entire vehicle to smithereens. In other, more fiendish, situations, a master villain with remote access to a vehicle might blow it up to keep the heroes from finding out about his plans — despite the fact that crewmembers remain on board.

Self-destruct systems are bought as Ranged Killing Attacks with the NND and Does BODY Advantages, and the No Range, Self Only, and 1 Charge Which Never Recovers (-4) Limitations. (Alternately, you can build it as a massive RKA, Explosion, thus effectively turning the system into a last-ditch weapon.) Usually it does not take the Focus Limitation; that would make it too easy for an enemy to accidentally set it off. The defense for the NND is defined as something the Vehicle doesn't have (often an ED Force Field, since few Vehicles have internal force fields). That ensures the Vehicle

takes all the damage. Typically, the device does enough dice of damage using the Standard Effect Rule to ensure complete destruction of the Vehicle (*i.e.*, to reduce it to negative its BODY; see page 11). They may have timing devices (Time Delay) or Trigger, require *Extra Time* to arm, or the like.

In most cases, self-destruct systems are arranged so that even if their force alone doesn't destroy the Vehicle, it causes dangerous or volatile systems on the Vehicle — stored fuel or antimatter, chemicals, or the like — to detonate as well. The end result may be a massive explosion capable of damaging anyone or anything nearby; the GM determines the final outcome.

Self-Destruct System (Crew-Triggered): RKA 20d6 (standard effect rule: 60 BODY [assumes Vehicle has 30 BODY]), NND (defense is ED Force Field; +1), Does BODY (+1), Trigger (spoken command authorization; +¼) (975 Active Points); No Range (-½), Self Only (-½), Real Weapon (-¼), Extra Time (once activated, takes 1 Minute to arm and detonate; -1½), 1 Charge Which Never Recovers (-4). Total cost: 126 points.

Self-Destruct System (Remotely Triggered): RKA 10d6 (standard effect rule: 30 BODY [assumes Vehicle has 15 BODY]), NND (defense is ED Force Field; +1), Does BODY (+1), Trigger (remote control signal from master villain; +¼) (487 Active Points); No Range (-½), Self Only (-½), Real Weapon (-¼), 1 Charge Which Never Recovers (-4). Total cost: 78 points.



Smoke Systems

In many situations, one of the best ways to protect a Vehicle is to hide it from the enemy. Sometimes this involves camouflaging it (see *Stealth Systems*, below), but sometimes all the vehicle has to do is block an onlooker's line of sight. Systems that generate thick clouds of smoke do an excellent job of concealing a vehicle. Of course, once the vehicle moves away from the place where it generated the smoke cloud, it can be seen again, but even then the cloud may linger for a while, providing cover for the vehicle from some angles. See also page 126 regarding smoke grenades.

Engine Smoke Generator: By dropping a little bit of diesel fuel or other chemicals into an engine's intake, the crew makes the engine generate a thick cloud of smoke around the Vehicle.

Darkness to Sight Group 5" radius (50 Active Points); No Range (-½), Real Weapon (-¼), 4 Charges lasting 1 Turn each (removed by wind or rain; -½). Total cost: 22 points.

Mounted Smoke Grenade: The Vehicle has a single smoke grenade mounted to some part of its exterior. When it needs a quick bit of cover, it triggers the grenade and "pops smoke."

Darkness to Sight Group 2" radius (20 Active Points); OIF Bulky (-1), Real Weapon (-¼), 6 Charges lasting 1 Minute each (removed by winds or rain; -0). Total cost: 9 points.

Stealth Systems

The art of not being seen remain important in combat no matter what the era or technology. You can create a hard-to-detect Vehicle in several ways.

If you want a Vehicle that's harder to perceive, but not impossible, buy Change Environment (see *Area-Affecting Abilities*, page 117, for an example of this). This works best for Vehicles that only need to hide from one Sense Group; otherwise, buy the Change Environment multiple times (once per Sense Group). Alternately, you could buy the Stealth and/or Concealment Skills for the Vehicle, using those in Skill Versus Skill Contests to determine how easy it is to detect.

If you want a Vehicle that's impossible (or almost impossible) to perceive, buy Invisibility to the appropriate Sense Group(s). If the Invisibility is an innate part of the Vehicle (perhaps because it depends on the shape and configuration of the Vehicle's body), consider making it Inherent. If the Invisibility only serves to conceal the Vehicle when it doesn't move, apply the *Chameleon* Limitation.

See *Disguise Systems*, above, for related technology.

Cloaking Device: The most "rubber science" form of stealth is the cloaking device. It's a highly effective invisibility device which bends light and other forms of energy around the vehicle, making it almost impossible to detect (*i.e.*, it provides full

Invisibility to many Sense Groups). A cloaking system allows an air or space Vehicle to act like a submarine, lurking hidden until it's time to strike.

Invisibility to Sight and Radio Groups, No Fringe (40 Active Points); IIF Bulky (-¾), Extra Time (Extra Phase to activate; -¼), Increased Endurance Cost (x4 END; -1½). Total cost: 11 points.

Low-Albedo Coating: Space vehicles sometimes have hull coatings designed to minimize albedo (reflectivity), making them difficult to see in the darkness of space.

Change Environment 4" radius, -3 to Sight Group PER Rolls, Persistent (+½), Reduced Endurance (0 END; +½), Inherent (+¼) (47 Active Points); Always On (-½), No Range (-½), Self Only (-½). Total cost: 19 points.

Stealth Hull: This isn't a system so much as how a vehicle is built. The vehicle's hull is distinctively-shaped and made of special materials, so that it absorbs radar waves or allows them to pass over it without registering its presence. Stealth hulls are distinctive, readily recognizable if seen, so the vehicle may have a *Distinctive Features* Disadvantage.

Basic Stealth Hull: *Change Environment 4" radius, -5 to Radar PER Rolls, Persistent (+½), Reduced Endurance (0 END; +½) (46 Active Points); Always On (-½), No Range (-½), Self Only (-½). Total cost: 18 points.*

Advanced Stealth Hull: *Invisibility to Radio Group, Persistent (+½), Reduced Endurance (0 END; +½), Inherent (+¼) (45 Active Points); Always On (-½), Limited Effect (Radar only; -¼). Total cost: 26 points.*

System-Specific Protection

There are two ways for a Vehicle designer to provide special protection for a specific system. The first is ruggedizing, which refers to a process by which vehicle systems or components are manufactured from tougher material to higher stress and impact tolerances. In short, it's a way of making a piece of vehicular equipment, like a weapon or a radio, harder to destroy — it's designed for more "rugged" use. You can buy this as extra BODY with the *Partial Coverage* Limitation (almost always at the -2 level). Typically +10 BODY is the most ruggedizing possible (and anything beyond +5 BODY is rare), but this may depend on the level of technology in the campaign and the materials available.

The second way is to build a special armored shell or compartment specifically for the system. You can buy this as extra DEF with the *Partial Coverage* Limitation (again, usually at the -2 level). Typically +8 DEF is the most armoring possible (and anything beyond +4 DEF is rare), but this may depend on the system, the Vehicle's configuration, and the campaign's technological standards.

Ruggedized Laser: +5 BODY (5 Active Points); Partial Coverage (laser only; -2). Total cost: 2 points.

Armored Radio: +2 DEF (6 Active Points); Partial Coverage (radio only; -2). Total cost: 2 points.

Wheel And Tire Protection

One particularly popular form of system-specific protection is dedicated armoring for wheels and tires. In many ground vehicle battles, the combatants frequently shoot for the tires, since immobilizing a vehicle goes a long way toward rendering it helpless. Accordingly, people who get into a lot of automobile duels have found two ways to protect their tires: wheel well armor and armored hubcaps. The two methods are not compatible; a Vehicle designer must choose one or the other. Neither type of defense protects a tire against things it can run over (like dropped caltrops or mines).

Wheel Well Armor: This is a special armored panel that fits over the wheel well. The benefit to it is that it provides more defense than an armored hubcap; the drawback is that it still leaves some of the tire exposed.

+4 DEF (12 Active Points); Activation Roll 11- (-1), Partial Coverage (tires only; -2). Total cost: 3 points.

Armored Hubcap: An armored hubcap takes the place of a regular hubcap. It has flanges that cover

more of the tire than a normal hubcap, though it cannot provide complete coverage.

+2 DEF (6 Active Points); Activation Roll 14- (-½), Partial Coverage (tires only; -2). Total cost: 2 points.

Windshield And Window Defenses

Since it's important for the operator of a vehicle to see where he's steering, some vehicles have special defenses installed in the windshields (and/or windows) themselves. (See also *Transparency And Openings*, page 13.)

Anti-Paint Windshield: This windshield is specially manufactured, and has a special power current running through it, so that it can shed the paint from a paint sprayer as easily as a normal windshield sheds water.

Sight Group Flash Defense (15 points) (15 Active Points); OIF Bulky (-1), Only Works Against Paint Sprayer Flashes (-1). Total cost: 5 points.

Polarized Windshield: This windshield darkens temporarily to shield the Vehicle's occupants against blindingly bright lights.

Mildly Polarized Windshield: *Sight Group Flash Defense (5 points) (5 Active Points); Only Protects Versus Exterior Flashes Against Interior Personnel (-1). Total cost: 2 points.*

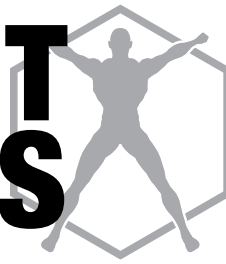
Standard Polarized Windshield: *Sight Group Flash Defense (10 points) (10 Active Points); Only Protects Versus Exterior Flashes Against Interior Personnel (-1). Total cost: 5 points.*

Heavily Polarized Windshield: *Sight Group Flash Defense (15 points) (15 Active Points); Only Protects Versus Exterior Flashes Against Interior Personnel (-1). Total cost: 7 points.*

Darkly Polarized Windshield: *Sight Group Flash Defense (20 points) (20 Active Points); Only Protects Versus Exterior Flashes Against Interior Personnel (-1). Total cost: 10 points.*



MOVEMENT SYSTEMS



In addition to basics such as engines, tires, steering columns, and control surfaces, many vehicles have gadgets or systems that let them move more quickly, or move better than other vehicles. Gamemasters should be careful about letting characters buy too many of these devices for any one Vehicle; they tend to be relatively inexpensive, and may unbalance the game if applied *en masse* to a single car or helicopter.

Typically movement systems occupy very little space — a volume of .1-1 cubic hexes per 10 Active Points — and only weigh about .2 kg per Active Point. A few are a little larger and heavier. As always, the GM may vary this as he sees fit.

ANCHOR

Despite the fact that they often weigh dozens or hundreds of tons, watercraft don't remain in place when they stop moving on the water. If not tied down to something solid, they'll drift with the current and the wind. When a ship is at sea, without a dock or pier to tie itself to, it uses an anchor to keep itself from moving. An anchor's effectiveness depends on several factors: its weight relative to the ship and the force of the wind and current; how well it's situated on the sea floor; and the durability of the rope or chain connecting it to the ship.

An anchor's weight is simulated by buying STR with the *Focus* and *Partial Coverage* (-2) Limitations. An anchor gets no benefit from its Vehicle's STR, and typically should have a STR equal to the STR for its Vehicle's Size. The GM compares this STR to the STR rating for the prevailing wind and current.

ANCHOR TABLE

Wind	STR
None	0
Very Light	5-15
Light	20-30
Moderate	35-45
Heavy	50-60
Very Heavy	65-75
Storm Force	80 or more
Other Condition	STR Modifier
Weak current	+1d6 STR if with current, -1d6 STR if against current
Moderate current	+2d6 STR if with current, -2d6 STR if against current
Strong current	+3d6 STR if with current, -3d6 STR if against current
Crew makes a PS: Sailing (or like Skill) roll to seat anchor properly	-3 STR for making roll exactly, with an additional -2 for each point by which the roll was made

The accompanying Anchor Table (which uses the wind speed categories from the Sailing Speed Table, page 57) lists suggested STR ratings, but the GM may modify these if appropriate. If the anchor's STR is equal to or greater than the STR of the wind and current, the ship is firmly anchored and won't move. If the wind and current's STR exceeds that of the anchor, for every +5 STR (or fraction thereof), the ship moves 1" per Turn in the direction of the prevailing wind, despite having an anchor. (Alternately, the GM can roll a STR Versus STR Contest, pitting the anchor against nature.) If a ship has more than one anchor, add the lifting capacities of their respective STRs together and compare that to the STR Table (*Hero System 5th Edition, Revised*, page 34) to determine their "overall STR" for purposes of holding the ship in place.

An anchor's rope or chain has the standard BODY for a Focus, given its Active Points. Ships often buy more for it with the *Partial Coverage* Limitation.

Small Boat's Anchor: 20 STR, Reduced Endurance (0 END; +½) (30 Active Points); OIF Bulky (-1), Partial Coverage (-2). Total cost: 7 points.

Medium Boat's Anchor: 40 STR, Reduced Endurance (0 END; +½) (60 Active Points); OIF Bulky (-1), Partial Coverage (-2). Total cost: 15 points.

Large Boat's Anchor: 60 STR, Reduced Endurance (0 END; +½) (90 Active Points); OIF Bulky (-1), Partial Coverage (-2). Total cost: 22 points.

Enormous Boat's Anchor: 80 STR, Reduced Endurance (0 END; +½) (120 Active Points); OIF Bulky (-1), Partial Coverage (-2). Total cost: 30 points.

Huge Boat's Anchor: 100 STR, Reduced Endurance (0 END; +½) (150 Active Points); OIF Bulky (-1), Partial Coverage (-2). Total cost: 37 points.

Gigantic Boat's Anchor: 120 STR, Reduced Endurance (0 END; +½) (180 Active Points); OIF Bulky (-1), Partial Coverage (-2). Total cost: 45 points.

Heavy Anchor Chain: +10 BODY (10 Active Points); OIF Bulky (-1), Partial Coverage (-2). Total cost: 2 points.

Extremely Heavy Anchor Chain: +20 BODY (20 Active Points); OIF Bulky (-1), Partial Coverage (-2). Total cost: 5 points.

AUTOPILOT

In most cases, the best way to buy an autopilot — a device that can operate a vehicle — is as a Computer (see page 161). However, it may be simpler in some cases to simply give a Vehicle the appropriate Skills on a Focus.

Combat Driving (or Piloting) 14- and Navigation (appropriate environment) 14- (25 Active Points); OIF Bulky (-1). Total cost: 12 points.

ENHANCED DECELERATION

Sometimes what's important is not how fast a Vehicle can go, but how quickly it can stop. Vehicles with enhanced deceleration systems usually don't have to worry about coming to a halt in a hurry.

Drag Chute: Vehicles that need to decelerate quickly sometimes come equipped with a parachute they can release from a rearward compartment. The chute creates so much drag that it slows the Vehicle down very quickly.

Increased Deceleration +10" (can subtract 15" of Ground Movement per hex) (20 Active Points); OIF Bulky (-1), 1 Recoverable Charge (-1¼). Total cost: 6 points.

Improved Brakes: A Vehicle with this system has a better, higher-tech braking system, allowing it to come to a screeching halt more quickly than other vehicles.

Increased Deceleration +5" (can subtract 10" of Ground Movement per hex). Total cost: 10 points.

FLIGHT CONTROL SYSTEMS

Besides an engine, there are several types of piloting (or "flight control") systems characters may want to include on aircraft and space vehicles.

Command Center: Many Vehicles, particularly larger ones, need a command center (often referred to as a cockpit or bridge). This typically requires at least 1 hex of space per crewmember who can be present at once. One-man Vehicles may have just a pilot's seat, but larger ones have multiple control stations. Really big Vehicles have a command bridge with space for dozens of specialists and an impressive chair for the captain.

Command centers do not cost Character Points unless they provide Skill Roll bonuses or some other quantifiable benefit to the Vehicle.

Enhanced Flight Control: Some Vehicles have improved, expanded, or enhanced systems that make it easier to fly and maneuver the Vehicle. You can buy this as bonuses to the Combat Piloting roll of anyone flying the Vehicle.

+4 to Combat Piloting roll (8 Active Points); OAF Bulky (-1½). Total cost: 3 points.

Navigation Computer: Some Vehicles also have navigation computers ("navcomps") to make it easier to steer the vessel toward its destination. You can buy this as bonuses to the appropriate type of Navigation. If a Vehicle has a navcomp, its main computer (if any) may have only a slight amount of navigation informa-

tion (*i.e.*, it takes the Navigation Skill as a Familiarity). In some settings, pilots themselves know little or nothing about the complex subject of navigation; if a Vehicle's computer and/or navcomp stop functioning, the pilot has no idea which way to go.

Starship Navcomp: +4 to Navigation (Space) roll (8 Active Points); OAF Bulky (-1½). Total cost: 3 points.

Thrusters: Many space vehicles have thrusters, small rockets used to maneuver the Vehicle in tiny increments so it can safely enter repair bays and other close spaces. You can buy thrusters as a few inches of Flight (no more than 10"), without any MegaScaling. Of course, if the spacecraft already has Flight without MegaScale, it doesn't need a separate set of thrusters... unless it wants them as a backup system.

Flight 5". Total cost: 10 points.

FLOATS

Air and ground vehicles sometimes have flotation devices that allow them to land and move on the top of calm water. The easiest way to define this in game terms is not to sell back the Vehicle's normal 2" of Swimming, and to apply a default Surface Only Limitation to them. The Vehicle could even buy more inches of Swimming (with the normal Surface Only Limitation) if it wanted to skim along the water more swiftly.

IMPROVED MANEUVERING

Many different systems exist to help various types of Vehicles improve their handling and maneuvering. Typically these are bought as Movement Skill Levels with appropriate Limitations. They include:

Airdam and Spoiler: Airdams and spoilers are devices or superstructures attached to a vehicle (typically a ground vehicle) to improve its aerodynamicity. This not only improves its gas mileage, but can enhance handling at high speeds.

An airdam is installed on the front of a car. It causes air to flow up and around a car, rather than underneath it, which helps to maintain ground contact (and thus improve handling) at high rates of speed. A car cannot have both an airdam and a forward ram (like an augmented front bumper). A spoiler functions similarly, but it's a wing-like superstructure attached to the rear of the car.

Airdam or Spoiler (just one): +1 with Ground Movement (3 Active Points); OAF Bulky (-1½), Only At Speeds Above 40 MPH (-1). Total cost: 1 point.

Airdam and Spoiler (both): +2 with Ground Movement (6 Active Points); OAF Bulky (-1), Only At Speeds Above 40 MPH (-1). Total cost: 2 points.

Enhanced Suspension: The suspension, an important component of ground vehicles, is discussed on page 41. Some cars have enhanced suspensions which lets them maneuver more agilely than other cars.

Enhanced Suspension, Type I: +1 with *Ground Movement*. Total cost: 2 points.

Enhanced Suspension, Type II: +2 with *Ground Movement*. Total cost: 4 points.

Enhanced Suspension, Type III: +3 with *Ground Movement*. Total cost: 6 points.

Improved Control Surfaces: An airplane with improved control surfaces has better-crafted, higher-tech ailerons, rudder, elevator, flaps, slats, and spoilers, making it more maneuverable.

Improved Control Surfaces, Type I: +1 with *Flight*. Total cost: 2 points.

Improved Control Surfaces, Type II: +2 with *Flight*. Total cost: 4 points.

Maneuvering Foils: Airplanes and submarines sometimes have special maneuvering foils attached to their fuselage/hull, to allow for sharper turns and greater maneuverability. An airplane can have both improved control surfaces and maneuvering foils, if appropriate.

Maneuvering Foils, Type I: +1 with *Flight*. Total cost: 2 points.

Maneuvering Foils, Type II: +2 with *Flight*. Total cost: 4 points.

Maneuvering Foils, Type III: +3 with *Flight*. Total cost: 6 points.

IMPROVED FUEL

Some Vehicles, particularly ground vehicles, enhance their performance by burning higher-quality fuel. For example, a supercar might use a specially-refined type of gasoline, or a starship might drop a few atoms of antimatter into its rocket fuel.

In *Hero System* terms, there are two ways to represent improved fuel. One is simply to boost the Vehicle's inches of Combat Movement for a

short period defined by a Fuel Charge. The other is to enhance the Vehicle's acceleration (again, on a Fuel Charge).

Improved Fuel I: *Ground Movement +3"* (6 Active Points); 1 Continuing Fuel Charge (Difficult to obtain fuel; 6 Hours; -0). Total cost: 6 points.

Improved Fuel II: *Increased Acceleration +3"* (can add 8" of movement per hex) (6 Active Points); 1 Continuing Fuel Charge (Difficult to obtain fuel; 6 Hours; -0). Total cost: 6 points.

NITROUS OXIDE INJECTOR

By injecting nitrous oxide into an internal combustion engine, a driver can improve the engine's performance. Nitrous oxide supplies oxygen better than normal air, allowing the engine to burn more fuel and thus produce more horsepower.

There are several ways to define this effect in *Hero System* terms. The simplest, and in many ways most accurate, is to build it as one extra level of Noncombat Movement on a Focus, with Charges:

Nitrous Oxide Injector: *x2 Noncombat Movement for Ground Movement* (5 Active Points); OIF Bulky (-1), 12 Charges (-¼). Total cost: 2 points.

Another way is to build it as a turbocharger, as discussed on page 24. This involves the Succor form of Aid. A third way is simply to buy extra inches of movement, again with Focus and Charges.

OFFROAD SUSPENSION

A ground vehicle with this system has had its suspension specially modified to handle the rigors of off-road driving.

Offroad Suspension: +3 Penalty Skill Levels To Counteract Offroad Driving Penalties with *Ground Movement*. Total cost: 6 points.



PERSONNEL SYSTEMS



Vehicles, particularly large ones with large crews, need to make some provision for the comfort and happiness of the people who ride, live, and work on them. In game terms you don't need to define a lot of this with Character Points; if a character wants his car or starship to be especially luxurious or have numerous entertainment options, it's usually all right just to let it have those things. But a few personnel-related systems do require some rules definitions, since how they work may affect game play from time to time.

Gravity

Gravity is a consideration for space vehicles. In many cases, it's almost as important as life support — it's hard to get most jobs done, much less fight in a star-battle, if everyone in the crew is flailing around in zero-G!

There are two basic ways to generate gravity. The first is to spin the Vehicle so that centrifugal force holds the contents and inhabitants of the Vehicle against the floors and hull with the same force as planetary gravity. This is typically the only solution available in low-tech settings, and it dictates many features of starship (or space station) design — long, symmetrical structures (cylinders, typically) are necessary.

The second is the “rubber science” method of artificial gravity generation, usually through special “plates” or “generators” built into each deck of a Vehicle. This allows for any sort of starship design, and also makes maneuvering easier — even if the Vehicle is flying straight “up,” the crew still perceives the deck floor as “down” and can move and act accordingly. The crew may also be able to selectively decrease (or perhaps increase) the gravity from place to place in the Vehicle by controlling the gravity generators.

In either case, you can simulate gravity as Telekinesis with the Limitation *Only To Pull Objects Straight Down To The Floor* (-1) (this is a broader and more restrictive form of the *Affects Whole Object* Limitation). Normal Earth gravity (1 G) is equivalent to 5 STR Telekinesis, with every +5 STR equaling +1 G (10 STR is 2 G, 15 STR is 3 G, and so forth). This gravity applies throughout the ship; you do not have to add the *Area Of Effect* Advantage to it (see page 117). However, for artificial gravity generators, ships may, with the GM's permission, apply the *Selective* (+½) Advantage to the Telekinesis so they can give some areas stronger gravity, and some lighter gravity.

For general rules about gravity, see page 278 of *Star Hero*.

Spinning Gravity: This represents gravity generated by spinning the ship.

Telekinesis (5 STR) (9 Active Points); Only To Pull Objects Straight Down To The Floor (-1), Must Maintain Spin (-¼). Total cost: 4 points.

Artificial Gravity: This represents a system that generates gravity artificially. It can go as high as STR 20 (4 G), though it's usually kept at STR 5 (1 G).

Telekinesis (20 STR), Selective (+½) (45 Active Points); OIF Bulky (-1), Only To Pull Objects Straight Down To The Floor (-1). Total cost: 15 points.

Life Support

Perhaps the most crucial systems on Vehicles that venture into hostile environments — submarines and starships, in other words — are the life support systems, which keep the crew from dying. Space vehicles must provide the following sorts of Life Support to those on board: Self-Contained Breathing, Safe Environments (High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum). Submarines must provide Self-Contained Breathing and Safe Environments (High Pressure, Intense Cold).

Most environmental protection systems are just part of having an airtight, insulated hull, but breathing requires some complex equipment. Supplying oxygen (or other breathing gases, as appropriate to the species) to people in space is done in one of two ways: Consumable or Regenerative.

Consumable life support means just a big tank of air, which gets used up during the voyage. You can simulate this with a Fuel Charge, or simply make it the special effect of having the Vehicle's Life Support cost no END. The longer the voyage and the larger the crew, the more appropriate the “0 END” solution becomes.

Regenerative breathing systems use greenhouses (at current and near-future technology), “atmospheric scrubbers,” or nanotech systems to convert carbon dioxide back into oxygen for the crew to breathe. They can operate indefinitely as long as there is power, which means you should buy the Life Support as having an END cost. Greenhouses are fairly bulky — assume 1 hex of greenhouses for every 4 people on board. Nanotech recyclers or air tanks are more compact, taking up 1 hex for every 100 people.



In the game, a Vehicle running out of oxygen presents the heroes with a serious problem to solve and lots of opportunities for suspense and adventure (see Arthur C. Clarke's short story "Breaking Strain," or many episodes of Star Trek, for some good examples). Despite the fact that most Vehicles' life support systems supposedly contain multiple redundant backups and other safeguards, somehow an accident or invader always seems to find a way to disable life support.

Life support also includes providing enough food and water for the crew. You buy this as the Diminished Eating category of Life Support, with the special effect being that the ship provides food for the occupants to eat. This may cost no END (representing stored preserved food which the crew can cook using minimal power), or have an END cost (representing the power needed to refrigerate and prepare the food). Fuel Charges may be an appropriate Limitation instead of *Costs Endurance*.

Starship Main Life Support System: *Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum) (18 Active Points); Costs Endurance (-½). Total cost: 12 points.*

Starship Backup Life Support System: *Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum) (18 Active Points); Only Within Affected Area (2.5" x 1.25" chamber; -2), 1 Continuing Fuel Charge (easily replaced from sources outside the ship; 1 Month; -0). Total cost: 6 points.*

Submarine Life Support System: *Life Support (Self-Contained Breathing; Safe Environments: High Pressure, Intense Cold) (14 Active Points); Costs Endurance (-½). Total cost: 9 points.*

Food Supplies: *Life Support (Diminished Eating; no need to eat) (3 Active Points); 1 Continuing Fuel Charge (easily replaced from sources outside the Vehicle; 1 Month; -0)*

Medical Systems

Many large Vehicles have their own medical facilities — sickbays, as they're sometimes called. Typically a Vehicle's medical facilities are built primarily as labs for Paramedics and various Science Skills (like Biology and Medicine), and occupy one hex of space per ten people in the standard crew + passengers complement, plus one hex per doctor intended to work in the facility at once.

Some of the vehicular equipment characters might encounter in a medical facility include:

Autodoctor: A marvel of science fiction technology, this device is a small chamber on a pedestal. A person seals himself in, and the computers operating the Autodoctor go to work, using its built-in diagnostic systems and medical technology to repair injured bodies, cure illnesses, and otherwise restore the character to good health. This often takes a long time — a minimum of 1 Minute, but usually one hour to one day per BODY lost.

Simplified Healing 8d6 (80 Active Points); OAF Immobile (-2), Extra Time (see text; -1½), Requires A Paramedics Roll (-½). Total cost: 16 points.

Diagnostic Systems: The medical facility comes equipped with various sensors and scanners that can determine a character's illnesses and injuries with a high degree of precision.

Detect Health Status And Physical Integrity Of Patient 18- (Radio Group), Discriminatory, Analyze (29 Active Points); OAF Bulky (-1½), Extra Time (take a minimum of 1 Turn, and perhaps as much as 1 Hour or more, to scan and analyze patient; -1¼), Costs Endurance (-½). Total cost: 7 points.

Improved Medical Facilities: The general quality of the equipment in the medical facility is so high, it makes the doctors' jobs easier.

Improved Medical Facilities: +2 with all Medical Skills (10 Active Points); OIF Bulky (-1), Only Within Affected Area (sickbay itself; -2), Costs Endurance (-½). Total cost: 3 points.

Advanced Medical Facilities: +3 with all Medical Skills (15 Active Points); OIF Bulky (-1), Only Within Affected Area (sickbay itself; -2), Costs Endurance (-½). Total cost: 4 points.

Enhanced Medical Facilities: +4 with all Medical Skills (20 Active Points); OIF Bulky (-1), Only Within Affected Area (sickbay itself; -2), Costs Endurance (-½). Total cost: 6 points.

Quarters And Corridors

All of a Vehicle's crewmembers and passengers need places to sleep and relax. One hex can hold up to three Human-sized persons in bunks or racks, or a single person in minimal comfort. More pleasant accommodations require two to eight hexes per person; luxurious quarters can be virtually any size. For corridors, elevators, access tunnels, and other means of physically moving through the ship, you should allot about ten percent of the total interior space devoted to other facilities and systems (or, for ease of calculation, a straight ten percent of the Vehicle's volume).

Generally, neither quarters nor corridors require the expenditure of Character Points. However, the GM may, if he wishes, assign a small, fixed cost (like 1 point for average quarters and 2 points for luxurious quarters) as a way of keeping track of such facilities' impact on the overall Vehicle.

Recreation And Entertainment

As with quarters and corridors, recreation and entertainment facilities generally don't cost points. If appropriate, though, the GM could have a Vehicle's designer buy a gym as a laboratory for athletic-oriented Skills, a movie theater as KS: Current Movies, or the like. For recreation and related activities, usually designers should allot two to four hexes per person the ship normally carries (both crew and passengers).

Holographic Entertainment: In some science fiction settings, characters on starships can fulfill their need for entertainment and recreation in ultra-advanced holography chambers that use photons and inert raw materials to create any sort of "reality" or adventure they can imagine. It looks, sounds, and sometimes even feels real, but it's all just an elaborate illusion (at least until the controls malfunction and the holograms gain the ability to kill...). Here's how a "holographic entertainment room" might look in *Hero System* terms:

Sight, Hearing, and Touch Group Images, -3 to PER Rolls, Increased Size (16" radius; +1) (58 Active Points); OIF Immobile (-1½), Only Within Defined Area (16" radius chamber; -2). Total cost: 13 points.

Teleporters

In some science fiction settings, Vehicles often come equipped with teleportation devices which allow the crewmembers to get from the ship to a planet without having to actually land their vessel. Here's an example of one type of teleporter; for more information and examples, see *Star Hero*, page 173.

Quantum Displacement Transporter: A standard teleportation device found on starships, space stations, and developed worlds. It typically consists of a chamber containing one or more "teleportation pads" on which the users stand, while another character operates the controls. It's particularly handy for teleporting personnel and objects to and from a planet's surface without the need to land a starship or use shuttles (if characters want to Teleport over shorter ranges, add two non-MegaScaled slots). It requires similarly MegaScaled sensors to locate the destination (or the objects to be teleported to the device).

Cost Quantum Displacement Transporter

- 80 *Quantum Displacement Transporter:* Multipower, 240-point reserve, all OIF Immobile (-1½), Extra Time (Full Phase; -½)
- 4u 1) *Teleporting Away:* Teleportation 10", x8 Increased Mass, Position Shift, MegaScale (1" = 100,000 km, scalable down to 1" = 1 km; +1¾); OIF Immobile (-1½), Extra Time (Full Phase; -½)
- 8u 2) *Teleporting To:* Teleportation 10", x8 Increased Mass, Position Shift, MegaScale (1" = 100,000 km, can scale down to 1" = 1 km; +1¾), Usable As Attack (+1), Ranged (+½), MegaRange (1" = 100,000 km, can scale down to 1" = 1 km; +1¾); OIF Immobile (-1½), Extra Time (Full Phase; -½)

Total cost: 92 points.

POWER SYSTEMS



Vehicles usually require a source of power to keep them (and their systems) running. There are three primary ways to power a Vehicle in *Hero System* terms: power provided by an external source; equipment bought to cost no END; and Endurance Reserves.

External Power Sources

Some Vehicles, such as towed ground vehicles and rowed watercraft, need an outside source of power for their Movement Powers (and sometimes other systems as well). They take the *Costs Endurance* Limitation, with the notation that it costs the operator's END, not the END of the Vehicle itself. See Chapters Two and Three for several examples.

Gamemasters can expand this phenomena if desired. For instance, in some Cyberpunk or science fiction settings, it may be possible for characters to “jack in” to a Vehicle directly and run the Vehicle in part through expenditure of their own END.

Equipment That Does Not Cost Endurance

With the GM's permission characters can buy all the equipment on a Vehicle as costing no END. This works particularly well for simple vehicles, including just about any vehicle before engines are invented, but not as well for complex vehicles like modern naval vessels or starships. The advantage to this is it's simpler; it eliminates END bookkeeping. The drawbacks are that (a) it increases the expense of the Vehicle, and (b) it removes the potential drama and fun of the Vehicle running out of power in crucial situations. However, if the GM and players are willing to roleplay “we're runnin' outta power, Cap'n!” situations without regard for the rules, this option may work best for the campaign.

Endurance Reserves

The most common way to simulate a Vehicle's power is for the Vehicle to have an Endurance Reserve. Virtually every system on the Vehicle, even basics like artificial gravity and life support, runs off this power. Therefore, when determining the END and REC of the Endurance Reserve, you need to take into account both the “basic” systems (things the Vehicle needs to run all the time, like life support) and things that aren't always in use (defensive shields, weapons, propulsion, and

so forth). For story purposes, ideally the Vehicle should have enough power to run its basic and a few military systems at normal strength without difficulty. But if it starts Pushing weapons, using lots of weapons, or the like, it has to dip into “power reserves” (smaller, backup Endurance Reserves), or conserve power, lest it risk running out of energy.

For “basics” the spacecraft needs to maintain constantly (like gravity and life support), and which affect the entire spacecraft (or a significant part of it), consider them the equivalent of Constant Area Of Effect attacks: they remain in existence on the Segments between the Vehicle's Phases. However, the Vehicle only pays END for them on its Phases. For equipment not in constant use, like weapons and cloaking devices, END expenditure depends on the SPD of the Vehicle, Computer, or character operating them.

Ordinarily, a character with an Endurance Reserve specifies whether a power uses personal END or Reserve END. A Vehicle has no personal END, so it always uses Reserve END. If a Vehicle has multiple Endurance Reserves (typically defined as “auxiliary” power or the like), it may draw END from any of them without paying for an Advantage or the like. (Sometimes, Limitations on the Reserve restrict which systems can draw END from it.)

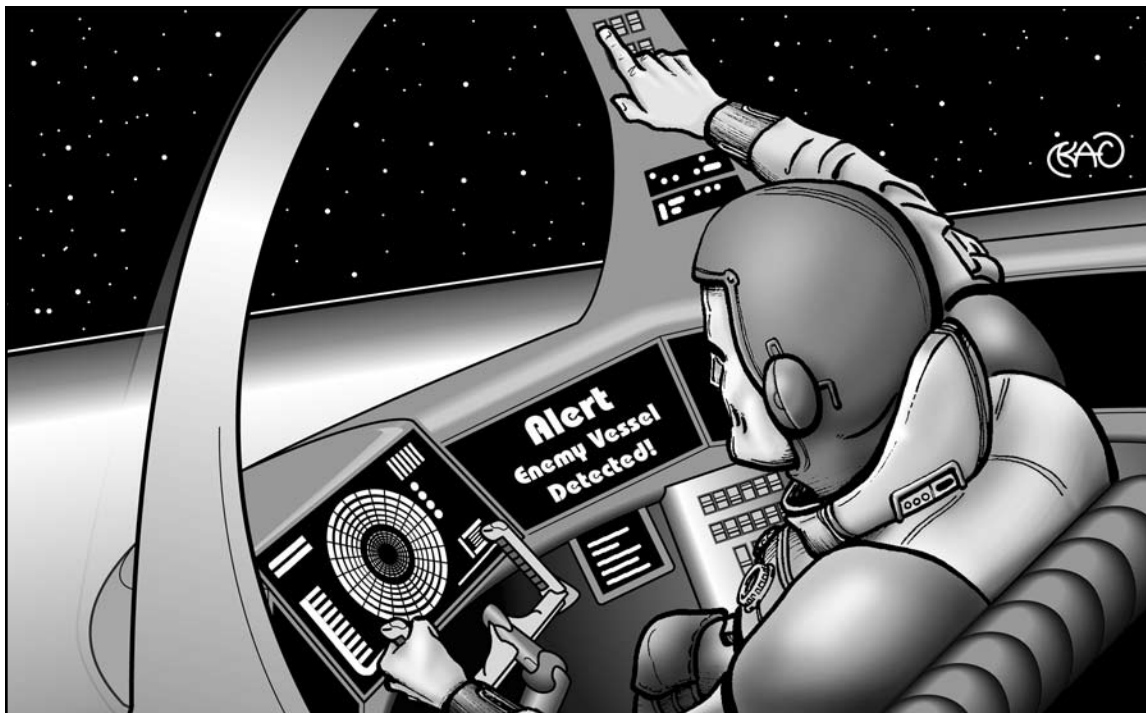
The text below describes some examples of Endurance Reserve-based power systems. If none of those work for the Vehicle you have in mind, you can easily use them as examples for designing your own.

“I NEED MORE POWER!”

A common trope in many stories is for characters to increase the power to a system on a vehicle to improve that system's performance — they boost the sensors to detect something at greater range, increase the strength of their vehicle's weapons to punch through an enemy's defenses, or enhance a force field to withstand the effects of an attack.

In *Hero System* terms, increasing equipment performance by pumping in more power is best reflected by Pushing. Even in Heroic campaigns, GMs should normally allow at least 10 Character Points' worth of Pushing for Vehicle equipment, with no need for an EGO Roll. However, the GM may require a Systems Operation roll to route the power successfully, and/or an Electronics or Mechanics roll to keep from damaging the system with the pulse of extra power.

Gamemasters may even want to consider allowing characters to Push Vehicle equipment for more than 10 points' worth of effect. There



are several ways to approach this. First, GMs can require Vehicles to pay for the privilege — they buy extra points' worth of effect for their equipment, with the Limitations Only When Pushing (-1) and *Increased Endurance Cost* (x10 END; -4). However, that can get expensive, and clutters up the Vehicle's character sheet. Second, GMs can simply increase the Pushing threshold — perhaps to 20 points, or maybe varying from system to system (“In this campaign, you can Push sensors for 10 points' worth of effect, weapons for 20 points, and defenses for 30 points, at the standard END cost for Pushing”). Alternately, the effect may depend on the appropriate roll: a character who makes the necessary Skill Roll (typically Systems Operation, Electronics, Mechanics, or Computer Programming) exactly can Push for 10 points of effect, with +5 points per point the roll is made by, to a predefined maximum. The exact parameters depend on the dramatic effect the GM wants to achieve — some campaigns benefit from the dramatic scenes where a character says, “More power to the engines!”, others don't.

Reserve And Auxiliary Power

Many Vehicles have one or more backup power sources, usually referred to as reserve power, auxiliary power, batteries, or the like. Some also have specific power sources dedicated to one system or weapon, to keep it functioning when the rest of the Vehicle's power has dwindled or been exhausted. In *Hero System* terms, these are just other Endurance Reserves, with much less END and REC than the vehicle's main power system, and sometimes other Limitations (such as *Only Powers Specific System*, typically a -¼).

REAL WORLD POWER SUPPLIES

These sources of power actually exist in real life, or could plausibly be developed in the future.

Steam Engines

For details on steam engines, see page 38.

Early Steam Engine: *Endurance Reserve* (15 END, 15 REC) (17 Active Points); *OAF Immobile Fragile* (-2 ¼), *Extra Time* (1 Minute to start; -¾). Total cost: 4 points.

Forced Draft Steam Engine: *Endurance Reserve* (20 END, 20 REC) (22 Active Points); *OAF Immobile Fragile* (-2 ¼), *Extra Time* (1 Minute to start; -¾). Total cost: 5 points.

Triple-Expansion Steam Engine: *Endurance Reserve* (25 END, 25 REC) (28 Active Points); *OAF Immobile Fragile* (-2 ¼), *Extra Time* (1 Minute to start; -¾). Total cost: 7 points.

Quadruple-Expansion Steam Engine: *Endurance Reserve* (30 END, 30 REC) (33 Active Points); *OAF Immobile Fragile* (-2 ¼), *Extra Time* (1 Minute to start; -¾). Total cost: 8 points.

Steampunk Engine: An enormous, clanking, clock-work-and-steam-powered engine such as those found in “steampunk” fiction.

Endurance Reserve (45 END, 45 REC) (50 Active Points); *OAF Immobile Fragile* (-2 ¼), *Extra Time* (1 Minute to start; -¾). Total cost: 12 points.

Internal Combustion Engines

For details on internal combustion engines, see page 38.

Early Internal Combustion Engine: *Endurance Reserve* (22 END, 22 REC) (25 Active Points); *OAF Immobile Fragile* (-2 ¼), *Extra Time* (1 Turn to start; -½). Total cost: 7 points.

Standard Internal Combustion Engine: *Endurance Reserve (30 END, 30 REC) (33 Active Points); OAF Immobile (-2). Total cost: 11 points.*

Advanced Internal Combustion Engine: *Endurance Reserve (40 END, 40 REC) (44 Active Points); OAF Immobile (-2). Total cost: 15 points.*

Standard Internal Combustion Engine: *Endurance Reserve (50 END, 50 REC) (55 Active Points); OAF Immobile (-2). Total cost: 18 points.*

Turbines

For details on turbines, see page 38.

Steam Turbine: *Endurance Reserve (25 END, 25 REC) (28 Active Points); OAF Immobile Fragile (-2), Extra Time (1 Minute to start; -¾). Total cost: 7 points.*

Gas Turbine: *Endurance Reserve (40 END, 40 REC) (44 Active Points); OAF Immobile (-2). Total cost: 15 points.*

Magnetohydrodynamic Turbine: *Endurance Reserve (70 END, 70 REC) (77 Active Points); OAF Immobile (-2). Total cost: 26 points.*

Solar Power

Solar power is abundant, especially in space, and requires no fuel, but the solar panels to collect it are often large and bulky — the larger the panels, the more power they can generate. However, the primary difficulty with solar power is not panel size, but the fact that the farther away the panels are from a star, the less power they generate. For example, a solar panel at the orbit of Mars produces only half the power of the same-size panel in Earth's orbit; at Jupiter, the same panel generates ½5 of the energy it generates at Earth.

In game terms, a solar power array is an Endurance Reserve. The Reserve's END and REC depend on its size. Both take a -½ Limitation, *Requires Solar Proximity*, to reflect the fact that the energy output drops as the panels get further away from a star. The listed END and REC for a solar power Reserve indicate its maximum power-generating capacity at a distance of up to 1 Astronomical Unit (AU, the average distance from the Earth to the Sun). For each AU (or fraction thereof) beyond that distance, halve the Reserve's END and REC (minimum of 1 each). (In some respects, this is a form of the Limited Recovery Limitation for Endurance Reserves, so those taking *Requires Solar Proximity* may not also take that Limitation to simulate the need for proximity to a star.)

A one-hex solar power array (2.6 square meters) can generate up to 12 END, 12 REC. Add at least one hex to the array for each additional point of END and REC (keep the two equal).

As of the early twenty-first century, each hex of solar cells has a mass of 10 kilograms. Advanced technology makes cells lighter and cheaper: by the middle twenty-first century, a one-hex panel masses only 5 kilograms, and the weight in most settings continues to go down from there as the decades progress.

Solar Panel: This is a 25-hex panel generating enough power for a small space station or spaceship.

Endurance Reserve (36 END, 36 REC) (40 Active Points); OAF Immobile Fragile (-2 ¼), Only Powers Electrical Devices (-¼), Requires Solar Proximity (-½). Total cost: 10 points.

Fuel Cells

Fuel cells burn hydrogen and oxygen to produce electricity. Some versions can run on other combinations of reactive gases, but hydrogen-oxygen cells are popular because their waste is fresh water. While fuel cells are compact and powerful, they do require fuel on a monthly basis, making them less useful on long-duration voyages. The Space Shuttle gets its power from fuel cells, since its missions typically last less than two weeks.

A basic fuel cell has a mass of approximately 1 kilogram. It can produce up to 4 END, 4 REC, and uses 1 liter of fuel per hour in the process. For up to each +4 END/+4 REC, double the number of cells.

Fuel Cell Generator: This array of fuel cells includes enough fuel for a month's operation and has a total mass of 2,500 kg.

Endurance Reserve (20 END, 20 REC) (22 Active Points); OAF Immobile (-2), Only Powers Electrical Devices (-¼), Requires Fuel (-¼). Total cost: 6 points.

Radiothermal Generators

For missions to the outer solar system, space probes use compact radiothermal generators which produce electricity from the heat given off as radioactive materials decay. These are extremely reliable and long-lasting, but don't produce a great deal of power and would need radiation shielding on manned spacecraft.

At the earliest stage of this technology, a radiothermal power plant generates 2 END, 2 REC of power per kilogram of weight. As radiothermal generator technology improves, increase the power output while reducing the weight.

Small Radiothermal Powerplant: This is a small radiothermal generator, such as a space probe might carry.

Endurance Reserve (2 END, 2 REC) (3 Active Points); OAF Bulky (-1½), Only Powers Electrical Devices (-¼). Total cost: 1 point.

Nuclear Fission

This is what most people mean by "nuclear power" — a tested and reliable technology which generates power by splitting atoms. As of the early twenty-first century, nuclear fission supplies a quarter of the United States's electricity and allows France to be an energy exporter without oil. Modern Earth nuclear reactors are large and bulky, useful only when really huge amounts of power are needed. They can run for up to 5 years between refueling. A reactor masses about 10 metric tons per 20 END, 20 REC produced.

Technology can improve reactors somewhat, reducing the mass of shielding and the cost. Halve the weight, volume, and cost of a fission power

plant at near-future (Cyberpunk) technology levels, and again a generation later. After that stage of technological development, fusion powerplants replace fission powerplants.

Nuclear Reactor: A modern reactor (such as a submarine or interplanetary spacecraft might carry) that masses about 100 metric tons.

Endurance Reserve (204 END, 204 REC) (225 Active Points); OAF Immobile (-2), Only Powers Electrical Devices (-¼). Total cost: 69 points.

SPECULATIVE AND RUBBER SCIENCE POWER SUPPLIES

Science fiction writers and space scientists have suggested several possibilities for new power sources. Some of them will probably become practical, while others remain in the realm of rubber science. Since all of these are highly speculative, mass and cost are just estimates.

Fusion Power

Nuclear fusion power is the most likely candidate for a new type of power generation, at least in the near future. Current research is creeping towards a fusion reactor which produces more power than it consumes. A fusion powerplant would need only a few kilograms of deuterium or helium-3 to produce large amounts of power for long periods. Just like fission plants, fusion generators require some fairly heavy shielding.

A fusion powerplant when the technology first becomes available in the early-mid twenty-first century has a mass of 500 kilograms per 20 END, 20 REC generated (fusion reactors are lighter than fission powerplants, but bulkier). Technology rapidly improves fusion powerplants, allowing them to generate more power per kilogram for less cost.

Starship Fusion Plant: This fusion plant is suitable for interstellar spacecraft. It has a 10-year supply of deuterium fuel and a mass of as much as 4 metric tons.

Early Starship Fusion Plant: *Endurance Reserve (156 END, 156 REC) (172 Active Points); OAF Immobile (-2), Only Powers Electrical Devices (-¼). Total cost: 53 points.*

Advanced Starship Fusion Plant: *Endurance Reserve (210 END, 210 REC) (231 Active Points); OAF Immobile (-2), Only Powers Electrical Devices (-¼). Total cost: 71 points*

Ultra-Advanced Starship Fusion Plant: *Endurance Reserve (250 END, 250 REC) (275 Active Points); OAF Immobile (-2), Only Powers Electrical Devices (-¼). Total cost: 85 points.*

Cold Fusion

A variant form of fusion power, “cold fusion” was announced with great fanfare in the late 1980s and then quietly dropped when the researchers discovered flaws in their experiment. Cold fusion uses as-yet-undiscovered chemical or electrochemical means to cause fusion a few atoms at a time. The

energy given off is low, but cold fusion generators don't need any shielding and are very compact.

When they first appear, cold fusion cells weigh 1 kilogram per 2 END, 2 REC. The heavy water in a cold fusion cell lasts 1 year before replenishing. Technology rapidly improves cold fusion cells, increasing the output more than decreasing the size.

Vehicular Cold Fusion Generator: This cold fusion device is designed for installation in most models of consumer hovercraft.

Endurance Reserve (90 END, 90 REC) (99 Active Points); OAF Bulky (-1½), Only Powers Electrical Devices (-¼). Total cost: 36 points.

Antimatter Power

Well-known to SF fans from its use on Star Trek, antimatter power is the ultimate form of nuclear energy, because it converts all the mass of its fuel into energy. Tiny amounts of matter combined with antimatter would result in immediate annihilation of both in a reaction releasing immense amounts of power. Aside from containing and channeling this immensely powerful reaction, the chief problem is that antimatter doesn't occur naturally. Civilizations can't mine it, they must manufacture it. It may someday be used as a means of storing and transporting energy, with huge solar-powered antimatter factories in remote star systems generating antimatter by the gram for distribution to planets and starbases. Handling antimatter is extremely tricky — it requires magnetic force-fields and the like — and an accident could wipe out an entire facility, continent, or planet.

Given the rubber science involved, an antimatter reactor usually doesn't need heavy shielding, but does require special containers for the antimatter. Early antimatter generators weigh 1 ton per 20 END, 20 REC; a single gram of fuel suffices to run the plant for a year. Technological advances can improve antimatter power substantially, increasing power output and decreasing cost and weight.

Starship Antimatter Reactor: This is a large, powerful reactor capable of running a major spacecraft. It weighs six tons or more.

Low-Powered Antimatter Reactor: *Endurance Reserve (170 END, 170 REC) (187 Active Points); OAF Immobile (-2), Only Powers Electrical Devices (-¼). Total cost: 57 points.*

Standard Antimatter Reactor: *Endurance Reserve (230 END, 230 REC) (253 Active Points); OAF Immobile (-2), Only Powers Electrical Devices (-¼). Total cost: 78 points.*

High-Powered Antimatter Reactor: *Endurance Reserve (290 END, 290 REC) (319 Active Points); OAF Immobile (-2), Only Powers Electrical Devices (-¼). Total cost: 98 points.*

Singularity Power

Singularity power sources make use of tiny black holes, either artificially created in giant particle accelerators or left over from the early days

of the universe, contained in special force-fields. Feeding mass into the black hole causes the matter to release almost all its energy. This means a singularity powerplant can use anything for fuel. On the other hand, all the mass remains in the singularity, which makes it gain weight over time (at the rate of 1 kg per year). Singularity power sources don't scale down well — they can provide energy for a large starship or even a whole planet, but not a car or a personal energy weapon.

The singularity inside a power plant is an extremely valuable object — salvagers and pirates may want to recover or steal it, and finding a singularity is an excellent adventure hook. However, it's also extremely dangerous. If the force-fields and other safeguards holding it “inert” are shut off, the black hole “manifests” in real space, destroying objects on an interstellar scale.

At first introduction a singularity plant generates 400 END, 400 REC and masses 400 metric tons or more (plus the mass of the singularity, which starts at 100 metric tons). As technology progresses, the plant becomes smaller and lighter, and the power output doubles, then triples.

Singularity Engine: This device, which masses 500 metric tons or more, is designed to power a large starship.

Low-Powered Singularity Engine: *Endurance Reserve (400 END, 400 REC) (440 Active Points); OAF Immobility (-2), Only Powers Electrical Devices (-¼). Total cost: 135 points.*

Standard Singularity Engine: *Endurance Reserve (500 END, 500 REC) (550 Active Points); OAF Immobility (-2), Only Powers Electrical Devices (-¼). Total cost: 169 points.*

High-Powered Singularity Engine: *Endurance Reserve (600 END, 600 REC) (660 Active Points); OAF Immobility (-2), Only Powers Electrical Devices (-¼). Total cost: 203 points.*

Zero Point Power

Zero Point Energy is a theoretical method of using the energy inherent in space itself. If this could actually be accomplished, it would effectively be perpetual motion — free energy from nothing at all. It could also be a terrifying weapon if the release of energy could be triggered from a distance. This is serious “rubber science” at present, although it has a basis in real physics. Power output, costs, and weights are pure guesswork, but should eventually become better than fusion (though probably not as good as antimatter or singularity power).

Starship Zero Point Power Generator: A large generator designed to provide zero point power to an entire starship.

Early Starship Zero Point Power Generator: *Endurance Reserve (160 END, 160 REC) (176 Active Points); OAF Immobility (-2), Only Powers Electrical Devices (-¼). Total cost: 54 points.*

Advanced Starship Zero Point Power Generator: *Endurance Reserve (220 END, 220 REC) (242 Active Points); OAF Immobility (-2), Only Powers Electrical Devices (-¼). Total cost: 74 points.*

Ultra-Advanced Starship Zero Point Power Generator: *Endurance Reserve (260 END, 260 REC) (286 Active Points); OAF Immobility (-2), Only Powers Electrical Devices (-¼). Total cost: 88 points.*

Magic Power

In fantasy settings, it may be possible to generate power with magic spells. For example, a “sorcerous engine” might use a perpetual kinetic-motion spell to keep an engine running virtually forever, cranking out power for a flying ship the entire time. A gigantic golem might have inside its chest the Crystal Heart of Tar'anath, a rock pulsating with magical energy that powers the construct. Given the breadth and power of magic, there's no limit to the amount of END a magical engine could generate, except restrictions imposed by the GM based on the way magic works in his campaign or considerations of game balance.



SENSORS AND COMMUNICATIONS



Many Vehicles need a way for their occupants to communicate with people outside the Vehicle, and to detect and perceive external phenomena. Collectively, systems that allow a Vehicle to do this are referred to as “sensors and communications.”

General Rules

Here are some rules for communications and sensor systems generally. See *Star Hero*, pages 200-02, for more information on the implications of different types of systems.

SENSORS AND COMMUNICATIONS MASS AND VOLUME

Typically sensor and communications systems occupy a volume of .5-1 cubic hexes per 5-10 Active Points, and have a mass of up to .5 kg per Active Point. As always, the GM may vary this as he sees fit.

SENSE-AFFECTING POWERS

Sensor and communications systems often take the *Affected As More Than One Sense* Limitation described on page 126 of the *Hero System 5th Edition, Revised*. In this case, what it typically refers to is the operator or passengers in the Vehicle being affected by a Sense-Affecting Power. For example, a pilot cannot view his plane’s radar screen if his Sight has been Flashed, so both Radio Group Flashes and Sight Group Flashes “affect” the radar — though a Computer installed in the plane could still use the radar system, since it has no eyes to Flash. Similarly, a character cannot use a radio if he’s deafened, or a viewscreen if he’s blinded. As always, the GM should interpret the impact of the Limitation in light of common sense, dramatic sense, and considerations of game balance.

COMMUNICATIONS SYSTEMS

Vehicles mostly communicate via radio or light beams — or, in some *Star Hero* campaigns, via rubber science methods that allow instantaneous communication across vast distances. In game terms, communication systems are simply the appropriate Senses (sensor systems; see below) with the Transmit Sense Modifier. Radio Perception, Radio Perception/Transmission, and High Range Radio Perception (HRRP) are the most common Senses used for communications devices.

In science fiction games and other campaigns where characters need to communicate over vast distances, communication systems often include the *Increased Maximum Range* or *MegaScale*

Advantages (see page 55 of *Star Hero* for more information). Ordinarily characters shouldn’t apply Advantages to Senses, but in this case GMs should allow it for the sake of simplicity and smooth game play. The MegaScale is often bought as a naked Power Advantage so the user can easily turn it on and off (thus allowing him to communicate with a world in another star system one minute, and the space station his starship’s orbiting the next).

Communications And Lightspeed

In some *Star Hero* campaigns, characters only have communication systems that work at STL speeds (or, at most, the speed of light). These communicators can apply a Limitation, *Lightspeed Delay* (-½), to their *MegaScale* Advantage. This means that at ranges over 300,000 kilometers, a lightspeed lag of one second per +300,000 kilometers distance occurs. Thus, it may take hours to get a reply from a message sent to another system, and communications across the Galaxy are impossible. Faster-than-light communications get *MegaScale* without the *Lightspeed Delay* Limitation (though the GM may still, in his discretion, impose a slight time lag over long distances).

Advanced Car Radio: While ground vehicles usually get a standard AM/FM radio as Everyvehicle Equipment (page 42), more advanced forms of radio (such as CB) which let them transmit cost points.

Radio Perception/Transmission (Radio Group) (10 Active Points); OIF Bulky (-1), Affected As Hearing Group As Well As Radio Group (-¼). Total cost: 4 points.

Communications Suite: A wide-band communications system.

HRRP (Radio Group) (12 Active Points); OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½). Total cost: 5 points.

Space Vehicle Option: *MegaScale* (1 light-year per Active Point, can scale down to 1 km per Active Point; +3½) for HRRP (42 Active Points); OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½). Total cost: 17 points.

Secure Laser Communication System: This short-range communication device, using both laser and radio, allows for a high level of coordination between two Vehicles. However, it can easily be cut off by intervening obstacles or electronic warfare.

Mind Link, any willing target (15 Active Points); OIF Bulky (-1), Only With Other Vehicles Who Have Mind Link (-1), Affected As Radio And Hearing Groups, Not Mental Group (-½), Must Maintain LOS (-½). Total cost: 4 points.

SENSOR SYSTEMS

Closely related to communications systems are sensor systems — the eyes and ears of a Vehicle. They range from simple visual cameras to advanced rubber science devices able to detect trace particles from light-years away if properly “configured” (set up or programmed).

Sensors are bought as various Enhanced Senses, often with the *MegaScale* Advantage (as discussed above) and the *Telescopic* Sense Modifier. Characters should ordinarily define a vehicle’s Senses as belonging to the Radio Sense Group (though a few may qualify as Sight Group). Radar is the most common general Sense used by Vehicles, even if it’s defined as a “hyperspace detector” or in some other rubber science way.

In many types of science fiction settings, a Vehicle’s sensors seem able to detect just about anything (though locating obscure substances or energy phenomena may require the crew to “reconfigure” or “recalibrate” the sensors first). Rather than requiring Vehicle designers to try to think of all the possible Senses a Vehicle needs in advance and pay for them separately, GMs should allow Vehicles to buy Variable Power Pools just for sensor and communications systems. This constitutes an exception to the general rule against putting Special Powers in Power Frameworks, but it lets the game progress much more smoothly and seem more like typical science fiction. If a Vehicle has a Sensor Pool, it can buy a single naked *MegaScale* Advantage it can apply to any Sense bought with the Pool. The vehicle may, of course, have some commonly-used senses (such as HRRP) bought outside the Pool, to free up Pool resources.

Because characters using a Vehicle’s sensors aren’t literally perceiving things with their own Senses, a “Perception Roll” made by a Vehicle’s crew should be made using Systems Operation, not a PER Roll. However, a Vehicle’s Computer using its Vehicle’s sensors would make a PER Roll using its INT, as normal (but any form of interference which penalizes Systems Operation rolls also applies to its PER Roll).

All the sensors described here focus on external phenomena. If a Vehicle wants sensors to detect things inside it, it typically buys those separately; see the “black box” (page 21) and security sensors (page 142) for examples. Of course, if the Vehicle has a Sensor And Communications VPP, it can configure its sensors for internal use if necessary.

Cost Sensor And Communication Systems

- 46 *Sensor And Communication Systems:* Variable Power Pool (Sensor Pool), 40 base + 20 control cost; OIF Bulky (-1), Only For Senses And Communications (-1), *Costs Endurance* (-½)
- 70 *Long-Range Sensors:* *MegaScale* (1 light-year

per Active Point, can scale down to 1 km per Active Point; +3½) for any Sensor Pool Sense; OIF Bulky (-1)

- 15 *Long-Range Sensors:* +20 versus Range for Radio Group; OIF Bulky (-1)

Total cost: 131 points.

Enhanced Sensor/Communications System: This represents a vehicle with particularly advanced sensor and communications technology.

+4 to Systems Operation roll (8 Active Points); OIF Bulky (-1). Total cost: 4 points.

Targeting Sensor: This is a combat sensor that seeks out, and helps the Vehicle target, weak points in the opposition’s armor.

Find Weakness 13- with all Vehicle Ranged Weapons (30 Active Points); Costs Endurance (-½). Total cost: 20 points.

Scientific Scanners: Here are some example sensor “packages” a starship or research vessel might buy with its Sensor And Communications VPP.

Biology Scanner: *Detect Life-Forms 16- (Radio Group), Discriminatory, Analyze, Telescopic (+12 versus Range Modifier) (39 Active Points); OIF Bulky (-1). Total cost: 19 points.*

Geology Scanner: *Detect Geological Data 16- (Radio Group), Discriminatory, Analyze, Telescopic (+12 versus Range Modifier) (34 Active Points); OIF Bulky (-1). Total cost: 17 points.*

Meteorology Scanner: *Detect Weather 16- (Radio Group), Discriminatory, Analyze, Telescopic (+12 versus Range Modifier) (34 Active Points); OIF Bulky (-1). Total cost: 17 points.*

Personnel Scanner: *Detect Specific Member Of The Crew Or Other Person For Whom Scanner Has Individualized Data 16- (Radio Group), Discriminatory, Analyze, Telescopic (+12 versus Range Modifier) (32 Active Points); OIF Bulky (-1). Total cost: 16 points.*

Sensor And Communication Interference

In addition to problems deliberately caused by electronic warfare (see page 126), vehicles may experience other forms of interference with their sensor and communications systems. Weather patterns, strange energy fields, nebulae, large masses of rock, and other such phenomena may prevent a vehicle from using its sensors or communicators, or make using them harder. For example, a vehicle on one side of a planet may not be able to track an object on the other side of that planet accurately, and a car going through a tunnel may experience problems with its radio reception. Gamemasters can represent interference by imposing penalties on the Systems Operation rolls required to operate the sensors and communications system, or by cutting off some (or all) of a transmission. The accompanying table has some suggested modifiers, but since the modifiers depend largely on the type of technology used in the game, the GM should adjust the table to suit his own campaign.

Vehicles with advanced sensor and/or communication systems often represent this by buying bonuses to Systems Operation that apply when anyone uses the vehicle's equipment. These bonuses help to counteract interference and make electronic warfare easier.

COMMUNICATIONS AND SENSOR INTERFERENCE

Modifier	Phenomenon
-1 to -3	Intense weather
-1 to -3	Atmospheric electromagnetic interference
-1 to -3	Large masses of rock or earth directly between vehicle and target object
-1 to -5	Energy field (plasma or ion storm, intense solar radiation, or the like)
-1 to -4	Vehicle or target is inside a nebula (see <i>Star Hero</i> , page 71)
-3 to -8	Vehicle or target is inside a star's chromosphere or a planet's polar magnetic field

360-Degree Viewing System

Some Vehicles come equipped with cameras mounted on multiple places around their bodies. The operator can view the feed from all these cameras.

Increased Arc Of Perception (360 Degrees) for Sight Group (10 Active Points); OIF Bulky (-1). Total cost: 5 points.

Nightsight Package: *Add Infrared Perception and Ultraviolet Perception (both for Sight Group) (5 Active Points and 5 Active Points); both OIF Bulky (-1). Total cost: 4 points.*

Battlenet (Tactical Communications Network)

Military vehicles often have highly advanced communications systems, with special defenses to prevent the enemy from listening in or disrupting the transmission. Known as "battlenets" or tactical communications networks, these devices allow for the rapid transmission of extensive amounts of data, giving commanders a "real time" picture of what's occurring on the battlefield. In game terms, it's built as a Mind Link with Linked HRRP (thus allowing for the exchange of all types of data and images), with some Radio Group Flash Defense.

Mind Link, specific group of up to any 64 minds, No LOS Needed, Difficult To Dispel (x2 Active Points; +¼) (62 Active Points); OIF Bulky (-1), Only With Other Vehicles Who Have Mind Link (-1), Affected As Radio And Hearing Groups, Not Mental Group (-½) (total cost: 18 points) plus HRRP (Radio Group), Difficult To Dispel (x4 Active Points; +½) (18 Active Points); OIF Bulky (-1), Affected As Sight And Hearing Group As Well As Radio Group (-½), Linked (-½) (total cost: 6 points) plus Radio Group Flash Defense (10 points); OIF Bulky (-1) (total cost: 5 points). Total cost: 29 points.

Bug Detection Systems

Vehicle occupants sometimes use, or worry about, "bugs" — miniature electronic tracking and listening devices. Here are some related systems.

Bug Sweeper: A Vehicle with this system can "sweep" itself for bugs, locating them so its operator can remove and destroy them.

Detect Electronic Listening/Tracking Devices 16- (Radio Group), Discriminatory (17 Active Points); OIF Bulky (-1), No Range (can only detect "bugs" in or on self; -½). Total cost: 7 points.

Bug Tracker: This system allows a character who's planted a "bug" on someone to follow him. In addition to the sensor itself, it has a viewscreen that tracks the bugged person's movements on a small-scale map.

Radio Perception, Tracking (13 Active Points); OIF Bulky (-1), Only For Tracking Specific Electronic Tracking Devices (-1). Total cost: 4 points.

Bug: Here's one way to build a tracking "bug" in *Hero System* terms (you can build a listening bug with Clairsentience for the Hearing Group). It can reliably be "tracked" primarily within a 32" radius. However, characters outside that radius may still be able to track the Beacon,



if the GM so permits: from 33-64”, the Image is at only +2 to PER Rolls; from 65-125”, it’s at +0; from 126-250” it’s at -2; beyond that it would require an Extraordinary Skill Roll to locate it.

Images to Radio Group, +4 to PER Rolls, Increased Size (32” radius; +1¼), Usable As Attack (ranged, based on STR; allows character to “stick” the Image to a target; +1¼), 1 Continuing Recoverable Charge lasting 1 Week (stops functioning if it gets wet or experiences severe radio interference; +1) (76 Active Points); IAF (-½), Image Only Perceivable On Special Radio Frequencies (-0). Total cost: 51 points.

Computers

Many Vehicles, particularly advanced military vehicles and spacecraft, come equipped with computers. None of the Vehicles written up in this book were given Computers to save space, but you can easily give any of them one (or more) of the following vehicular computers, with the programming tailored to the specific vehicle and campaign. For more on Computers generally, see pages 160-65 of *Star Hero*.

VEHICULAR COMPUTER

Val	Char	Cost	Roll	Notes
15	INT	5	12-	PER Roll 12-
12	DEX	6	11-	OCV: 4/DCV: 4
3	SPD	8		Phases: 4, 8, 12
Total Characteristic Cost: 19				

Cost Skills

- 3 Computer Programming 12-
- 3 Cryptography 12-
- 11 AK: Area In Which Vehicle Operates 20-
- 3 KS: Archived Recent News 12-
- 3 KS: Current News 12-
- 3 KS: Movies Database 12-
- 3 KS: Music Database 12-
- 3 Systems Operation 12-

Programs

- 1 Monitor Vehicle Functions, Report Anomalies
- 1 Open/Lock Accessways
- 1 Operate Sensors To Scan For Designated Phenomena/Object
- 1 Scan And Enter Data
- 1 Search Reference Material For Information On A Topic
- 1 Send Emergency Call If Operator Incapacitated/Killed
- 1 Send Emergency Call If Specified Protocols Are Not Met

Talents

- 3 Clock: Absolute Time Sense
- 5 Memory: Eidetic Memory
- 3 Calculator: Lightning Calculator
- 3 Instant-On Feature: Lightsleep
- 6 Scanner: Speed Reading (x100)

Total Abilities Cost: 59

Total Computer Cost: 78

Value Disadvantages

None (or to be chosen by the players)

Total Disadvantage Points: 0

Total Cost: 78/5 = 16

OPTIONAL EQUIPMENT

Cost Option

- +14 *Autopilot Variant:* Add Combat Driving (or Piloting) 12-, Navigation (appropriate environment) 14-, appropriate 2-point Transport Familiarity, and Driving/Piloting Program
- +1 *Combat Subroutines:* Add WF: Vehicle Weapons
- +15 *Diagnostic Subroutines:* Add Electronics 14-, Mechanics 14-, and Diagnostic Program
- +25 *Science Computer:* Add 25 points’ worth of Science Skills
- +20 *Translator:* Universal Translator 12-

Description: This represents a typical, low-powered vehicular computer that provides general assistance to a driver or pilot. By adding options, improving Characteristics, and increasing the number of programs it has, a Vehicle’s designer can make it even more useful.

Vehicular Computers on Vehicles with Endurance Reserves often take the Physical Limitation *Requires Endurance From Vehicle* (Infrequently, Slightly Impairing; 5 points). This means they need END (electrical power) to operate — typically 2 END per 100 Character Points (or fraction thereof) the Computer’s built with. Other Vehicular Computers have their own batteries or independent power sources.

MILITARY VEHICLE COMPUTER

Val	Char	Cost	Roll	Notes
25	INT	15	14-	PER Roll 14-
20	DEX	30	13-	OCV: 7/DCV: 7
5	SPD	20		Phases: 3, 5, 8, 10, 12
Total Characteristic Cost: 65				

Cost Skills

- 3 Computer Programming 14-
- 3 Cryptography 14-
- 3 Electronics 14-
- 14 AK: appropriate area 25-
- 9 KS: Known Military Technology 20-
- 3 Mechanics 14-
- 2 Navigation (appropriate environment) 14-
- 3 Systems Operation 14-
- 2 TF: as appropriate to Vehicle
- 1 WF: Vehicle Weapons

Programs

- 1 Attack Target
- 1 Diagnose Vehicle Malfunction/Damage
- 1 Engage In Evasive Maneuvers
- 1 Locate Target
- 1 Monitor Sensor Systems, Report Anomalies
- 1 Monitor Vehicle Functions, Report

- Anomalies
- 1 Obtain Latest Tactical Data Via Communications System
 - 1 Open/Lock Accessways
 - 1 Operate Sensors To Scan For Designated Phenomena/Object
 - 1 Pilot Vehicle From Location A To Location B
 - 1 Scan And Enter Data
 - 1 Schedule Vehicle Events/Use Of Vehicle's Resources
 - 1 Search Reference Material For Information On A Topic
 - 1 Send Emergency Call If Designated Personnel Incapacitated/Killed
 - 1 Send Emergency Call If Specified Protocols Are Not Met

Talents

- 3 Clock: Absolute Time Sense
- 5 Memory: Eidetic Memory
- 3 Calculator: Lightning Calculator
- 3 Instant-On Feature: Lightsleep
- 8 Scanner: Speed Reading (x1,000)

Total Abilities Cost: 80**Total Computer Cost: 145****Value Disadvantages**

None (or to be chosen by the players)

Total Disadvantage Points: 0**Total Cost: 145/5 = 29****OPTIONAL EQUIPMENT****Cost Option**

- +5 *IR Sensors*: Infrared Perception (Sight Group)
- +5 *UV Sensors*: Ultraviolet Perception (Sight Group)
- +15 *Dedicated Forward-Looking Radar*: Radar (Radio Group)
- +33 *360 Radar*: Radar (Radio Group), Discriminatory, Increased Arc Of Perception (360 Degrees), Telescopic (+8 versus Range Modifier)

Description: This character sheet represents a sophisticated, high-tech computer for use on a military vehicle. Unlike the Tactical Computer (see below), which is dedicated to a single combat function, this computer can run the entire Vehicle if necessary. In some vehicles, it has dedicated sensor technology; some of the options listed for the Vehicular Computer may be appropriate for it as well.

TACTICAL COMPUTER

Val	Char	Cost	Roll	Notes
13	INT	3	12-	PER Roll 12-
15	DEX	15	12-	OCV: 5/DCV: 5
3	SPD	5		Phases: 4, 8, 12
Total Characteristic Cost: 23				

Cost Skills

- 6 +2 with Ship's Weapons
- 6 KS: Known Enemies & Threats 15-
- 3 Systems Operation 12-
- 3 Tactics 12-
- 1 WF: Vehicle's Weapons

Programs

- 1 Locate Target
- 1 Analyze Target
- 1 Attack Target

Total Abilities Cost: 22**Total Computer Cost: 45****Value Disadvantages**

None (or to be chosen by the players)

Total Disadvantage Points: 0**Total Cost: 45/5 = 9**

Description: This character sheet represents a dedicated combat computer. It can fire a Vehicle's weapons, thus freeing the operator and/or crew to do other things (including firing other weapons). Some Vehicles go so far as to have multiple Tactical Computers, up to as many as one per weapon!

All of the options listed for the Military Vehicle Computer are appropriate for the Tactical Computer.

PROGRAMS FOR VEHICLE COMPUTERS

In addition to the standard programming found on the typical Vehicular Computer, the following programs are often appropriate. All cost 1 Character Point.

- Activate Multiform System
- Analyze Target
- Attack Target
- Diagnose Vehicle Malfunction/Damage
- Engage In Evasive Maneuvers
- Locate Target
- Monitor Communications System, Report Anomalies
- Monitor Internal Monitor System, Report Anomalies
- Monitor Sensor Systems, Report Anomalies
- Notify Operator [or Designated Crewmember] If X Occurs
- Obtain Latest Data On Subject X Via Communications System
- Pilot Ship From Location A To Location B
- Raise/Lower Retractable Armor
- Schedule Vehicle's Events/Use Of Vehicle's Resources

Direction Finders

The following systems help keep a Vehicle (or, more accurately, its operator) from becoming lost.

Compass: A device that uses a magnetized needle (or needles) to point toward magnetic north, thus allowing the user to determine which direction he's currently moving in.

Bump Of Direction (3 Active Points); OIF Bulky (-1). Total cost: 1 point.

GPS Tracker: The Global Positioning System is a group of satellites orbiting the Earth (or another planet, in a *Star Hero* game). Each satellite broadcasts its location above the Earth, and by triangulating that data, a GPS tracker can establish its own location on Earth with precision.

Detect Exact Position On Earth 16- (Radio Group) (10 Active Points); OIF Bulky (-1). Total cost: 5 points.

Sextant: Used on sailing ships, particularly during the Age of Sail, a sextant measures angular distances, thereby allowing a trained sailor to ascertain a ship's latitude and longitude.

Detect Current Longitude And Latitude 14- (Sight Group) (8 Active Points); OAF (-1), Requires A PS: Use Sextant Roll (-¼). Total cost: 3 points.

Probes

In some science fiction settings, characters have access to probes — small sensor devices they can fire like missile weapons to extend the range of a vehicle's sensors, get a sensor package close to a dangerous phenomenon without risking the Vehicle itself, or expand the scope of a large-scale search. Characters can build probes in two ways. The more complicated way is to design them as Automotons (possibly with Computer "brains"), so they can act independently (without oversight or direction from a character). The easier way is to define probes as MegaScaled Clairsentience, with the ability to move the perception point and maintain multiple perception points at once (see *Star Hero*, page 53). The multiple perception points in this case represent how many probes the Vehicle can monitor and track at once; each active probe counts as a single perception point. Clairsentience probes have the Limitation *OAF Bulky*, signifying that they can be removed from a Vehicle, shot down in mid-flight (their DCV depends on their size, as defined by the GM), and so forth.

Long-Range Reconnaissance Probe: *Clairsentience (Radio Group), Mobile Perception Point, Multiple Perception Points (up to four at once), MegaScale (1" = 1 billion km; +2½) (122 Active Points); OAF Bulky (-1½), Extra Time (takes probe 1 Phase or more to get to perception point, depending on distance thereto; -0), Perception Point Cannot Move Through Solid Objects (-0). Total cost: 49 points.*

Radar

One of the most common sensor systems for air vehicles, or vehicles that have to track aircraft, is radar (radio detection and ranging). A radar system sends out pulsed radio waves, then reads and interprets the reflection when those waves hit an object and bounce back to the receiver. In game terms, radar systems are bought with the Enhanced Sense *Radar* (surprise, surprise) and belong to the Radio Sense Group. They're often (but not always) bought with Increased Arc Of Perception (many radar systems can "see" all around themselves) and Telescopic. If meant for use by people, they take the *Affected As Sight Group As Well As Radio Group (-½)* Limitation, since a blinded person can't read a radar screen. They're also usually OAFs, since it's not hard to break the screen, but may be OIFs if the designer prefers.

Forward-Looking Radar, Type I: *Radar (Radio Group) (15 Active Points); OAF Bulky (-1½), Affected As Sight Group As Well As Radio Group (-½). Total cost: 5 points.*

Forward-Looking Radar, Type II: *Radar (Radio Group), Telescopic (+4 versus Range Modifier) (19 Active Points); OAF Bulky (-1½), Affected As Sight Group As Well As Radio Group (-½). Total cost: 6 points.*

Forward-Looking Radar, Type III: *Radar (Radio Group), Telescopic (+6 versus Range Modifier) (21 Active Points); OAF Bulky (-1½), Affected As Sight Group As Well As Radio Group (-½). Total cost: 7 points.*

Forward-Looking Radar, Type IV: *Radar (Radio Group), Telescopic (+8 versus Range Modifier) (23 Active Points); OAF Bulky (-1½), Affected As Sight Group As Well As Radio Group (-½). Total cost: 8 points.*

360-Degree Radar, Type I: *Radar (Radio Group), Increased Arc Of Perception (360 Degrees) (20 Active Points); OAF Bulky (-1½), Affected As Sight Group As Well As Radio Group (-½). Total cost: 7 points.*

360-Degree Radar, Type II: *Radar (Radio Group), Increased Arc Of Perception (360 Degrees), Telescopic (+4 versus Range Modifier) (24 Active Points); OAF Bulky (-1½), Affected As Sight Group As Well As Radio Group (-½). Total cost: 8 points.*

360-Degree Radar, Type III: *Radar (Radio Group), Increased Arc Of Perception (360 Degrees), Telescopic (+6 versus Range Modifier) (26 Active Points); OAF Bulky (-1½), Affected As Sight Group As Well As Radio Group (-½). Total cost: 9 points.*

360-Degree Radar, Type IV: *Radar (Radio Group), Increased Arc Of Perception (360 Degrees), Telescopic (+8 versus Range Modifier) (28 Active Points); OAF Bulky (-1½), Affected As Sight Group As Well As Radio Group (-½). Total cost: 9 points.*

Radar Hardening: *Radio Group Flash Defense (10 points); OAF Bulky (-1½) (total cost: 4 points) plus Power Defense (10 points); OAF Bulky (-1½) (total cost: 4 points). Total cost: 8 points.*

Radar Detector: While any Vehicle with HRRP can sense radar emissions, not all Vehicles have such sophisticated sensor technology. Those that don't can buy the ability to detect radar waves separately. Ground vehicles often have this device as a way of detecting police officers using radar to try to catch speeders (such models are usually ordinary OAFs, not Bulky).

Detect Radar Emissions 14- (Radio Group) (8 Active Points); OAF Bulky (-1½). Total cost: 3 points.

Military Targeting Option: *Detect Radar Emissions 14- (Radio Group), Targeting (18 Active Points); OAF Bulky (-1½). Total cost: 7 points.*

Sighting Systems

These systems improve an operator's or occupant's ability to perceive things with sight.

Nightsight Scope: This device amplifies ambient light, thus allowing the user to see clearly in all but the darkest conditions.

Nightvision (5 Active Points); OIF Bulky (-1). Total cost: 2 points.

Thermal Sensors: This device detects heat, allowing the user to see engine exhausts, body heat, and the like clearly.

Infrared Perception (Sight Group) (5 Active Points); OIF Bulky (-1). Total cost: 2 points.

Ultraviolet Sensors: This device detects ultraviolet light.

Ultraviolet Perception (Sight Group) (5 Active Points); OIF Bulky (-1). Total cost: 2 points.

Sonar

Sonar (sound navigation and ranging) is for watercraft what radar is for air vehicles. It comes in an array of types, frequencies, and functions, including both active sonar (which emits pulses of sound and then interprets the "echoes" as they bounce off objects and return to the receiver) and passive sonar (enhanced listening devices) systems. Many vehicles have both active and passive sonar systems. Because it uses a viewing screen as well as audio reception, sonar can be affected as both the Sight and Hearing Groups.

Active Sonar, Type I: *Active Sonar (Hearing Group), Increased Arc Of Perception (360 Degrees) (20 Active Points); OIF Bulky (-1), Affected As Sight Group As Well As Hearing Group (-½). Total cost: 8 points.*

Active Sonar, Type II: *Active Sonar (Hearing Group), Increased Arc Of Perception (360 Degrees), Telescopic (+4 versus Range Modifier) (24 Active Points); OIF Bulky (-1), Affected As Sight Group As Well As Hearing Group (-½). Total cost: 10 points.*

Active Sonar, Type III: *Active Sonar (Hearing Group), Increased Arc Of Perception (360 Degrees), Telescopic (+6 versus Range Modifier) (26 Active Points); OIF Bulky (-1), Affected As Sight Group As Well As Hearing Group (-½). Total cost: 10 points.*

Active Sonar, Type IV: *Active Sonar (Hearing Group), Increased Arc Of Perception (360 Degrees), Telescopic (+8 versus Range Modifier) (28 Active Points); OIF Bulky (-1), Affected As Sight Group As Well As Hearing Group (-½). Total cost: 11 points.*

Passive Sonar, Type I: +2 PER with Hearing Group (4 Active Points); OIF Bulky (-1) (total cost: 2 points) **plus** Ultrasonic Perception (Hearing Group) (3 Active Points); OIF Bulky (-1) (total cost: 1 point). Total cost: 3 points.

Passive Sonar, Type II: +3 PER with Hearing Group (6 Active Points); OIF Bulky (-1) (total cost: 3 points) **plus** Ultrasonic Perception (Hearing Group) (3 Active Points); OIF Bulky (-1) (total cost: 1 point) **plus** Telescopic (+2 versus Range Modifier for Hearing Group) (3 Active Points); OIF Bulky (-1) (total cost: 1 point). Total cost: 5 points.

Passive Sonar, Type III: +4 PER with Hearing Group (8 Active Points); OIF Bulky (-1) (total cost: 4 points) **plus** Ultrasonic Perception (Hearing Group) (3 Active Points); OIF Bulky (-1) (total cost: 1 point) **plus** Telescopic (+4 versus Range Modifier for Hearing Group) (6 Active Points); OIF Bulky (-1) (total cost: 3 points). Total cost: 8 points.

Passive Sonar, Type IV: +5 PER with Hearing Group (10 Active Points); OIF Bulky (-1) (total cost: 5 points) **plus** Ultrasonic Perception (Hearing Group) (3 Active Points); OIF Bulky (-1) (total cost: 1 point) **plus** Telescopic (+6 versus Range Modifier for Hearing Group) (9 Active Points); OIF Bulky (-1) (total cost: 4 points). Total cost: 10 points.

MISCELLANEOUS EQUIPMENT



Last but not least, here are a few vehicular gadgets that don't fit into any of the categories above.

Arms (Waldoes)

Some Vehicles come equipped with mechanical arms — or waldoes — which they use to gather samples from environments the Vehicle's occupants can't enter, handle dangerous items, and so forth. Waldoes are built as Extra Limbs with the *Costs Endurance* Limitation. They may take the *Limited Manipulation* Limitation if appropriate, but sophisticated waldoes are highly dextrous when operated by a trained user. (The GM may require a PS: Operate Waldoes roll for any fine work.)

Waldoes: *Extra Limbs* (2 — *mechanical arms*) (5 *Active Points*); *Costs Endurance* (-½). *Total cost:* 3 points.

Ejection Seat

When a driver or pilot needs to make a quick escape from a vehicle that's about to crash — or perhaps get rid of an unwanted passenger — an ejection seat is just the thing. Although most common on some types of cars and planes, ejection seats can also be found on helicopters (they eject sideways) and some other vehicles.

Ejection Seat: *Telekinesis* (26 STR) (39 *Active Points*); *OIF Bulky* (-1), *Affects Whole Object* (-¼), *No Range* (-½), *Only To Throw Target Straight Up* (-2), *1 Recoverable Charge* (-1¼). *Total cost:* 6 points.

Disguised Option: *Make Ejection Seat an IIF instead* (-¾). *Total cost:* 7 points.

Triggered Option: *Add Trigger* (spoken command or the like; +¼) (49 *Active Points*). *Total cost:* 8 points.

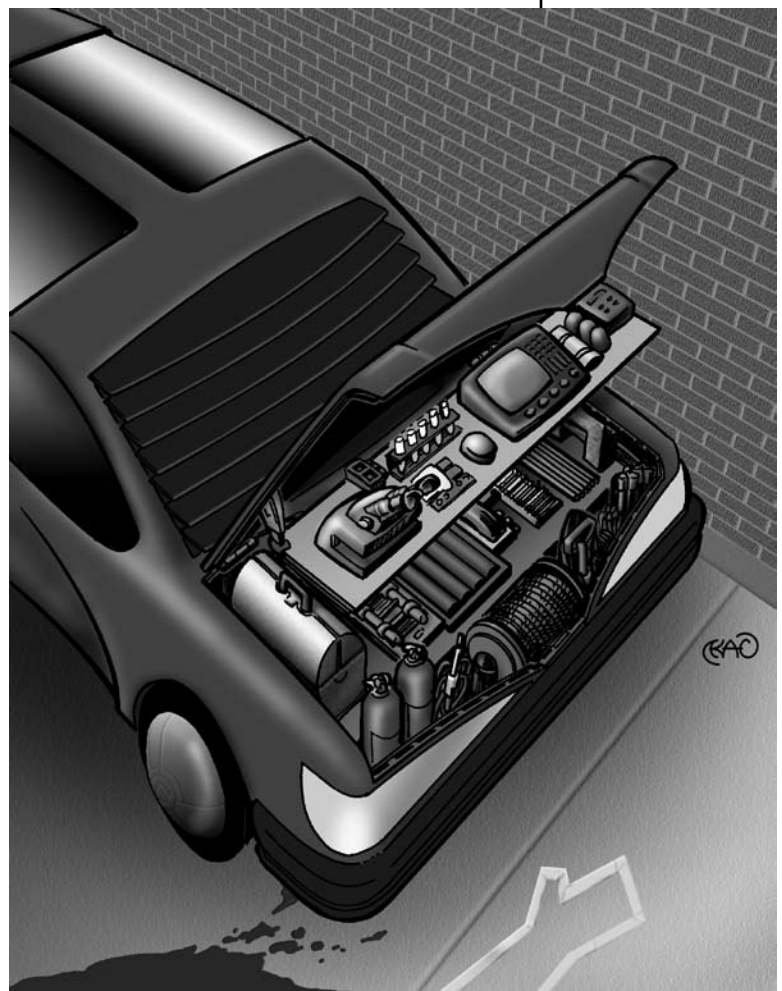
Laboratories

Sufficiently Large Vehicles, such as modern sailing ships or the starships of *Star Hero*, are large enough to have laboratories on board. In some campaigns, such as *Champions* and *Dark Champions* games, characters may even be able to fit miniaturized but incredibly sophisticated labs in car-sized vehicles — though all labs must take up a minimum of 1 hex of space unless the GM rules

otherwise. Gamemasters may want designers to make labs with better rolls larger — for example, one hex for a base roll, +1 hex per +1 to the roll. In many cases, it's also appropriate to increase the size of the lab by +1 hex per person who can work in there at the same time.

Labs help characters do research and improve certain Skills, provide a way to analyze data about mysterious events, and so forth. Don't let the term "lab" confuse you; they're not restricted to the hard sciences. A Vehicle could have a "lab" stocked with Disguise equipment, or lockpicking tools and practice locks.

To build a lab, simply buy the appropriate Skill — this indicates what the lab is designed for. This Skill can be a Familiarity for poor labs, or a normal Skill for better ones. When a character uses the lab, its roll acts as a Complementary Skill Roll to his own roll. Because labs don't have any Characteristics, the base roll for a lab Skill is always 9-. (If a



Vehicle has a laboratory based on a Knowledge Skill, Professional Skill, or Science Skill, the lab starts with a base Skill Roll of 8- for 1 Character Point, or 11- for 2 Character Points.) Of course, the lab only helps the character with his Skill; if he doesn't have the Skill in the first place the lab does him no good. (Most people couldn't make heads or tails out of the equipment in Einstein's laboratory, for example.)

A character can give a Computer control over a laboratory, though of course the Computer must have the requisite Skill to use it. The Computer needs either Extra Limbs, a robot, or a person in the lab to help it use the facility.

Standard Laboratory: *Characteristic-based Skill at 8-. Total cost: 1 point.*

Basic Laboratory: *Characteristic-based Skill at 11-. Total cost: 7 points.*

High Laboratory: *Characteristic-based Skill at 14-. Total cost: 13 points.*

Advanced Laboratory: *Characteristic-based Skill at 17-. Total cost: 19 points.*

Extremely Advanced Laboratory: *Characteristic-based Skill at 20-. Total cost: 25 points.*

Ultra-Advanced Laboratory: *Characteristic-based Skill at 23-. Total cost: 31 points.*

Large Vehicles often include repair shops, for purposes of maintenance and damage control. You can simulate this by buying "labs" for Mechanics and various other Skills.

Signaling Systems

These systems are all used to attract the attention of, or communicate with, people outside a Vehicle (often large numbers of people).

Emergency Lights And/Or Siren: Commonly seen (and heard) on emergency services vehicles such as ambulances, fire trucks, and police cars, emergency lights and sirens warn other drivers to get out of the way. In most jurisdictions it's illegal for civilian vehicles to have them.

Emergency Lights: *Sight Group Images, +4 to PER Rolls, 1" radius, Reduced Endurance (0 END; +½) (33 Active Points); OAF Bulky (-1½), No Range (-½), Set Effect (-1). Total cost: 8 points.*

Emergency Siren: *Hearing Group Images, +4 to PER Rolls, 1" radius, Reduced Endurance (0 END; +½) (25 Active Points); OAF Bulky (-1½), No Range (-½), Set Effect (-1). Total cost: 6 points.*

Emergency Lights & Siren: *Sight and Hearing Group Images, +4 to PER Rolls, 1" radius, Reduced Endurance (0 END; +½) (40 Active Points); OAF Bulky (-1½), No Range (-½), Set Effect (-1). Total cost: 10 points.*

Public Address System: Sometimes the occupants of a Vehicle need to make themselves heard without exiting the Vehicle. In those situations, a PA system comes in handy.

Hearing Group Images, +3 to PER Rolls, 1" radius, Reduced Endurance (0 END; +½) (21 Active Points); OAF Bulky (-1½), No Range (-½), Set Effect (only amplifies what's said into it; -1). Total cost: 5 points.

Spotlight: Many Vehicles mount large lights with which to illuminate the darkness.

Sight Group Images, +5 to PER Rolls, Increased Radius (4" radius; +½), Reduced Endurance (0 END; +½) (50 Active Points); OAF Bulky (-1½), Only To Create Light (-1). Total cost: 14 points.

Vehicles Within Vehicles

Large Vehicles often carry smaller Vehicles inside or with them for various purposes. A lifeboat is perhaps the best example; you can use the Canoe write-up (page 61) for that. Here are a few more:



ELEVATOR

Val	Char	Cost	Notes
1	Size	5	1.25" x .64"; -1 KB; -0 DCV
20	STR	5	Lift 400 kg; 4d6 HTH [0]
3	DEX	-21	OCV: 1/DCV: 1
13	BODY	2	
2	DEF	0	
2	SPD	7	Phases: 6, 12
Total Characteristic Cost: -2			

Movement: Ground: 0"/0"
Flight: 3"/6"

Abilities & Equipment

Cost	Power	END
2	<i>Going Up!</i> : Flight 3"; Restricted Path (-1), Limited Maneuverability (-1)	0
-12	<i>Only Flies</i> : Ground Movement -6" (0" total)	
-2	<i>Only Flies</i> : <i>Swimming</i> -2" (0" total)	

Total Abilities & Equipment Cost: -12
Total Vehicle Cost: -14

Value Disadvantages

None

Total Disadvantage Points: 0
Total Cost: -14/5 = 1

OPTIONS

Cost	Power
+2	<i>Express Elevator</i> : Add +3" to Flight
+2	<i>Turbolift</i> : Add Sideways Maneuverability (+½) to Flight, and remove Limited Maneuverability

Description: Large Vehicles, like cruise ships or starships, often have elevators so people can move around in them more quickly and easily. On high-tech Vehicles, the elevator may even be a turbolift, able to move sideways through the Vehicle as well as up and down. In either case, the elevator can only travel through the shafts built for it.

ESCAPE POD

Val	Char	Cost	Notes
3	Size	15	2" x 1"; -3 KB; -2 DCV
25	STR	0	Lift 800 kg; 5d6 HTH [0]
8	DEX	-6	OCV: 3/DCV: 3
13	BODY	0	
3	DEF	3	
2	SPD	2	Phases: 6, 12
Total Characteristic Cost: 14			

Movement: Ground: 0"/0"
Flight: 10"/320"

Abilities & Equipment

Cost	Power	END
32	<i>Fusion Thrusters</i> : Flight 10", x32 Noncombat; Limited Maneuverability (-¼)	0
-12	<i>Only Flies</i> : Ground Movement -6" (0" total)	
-2	<i>Only Flies</i> : <i>Swimming</i> -2" (0" total)	

44	<i>Distress Beacon</i> : Radio Group Images, +8 to PER Rolls, 1" radius, MegaScale (1" = 10 light-years; +3¾), Reduced Endurance (0 END; +½); OAF Bulky (-1½), No Range (-½), Set Effect (-1)	0
18	<i>Communications System</i> : HRRP (Radio Group), MegaScale (1 light-year per Active Point, can scale down to 1 km per Active Point; +3½); OAF Bulky (-1½), Affected As Sight And Hearing Group As Well As Radio Group (-½)	0
18	<i>Life Support</i> : Life Support (Self-Contained Breathing; Safe Environments: High Radiation, Intense Cold, Intense Heat, Low Pressure/Vacuum); Continuing Fuel Charge (easily replaced from sources outside the pod; 1 Month (120 man-days); -0)	[1cc]
3	<i>Food Supplies</i> : Life Support (Diminished Eating: no need to eat); 1 Continuing Fuel Charge (easily replaced from sources outside the pod; 1 Month (120 man-days); -0)	[1cc]

Total Abilities & Equipment Cost: 102
Total Vehicle Cost: 115

Value Disadvantages

None

Total Disadvantage Points: 0
Total Cost: 115/5 = 23

Description: This is a simple starship escape pod, able to support four people for a month (or more for less time). It includes a supply of breathing gases, food, and drink, a standard communications system (including dedicated distress beacon), and possibly a simple computer with minor entertainment programs.

Winch

Vehicles designed to help people perform hard tasks and strenuous chores sometimes come equipped with winches for hauling heavy objects. The winch's Stretching defines how long its cable is (it uses the Vehicle's STR for pulling); the Requires Outside Operator signifies that the Vehicle cannot reach for something — the operator or another person has to get out, unwind the winch cable by hand, wrap it around or hook it to the object to be pulled, and then start it up from inside the Vehicle. (A winch without that Limitation would be a cable-gun or rocket-powered grapnel.)

Winch: *Stretching* 20", *Reduced Endurance* (0 END; +½) (150 Active Points); *OAF Bulky* (-1½), *Always Direct* (-¼), *No Noncombat Stretching* (-¼), *Cannot Do Damage* (-½). *Total cost: 43 points.*

Enhanced Winch Motor: +10 STR (10 Active Points); *OAF Bulky* (-1½), *Only Works With Winch* (-1). *Total cost: 3 points.*



8 DOGFIGHTS, CAR CHASES: COMBAT & ADVENTURING

Vehicle chases and battles are a long-standing part of adventure fiction. This chapter provides some additional and expanded *Hero System* rules for conducting Vehicle battles, and otherwise using Vehicles in scenarios. However, the nature of Vehicle combat depends largely on the environment, the types of technology available, and numerous other factors that no single chapter or book can fully

quantify. Therefore, the rules presented here are general ones, intended for use in a wide variety of *Hero System* campaigns. Gamemasters can, and should, alter and adapt them for use in their own games, and if necessary create new rules appropriate for their campaign settings and preferred style of play.

For additional information regarding space combat specifically, see Chapter Eight of *Star Hero*.

ENTERING VEHICLE COMBAT



Before you introduce Vehicle combat into your game, consider the roles of “fun” and “realism.” Vehicle chases and battles are often tense, exciting, and dramatic — and realism be damned. This can lead to fast-paced, exciting game scenes, but requires the GM to ignore a lot of rules or make things up on the fly. On the other hand, gamers who prefer accuracy and realism like to emphasize what is currently known about vehicles and vehicle combat, often stressing correct simulation even when that slows down the game. Gamemasters should decide what style of play they want, and adjust the rules to fit.

VEHICULAR PERCEPTION

Vehicles themselves do not make PER Rolls, even if they have built-in sensory devices, because they have no INT on which to base such a roll. (This would not apply in games where the GM allows Vehicles to have INT, of course.) It’s the Vehicle’s operator, be it a Computer or a character, who makes PER Rolls “for the Vehicle.” Most operators use Systems Operation to make the PER Roll with (representing their ability to use the sensors and interpret their data); a Computer would make a PER Roll with its own INT. However, Sense-Affecting Powers used against the Vehicle can “blind” it by scrambling its sensors or the like; additionally, attackers can use such Powers against the Vehicle’s operator and/or occupants, making it difficult or impossible for them to take advantage of the Vehicle’s sensors even if they’re functional. See page 23 for more information.

OPERATING A VEHICLE IN COMBAT

Characters use Skills to operate Vehicles: Combat Driving (for Vehicles that move in two dimensions, like cars and ships); Combat Piloting (for Vehicles that move in three dimensions, like planes, submarines, and starships); and Transport Familiarity.

Transport Familiarity (TF), discussed in detail on pages 73-74 of the *Hero System 5th Edition, Revised*, is a Background Skill indicating that a character has the knowledge and ability to operate a particular type or class of Vehicle, and has a flat 8- roll for making Control Rolls and maneuvering in dangerous or stressful conditions. Transport Familiarity is most common in Heroic games, where characters often buy Vehicles with money in-game. See also page 20.

Characters who want the ability to operate a

vehicle more reliably in combat or other dangerous conditions need Combat Driving/Piloting (or in some campaigns, variants of them like the “Combat Sailing” mentioned on page 155). They use these Skills when making Control Rolls (see below). A character with one of these Skills gets an appropriate 1-point TF of his choice for free. However, he has to buy other TFs if he wants to operate other types of Vehicles; a character who knows how to use Combat Piloting with helicopters doesn’t necessarily know how to maneuver an airplane, much less a submarine or starship. At the GM’s option, a character who wants to use his Combat Driving/Piloting with a type of Vehicle for which he has no TF can do so, but at a -4 penalty on every roll.

Control Rolls

When the going gets tough, a Vehicle operator must make a Control Roll to keep his Vehicle under control. The operator’s ability to do this is often central to Vehicle combat.

A Vehicle operator must make a Control Roll whenever the GM believes there’s a chance he may lose control of his Vehicle, or when the rules call for one. This includes when the Vehicle:

- performs a Vehicle Maneuver
- tries to avoid an obstacle
- suffers damage, or
- suffers Knockback

Control Rolls may also be necessary when the operator is distracted, such as when he tries to both operate the Vehicle and do something else (such as make an attack).

The GM decides at what point during a Vehicle’s movement it makes a Control Roll. Some Control Rolls may take place just as the Vehicle begins moving, others after a Half Move or at some point mid-move, others at the end of the movement.

See the Control Roll Modifiers Table for suggested bonuses and penalties for Control Rolls.

FAILED CONTROL ROLLS

If a Vehicle fails a Control Roll, typically the Vehicle moves out of control in the same direction it was traveling, often spinning, tipping over, or otherwise becoming disoriented. The Vehicle cannot perform any more actions that Segment (and, at the GM’s option, possibly in its next Phase as well). If you use the Complex Vehicle Actions rules, no one aboard the Vehicle can act during this time; usually they get tossed around or disoriented themselves inside the Vehicle.

HERO SYSTEM VEHICLE COMBAT

In general, this chapter tries to treat Vehicles the same as characters, robots, or any other being, entity, or thing involved in a combat. Instead of coming up with an entirely new set of rules governing vehicular combat, it shows how the standard *Hero System* combat rules apply to and interact with Vehicles. In some cases, this involves creating additional rules, since Vehicles act, and are used, differently from a standard character. But even then, those rules are designed to integrate with the regular combat rules as smoothly as possible. As always, the GM should evaluate the new or optional rules, decide whether they’re suitable for his campaign, and implement them as appropriate.

Unless noted otherwise, it’s generally safe to assume that any rule in Chapter Two of the *Hero System 5th Edition* that isn’t mentioned here, but which should, logically or for game balance purposes, apply to Vehicles, does apply. If a rule doesn’t seem appropriate for Vehicles, don’t use it, or use it differently, even if it’s not discussed in this chapter — don’t follow the rules rigidly when your common sense and dramatic sense tell you otherwise.

CONTROL ROLL MODIFIERS TABLE

Modifier	Terrain, Ground
	Paved Ground, Smooth paved ground (e.g., typical paved road or parking lot)
+2	Dry
+1	Wet
-3	Ice-/snow-covered
	Rough paved ground (e.g., paved roads in poor condition)
+0	Dry
-1	Wet
-3	Ice-/snow-covered
	Unpaved Ground, Smooth unpaved ground (e.g., football field, meadow)
-1	Dry
-2	Wet/muddy
-4	Ice-/snow-covered
	Rough unpaved ground (e.g., rocky ground, typical off-road terrain)
-2	Dry
-3	Wet/muddy
-4	Ice-/snow-covered
	Interior floor not designed for vehicles (e.g., a mall, an office building)
+1	Dry
-2	Wet
-3	Ice-/snow-covered
	Miscellaneous Surfaces
-5	Flat ice (e.g., frozen lake surface)
Varies	Oil slick (see page 125)

Modifier Terrain/Wind/Weather, Water*

Modifier	Wind Speed
-0	None
-0	Very Light
-0	Light
-1	Moderate
-2	Heavy
-4	Very Heavy
-8	Storm Force
	Current/Tide, moving with
-0	Weak current
-0	Moderate current
-1	Strong current
	Current/tide, moving against
-0	Weak current
-1	Moderate current
-2	Strong current
	Other conditions#
-0	Calm waters
-1	Choppy waters
-2	Rough waters
-4	Extremely rough waters
N/A	Too rough to sail (Control Rolls automatically fail)

*: See page 57 for more information on wind speeds and the like.

#: Current/tide penalties are usually cumulative with wind speed penalties; water conditions penalties are not, since the wind speed penalty accounts for the presumed roughness of the waters under the prevailing weather conditions.

Modifier Wind/Weather, Air*

-0	None
-0	Very Light
-0	Light
-1	Moderate
-2	Heavy
-4	Very Heavy
-8	Storm Force

*: See page 57 for more information on wind speeds and the like.

Modifier Space

Asteroid field (see *Star Hero*, pages 95-96)

+2	Very light field density
+1	Light field density
+0	Average field density
-3	Tight field density
-6	Very tight field density
-9	Extremely tight field density

Modifier

Vehicle/Operator Condition

-1 per 2 BODY	Injury to operator
-1 per 2 BODY	Damage to Vehicle
-1 per 2" KB	Vehicle takes Knockback

Modifier

Velocity*

-0	1-40" per Turn
-1	41-80" per Turn
-2	81-160" per Turn
-3	161-320" per Turn
-4	321-640" per Turn
-5	641" or more per Turn

*: Generally, space vehicles do not suffer velocity modifiers. However, the GM may impose them if he feels it would be appropriate (for example, if a starship tries to fly at fast speed through an asteroid field).

Modifier

Movement

-1	Sideways movement
-1	Straight up or down movement
-2	Backwards movement

Modifier Obstacles

Number Of Obstacles

-0	Few obstacles
-1	Numerous obstacles
-2	Extremely numerous obstacles

Size Of Obstacle(s)

-0	Small: Average obstacle is 25% of Vehicle's size, or smaller
-1	Medium: Average obstacle is 26-50% of Vehicle's size
-2	Large: Average obstacle is 51-75% of Vehicle's size
-4	Very Large: Average obstacle is 76-100% of Vehicle's size
-6	Extremely Large: Average obstacle is 101% of Vehicle's size, or larger

Modifier Overloading

-1 per 10%	Overloading (see page 10)
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The GM should apply all appropriate modifiers. For example, a Vehicle moving backwards over rough, unpaved, icy ground suffers a -6 Control Roll penalty.

The GM may, if he wishes, alter any of these modifiers to suit particular conditions. The GM may also rule that movement on or through some types of terrain or weather conditions is impossible; for example, few ground vehicles can move across extremely muddy ground without sinking into it and becoming stuck.

While out of control, a Vehicle typically “skids” a number of inches equal to 1-2” per point by which the Combat Driving roll was missed. The GM may increase this amount if he prefers, which would be appropriate if, for example, the Vehicle is moving at a high velocity. This can, in some cases, carry the Vehicle further than it could normally move with a Full Move.

The direction of a Vehicle’s skid may depend on what the Vehicle was doing. For example, if a driver loses control of his car while making a sharp turn, the Vehicle may “fishtail,” shifting or spinning out of control in a direction off the angle of the turn. Alternately, the GM may roll 1d6 to determine the “drift” of an out-of-control Vehicle (1-3, drift 10-60 degrees to the right; 4-6, drift 10-60 degrees left), instead of having it proceed on its current vector. This adds a further element of unpredictability. If the Vehicle spins, the GM can use the Area Of Effect attacks diagram of page 376 of the *Hero System 5th Edition, Revised* to determine what direction it ends up facing.

Effects Of Skids

There are several possible effects from skids, including tire damage, loss of velocity, and collisions.

First, if a Vehicle is in contact with a surface (like most ground vehicles are) and skids more than 4”, or any distance on a particularly rough surface, at the GM’s option its tires (or whatever other part is in contact with the surface) take ½d6 Killing Damage.

Second, also at the GM’s option, a skid may end with the Vehicle at less than the velocity it was moving when it lost control. It may be reduced to half Combat velocity, half the velocity it was moving at, a velocity of zero, or the like; the final determination is up to the GM.

Third, the Vehicle may collide with something. In this case, the Vehicle takes damage as if performing a Move By (for “sideswipes”) or Move Through (for direct collisions) on itself at its Combat velocity (*i.e.*, it takes full damage, not one-third or half damage). However, the maximum number of dice of damage the Vehicle can take equals the DEF+BODY of the object it collides with.

If a Vehicle collides with a small obstacle, or one that’s low to the ground, a crash, roll, tip-over, or similar catastrophic effect often occurs. The Vehicle takes Move Through damage (unless the GM deems that result totally inappropriate). The Vehicle cannot take further actions in the Segment the catastrophe occurs, and probably not in its next Phase, either (if then). If you use the Complex Vehicle Actions rules, no one aboard the Vehicle can act during this time; usually they get tossed around or disoriented themselves inside the Vehicle. At the GM’s option, a crash, roll, or the like may also occur whenever a Vehicle fails a Control Roll by 5 or more (this is particularly appropriate for large or top-heavy Vehicles).

If appropriate, after a Vehicle rolls or flips, roll 1d6. A result of 1-3 indicates it ends up properly oriented (wheels on the ground, or the like); a 4-5

that it’s on its side (GM determines which side randomly); a 6 that it’s upside down.

CONTROL ROLL MODIFIERS AND OTHER SKILLS

The modifiers listed in the Control Roll Table may, at the GM’s option, apply to other Skill Rolls by characters. For example, a character on top of a fast-moving Vehicle may suffer velocity modifiers to his Skill Rolls, and one trying to pick the lock of a Vehicle moving over rough terrain suffers the terrain penalty to his Lockpicking roll. The GM decides what conditions affect what Skills, and to what extent.

CONTROL ROLL MODIFIERS AND TURN MODE

At the GM’s option, the inverse of some negative Control Roll modifiers may apply to increase a Vehicle’s Turn Mode. For example, if a car travels 15” per Phase, it has a normal Turn Mode of 3” (it could turn 60° every 3”). Using this rule, that car could only make a 60° turn every 5” if moving on wet/muddy smooth, unpaved ground — the -2 Control Roll modifier becomes a +2” increase in the Vehicle’s Turn Mode. However, positive modifiers do not decrease a Vehicle’s Turn Mode.

VEHICLE INITIATIVE

In combat, a Vehicle’s initiative — its DEX value for purposes of determining who acts first in a Segment — derives from its DEX or the DEX of its operator, whichever is *lower*; this is referred to as a Vehicle’s *effective DEX*. For example, a Vehicle with DEX 23 and an operator with DEX 18 has an effective DEX of 18, meaning characters with DEX 19 or higher act before it in Segments when it has a Phase.

VEHICLE SPEED

A Vehicle’s Phases derive from its SPD, just like a character. For example, a Vehicle with a SPD 4 moves on Segments 3, 6, 9, 12.

In combat, a Vehicle’s SPD equals its SPD or the operator’s SPD, whichever is *lower*; this is referred to as a Vehicle’s *effective SPD*. If the Vehicle is operated on the Phases for this SPD (or a lower SPD), it has a normal Turn Mode for all of its types of movement. In addition, the Vehicle may receive a DCV bonus if the operator has Combat Driving/Piloting (see page 182).

If the operator has a higher SPD than the Vehicle, the Vehicle simply isn’t responsive enough for him. He must Hold his Actions so that he acts on the Phases in which the Vehicle can act if he wants to maintain full control over the Vehicle. Alternately, he can perform other actions (such as making an attack) on any Phase which he has but the Vehicle does not. (See pages 174, 181 regarding other actions by the operator.)

If the Vehicle has a higher SPD than the operator, the operator has two choices. First, he

OTHER TERRAIN EFFECTS

Terrain and weather can affect a Vehicle’s velocity as well as its Control Rolls. See page 35 for terrain’s effects on ground Vehicles, page 58 for its effects on water Vehicles, and page 71 for its effects on air Vehicles.

The GM may, if he wishes, impose CV penalties due to terrain or weather — the roughness of the ride or the prevailing conditions makes it harder to target opponents, or dodge their attacks. Typically a penalty equal to half the Control Roll penalty is appropriate, but the final decision is up to the GM. Vehicles can never obtain CV bonuses from terrain or weather.

can, as described above, have the Vehicle only move on his Phases (in essence, he makes the Vehicle Hold its Action until he can control its movement). However, he can, if he wishes, try to drive the Vehicle at its SPD instead of his own, lower, SPD. If the Vehicle moves in a Phase which it has but the operator does not, it is considered to be moving at Noncombat Movement velocity (regardless of how many inches of movement it actually uses) and thus to be at 0 OCV, ½ DCV. It cannot accelerate or decelerate; it must continue moving at the velocity it had on its last Phase. Furthermore, it's harder to turn — it must continue moving in the direction it was moving, since the operator can only adjust the Vehicle's direction or velocity when he has an Action (*i.e.*, on one of his Phases) or if he Aborts one of his Phases to do so for defensive purposes. The Vehicle can only attack when its operator has an Action, except for Move Throughs — if it runs into something, it does Move Through damage, regardless of whether its operator had a Phase that Segment.

A Vehicle can never move at a SPD higher than its own (a Vehicle can only be so responsive).

Example: *Fast Eddie (SPD 2) is driving a Corvette (SPD 4). Eddie can drive the Vehicle at SPD 2, thus driving at Combat Movement velocity. Alternatively, he can really open it up and drive the Vehicle at SPD 4. On the Phases which the 'vette has but Eddie does not, it's considered to be traveling at Noncombat Movement velocity (regardless of how many inches it moves) and is at 0 OCV, ½ DCV. In addition, Eddie can only adjust the Vehicle's course or velocity in his Phases (Segments 6 and 12), even though the car moves on Segments 3, 6, 9, and 12.*

VEHICLE ACTIONS

Gamemasters running Vehicle combat have two options for determining who can act, and when: Simple Vehicle Actions; and Complex Vehicle Actions.

SIMPLE VEHICLE ACTIONS

The Simple Vehicle Actions option treats each Vehicle as a single entity, regardless of how many crewmembers it has, weapons it mounts, or computers it uses. Each Vehicle moves according to the standard Vehicle rules: its uses its own SPD or its pilot's SPD (whichever is lower), and its defined inches of movement. It performs actions as if it were a single entity: it can make one attack using one of its weapons, for example, but that's it... and that's assuming it makes only a Half Move beforehand.

The benefit to the Simple Vehicle Action rules is that they make the combat easy to understand and run. The drawback is that they're not in any way "realistic." Even if it has the power to do so, the Vehicle can't fire multiple weapons or engage in a lot of fancy maneuvering, and that saps a lot of the flavor from Vehicle battles.

COMPLEX VEHICLE ACTIONS

For greater "realism," and a greater degree of participation by the PCs, GMs can use more complex rules to resolve Vehicle actions. In the Complex Vehicle Action system, the Vehicle counts as one character who can act on its own Phases (or using the per-Turn rules for Dogfight or Intercept Combat, if those are in effect). It can move, fire one weapon, perform a maneuver, or the like. It uses its effective DEX and effective SPD to determine when it can act.

Additionally, each PC, and any other prominent character aboard the Vehicle, also gets to act, according to his own SPD and DEX (or, to simplify things, the GM may rule that all characters on a Vehicle act with the Vehicle's SPD). That allows characters to do things like pilot the Vehicle, fire a weapon, activate point defenses, perform first aid on injured crewmembers, fight boarders, and so forth. Characters use their own DEXs, Skills (including relevant Combat Skill Levels), and other attributes to resolve the outcome of actions they attempt. If a character fires a Vehicle's weapons, he uses the Vehicle's OCV; if he gets involved in personal combat, he uses his own CVs. If a character uses the Vehicle's weapons or equipment, the Vehicle pays the END for them in the Segment when they're used.

One exception to this general rule: if a character operates the Vehicle, his Action in a Phase is to do that — operate (drive/pilot) the Vehicle. Typically this means make a Full Move, or a Half Move and a Vehicle Maneuver, or a Half Move and an attack. The operator cannot also, on his own, do things like fire a weapon or operate the sensors (unless the GM permits).

The GM determines how many crewmembers on a Vehicle count as "prominent" for purposes of this rule. For example, assuming a Vehicle had sufficient power, theoretically it could fire every single weapon it has, since a separate crewmember can man each weapon and fire it individually. But that could take a lot of time, so the GM may not want to consider every crewmember capable of firing a weapon as "prominent." He may prefer to designate only the PCs and major occupants or crewmembers as prominent, or only enough gunners to man half the weapons, or the like.

Some characters' actions can affect the actions of all other characters on the Vehicle. For example, a character who uses sensors to obtain a +2 Attack Roll bonus for the Vehicle's weapons doesn't just obtain that bonus for himself — it applies to all other attacks the Vehicle makes that Phase (unless for some reason the sensor was only usable with one weapon). The GM determines who a character's actions affect.

Example: *The Sword Of Orion is a large starship with a crew of 500 persons, including five PCs. The GM decides that, in battle, each PC, each of the Vehicle's six major officers who aren't PCs, and enough average crewmembers to man one-third of the Sword's weapons are "prominent" characters.*



The Sword gets into a fight with a strange enemy Vehicle. The Sword itself counts as a character, and moves to attack. One PC, Lt. Jackson, is the Vehicle's Flight Officer, so he's piloting the Vehicle, and that counts as his Action (he could have had the Vehicle perform a maneuver or make an attack, if he'd wanted).

The first PC in the initiative order is Lt. Thalira, who's manning a torpedo launcher. She acts on her own DEX, and uses the Vehicle's CV to determine whether she hits the enemy Vehicle.

The next PC is Ensign Rodriguez, who's manning the sensors. One of the Vehicle's sensors is defined as Find Weakness, so he uses his action to make the roll. He succeeds, and relays the information he's uncovered to the other PCs. All the Vehicle's attacks get to take advantage of the halving of the target's defenses, not just attacks made by Rodriguez.

The next PC, Ensign Flynt, is an engineer who's been assigned to repair duty. He Holds his Action, waiting until the Vehicle suffers damage before he acts.

The last PC is Dr. Petrine, who's waiting in sickbay for injured crewmembers. She, too, Holds her Action until she needs to act.

The GM now resolves the actions of any NPC crewmembers firing weapons or performing other tasks. To keep the pace of combat moving quickly, the GM uses the optional rule on page 172 — he rolls once for all NPCs making attacks, using that one roll to determine how

many of them hit. He also just assumes the attacks do average damage, rather than rolling dice for each attack that hit.

Multiple-Power Attacks

Vehicles can perform multiple-Power attacks, unless the GM forbids this for some reason.

Making attack and damage rolls for every weapon a Vehicle fires in a Phase can become time-consuming and tedious. To keep combat moving quickly and smoothly, the GM might instead want to consider all of a Vehicle's weapons fired at a single target as one multiple-Power attack (see the *Hero System 5th Edition, Revised*, page 358). That allows for "broadside" or "gang-fire" attacks the GM can resolve quickly and easily (especially if he uses average damage for each of the attacks).

To keep gang-fire attacks from becoming overwhelming, the GM may want to impose preconditions or restrictions on them, such as:

- making a "broadside" takes a Full Phase Action by the Vehicle and everyone on the Vehicle manning a weapon (though the GM may also want to allow multiple broadsides at multiple targets in a Phase, if the Vehicle has enough weapons to make that many attacks)
- imposing a cumulative OCV penalty for each weapon included in the broadside after the first (say, -1 or -2 per weapon)
- reducing the Vehicle's DCV by half when it makes a broadside attack

■ requiring the Vehicle to execute a *Maneuver Positioning* Vehicle Maneuver successfully before it can make a broadside attack

Holding And Aborting

A Vehicle may Hold its Action using the standard rules. If you're using the Complex Vehicle Actions method, the Vehicle and each person able to act decides whether to Hold his own Action. If the Vehicle itself chooses to Hold, that doesn't prevent a person on the Vehicle from taking his own Actions on his own Phases, even if those Actions involve using vehicular equipment (like firing one of the Vehicle's weapon or operating a Vehicle's sensors). If an occupant of a Vehicle chooses to Hold his Action, that doesn't prevent the Vehicle or other occupants from taking their own Actions on their own Phases.

A Vehicle may Abort to a defensive action using the standard rules (including the defense-oriented Vehicle Maneuvers). With the Complex Vehicle Actions method, if the Vehicle Aborts, neither the Vehicle nor anyone on it can act until the Vehicle itself can act again — the sudden change of conduct by the Vehicle affects everyone inside it. However, occupants of the Vehicle can Abort their own Phases without affecting the ability of the Vehicle or any other occupant to act. For example, a security guard fighting boarders could Abort to Dodge an attacker's gunfire, but the Vehicle could still act normally on its own Phases, and a gunner elsewhere on the Vehicle could fire a vehicular weapon on his own Phases.

VEHICLE ACTIONS TABLE

Action	Time Required
Combat/Martial Maneuver	½ or 1 Phase, depending on Maneuver (Attack Action)
Fire a weapon	½ Phase (Attack Action)
Making Combat Driving/Piloting roll as a Complementary Skill to operator's roll	½ Phase
Move more than half a Vehicle's inches with any mode of movement	Full Phase
Move up to half a Vehicle's inches with any mode of movement	½ Phase
Ram (Move Through)	1 Phase*
Sideswipe (Move By)	1 Phase*
Start a Vehicle	½ Phase
Vehicle Maneuver	½ Phase (Attack Action (see page 178))
Vehicular Presence Attack	½ Phase (Attack Action) (see page 16)

For other Actions, refer to the Actions Table on page 237 of the *Hero System 5th Edition*.

*: Move By/Through can be performed as Half Phase Actions, though this means the Vehicle can only perform a Half Move with them. Ordinarily they are performed in conjunction with a Full Move, making them take an entire Phase.

CHARACTERS IN VEHICLE COMBAT

In many Vehicle combats, what matters most is not the abilities and equipment of the Vehicles involved, but the skills and daring of the people in those Vehicles — the operators, crews, and passengers, in other words. For simplicity's sake, *The Ultimate Vehicle* refers to all these people collectively as "occupants" (or sometimes "personnel" or "crew").

Character Actions In Vehicle Combat

If the GM uses the Simple Vehicle Actions option, generally only one character's abilities, Skills, and other attributes matter during a Phase, since a Vehicle can only take one Action no matter how many people are aboard. The occupant in a position to perform the chosen Action, or the PC with the best Skills for the job (if appropriate), makes whatever rolls are needed to resolve an attack or other Action.

If the GM uses the Complex Vehicle Actions option, things change significantly. Now every PC and every "prominent" NPC can act on his own Phases. One might operate a Vehicle's weapons, one monitors its sensors, and a third fights invaders in HTH Combat. In this situation, the GM has to use his judgment regarding the effects of one character's actions on the Vehicle as a whole, what DEX and SPD a character should use for his Actions, and so forth.

Generally speaking, an action performed by one character can benefit all the other characters in a Phase who act later in the Segment than he does. For example, if a character uses the sensors to obtain a +1 OCV bonus against an enemy vehicle, typically that bonus applies to all attacks the Vehicle makes that Segment that occur after the character obtains the bonus. In some cases, the bonus lasts until the character's next action, thus allowing it to affect Vehicle actions in later Segments. The GM makes the final decision as to what effect a character's actions have.

Some possible character actions in Vehicle combat include:

FIGHTING

First and foremost, characters can fight. They can fire a Vehicle's weapons, use their own weapons (if appropriate), operate sensors or communications systems, or take other actions designed to improve the Vehicle's ability to win the battle. See the rest of this chapter for information, possible actions, and their effects.

MEDICAL DUTY

Characters with medical training — such as the Skills *Paramedics* or *SS: Medicine* — may find themselves patching up injured crewmen, performing life-saving combat surgery, and so forth.

The GM can deal with this on both a personal and an abstract level. On the personal level, if a PC or prominent NPC suffers an injury, a character on medical duty can attempt a Skill Roll in the normal fashion to try to make him better (or at least keep him comfortable until he can receive full medical attention). Standard rules for Paramedics apply.

On an abstract level, the GM can compare the efforts of the medical crew to the percentage of injured crewmembers. For each Phase of medical attention, have the character (PC or NPC) with the highest Paramedics or SS: Medicine roll make a roll. Crew casualty penalties (see page 176) apply to this roll; after all, doctors get injured and overworked, too. For every two points by which the character makes the roll, the medical crew reduces the percentage of injured crew by 1% (thus allowing those newly-healed crewmembers to return to duty). (For more realistic games, the GM may want to allow healing only for every Turn of effort by the medical crew, and/or to reduce the percentage of crewmembers healed.)

COMBAT REPAIR DUTY

Characters can also try to make mid-combat repairs to a damaged vehicular system. See page 207 for rules.

Crew Skills

Sometimes it's easier for the GM to determine the overall effect of a Vehicle's occupants' actions on a particular task (such as extensive repair work) than to make a separate Skill Roll for each major NPC (not to mention Complementary Skill Rolls and the like). In that case, the GM can simply assign the crew as a whole a "Crew Skill" and apply that to the "meta-task" as a whole.

To determine a Vehicle's Crew Skill for a particular subject, the GM must first decide which active crewmember has the highest Skill Roll in the appropriate Skill. (Alternately, he can use a PC's Skill, if the PC leads the effort — as he probably does.) Then he increases that Skill based on how many other crewmembers are working on the meta-task. He might add +1 to the roll per crewmember, per three crewmembers, per five crewmembers, or whatever else seems appropriate. Then he makes the Crew Skill roll for the crew as a whole to find out how well it performed the task.

Because meta-tasks tend to be large-scale efforts, Crew Skills should take a long time to use — typically four steps down the Time Chart for every unit of time involved. Thus, a task normally requiring 1 Turn takes 1 Hour. The GM can increase or decrease the time required if appropriate; complex or dangerous systems may take much longer to work on.

Example: *A starship has suffered 34 BODY damage out of 50. To determine the effects of the engineering crew's efforts to repair the starship in mid-combat, the GM decides to use a Crew Skill. Mechanics is the most applicable Skill to the job, so he determines that Commander Korel, with his Mechanics 15-, has the*



highest roll. He decides to add +1 to the roll for every three crewmembers involved in the repair work. Since there are 60 engineering personnel on the starship, that's a +20, for a total Skill Roll of 35-. Korel's player makes the roll, at a -17 penalty due to the extent of the damage, and rolls a 10. Since he made the roll by 8, the repair crews fix 4 BODY worth of damage. Since mid-combat jury-rigged repairs normally take 1 Turn (page 207), the repair crews require 1 Hour to get their work done.

Gamemasters can also adapt these rules for combat, deriving a "Crew OCV" from the crewmembers' average CVs. In this case the task typically just takes a Phase, though the GM may want to establish a "Crew SPD" representing how often the crew, as a whole, can attack.

Crew Casualties

Player characters and NPCs aboard a Vehicle in combat are in danger. There are many ways to get hurt, killed, or left behind during a vehicular battle.

Whenever a Vehicle gets an Occupants/Cargo result on its Vehicle Hit Location table (and some-



times other results), or it suffers a crew casualties result on an optional effects roll, or it loses more than half its current BODY, the characters aboard are endangered. Each PC in an affected area of the Vehicle, and any other prominent NPC the GM wants to roll for individually, must make a DEX Roll to avoid harm. (Characters with Luck or Unluck should roll that as well.) If the roll succeeds, the character remains unharmed — a panel shorts out nearby, a pipe bursts across the room, or the like, but the PC takes no damage.

CREW CASUALTIES TABLE

Percentage Of Crew Casualties	Modifiers To All Skill Rolls
0-10%	-0
11-20%	-1
21-40%	-2
41-80%	-4
81% or more	-8

If his roll fails, a character must roll on the accompanying Character Damage Table to determine what happens to him. If a result does not apply, reroll (for example, characters in small Vehicles generally can't get "trapped beneath debris"). The results are not intended to be fatal to characters in good health, but rather to add color, drama, and a personal touch to the battle. Gamemasters should be merciful; it's not fun for characters to suffer fatal (or frequent) injuries in a situation they don't have significant control over.

EFFECT OF CREW CASUALTIES

The optional effects rules provide a way for the GM to determine what percentage of the crew becomes casualties during a battle. A "casualty" is a crewmember killed or so badly injured that he can no longer perform his combat duties.

The more crewmembers that become casualties, the harder it is to keep a Vehicle functioning efficiently. In game terms, the GM can represent this abstractly by imposing penalties to all Skill Rolls the Vehicle or other crewmembers make — without a full crew to man all the duty stations, keep things running efficiently, relay messages, interpret data, and so forth, everyone else's ability to do his job becomes impaired. The Crew Casualties Table describes this effect.

This system works best when applied to Vehicles with large crews, like aircraft carriers and some starships. The GM may wish to ignore it for Vehicles meant to be operated by just one, two, or a handful of people.

CHARACTER DAMAGE TABLE

Roll (2d6)	Result
2	Reroll and double the effect
3	Shards of debris strike the character, causing RKA 1d6 damage (physical)
4	An area becomes hazardous, exposing a character to something he's Susceptible to, is sickening/poisonous to him, or the like
5	The character is trapped beneath debris (Entangle 2d6, 4 DEF)
6	The character is knocked into a wall and suffers 4d6 STUN damage (defenses apply)
7	The character is caught on the fringes of a blast wave; he suffers a Sight and Hearing Group Flash 4d6
8	The character is caught in an explosion; he suffers an RKA 1 ½d6
9	The character takes a hard knock to the head; he's Knocked Out for 1d6 Segments, and suffers a -2 to all INT Rolls, PER Rolls, and Intellect Skill rolls for the next 1d6 Hours
10	The character is exposed to dangerous, sickening fumes (or the like); he suffers a Drain CON 4d6 (points return at the rate of 5 per Minute)
11	An arc of electricity zaps the character, causing RKA 1d6 damage (energy)
12	Roll twice

MOVEMENT AND MANEUVERING



The basic *Hero System* vehicle combat rules are appropriate for cinematic battles. Vehicles get their Move each Phase, and maneuver freely.

MOVEMENT BASICS

Tracking Vehicle movement often works best if you have a hex map — particularly if you're running an air or space combat, since they tend to involve high speeds and lots of “ground.” This is especially true if the GM uses “realistic” movement rules for space combat (page 87), because the cumulative nature of space movement means Vehicles can rapidly move very far apart. However, a hex map is never required for Vehicle combat. Gamemasters may prefer to use non-mapped vehicle combat (as described on page 213 of this book), particularly if there are only two Vehicles in a battle. All that requires is keeping track of the distance between the two.

At the beginning of a battle the GM should “peg” the map to the slowest-moving Vehicle, or some other Vehicle that's particularly significant to the battle (like one side's flagship). That Vehicle begins at rest with regard to the map. It isn't at rest, of course — it's just that the map is “moving” along with the Vehicles. As the battle progresses, the GM may peg the map to some other Vehicle, as appropriate.

Of course, most space battles occur over ranges too great for any map. Weapons and sensors which can detect and hit a Vehicle 300,000 kilometers away won't fit on a single map, unless you increase the scale of the hexes to the point where they're of no use. In those cases, the Vehicles are effectively at rest — the GM simply states the range at which they first detect each other, and the Vehicles attack from extreme range with no real maneuvering at all.

Whether you use the Simple or Complex rules described above, a Vehicle can only make a Half Move with a mode of movement if it also wants to perform an Action (a Vehicle Maneuver, Combat Maneuver, an attack, or the like).

ACCELERATION AND DECELERATION

Vehicles ordinarily use the normal rules for acceleration and deceleration, as described on page 22. The Hit The Brakes Vehicle Maneuver allows a Vehicle to decelerate more quickly than usual, but at the risk of losing control. Various other methods for increasing or decreasing acceleration and deceleration are found elsewhere in this book.

A Vehicle cannot instantly go from forward movement to reverse movement. It has to either

turn around (using the normal rules for Turn Mode and the like), or decelerate to 0” movement and then start moving backwards.

SCALE OF MOVEMENT

Gamemasters running Vehicle battles must consider the scale of Vehicles' movement. This is primarily a consideration for space battles, and some air battles; ground and water vehicles use the normal movement scale when fighting.

Normally, space combat takes place at slower-than-light speeds. That's easier to show on the screen, and avoids all sorts of questions about how various weapons would perform at FTL velocities. In game terms, that means Vehicles use ordinary Flight to move around the battlefield. The GM can assume Vehicles maneuver fairly close to one another, so that each hex on the map is of the standard distance — 2 meters. That means you can resolve movement according to the normal rules.

For greater “realism,” GMs may wish to establish that each hex on the map is larger than 2 meters. For example, each hex might be 100 meters, or 1 kilometer, or 10 kilometers. If Vehicles use normal movement, it may take a long time for one to cross a single hex (and the GM may need “sub-maps” of individual hexes, if Vehicles want to fight close to each other). Alternately, the GM can apply a scale change to movement as well. Maybe each 1” of Flight works on the same scale as the map, or at some lesser rate (but one still greater than 1” = 2m).

If one or more Vehicles have MegaScaled Flight, the GM must also account for that when setting the scale and determining distances moved. If all Vehicles have MegaScaled Flight, the GM can simply set the map scale so that 1” equals the shortest distance the slowest Vehicle could move, and then let other Vehicles move accordingly. If some Vehicles have MegaScaled Flight but some don't, the GM needs to keep that in mind when setting the scale of the map and Vehicle movement — it's not fair to let Vehicles that haven't paid for MegaScale fly as fast as those that have, but it may still be necessary to let non-MegaScaled Vehicles move at least a little faster than 1” = 2m to keep the pace and scope of the battle reasonably fast and “realistic.”

THREE-DIMENSIONAL MOVEMENT

Space, air, and submarine Vehicle combats take place in three dimensions — the Vehicles can go “up” and “down” as well as toward the four edges of the map. Unfortunately, it's difficult to simulate this in gaming, because maps are flat. Unless you're willing and able to build special multi-level mapping tables for your games, you need to consider other solutions.

For example, you can mark a Vehicle's position with numerical notations indicating its position in the Z (up and down) scale, using some predefined unit of measurement (such as 100 meters or 1 kilometer). A "+" note indicates a Vehicle that's above the plane of the map; a "-" notation one that's below the map. For example, a Vehicle marked as +3 might be 300 meters above the map; one marked -1 is 100 meters below the map.

Precise calculations of distance to Vehicles above or below the map are possible using the Pythagorean Theorem, but generally this is a waste of time for gaming purposes. The GM should simply count the hexes normally on the map, and if appropriate add a few to reflect distances above or below the map.

REALISTIC SPACE MOVEMENT

Space Vehicles may, if desired, use this "realistic" system governing movement in outer space.

In realistic movement, a space vehicle's Flight is its delta-V, the amount by which it can accelerate or decelerate. Most vehicles have their movement and facing determined relative to the "stationary" one to which the GM has pegged the map.

Each Phase, mark where each Vehicle begins and ends its movement. On its next Phase the Vehicle automatically moves the same distance and direction, plus whatever delta-V it applies with its engines. Vehicles applying any delta-V automatically face in the direction they are adding movement. (Unless the GM chooses to waive the Turn Mode rules, a Vehicle can only change its direction of movement up to 60 degrees [one hex side] per Phase.) When moving the Vehicle, apply the new delta-V first, and the old movement second.

Example: *The Mockingbird, a small Vehicle, has Flight 30". It's currently heading straight "south" (toward the bottom edge of the map) to escape a pursuer. It detects an obstacle in the way and needs to maneuver. It applies "thrust" (i.e., its inches of Flight) at an angle 60 degrees to the left of its current trajectory. Its player first moves it 30" along the "60 degrees left" vector. Then he moves the Mockingbird the same distance and direction it was traveling before — 30" to the "south."*

Realistic Vehicle combat is typically resolved as Dogfight or Intercept Combat (page 213), particularly when Vehicles that can move in three dimensions are involved. Due to the distances involved in outer space, air battles, and submarine warfare, and the quality of the sensors most Vehicles have, Intercept Combat is the most common, with Vehicles accelerating flat-out and no combat maneuvering. In space combat, for early drives like chemical or thermal rockets, there just isn't enough fuel to waste ducking and weaving, and ion motors have such slow rates of acceleration they have to move at Noncombat speeds to get anywhere at all. More advanced engines allow for greater "agility," but at vast distances Intercept Combat rules still make more sense for a "realistic" battle.

DRAMATIC MOVEMENT

Many GMs prefer Vehicle combat rules emphasizing drama and excitement. For dramatic movement, ignore the realities of movement in space or other environments. Vehicles move as they normally do — up to their full inches per Phase, in whatever direction they desire (and their Turn Mode allows).

Vehicle Maneuvers

Instead of using Dogfight and Intercept Combat, GMs taking a more dramatic approach should treat Vehicles as if they were characters, and have them maneuver and fight accordingly (with whatever changes in points of detail the Vehicle-specific rules require). Alternately, GMs who want a little more "flavor" for their Vehicle battles, but at the cost of introducing a new rule, can try the Vehicle Maneuvers listed in the accompanying table.

Each Vehicle Maneuver counts as an Attack Action, and the operator has to make a Half Move before performing the Vehicle Maneuver (since they all involve some sort of jinking, turning, diving, dodging, or other "maneuvering"). Additionally, he must make a Control Roll with the listed penalty for the Maneuver, plus any other penalties for terrain, Vehicle condition, and the like. Typically this roll involves only the operator's natural Skill; bonuses from the Vehicle's equipment do not apply unless the GM deems them appropriate. Each maneuver describes the effects of succeeding or failing with the Control Roll; the GM may impose other consequences for failure (such as crashing, CV penalties the next Phase, or loss of actions) if he wants.

As with other *Hero System* elements, many of the Vehicle Maneuvers have "generic" names. It's up to the player whose character performs the maneuver to describe exactly what the character does. For example, a Defensive Maneuver could represent a barrel roll, presenting a minimal aspect to an attacker, deft driving, high-speed jinking, or clever use of "cover."

Vehicles with the *Limited Maneuverability* Limitation on a mode of movement cannot perform any Vehicle Maneuvers with that mode of movement. Alternately, the GM may allow the Vehicle to attempt a Vehicle Maneuver, but at an additional Control Roll penalty of -1 per $\frac{1}{4}$ worth of Limitation.

Vehicle Maneuver Descriptions

AGGRESSIVE ATTACK

This maneuver allows a Vehicle operator to eliminate the benefits another Vehicle obtains from a Defensive Maneuver or Extreme Defense. If the operator makes his Control Roll by the listed penalty (and any other penalties that apply), and makes it by more than the operator of the other Vehicle, then the DCV bonus granted by Defensive Maneuver or Extreme Defense is negated as to the Vehicle performing Aggressive Attack. The negation lasts only

until the next Phase of the Vehicle using Aggressive Attack, and applies only to the bonus obtained by the single target Vehicle chosen when Aggressive Attack is performed.

CLEVER POSITIONING

This maneuver allows a Vehicle’s operator to position his Vehicle near or between one or more designated targets in a way that minimizes exposure to counterattack. The operator makes a Control Roll at -4. If he succeeds, against the targets he has designated his Vehicle’s DCV for performing Rapid Fire is reduced only by -2, not halved. (If -2 would equal halving the Vehicle’s DCV, the Vehicle suffers only a -1 penalty.) If the Control Roll fails, the Vehicle may still attack, but at the standard DCV penalty for Rapid Fire.

The effects of Clever Positioning apply to all Rapid Fire attacks the Vehicle makes that Phase. If the roll fails, the Vehicle may choose to make some form of attack other than Rapid Fire.

CLOSE COMBAT

This maneuver allows an operator to bring a small Vehicle close in to a larger Vehicle to maximize his ability to attack, and decrease the larger Vehicle’s chance to hit him. It may only be used against a Vehicle whose Size is at least 10 larger than the attacking Vehicle. Furthermore, the Vehicle performing the maneuver must get as close as it possible can to the target Vehicle — it must be no more than about twelve feet (2”) from the target.

The pilot makes a Control Roll at -6. If he succeeds, he maneuvers in so close to the target’s hull that: (a) it’s virtually impossible for him to miss (+6 OCV to hit that target this Phase); and (b) the target Vehicle typically cannot bring its large weapons to bear against the attacker (GM’s decision as to the exact effect); and (c) any other Vehicle that attacks the attacker and misses has a 50% (1-3 on 1d6) chance of hitting the Vehicle the attacker is in Close Combat with.

If the Control Roll fails, typically it means the operator has not gotten close enough to obtain any of these benefits, though he may try again next Phase if he wishes. A badly failed roll (by 4 or more) usually indicates the pilot has crashed into the larger Vehicle.

Typically this maneuver only applies in air or space combat. However, GMs may allow its use in ground or water vehicle combat in appropriate circumstances.

DEFENSIVE MANEUVER

This maneuver improves a Vehicle’s DCV against a single designated attacker. The Vehicle performing it declares which Vehicle the maneuver will affect, then makes a Control Roll at -2. If the roll succeeds, the Vehicle has +1 DCV for attacks made by the target Vehicle. Its DCV as to all other attackers is unaffected. The DCV bonus lasts until the Vehicle’s next Phase (at which point it may, if it wishes, perform another Defensive Maneuver to maintain the bonus). If the roll fails, the Vehicle gets no DCV bonus.

VEHICLE MANEUVERS

Maneuver	Roll	Notes/Description
Aggressive Attack	-4	Eliminates bonuses from defensive maneuvers
Clever Positioning	-4	Positions Vehicle for better Rapid Fire
Close Combat	-6	Improves Vehicle’s attack against larger target.
Defensive Maneuver	-2	+1 DCV against single designated target
Drift	var	Move one or more hex lines while maintaining heading and velocity
Evade	-3	Breaks sensor lock
Extreme Defense	-4	+1 DCV against up to four designated targets
Extreme Offense	-6	+1 OCV against up to four designated targets
Hit The Brakes	-1/+5”	Decelerate more rapidly than normal
Maneuver Positioning	-4	Positions Vehicle to perform Haymaker (or other maneuver)
Offensive Maneuver	-2	+1 DCV against single designated target
Sharp Turn	-1/-1”	Decreases Vehicle’s Turn Mode
Wily Defense	-4	Eliminates bonuses from offensive maneuvers

“Roll” indicates the penalty to the Combat Driving/Piloting roll needed to perform the Maneuver.

DRIFT

This maneuver allows a Vehicle to “drift” one or more hex lines to one side (or up/down, for three-dimensional movement Vehicles) while maintaining present heading and speed. Drifting 1” requires no Control Roll; any Vehicle can do it automatically (though it still counts as a Vehicle Maneuver, and thus as the Vehicle’s Attack Action). For each hex line of drift after the first, the operator must make a Control Roll at -2 per +1 hex line. If he succeeds, the Vehicle moves as directed (with no loss of inches of forward movement); if he fails, normal rules for failure apply.

EVADE

This maneuver allows an operator to maneuver his Vehicle in such a way that he breaks a single enemy Vehicle’s sensor lock (page 182). To perform it, the operator makes a Control Roll at -3. If he succeeds, the sensor lock is broken; if he fails, the lock remains in effect.

EXTREME DEFENSE

This maneuver enhances a Vehicle’s defensiveness against multiple attackers. To perform it, a Vehicle operator designates up to four targets it will affect and makes a Control Roll at -4. If the roll succeeds, the Vehicle has +1 DCV for attacks made by the target Vehicles. Its DCV as to all other attackers is unaffected. The DCV bonus lasts until the Vehicle’s next Phase (at which point the Vehicle may, if it wishes, perform another Extreme Defense maneuver to maintain the bonus). If the roll fails, the Vehicle gets no DCV bonus.

EXTREME OFFENSE

This maneuver enhances a Vehicle’s accuracy against multiple attackers. To perform it, a Vehicle operator designates up to four targets the maneuver will affect and makes a Control Roll at -6. If the roll succeeds, the Vehicle has +1 OCV for all attacks it makes against the target Vehicles. Its OCV as to all other targets is unaffected. The OCV bonus lasts until the Vehicle’s next Phase (at which point the Vehicle may, if it wishes, perform another Extreme

ODD FACING

If you're using a hex map, when a character makes a 45° turn, 90° turn, or other turn on a hex map that isn't easily divisible by 60°, he often ends up driving at an odd angle to the normal hex pattern. The GM should be careful when counting hexes in such a situation — if necessary, use a ruler to make sure all vehicles are moving the same amount of map space per game inch of movement.

Offense maneuver to maintain the bonus). If the roll fails, the Vehicle gets no OCV bonus.

HIT THE BRAKES

This maneuver allows a Vehicle to decelerate more quickly than the normal 5" per hex moved. The operator must make a Control Roll with a -1 penalty for each additional 5" per hex (or fraction thereof). If he succeeds, the Vehicle decelerates more quickly without difficulty. If he fails, normal rules for failure apply; consider the Vehicle's velocity equal to its rate of movement prior to initiating this maneuver, minus the standard 5" of deceleration.

This maneuver is not necessary for shifting from Noncombat to Combat velocities, which is a quick and easy way to drastically reduce a Vehicle's rate of speed and requires no Control Roll.

MANEUVER POSITIONING

A Vehicle must perform this maneuver to position itself to perform a Haymaker (and, in the GM's option, certain other maneuvers or attacks, such as multiple-Power attacks or Rapid Fire). The operator declares what maneuver the Vehicle intends to make, and then makes a Control Roll at -4. If he succeeds, the Vehicle can perform a Haymaker with one of its weapons or attacks. If you're using the Simple Vehicle Actions system, the Vehicle starts the Haymaker on its next Phase. If you're using the Complex Vehicle Actions, it may be able to begin performing the Haymaker in the same Phase it performs the Maneuver Positioning, provided that (a) there's someone able to operate the weapon or make the attack who has an Action available, and (b) that person waits to perform his Action until after the operator has succeeded with Maneuver Positioning. If the Control Roll fails, the Vehicle cannot perform the maneuver, and the planned attack won't work; however, the weapon involved can make some other type of attack instead.

OFFENSIVE MANEUVER

This maneuver improves a Vehicle's OCV against a single designated attacker. The Vehicle performing it declares which Vehicle the maneuver will affect, then makes a Control Roll at -2. If the roll succeeds, the Vehicle has +1 OCV for all attacks it makes against the target Vehicle. Its OCV as to all other targets is unaffected. The OCV bonus lasts until the Vehicle's next Phase (at which point it may, if it wishes, perform another Offensive Maneuver to maintain the bonus). If the roll fails, the Vehicle gets no OCV bonus.

SHARP TURN

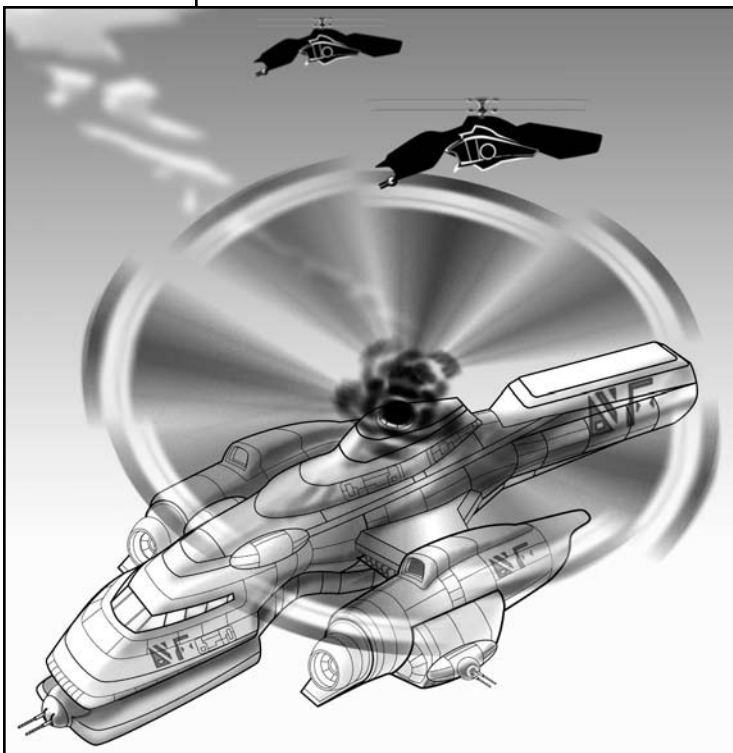
This maneuver allows a Vehicle to turn more sharply than its current Turn Mode would allow. The operator makes a Control Roll at a penalty of -1 for each -1" of Turn Mode he wants to achieve. If he succeeds, he turns as desired; if he fails, normal rules for failure apply, with rolls and crashes the most common result.

Vehicles that can move in three dimensions can make Sharp Turns to climb or dive at sharper angles. In this case, the turn is simply upwards or downwards, instead of to the side. If a three-dimensional Vehicle wants to climb/dive at a sharp angle while also turning to one side, determine the Control Roll penalties both for the upward/downward turn and the side turn, and combine them to determine the overall difficulty of the maneuver. Air vehicles typically refer to a turn that allows them to quickly change course and head the other way as an "Immelman 180," and can also use these rules to fly in loops so as to double-back on a pursuer and make him the target of pursuit instead.

Ground vehicles sometimes perform a maneuver called a bootlegger, in which they turn a complete 180 degrees (so that they're facing the opposite of the way they were just traveling) and come to a complete stop. To perform this maneuver, a driver needs to make a Control Roll combining the penalties for Hit The Brakes (sufficient to bring the Vehicle to a complete stop in 2") and a Sharp Turn (sufficient to reduce the Vehicle's Turn Mode to 0"). Given the difficulty of such a maneuver, drivers who want to perform it frequently often buy bonuses to their Combat Driving with the Limitation *Only To Perform Bootleggers* (-1).

WILY DEFENSE

This maneuver allows a Vehicle operator to eliminate the benefits another Vehicle obtains from an Offensive Maneuver or Extreme Offense. If the operator makes his Control Roll by the listed penalty (and any other penalties that apply), and makes it by more than the operator of the other Vehicle, then the OCV bonus granted by Offensive Maneuver or Extreme Offense is negated as to the Vehicle performing Wily Defense. The negation lasts only until the next Phase of the Vehicle using Wily Defense, or until the OCV bonus would disappear normally, whichever occurs first. However, if the same Vehicle obtains a bonus from Offensive Maneuver or Extreme Offense before the Vehicle's next Phase, the Wily Defense bonus still applies. The bonus applies only to the bonus obtained by the single target Vehicle chosen when Wily Defense is performed.



VEHICLE FIGHTING



After determining how your Vehicle is going to move in combat, you need to determine how it can attack and defend itself.

CALCULATING COMBAT VALUE

In combat, a Vehicle's Combat Value (CV) derives from its DEX or the DEX of its operator, whichever is lower; this is referred to as a Vehicle's effective DEX. For example, a Vehicle with DEX 23 and an operator with DEX 18 has an effective DEX of 18, giving it a CV of 6. The CV from effective DEX applies even if the Vehicle can fire its own weapons somehow (for instance, because it has a Computer).

Vehicular OCV

A Vehicle's OCV depends on its effective DEX. However, several common circumstances may alter base CV.

First, consider the application of a Vehicle's Combat Skill Levels and Penalty Skill Levels, if any. Pages 17 and 19 have specific rules and guidelines for them.

Second, for specific attacks, consider the application of appropriate Combat Skill Levels possessed by a character operating vehicular weaponry. See page 220 for more information.

Third, many Vehicle Maneuvers and Combat Maneuvers can alter a Vehicle's OCV.

Fourth, Vehicles are often operated at Noncombat Movement velocity, and if so, are at 0 OCV. If operated at Combat Movement velocities, a Vehicle has its full OCV (though negative modifiers from maneuvers and the like may still apply).

If you're using the Complex Vehicle Actions rules, a character firing a vehicular weapon uses the Vehicle's CV from effective DEX to determine "his" OCV with the weapon. However, he uses his own DEX for purposes of determining when his Phases occur.

Substituting Character OCV For Vehicle OCV

The GM can, if he wishes, allow Vehicle designers to apply a Power Modifier, *Uses Character OCV Not Vehicle OCV*, to a vehicular weapon. This represents a weapon the Vehicle cannot itself fire, and over which it has no control; use of the weapon depends entirely on the abilities of a character using it. For example, a machine gun on a pintle mount might qualify for this Modifier.

When using a vehicular weapon with this Modifier, a character determines his OCV based solely on his own DEX; the Vehicle's DEX does not matter. No vehicular Combat Skill Levels apply to the weapon. However, the weapon may have its own, built-in CSLs, and the character using it may have CSLs which apply as well.

Whether this Modifier is an Advantage or a Limitation depends on whether the average character's OCV is greater or lesser than the Vehicle's typical OCV, as indicated by the accompanying table. The GM makes the final determination as to the Modifier's value.

CHARACTER VERSUS VEHICLE OCV

Average Character OCV	Modifier
5 or more greater than Vehicle's OCV	+1 Advantage
3-4 greater than Vehicle's OCV	+½ Advantage
1-2 greater than Vehicle's OCV	+¼ Advantage
Equal to Vehicle's OCV	-0 Limitation
1-2 less than Vehicle's OCV	-¼ Limitation
3-4 less than Vehicle's OCV	-½ Limitation
5 or more less than Vehicle's OCV	-1 Limitation

Attacks By Vehicle Occupants

If a Vehicle's operator or occupants want to make their own attacks with their own weapons or Powers, they may do so; they act on their own Phases and DEXs, and calculate their base OCV from their own DEXs. All such attacks suffer an automatic -2 OCV penalty — it's hard to aim straight in a moving Vehicle. The operator suffers an additional -1, since he has to devote some of his attention to controlling the Vehicle. If the operator has made any Control Rolls at more than a -1 modifier that Segment to control or maneuver the Vehicle, all attacks he or other occupants make in that Segment after the Control Roll is made suffer an additional -1 modifier. These penalties also apply to OECV, if an occupant uses Mental Powers to attack.

The GM may, in appropriate circumstances, waive or alter these rules. For example, if a group of characters on a large, slow-moving starship engages in a laser battle with boarders, the GM might impose no OCV modifiers on either group unless the Vehicle makes a maneuver so severe it would cause anyone aboard to lose his footing.

At the GM's option, these same penalties apply to the use of Skills by the operator or occupants, if appropriate.

VEHICLE OCV CHECKLIST

- 1) Determine base OCV (DEX/3) from the Vehicle's effective DEX (its DEX or its operator's DEX, whichever is lower).
- 2) Add any applicable Combat Skill Levels which the Vehicle wishes to use to increase its OCV (see page 17).
- 3) Apply any modifiers for the particular weapon being used.
- 4) Apply any modifiers for the particular Vehicle Maneuver, Combat Maneuver, or Martial Maneuver being used. This includes the reduction to 0 OCV for moving at Noncombat velocity.
- 5) Apply any Combat Modifiers.
- 6) Apply the Range Modifier (if applicable).
- 7) Apply any other modifiers.
- 8) Apply any modifiers which halve OCV (or otherwise reduce it by a fraction or percentage).

VEHICLE DCV CHECKLIST

- 1) Determine base DCV (character's DEX/3) from the Vehicle's effective DEX (its DEX or its operator's DEX, whichever is lower).
- 2) Add any applicable Combat Skill Levels which the Vehicle wishes to use to increase its DCV.
- 3) Apply any modifiers for the particular weapon or armor being used.
- 4) Apply any modifiers for the particular Vehicle Maneuver, Combat Maneuver, or Martial Maneuver being used.
- 5) Apply any Combat Modifiers.
- 6) Apply any other modifiers, including the Size modifier.
- 7) Apply any modifiers which halve DCV (or otherwise reduce it by a fraction or percentage), including for moving at Noncombat velocity or being operated by a character without Combat Driving/Piloting.

A Vehicle's DCV cannot drop below 0.

Vehicular DCV

A Vehicle's base DCV depends on its effective DEX. However, several common circumstances can modify a Vehicle's DCV. Regardless of subtractions from Size or like factors, a Vehicle's DCV can never fall below 0.

First, a Vehicle's Size can negatively modify its DCV — the larger the Vehicle, the lower its DCV tends to be. For example, a Size 8 Vehicle suffers a -5 DCV penalty. See the Expanded Vehicle Size Table on page 9 for other examples. When Vehicles attack each other, the GM should apply the rules on pages 127 of the *Hero System 5th Edition, Revised* regarding two larger-than-human characters attacking one another. That way, the DCV penalty for one large Vehicle attacking another isn't as severe as it would be if a smaller Vehicle, or a person, attacked the large Vehicle.

Second, consider the application of appropriate Combat Skill Levels possessed by the Vehicle. As discussed on page 18, a Vehicle may buy 5-point DCV Levels, and can apply 8-point or 10-point CSLs with any of its attacks to increase its DCV. Characters sometimes buy Levels that increase a Vehicle's DCV; see page 220.

Third, Vehicles are often operated at Noncombat Movement velocity, and if so, are at half DCV. If operated at Combat Movement velocities, a Vehicle has its full DCV (though negative modifiers from Size, maneuvers, and the like may still apply).

Fourth, the operator's skill (or lack thereof) may also modify a Vehicle's DCV. If the operator does not have Combat Driving/Piloting, the Vehicle is at half DCV regardless of whether it's traveling at Combat or Noncombat velocity. As usual, DCV can only be halved once, and the halving takes place as the last step in the DCV calculation, so a Vehicle operated at Noncombat velocity by an untrained operator is only at ½ DCV, not ¼ DCV. If a Vehicle's operator has Combat Driving/Piloting, the Vehicle gets its full DCV when moving at Combat Movement velocities (though negative modifiers from Size, maneuvers, and the like may still apply).

Fifth, some Vehicle Maneuvers and Combat Maneuvers may affect a Vehicle's DCV. For example, see the rules for vehicular Dodge on page 185.

Sixth, in some cases the GM may prefer to use the rules for Velocity-Based DCV to determine a Vehicle's DCV (see below).

VELOCITY-BASED DCV TABLE

Velocity in Inches per Turn	Base DCV
1-32	1
33-64	3
65-125	5
128-250	7
251-500	9
501-1,000	11
1,001-2,000	13
2,001-4,000	15
4,001-8,000	17
8,001-16,000	19
and so forth	

VEHICULAR DCV MODIFIERS

Situation	DCV
Backwards movement	½ DCV
Driving on two wheels (page 212)	½ DCV
Entangled	
To less than full Combat Movement	½ DCV
0" Combat Movement or less	0 DCV
Noncombat Movement velocity	½ DCV
Operator's skill	
Operator has Combat Driving/Piloting	Full DCV
Operator does not have Combat Driving/Piloting	½ DCV
Sideways movement (+¼ Advantage)	½ DCV
Stationary (unmoving)	0 DCV

Consult the DCV Modifiers Table on page 245 of the *Hero System 5th Edition* for other common DCV modifiers that may apply to Vehicles.

VELOCITY-BASED DCV

To determine a Vehicle's DCV based on its velocity, determine the total number of inches it can travel in an entire Turn while using a particular mode of movement at a particular rate. The simple formula for this is:

$$\text{Velocity per Phase} \times \text{SPD} = \text{Inches per Turn}$$

After determining inches per Turn, consult the accompanying table to derive Velocity-Based DCV. See page 123 of the *Hero System 5th Edition, Revised* regarding the effects of MegaMovement.

Velocity-Based DCV is relative; two Vehicles moving at the same high speed in the same direction have their normal DCVs; relative to each other, they are not moving fast at all. As a good rule of thumb, if Vehicles are moving in the same direction, subtract the attacker's velocity from the target's velocity. If the result is 0 or less, the target gets its normal DCV; if the result is greater than 0, use that figure to determine its Velocity-Based DCV. On the other hand, if the Vehicles are heading directly towards each other, add their velocities together to determine each one's Velocity-Based DCV relative to the other.

ATTACKING AND DEFENDING

Here are some rules for Vehicle attacks and defenses.

Sensor Locks

In some forms of Vehicle combat — primarily three-dimensional combat at long range involving high-tech vehicles and weapons — the GM may require a Vehicle to obtain a sensor lock on its intended target. In other words, the attacking Vehicle (or, more accurately, its operator) has to properly "perceive" its target with its sensors, and feed that information to the targeting systems. Sensor locks are always required for space combat; the GM decides whether they're required for air or submarine combat.

To obtain a sensor lock, the character or Computer operating the sensors must make a PER Roll with a Targeting Sense. As noted on page 169, most operators make PER rolls using Systems Operation, but Computers do so using their own INT. This is an Attack Action. The Range Modifier applies; so do penalties for intervening physical obstacles, energy fields, and the like.

If the roll fails, the Vehicle cannot obtain a sensor lock. If it wishes to attack, it must do so at the OCV penalties for being unable to perceive its opponent (see page 349 of the *Hero System 5th Edition, Revised*). Non-perception penalties to DCV do not apply, unless the Vehicle's crew is also "blind." The Vehicle may make further attempts to obtain a sensor lock in its later Phases.

If the Complex Vehicle Actions rules are in use, OCV penalties for lack of sensor lock still apply even if individual characters can perceive the target themselves. However, if a character uses a weapon with the *Uses Character OCV Not Vehicle OCV* Power Modifier and can perceive a target with his own Targeting Senses, OCV penalties for lack of sensor lock do not apply.

If the roll succeeds, the Vehicle has obtained a sensor lock, and can in later Phases attack with any of its weapons at full OCV, possibly using a Combat Maneuver in the process (see below). Once the Vehicle has a lock, the lock remains in effect until the target does something to break it; the Vehicle does not have to take any Actions to maintain the lock. Possible ways to break a sensor lock include:

- successfully executing an *Evade* Vehicle Maneuver
- using electronic warfare to block, jam, or trick the enemy Vehicle's sensors
- moving so that a sufficiently large physical object passes between the Vehicle and the enemy Vehicle (Other Vehicles are not large enough for this unless they are at least twice the Size of the Vehicle attempting to break the lock.)

A Vehicle may attempt to re-establish a broken sensor lock using the same method for establishing it. If the lock was broken within the past Turn, the Vehicle has a +2 bonus to its PER Roll to re-establish; if within the past two Turns, a +1 bonus; and no bonus thereafter.

Powers In Vehicle Combat

In most cases, Powers (particularly Attack Powers) affect Vehicles the same way they affect characters (though of course Vehicles do not take STUN damage). However, several *Hero System* powers have unusual effects when used in vehicular combat. As always, GMs should consider the specifics of the circumstances in the game, the special effects involved, common sense, and dramatic sense when adjudicating these (and other) effects.

MENTAL POWERS

Since Vehicles have neither INT nor EGO, Mental Powers are useless against them, unless those Powers can somehow affect physical objects. (Of

course, in campaigns where the GM allows Vehicles to have INTs and EGOS, Mental Powers that work against the Machine class of minds can affect them.) However, the operator and occupants of a Vehicle are as susceptible to Mental Powers as they are normally (though some Vehicles do provide Mental Defense).

If the GM wants to allow characters with cyberkinetic-type abilities to control ordinary Vehicles, he may assign the Vehicle an "INT" and/or "EGO" by giving it a Physical Limitation, Affected By *Cyberkinesis*. The value of the Limitation depends on the rating of the Vehicle's INT and/or EGO (the higher the Characteristic score, the lower the Limitation value; see pages 207-09 of the *Hero System Bestiary* for examples). The Vehicle's INT and/or EGO in turn should depend upon how technologically advanced it is and like factors.

Additionally, characters may be able to "take control" of Vehicles through appropriate applications of Telekinesis (see below). A properly-constructed Telekinesis-based power could prevent engine parts or wheels from moving, for example.

ENTANGLE

A character with an Entangle may be able to use it to "gum up" the moving parts of a Vehicle — such as its wheels, axles, rudder, propeller, engine, or the like. The results depend on whether the Vehicle is moving when this occurs, and whether it breaks out of the effect.

Moving Vehicles

If the Vehicle is moving when Entangled, it gets an immediate roll to break free. Typically this roll uses the Vehicle's STR, as normal for breaking out of an Entangle. However, the GM may, in his discretion, reduce the Vehicle's STR for these purposes. For example, while the tires, axles, or treads of a ground vehicle should almost always have full STR for break-out purposes, an engine, aileron, sail, or rudder might only have half STR, since their parts are easier to foul or are weaker.

Alternately, the GM may base the Vehicle's STR for purposes of breaking out of an Entangle on its velocity — every inch of movement equals 2 STR. However, this may have the effect of unjustifiably "strengthening" fast, fragile vehicles and "weakening" large, powerful, but slow-moving ones.

If the Vehicle successfully breaks out, it keeps moving at full speed, but the operator must make a Control Roll (at +1 for each BODY by which the roll to break out exceeded the BODY of the Entangle). If the roll succeeds, nothing happens; if it fails, normal rules for failing a Control Roll apply.

If the Vehicle fails to break out, two effects occur. First, the Entangle reduces the Vehicle's Combat Movement velocity by 1" per point of BODY and DEF the Entangle has. If this reduces its Combat Movement to 0" or less, the Vehicle comes to an immediate halt (though forward momentum may carry it a few inches further) and is at 0 DCV. If the Entangle reduces the Vehicle's movement to 1" or greater, the Vehicle can continue to move, but at the reduced rate, and at half DCV (this penalty remains in effect until the Vehicle breaks out of the Entangle). Second, the operator must make a Control Roll, at a pen-



ality of -1 per 5" of velocity the Vehicle had when Entangled. If the roll succeeds, the operator retains control of the Vehicle; if not, normal rules for failure apply.

Unmoving Vehicles

An unmoving Vehicle, Entangled or not, is at DCV 0. However, if Entangled, a Vehicle has to break out of the Entangle before it can start moving. The same rules for breaking out as for moving vehicles apply. However, in this situation the GM is more likely to reduce the Vehicle's STR because it's difficult to get an engine going, an aileron moving, or a sail properly oriented to the wind when it's already "gummed up." The Vehicle's operator may have to find some way to remove the Entangle other than the Vehicle's own STR (like removing it himself by hand) before he can start his Vehicle.

TELEKINESIS

If a character uses Telekinesis to try to stop a Vehicle (or one of its major parts) from moving, apply the same rules as for Entangles, above, except that in this case it's a STR Versus STR Contest between the Vehicle and the telekinetic STR instead of the Vehicle's STR versus the DEF and BODY of the Entangle.

TELEPORTATION

If a character uses Teleportation Usable As Attack to move a Vehicle, it affects the Vehicle and everyone and thing in it. It does not cause the occu-

pants to remain where they are while the Vehicle moves to another location.

COMBAT MODIFIERS

Most Combat Modifiers apply normally in Vehicle combat — it's simply a matter of judging their effects Vehicle-to-Vehicle, rather than character-to-character. For example, a group of small fighters could swarm around a larger warship to get a Multiple Attacker bonus, or could Coordinate their weapons to inflict Stun damage on a giant space amoeba. A clever driver might hide his car in a junkyard so he could ambush another car and obtain a Surprised bonus, or he could maneuver his Vehicle in ways that gain him a Surprise Move bonus.

AREA OF EFFECT ATTACKS AND EXPLOSIONS

If a character uses an Area Of Effect or Explosion attack against a target larger than one hex — such as most Vehicles — the damage only applies to the target one time. It does not apply to every hex that it affects. If necessary, the GM can reflect the nature of the attack in the description of the damage it causes and other secondary effects ("Don't walk too near the edge of the bomb damage, Bob — the deck's fragile there, and you could fall in!").

BOUNCING AN ATTACK

A Vehicle needs the GM's permission (and, of course, one applicable Combat Skill Level) to Bounce an attack. Bouncing usually doesn't make much sense for many Vehicles and Vehicle weapons, but the GM can allow it in appropriate circumstances.

CONCEALMENT

A Vehicle can obtain Concealment bonuses if appropriate. Obviously, the bigger the Vehicle, the more difficulty it has finding Concealment — it's hard to hide an aircraft carrier!

COORDINATED ATTACKS

In some settings, it's not uncommon for two or more Vehicles to combine their firepower to focus on a specific point of the target's defenses, and thus overcome those defenses — something neither Vehicle could hope to accomplish individually. Gamemasters who want to allow this sort of action can modify the Coordinated Attack rules. In this case, the attackers who succeed with Teamwork rolls add the BODY of their attacks together to determine if they can overcome the target's defenses. To keep this from unbalancing the game, the GM may wish to impose restrictions on it, such as those listed on page 173 for multiple-Power attacks.

Even if the GM doesn't use this optional rule, Vehicles can still Coordinate to obtain a Multiple Attackers Bonus against a target, or to Stun a living target.

ENCUMBRANCE

As noted on page 10, Vehicles suffer standard Encumbrance penalties noted on page 379 of the *Hero System 5th Edition, Revised* if overloaded with cargo, passengers, and the like (and typically, a Vehicle loaded with more weight than its STR can carry cannot move at all). A Vehicle's STR indicates its carrying capacity *in addition to* its own weight; don't include the Vehicle's own mass when calculating Encumbrance. If appropriate, a Vehicle may buy extra STR *Only To Overcome Encumbrance Penalties* (-1); that allows you to create slow-moving Vehicles that can carry lots of weight.

Special considerations apply for several types of Vehicles. First, for operator muscle-powered Vehicles, such as bicycles, consider the *operator's* STR, rather than the STR of the Vehicle itself. Determine if the weight carried by the Vehicle (not including the mass of the Vehicle itself) would reduce the operator's inches of Running. If so, the *Cannot Exceed Twice Rider's Running Limitation* (page 36) comes into play and reduces the Vehicle's velocity. If not, the Vehicle retains its normal velocity (subject to the GM's judgment as to how much weight it can carry without itself suffering damage; the crushing damage rules on page 216 may apply).

Second, the rules for operator-powered Vehicles generally apply to rowed watercraft as well; if they carry too much cargo, the rower(s) may have trouble moving them. But since the resistance of moving through water is less than for moving over the ground, the GM may wish to allow a minimum of 1" Swimming in any event (assuming the Vehicle's Size hasn't already reduced it to 0", as described on pages 55-56).

Third, page 36 notes specific rules for how Encumbrance applies to towed Vehicles.

ENVIRONMENTAL CONDITIONS

See the discussion of the Environmental Movement Talent (page 21) for information about Vehicles and environmental conditions.

OFF HAND

Vehicles do not suffer "off hand" penalties, even if they have limbs.

SPREADING AN ATTACK

A Vehicle needs the GM's permission (and, of course, one applicable Combat Skill Level) to Spread an attack. Spreading usually doesn't make much sense for many Vehicles and Vehicle weapons, but the GM can allow it in appropriate circumstances.

SURPRISED

Vehicles can sometimes be Surprised — for example, when a starship using a cloaking system attacks another starship, it obtains a Surprised bonus because it (the attacker) is invisible. This includes attacking a Vehicle from behind, above, or the like. If the Vehicle doesn't have an obvious "rear" section (for example, perhaps it's a perfect sphere), the designer must designate one side as

"rear" for purposes of attacks from behind. However, because Vehicles don't take STUN damage, the only effect of being Surprised is the halving of DCV.

TARGET PRONE

Vehicles do not suffer from prone penalties unless they have humanoid shape (e.g., mecha).

TARGET SIZE

For Vehicles, their DCV modifiers from Size take the place of any Target Size modifiers. However, see page 182 regarding Vehicle versus Vehicle combat and its affect on the Size DCV modifier.

If a Vehicle attacks an object of unusual size — buildings, planets, birds — it may incur Target Size modifiers in the usual fashion. The GM may apply the rules referenced above for larger-than-human targets, if desired.

UNFAMILIAR WEAPON

Per page 20, Vehicles do not have to buy Weapon Familiarities for weapons they pay points for.

COMBAT MANEUVERS

Vehicles may use Combat Maneuvers. The text below notes special rules for some Maneuvers, and forbids Vehicles to use others; the GM may alter or add to this list as necessary to reflect the technology, nature, and dramatic feel of the setting.

Unless indicated otherwise, Combat Maneuvers provide the same OCV and DCV modifiers as Combat Maneuvers used by characters. If you're using the Complex Vehicle Actions system, a Combat Maneuver's modifiers apply to every attack or weapon the Vehicle uses that Phase. For example, if a Vehicle opts to perform a Move By (-2 OCV), it suffers a -2 OCV not only for the Move By, but with every other attack it makes that Phase. (The GM may, at his option, apply the modifier only to attacks made in the same Phase but after the attack that imposes the modifier, though he should be wary of characters Holding their actions just to avoid inflicting penalties on other characters in the same Vehicle.)

Standard Maneuvers**BLOCK, DISARM**

These Maneuvers are rarely appropriate for Vehicles, unless they have limbs.

BRACE, SET

Vehicles willing to take the time to aim carefully can use these maneuvers. Don't forget that Set requires a Full Phase.

DODGE

As described on page 472 of the *Hero System 5th Edition, Revised* rulebook, a vehicle can "Dodge" if the pilot does nothing else but move the Vehicle in a Phase (vehicles with the *Limited*

COLLISION DAMAGE TO VEHICLE OCCUPANTS

When any type of Vehicle collision occurs, the occupants of the Vehicle may be injured (this is an exception to the general rule that attacks which don't penetrate the Vehicle can't affect its occupants). They take the Move Through or Move By damage the Vehicle they're in takes, minus the Vehicle's DEF and their personal Physical Defense (and any other applicable personal defenses). Safety devices (such as seatbelts [page 42] or other personnel safety systems [page 141]) offer additional protection, typically in the form of extra PD. If appropriate, the GM may also apply this damage to cargo on the vehicle, or the like.

As always, the GM should use common sense when applying these rules. A small Vehicle sideswiping or ramming a large Vehicle may cause so little impact that no one on board the large Vehicle is affected, or takes only half the damage the Vehicle itself takes.

Maneuverability Limitation cannot perform this maneuver). This has the effect of eliminating the Vehicle's DCV penalty due to Size. If that seems unrealistic or unbalancing to the GM (given the vast size and ponderous movement of many large Vehicles), he can rule that the Dodge just provides a +3 DCV bonus, that it only eliminates half the Size penalty, that it provides +1 DCV per point by which the pilot makes a Combat Driving/Piloting roll, or the like.

GRAB, GRAB BY

To use these Maneuvers, a Vehicle needs a way to Grab — a tractor beam, a grapple-gun, limbs, or the like. It's most commonly used in mecha combat.

If a Vehicle's target is significantly larger than itself, performing a Grab may be more difficult or impossible, as noted on page 386 of the *Hero System 5th Edition, Revised*. As a general guideline, for each point of Size the target has in excess of the Grabber's Size, the target receives a +1 BODY result on its STR Rolls to break free from the Grab.

HAYMAKER

At the GM's discretion, a character could Haymaker with a Vehicle weapon attack. This simulates taking extra time to aim carefully, shooting at a weak point in the enemy's armor, or the like. Before performing a Haymaker, the Vehicle must perform a Maneuver Positioning Vehicle Maneuver (unless the GM rules otherwise). This maneuver only allows a Vehicle to perform a Haymaker with a single weapon attack, unless the GM is willing to allow multiple weapons to Haymaker simultaneously.

MOVE BY

This Maneuver represents a "sideswipe" or like attack. Standard OCV and DCV penalties for a Move By apply. After a Vehicle successfully sideswipes a target, it must make a Control Roll at -1 per 3 BODY damage it took from the impact. If the target was another Vehicle, that Vehicle must also make a Control Roll with the same penalty. Use the Move Through Relative Velocity Table to determine the total velocity when one Vehicle sideswipes another. Vehicles may be bought with Hand-To-Hand Attack dice to add to their Move By (and Move Through) damage (see pages 10, 130).

Forcing

Forcing means that the attacker is trying to "force" the target away from him (usually to knock it off the road, over a cliff, or into some obstacle). To force a target Vehicle, the attacking Vehicle must be side-by-side with it and perform a Move By, with the damage based on the attacker's velocity (don't use the Move Through Relative Velocity Table). Normal Move By OCV/DCV modifiers apply.

If the Move By does Knockback, the target must make a Control Roll at -1 per 2" Knockback to keep control of his Vehicle. If he fails, he drifts (page 179) a number of hex lines equal to the Knockback (possibly colliding with something, or having to make another Control Roll if he runs off

MOVE THROUGH RELATIVE VELOCITY TABLE

Target's Action	Velocity For Damage
Target is stationary	Attacker's velocity
Target and attacker are moving in opposite directions (<i>i.e.</i> , a head-on collision)	Add both vehicles velocity together
Target and attacker are moving in the same direction (<i>i.e.</i> , a front-to-rear collision)	Subtract target's velocity from attacker's velocity.
Target and attacker are moving in the different directions, but not opposite to each other (<i>e.g.</i> , attacker hits target in the side)	Attacker's velocity

the road or the like). If he succeeds, he only drifts ½" (or 0" if the Knockback was only 1").

If the Move By does no Knockback, the target has not been forced at all. Given the Knockback modifiers most Vehicles have, this may make it very difficult for one Vehicle to force another, which isn't entirely in keeping with Vehicle combat in adventure movies and fiction. At the GM's option, he may base the amount of forcing not on the Knockback a Vehicle does with a Move By, but on the outcome of a Combat Driving/Piloting Skill Versus Skill Contest, or STR Versus STR, between the two Vehicles. If the attacker wins, he forces the target to drift one hex line for every 2 points by which he won the contest; if the target wins, he is not forced.

MOVE THROUGH

This Maneuver represents "ramming" a target, or making a like attack.

Move Through OCV

Vehicles performing Move Throughs do not suffer the standard CV penalties for the Maneuver; if they did, they'd almost never hit due to their relatively high velocities. Instead, use the penalties for Move By: -2 OCV, -2 DCV.

However, don't forget that Vehicles moving at Noncombat velocities automatically have 0 OCV. The odds of causing truly enormous amounts of damage with a vehicular Move Through are slim, unless the target itself is so large that the Target Size modifiers overcome the 0 OCV.

At the GM's option, a Vehicle may be considered an Area Of Effect attack for Move Through purposes, and thus automatically attack against DCV 3. However, this could prove seriously unbalancing, since it makes high-velocity Move Throughs much easier.

Move Through Velocity

The velocity used to calculate the damage caused by ramming a stationary target is the attacker's velocity; but the damage caused when one Vehicle rams another depends on the relative velocity of the two (see accompanying table).

Running Over Characters

Running over a character with a Vehicle typically constitutes a Move Through against him.

STRIKE (SHOOT)

Vehicles use this Maneuver to make standard attacks.

In realistic long-range space combats, Vehicles need to beware the light-speed time lag. Light travels at 300,000 kilometers (150,000,000”) per second, so when a Vehicle makes an attack against something 100,000 kilometers away, the beam hits where the target was two-thirds of a second ago. A Vehicle with FTL sensors (*i.e.*, sensors able to detect things more than 300,000 km away) can avoid this problem. Vehicles without such sensors have to “guesstimate” where the target will be when the attack intersects its path; you can simulate this with an Attack Roll penalty of -3 for every 300,000 km of distance between the attacker and target (in addition to the standard Range Modifier).

Optional Maneuvers

The GM may require a Vehicle to perform a *Maneuver Positioning* Vehicle Maneuver before using any Optional Combat Maneuver.

BLAZING AWAY

This Maneuver is rarely appropriate for Vehicles.

CLUB WEAPON

This Maneuver is rarely appropriate for Vehicles, unless they have limbs and a HTH weapon.

COVER

At the GM's option, a Vehicle could use this Maneuver on another Vehicle. It's a good way to represent a “stand-off” between two powerful Vehicles.

DIVE FOR COVER

The GM might allow a Vehicle to perform a Dive For Cover as a sort of “extreme Dodge.” If a vehicle Dives For Cover, neither it nor any person aboard it may make any attacks that Segment (even if the Vehicle does not Abort to the Maneuver). Unless the Vehicle has a maneuverability Advantage allowing it to move sideways, it can only Dive forward (or backward, if it's stationary when it declares the Dive). It cannot perform a Vehicle Maneuver while Diving. At the GM's option, the Vehicle may use its operator's Combat Driving/Piloting Skill instead of its DEX Roll when determining whether it Dives successfully (assuming the operator has not yet acted that Segment).

The standard DCV penalty applies if a Vehicle Dives For Cover. Since many Vehicles already have 0 DCV, the GM may instead choose to impose some other penalty (see Rapid Fire, below).

HIPSHOT, HURRY

Vehicles cannot use these Maneuvers themselves, but characters firing a Vehicle's weapons can use them.

PULLING A PUNCH

This Maneuver is rarely appropriate for Vehicles, even if they have limbs.

RAPID FIRE, SWEEP

A Vehicle can Rapid Fire a Vehicle's weapon (or, if the Vehicle can attack hand-to-hand somehow, use Sweep in appropriate situations). That of course reduces the Vehicle's DCV by half, and counts as a Full Phase Action for whoever does the shooting. If the Vehicle is so large that its DCV is already zero, the GM should impose some other restriction on the use of the Maneuver, such as:

- increasing the OCV penalty to -3 per shot after the first (or more)
- requiring more than one Full Phase to perform (either an extra Segment, like a Haymaker, or two Full Phases)
- making the maneuver take a Full Phase for the entire vehicle and crew
- increasing the END cost for the weapon (if appropriate and sufficiently restrictive)
- imposing a chance for the weapon to burn out or otherwise malfunction

At the GM's option, a Vehicle cannot Rapid Fire or Sweep any of its weapons unless it first uses a *Maneuver Positioning* Vehicle Maneuver.

ROLL WITH A PUNCH

Vehicles may not use this Maneuver.

SNAP SHOT

Vehicles generally aren't maneuverable enough to use this Maneuver. However, in appropriate circumstances, the GM might allow it.

SUPPRESSION FIRE

Vehicles may perform this Maneuver normally. Given the large number of weapons some Vehicles mount, they can often lay down Suppression Fire quite effectively.

Martial Maneuvers

If Vehicles can buy Martial Maneuvers (see page 19), they can use any they pay for. Positive OCV modifiers from a Martial Maneuver do not apply to any other attack the Vehicle makes in the same Segment; negative OCV modifiers affect all other Vehicle attacks in the same Segment as discussed above.

The GM should use common sense when determining the effects of Martial Maneuvers in vehicular combat. Most are just advanced forms of the ordinary Combat Maneuvers discussed above, and some (such as Choke Hold and Nerve Strike) have no use in a battle where the combatants don't take STUN damage. Some may be impossible to perform based on a Vehicle's configuration, or may have no effect. Legsweep, for example, rarely affects Vehicles, particularly if they have more than two wheels (or other points of contact with the ground).

Gamemasters may allow the operators of humanoid mecha to buy *Use Art With Mecha* as a Weapon Element, so that they can use their own Martial Arts when operating a mech.

DETERMINING DAMAGE



Vehicles hit in combat take damage if the BODY damage caused by the attack exceeds their DEF. Gamemasters have two options for applying damage: one Simple; one Complex.

VEHICLE DAMAGE BASICS

Here are a few general rules and guidelines for damage to Vehicles.

STANDARD EFFECTS OF DAMAGE

A Vehicle reduced to 0 BODY cannot move or function, but is not yet fully destroyed — it can be repaired. A Vehicle reduced to negative its own BODY is destroyed (“totaled”), and cannot be repaired. However, at the GM’s option, characters can salvage a few parts or some scrap metal. A Vehicle reduced to negative twice its BODY (for example, -20 for a Vehicle with 10 BODY) is smashed into so many little pieces it lacks any salvage value.

In the case of large Vehicles, GMs may wish to consider applying the rule for damaging walls from page 449 of the *Hero System 5th Edition, Revised*: exceeding the Vehicle’s DEF causes a one hex-sized hole in its frame/hull/body, with the size of the hole doubling for every +1 BODY beyond the Vehicle’s base BODY. That way a single attack isn’t enough to completely destroy one side of a starship or aircraft carrier, but does create an impressive hole.

Damage To Systems/Equipment

Regardless of whether the GM uses the Simple or Complex method of determining damage to a Vehicle, loss of all of the BODY in a system or piece of vehicular equipment causes that device to cease functioning. For less than full damage, GMs should roll on the Device Malfunction Table on page 449 of the *Hero System 5th Edition, Revised*.

To determine how many BODY it takes to damage or destroy a given system, the GM has several options. If it’s a Focus, he can use the Focus rules on pages 293-94 of the *Hero System 5th Edition, Revised*. If it’s not a Focus, he can use the “Breaking Things” rules on page 447 of that book. Alternately, he can simply divide the system’s Active Points by 5, or just assign a number that seems appropriate to him.

Generally speaking, damage to vehicular systems or equipment is not separate from damage to the Vehicle itself — if a tank’s main gun takes 5 BODY damage, the tank itself loses 5 BODY. However, because a Vehicle’s BODY is not calculated by adding up the BODY of every system and piece

of equipment on it, the GM must approach this issue with common sense in mind. The general rule works best for attacks directed at the Vehicle itself which happen, through use of a Hit Location table or some other means, to damage a particular system as part of the overall attack. If an attacker targets a system, particularly a small or trivial one, directly, then in some cases the damage may only affect that system, and not reduce the Vehicle’s BODY as a whole.

Bigger Is Better?

The *Hero System* has no rules about scaling damage — for better or worse, all damage is the same, and a small Vehicle can easily mount a weapon with enough firepower to destroy the largest enemy vessel. Some GMs may prefer a more “realistic” approach, where the big, powerful guns mounted on large Vehicles automatically have an edge compared to the weapons on smaller Vehicles. To simulate this, subtract the smaller Vehicle’s Size from the larger Vehicle’s Size, and add the difference as points of BODY damage to every Normal or Killing Damage attack the larger Vehicle makes against the smaller.

The reverse does *not* apply — smaller Vehicles don’t reduce their damage when attacking larger vessels. Larger vessels typically already have the advantage of spending many more points on their Defense Powers; reducing the smaller Vehicles’ damage could easily make larger Vehicles effectively invulnerable. And that’s neither fun nor conducive to dramatic heroism.

APPLYING DEFENSES

Because many Vehicles have multiple layers of protection, the GM may need to consider which defenses apply first. Typically a Force Wall applies first, then a Force Field, then DEF/Armor (the body, frame, or hull). Ablative defenses always take damage first (*Hero System 5th Edition, Revised*, page 115), but the GM may waive this rule if he sees fit.

A Vehicle’s DEF has Force Wall-like properties, in that an attack whose BODY damage does not penetrate the Vehicle’s DEF (its frame, hull, or what have you) does not affect the passengers or contents of the Vehicle (except for collision damage; see page 186). If an attack’s BODY damage exceeds a Vehicle’s DEF, subtract the DEF from the BODY and STUN done by the attack, then apply that damage normally to any persons or objects in the path of the attack (typically, as indicated by an Occupant/Cargo result on Hit Location rolls). However, if a Vehicle is large enough, there may

be multiple walls between a point of attack and a given system or passenger, and those walls have the Vehicle's DEF, too, in most cases (see page 11). In that case, the GM may ignore the Hit Location result, apply the Vehicle's DEF once for each wall the attack passes through, or just apply the damage to the affected system normally, as he chooses.

SIMPLE VEHICLE DAMAGE

Gamemasters desiring a quick, easy way to determine what happens when a Vehicle takes damage should use this method. It sacrifices "realism" and complexity for smooth game play.

Vehicles which take damage slowly fall apart. Each time a Vehicle takes BODY from an attack, the GM should roll on the Vehicle Damage Table to determine the effects. The table defaults to a standard effect for each result, but provides a randomizing option for GMs who prefer a little less predictability.

COMPLEX VEHICLE DAMAGE

Gamemasters preferring greater accuracy and "realism" should use the Complex method of Vehicle damage, which involves Hit Locations and possible optional effects. These rules may also apply when a character in a campaign using Simple Vehicle damage wants to target a specific system.

The accompanying series of Hit Location Tables covers most of the major vehicle types. Gamemasters who need a table for a type of vehicle not covered here can adapt one of these. The Hit Location Tables are relatively "generic," since they must apply to many types of campaigns, settings, and technology; GMs should feel free to create more precise, campaign-specific ones.

In the Vehicle Hit Location tables, "BODYx" represents the multiplier to the BODY damage rolled on the attack. "Optional Effect" lists the chance that any BODY damage done to the Vehicle will have some additional effect (see below). "To Hit" is the OCV penalty for specifically targeting that part of the Vehicle. The Attack Roll modifiers depend not only on the general size of the system, and its BODYx, but on the chance for an optional effect, and the potential severity of such an effect.

Special rolls are given for attacks from the side, front, and rear of a Vehicle. Attacks from above or below a Vehicle generally use the standard 3d6 roll.

DAMAGE TO OCCUPANTS

On most Vehicle Hit Location tables, the possibility exists of the occupants (and/or the cargo) being hit by an attack (and of course, an attacker may target the occupants or cargo specifically). Here's how to deal with that situation.

Typically, an attack on a Vehicle damages the Vehicle first and foremost. If an Occupants/Cargo result comes up on a Vehicle Hit Location table, the damage applies to the Vehicle as normal. Any

VEHICLE DAMAGE TABLE

First Roll	Second Roll	Vehicle Loses
1	1-3	One 2x Noncombat Movement multiplier (or one x2 per 3 BODY suffered)
1	4-6	5" of Combat Movement (or 1d6+1 inches, or 1" per 1 BODY suffered)
2	1-3	-2 to Control Rolls (or 1d6-3, minimum of 1; or -1 per 1 BODY suffered)
2	4-6	Damage applies to cargo, or a piece of vehicular equipment (Vehicle's DEF has no effect, or half effect)
3	1-3	Vehicle's largest Power (or 2d6 x 10% of the Power's Active Points, maximum of 100%; or -5 Active Points per 1 BODY suffered)
3	4-6	Damage applies to operator or occupants (GM determines who gets hit randomly; Vehicle's DEF has no effect, or half effect)
4	1-3	One weapon (reroll if Vehicle is unarmed) (or 2d6 x 10% of the Power's Active Points, maximum of 100%; or -5 Active Points per 1 BODY suffered)
4	4-6	One defense (or 2d6 x 10% of the Power's Active Points, maximum of 100%; or -5 Active Points per 1 BODY suffered)
5	1-3	10 STR (or 2d6 STR)
5	4-6	5 DEX (or 1d6+1 DEX)
6	1-3	1 SPD (or 1d6-4, minimum of 1)
6	4-6	No effect (beyond the loss of BODY)

damage that gets through the Vehicle's defenses then applies to the occupant(s), and their personal defenses protect them against it.

In the case of Vehicles whose DEF provides only Limited Coverage (page 12), in many cases that means the DEF does not protect the occupants and cargo, and thus that a hit on them doesn't harm the Vehicle itself (or harms it minimally, at best). For example, an automobile's DEF doesn't usually cover its windows and windshield, which means in most cases, an Occupant/Cargo hit won't affect the Vehicle at all (except to break glass) — the damage goes straight to the occupants and/or cargo, and they apply only their personal defenses against it.

If a Vehicle has multiple occupants, and/or one or more cargo containers in addition to occupants, the GM must determine randomly what gets hit when an Occupants/Cargo result occurs. In many cases the angle and nature of an attack indicates what part of the Vehicle's interior is most likely to have suffered damage.

The optional effects for each Vehicle often indicate casualties of a percentage of the occupants (for example, "Vehicle suffers 2-12% casualties among the occupants"). This generally assumes the Vehicle has a large crew and/or group of passengers. If that's not the case, the GM may alter the result to a specific number of casualties, or apply the random percentage as best he can. See page 176 for rules on the effects of crew casualties.

Note also that the percentage of crew affected does not depend on the amount of damage done to the Vehicle. Sometimes a minor attack strikes a Vehicle in a place or a way that inflicts severe casualties on the crew; sometimes a devastating attack blasts through a Vehicle without hitting many areas containing crewmembers.

TARGETING TIRES

Since mobility is so important to Vehicles, it's not uncommon for attackers to target their

means of propulsion or related parts — the tires on a ground vehicle, the engines on an aircraft or starship, the propeller on a speedboat. While this is both realistic and plausible, it's not necessarily conducive to dramatic chases and fights. Vehicles that can move around are fun; Vehicles that can only sit in place and shoot at each other are not. Therefore, the GM may wish to forbid "tire shots" altogether, or to increase the OCV penalty for targeting any means of propulsion.

OPTIONAL DAMAGE EFFECTS

Listed following each Hit Location Table are the possible optional effects for each part of the

Vehicle that might get hit in combat. If a Vehicle suffers actual BODY damage in combat, the GM may, if he wishes, roll to see if an "optional effect" of damage occurs as a result. Gamemasters may roll randomly for an effect, choose an effect, or make up other effects, as they prefer. The GM need not apply any additional effect if he doesn't want to.

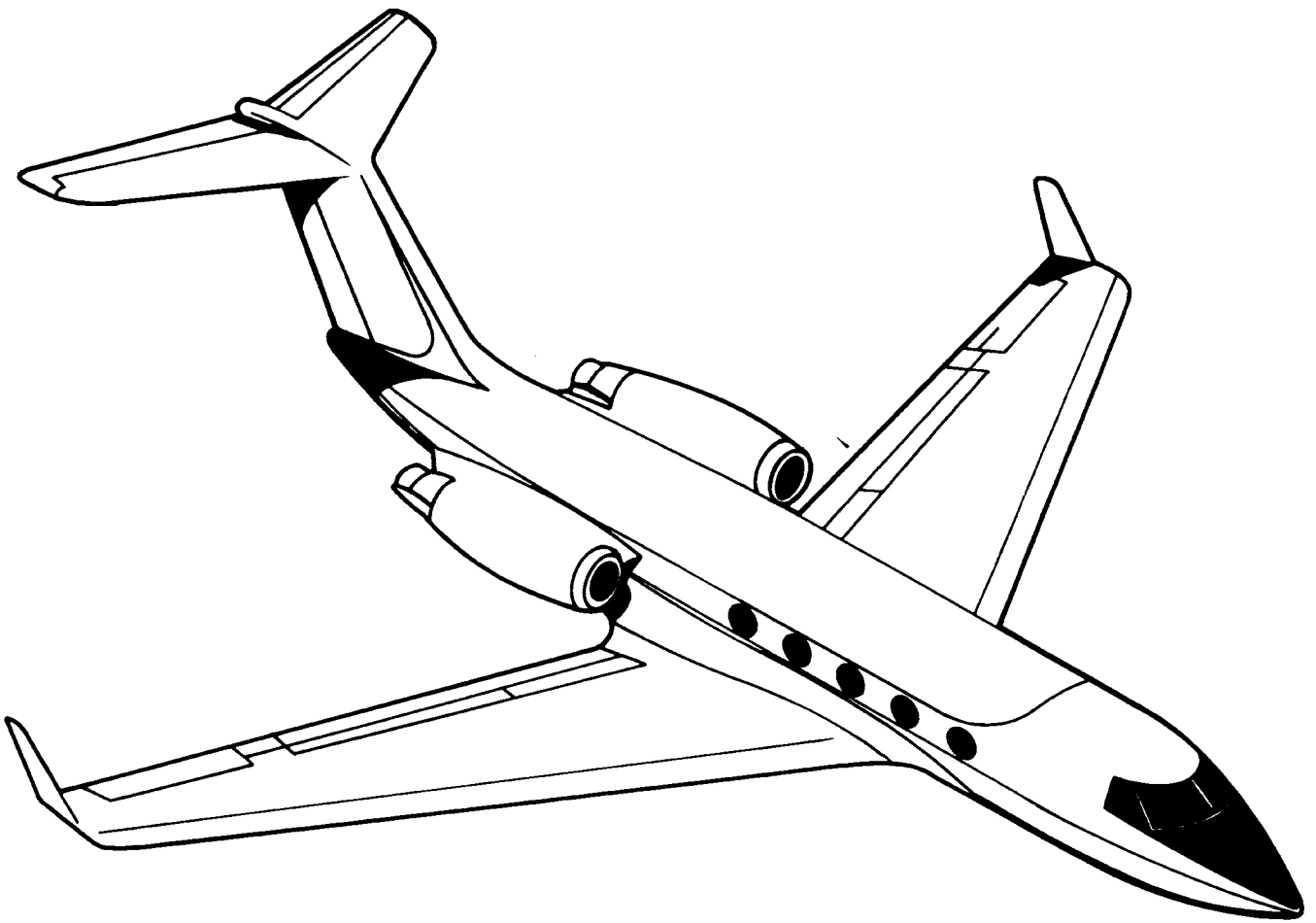
As the GM and players make multiple Hit Location rolls over the course of a battle, they may roll multiple results for the same system on a single Vehicle. The GM must decide whether only the worse result applies (the usual method) or the results are cumulative (a less common, but sometimes appropriate, outcome).

OPTIONAL AIRPLANE HIT LOCATION TABLE

Roll	Location	BODYx	Effect	To Hit
3	Cockpit	x2	1-2 on 1d6	-8 OCV
4-5	Sensors/Communications	x1	1-2 on 1d6	-5 OCV
6-7	Front Control Surfaces	x½	1-2 on 1d6	-5 OCV
8-9	Engines/Propeller	x1 ½	1-3 on 1d6	-6 OCV
10-11	Fuselage	x1	1 on 1d6	-3 OCV
12	Occupants/Cargo	x½	1-2 on 1d6	-5 OCV
13-14	Wings/Rear Control Surfaces	x½	1-3 on 1d6	-6 OCV
15-17	Military Systems*	x1	1-2 on 1d6	-6 OCV
18	Fuel Tank(s)	x½	1-4 on 1d6	-8 OCV

*: If none, reroll until you obtain a different result, or consider this an Occupants/Cargo result.

Front Attack: Roll 2d6+1 Side Attack: Roll 3d6 Rear Attack: Roll 2d6+6



AIRPLANE HIT LOCATION OPTIONAL EFFECTS

Roll	Cockpit Effects	Roll	Occupants/Cargo Effects
1	1-2 minor NPC crewmen killed or badly injured (if none, no effect)	1	4-24% of Vehicle's cargo destroyed or badly damaged
2	Windshield damaged; pilot and crew cannot see outside the Vehicle with Sight Group Senses	2	Plane suffers 1-6% casualties among the occupants
3	1 important NPC officer killed or badly injured (if there's just one pilot, he suffers the effect)	3	Plane suffers 2-12% casualties among the occupants
4	1-6 minor NPC crewmen killed or badly injured (if none, no effect)	4	Plane suffers 3-18% casualties among the occupants
5	1-3 important NPC officers killed (if there's just one pilot, he suffers the effect)	5	Plane suffers 4-24% casualties among the occupants
6	Cockpit loses all power, or has all physical access cut off	6	Personnel support system (a bathroom, medical facility, lounge, or the like) is damaged or destroyed; if appropriate, all Skill Rolls using its equipment suffer a -2 penalty
Roll	Sensors/Communications Effects	Roll	Military Systems Effects
1	Plane's interior communication system disabled for 1d6 Turns	1	One weapon suffers a loss of 40-90% of its Active Points
2	-1 to all Systems Operation rolls using the communications systems	2	One electronic countermeasures/counter-countermeasures system disabled or destroyed
3	-1 to all Systems Operation rolls using the sensors (such as radar)	3	Two weapons each suffer a loss of 10-60% of their Active Points (if plane has only one weapon, apply result 1)
4	-3 to all Systems Operation rolls using the communications systems	4	Cascading internal explosion; roll randomly on Airplane Hit Location Table and inflict 1d6 BODY damage to resulting system/section (no defense applies)
5	-3 to all Systems Operation rolls using the sensors	5	-2 OCV for all Vehicle attacks
6	All sensors and/or communications systems totally inoperable	6	-4 OCV for all Vehicle attacks
Roll	Control Surfaces (Front, Rear)/Wings Effects	Roll	Fuel Tank(s) Effects
1	-2 to all Combat Piloting rolls to land or take off	1	Vehicle loses 3-18% of its fuel at the rate of 1% per Segment.
2	-1 to all Combat Piloting rolls	2	Vehicle loses 4-24% of its fuel at the rate of 1% per Segment.
3	-4 to all Combat Piloting rolls to land or take off	3	Vehicle loses 5-30% of its fuel at the rate of 1% per Segment.
4	-2 to all Combat Piloting rolls	4	Vehicle loses 6-36% of its fuel at the rate of 1% per Segment.
5	-3 to all Combat Piloting rolls	5	Minor explosion; plane suffers 2d6 Killing generalized damage (no Hit Location; no defense applies)
6	Piloting systems completely disabled; pilot cannot steer Vehicle at all	6	Massive explosion; plane suffers 4d6 Killing generalized damage (no Hit Location; no defense applies)
Roll	Engine/Propeller Effects		
1	Plane loses one Noncombat Movement multiple		
2	Internal explosion; plane suffers 1d6 BODY of generalized damage (no Hit Location; no defense applies)		
3	Plane loses 5" of Flight		
4	Plane loses 10" of Flight		
5	Plane loses 20" of Flight		
6	Plane loses all engines and cannot move; if airborne, it begins to descend, and pilot must make Control Roll at -3 every Phase to control the descent		
Roll	Fuselage Effects		
1	Plane suffers 2-12% casualties among the occupants		
2	Plane loses 2 DEF		
3	Plane loses 5 STR		
4	Plane loses 10 STR		
5	Plane loses 20 STR		
6	Cascading internal explosion; roll randomly on Airplane Hit Location Table and inflict 1d6 BODY damage to resulting system/section (no defense applies)		

AUTOMOBILE HIT LOCATION OPTIONAL EFFECTS

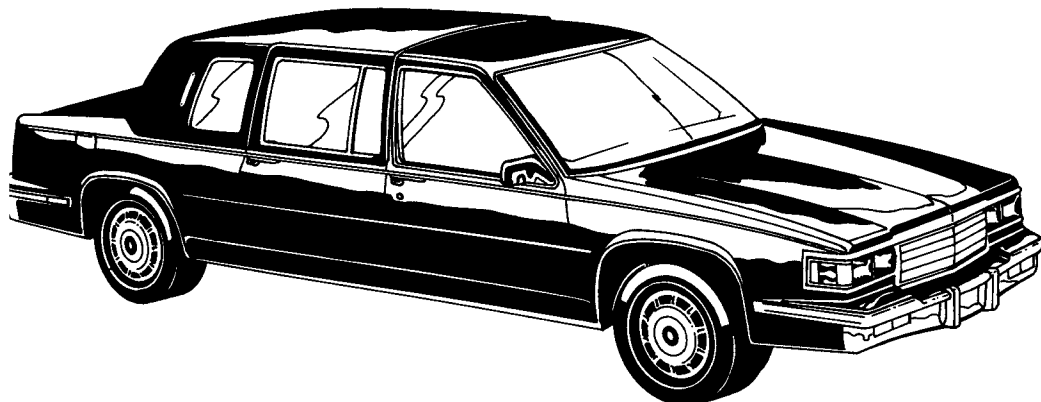
Roll	Wheels (Front, Rear) Effects	Roll	Chassis/Frame Effects
1	Vehicle loses an additional 1-6% of Ground Movement	1	Vehicle suffers 2-12% casualties among the occupants
2	Vehicle loses an additional 2-12% of Ground Movement	2	Vehicle loses 2 DEF
3	Vehicle loses an additional 3-18% of Ground Movement	3	Vehicle loses 5 STR
4	-1 to all Control Rolls	4	Vehicle loses 10 STR
5	-2 to all Control Rolls	5	Vehicle loses 20 STR
6	-4 to all Control Rolls	6	Vehicle's deceleration rate reduced by 1d6-3 (minimum of 1) inches per hex
Roll	Suspension (Front, Rear) Effects	Roll	Occupants/Cargo Effects
1	Vehicle loses 1 Movement Skill Level (if none, use effect 4)	1	4-24% of Vehicle's cargo destroyed or badly damaged
2	Vehicle loses 2 Movement Skill Levels (if none, use effect 5)	2	Vehicle suffers 1-6% casualties among the occupants
3	Vehicle loses 3 Movement Skill Levels (if none, use effect 6)	3	Vehicle suffers 2-12% casualties among the occupants
4	-1 to all Control Rolls	4	Vehicle suffers 3-18% casualties among the occupants
5	-2 to all Control Rolls	5	Vehicle suffers 4-24% casualties among the occupants
6	-4 to all Control Rolls	6	-2 to all Control Rolls (in addition to any driver suffers for being injured, if applicable)
Roll	Engine/Drive Train Effects	Roll	Fuel Tank(s) Effects
1	Vehicle loses one Noncombat Movement multiple	1	Vehicle loses 3-18% of its fuel at the rate of 1% per Segment.
2	Vehicle loses two Noncombat Movement multiples (if it only has one, it loses that one and 1d6 inches of Ground Movement)	2	Vehicle loses 4-24% of its fuel at the rate of 1% per Segment.
3	Vehicle loses 5" of Ground Movement	3	Vehicle loses 5-30% of its fuel at the rate of 1% per Segment.
4	Vehicle loses 10" of Ground Movement	4	Vehicle loses 6-36% of its fuel at the rate of 1% per Segment.
5	Vehicle loses 20" of Ground Movement	5	Minor explosion; Vehicle suffers 1 ½d6 Killing generalized damage (no Hit Location; no defense applies)
6	-2 to all Control Rolls	6	Massive explosion; Vehicle suffers 3d6 Killing generalized damage (no Hit Location; no defense applies)

OPTIONAL AUTOMOBILE HIT LOCATION TABLE

Roll	Location	BODYx	Effect	To Hit
3-4	Front Wheels*	x1	1-2 on 1d6	-7 OCV
5-6	Front Suspension	x1	1-2 on 1d6	-5 OCV
7-9	Engine/Drive Train	x1 ½	1-3 on 1d6	-6 OCV
10-11	Chassis/Frame	x1	1-2 on 1d6	-3 OCV
12	Occupants/Cargo	x½	1-2 on 1d6	-5 OCV
13-14	Rear Suspension	x1	1-2 on 1d6	-5 OCV
15-17	Rear Wheels*	x1	1-2 on 1d6	-7 OCV
18	Fuel Tank(s)	x½	1-4 on 1d6	-8 OCV

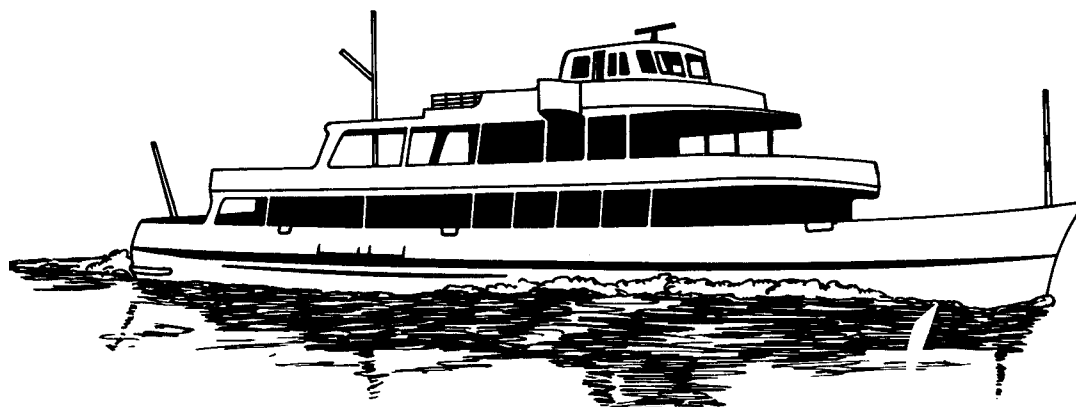
*: See page 40 regarding the effect of loss of wheels. Any optional effect rolled is in addition to the loss of Ground Movement described there.

Front Attack: Roll 2d6+1 Side Attack: Roll 3d6 Rear Attack: Roll 2d6+6



BOAT HIT LOCATION OPTIONAL EFFECTS

<p>Roll Keel Effects</p> <p>1 Boat begins leaking, and will sink in 2d12 Minutes unless preventive measures are taken; reduce Swimming by 1" per Minute</p> <p>2 -1 to all Combat Driving rolls</p> <p>3 Boat begins leaking, and will sink in 1d6 Turns unless preventive measures are taken; reduce Swimming by 1" per Turn</p> <p>4 -2 to all Combat Driving rolls</p> <p>5 -3 to all Combat Driving rolls</p> <p>6 Operator cannot steer Vehicle at all; boat is adrift</p> <p>Roll Engine/Propulsion Effects</p> <p>1 Vehicle loses one Noncombat Movement multiple</p> <p>2 Vehicle loses two Noncombat Movement multiples (if not applicable, -1 to Control Rolls)</p> <p>3 Vehicle loses 2" of Swimming</p> <p>4 Vehicle loses 4" of Swimming</p> <p>5 Vehicle loses 8" of Swimming</p> <p>6 -2 to all Control Rolls</p> <p>Roll Hull Effects</p> <p>1 Vehicle suffers 2-12% casualties among the occupants</p> <p>2 Vehicle loses 2 DEF</p> <p>3 Vehicle loses 5 STR</p> <p>4 Vehicle loses 10 STR</p> <p>5 Boat begins leaking, taking on 1-2 cubic hexes of water per Minute unless the crew takes preventive measures</p> <p>6 Boat begins leaking, taking on 1d6 cubic hexes of water per Minute unless the crew takes preventive measures</p>	<p>Roll Occupants/Cargo Effects</p> <p>1 4-24% of Vehicle's cargo destroyed or badly damaged</p> <p>2 Vehicle suffers 1-6% casualties among the occupants</p> <p>3 Vehicle suffers 2-12% casualties among the occupants</p> <p>4 Vehicle suffers 3-18% casualties among the occupants</p> <p>5 Vehicle suffers 4-24% casualties among the occupants</p> <p>6 -2 to all Control Rolls (in addition to any driver suffers for being injured, if applicable)</p> <p>Roll Fuel Tank(s) Effects</p> <p>1 Vehicle loses 3-18% of its fuel at the rate of 1% per Segment.</p> <p>2 Vehicle loses 4-24% of its fuel at the rate of 1% per Segment.</p> <p>3 Vehicle loses 5-30% of its fuel at the rate of 1% per Segment.</p> <p>4 Vehicle loses 6-36% of its fuel at the rate of 1% per Segment.</p> <p>5 Minor explosion; Vehicle suffers 1 ½d6 Killing generalized damage (no Hit Location; no defense applies)</p> <p>6 Massive explosion; Vehicle suffers 3d6 Killing generalized damage (no Hit Location; no defense applies)</p>
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OPTIONAL BOAT HIT LOCATION TABLE

Roll	Location	BODYx	Effect	To Hit
Roll	Location	BODYx	Effect	To Hit
3-4	Keel*	x1 1/2	1-2 on 1d6	-7 OCV
5-7	Engine/Propulsion†	x1 1/2	1-3 on 1d6	-6 OCV
8-12	Hull	x1	1-2 on 1d6	-3 OCV
13-14	Occupants/Cargo	x1/2	1-2 on 1d6	-5 OCV
15-17	Rudder	x1	1-2 on 1d6	-7 OCV
18	Fuel Tank(s)†	x1/2	1-4 on 1d6	-8 OCV

*: If boat has no keel (like most speedboats), treat result as Hull.

†: For rowed boats and other non-motorized small watercraft, an Engine/Propulsion result represents damage to the oars, sails, or the like. Reduce the BODYx to x1, and the Optional Effect to 1-2 on 1d6. Treat a Fuel Tank(s) result as a Hull result.

Front Attack: Roll 2d6+1 Side Attack: Roll 3d6 Rear Attack: Roll 2d6+6

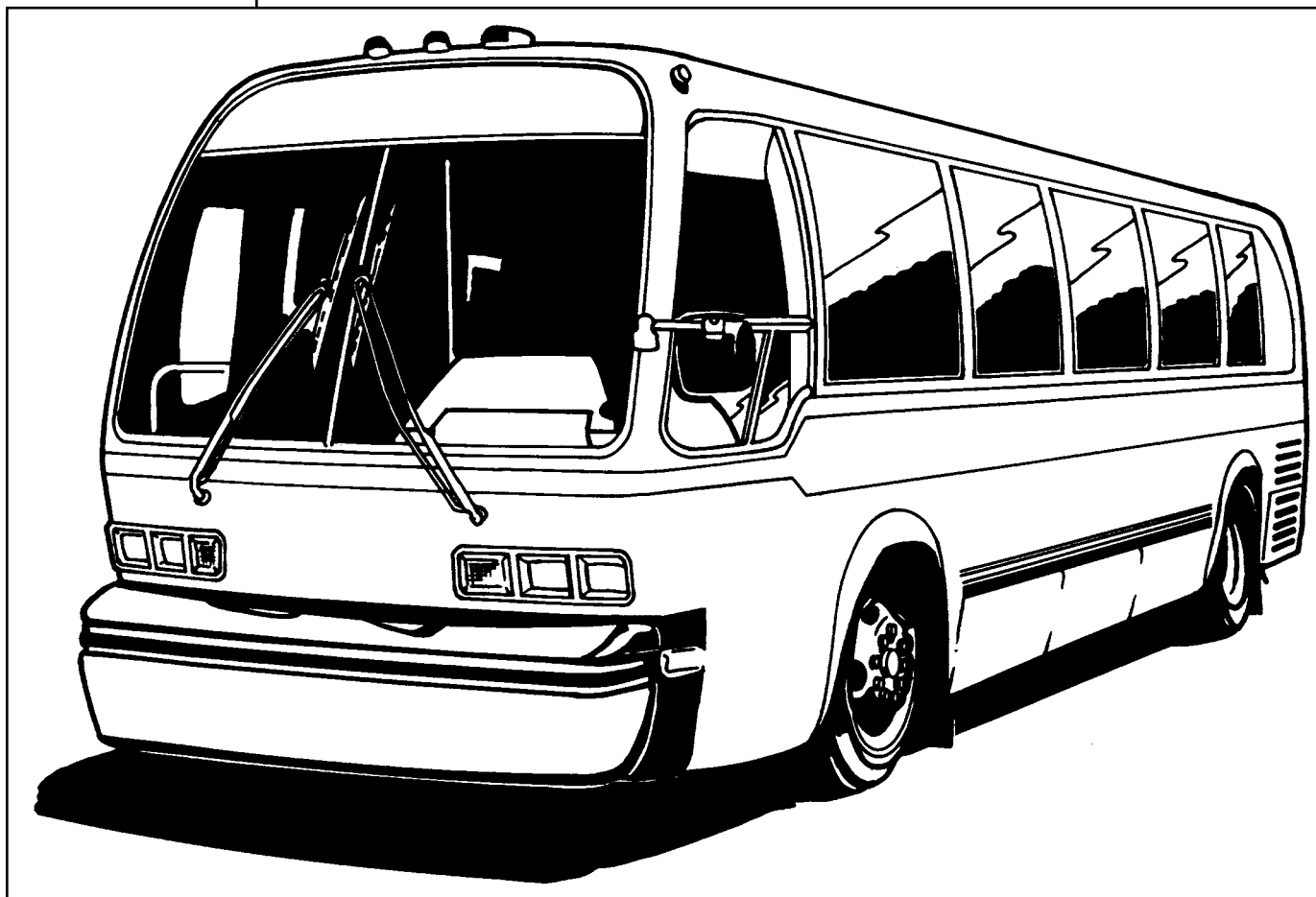
OPTIONAL BUS HIT LOCATION TABLE

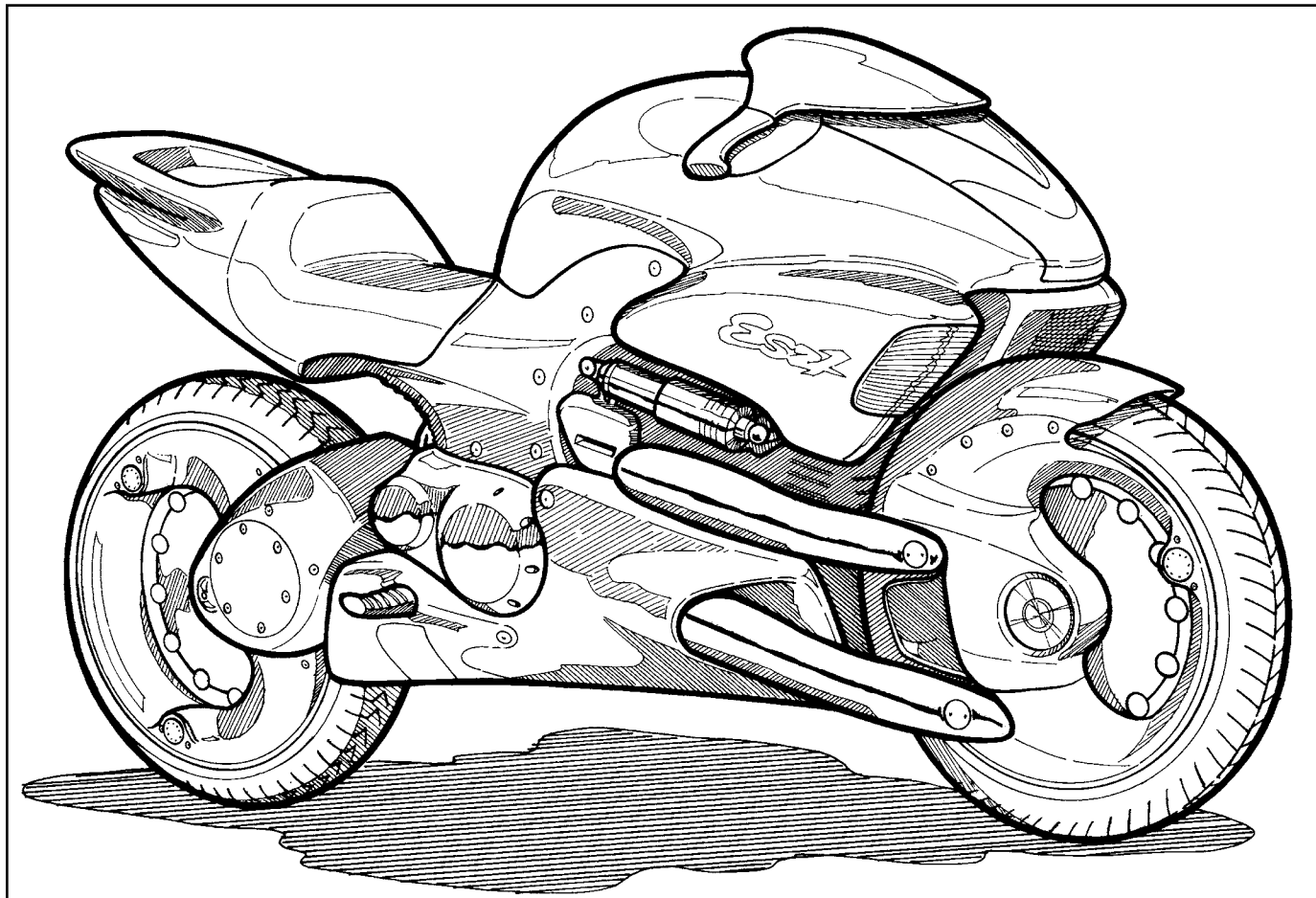
Roll	Location	BODYx	Effect	To Hit
3-4	Front Wheels*	x1	1-2 on 1d6	-7 OCV
5	Front Suspension	x1	1-2 on 1d6	-5 OCV
6-7	Engine/Drive Train	x1 ½	1-3 on 1d6	-6 OCV
8-10	Chassis/Frame	x1	1-2 on 1d6	-3 OCV
11-13	Occupants/Cargo	x½	1-2 on 1d6	-5 OCV
14	Rear Suspension	x1	1-2 on 1d6	-5 OCV
15-17	Rear Wheels*	x1	1-2 on 1d6	-7 OCV
18	Fuel Tank(s)	x½	1-4 on 1d6	-8 OCV

*: See page 40 regarding the effect of loss of wheels. Any optional effect rolled is in addition to the loss of Ground Movement described there.

Front Attack: Roll 2d6+1 Side Attack: Roll 3d6 Rear Attack: Roll 2d6+6

Bus Optional Effects are the same as for Automobiles.





OPTIONAL MOTORCYCLE HIT LOCATION TABLE

Roll	Location	BODYx	Effect	To Hit
3-4	Front Wheel*	x1	1-2 on 1d6	-7 OCV
5-6	Front Suspension	x1	1-2 on 1d6	-5 OCV
7-9	Engine/Drive Train	x1 ½	1-3 on 1d6	-6 OCV
10-11	Chassis/Frame	x1	1-2 on 1d6	-3 OCV
12-13	Rider	x½	1-2 on 1d6	-5 OCV
14-15	Rear Suspension	x1	1-2 on 1d6	-5 OCV
16-17	Rear Wheel	x1	1-2 on 1d6	-7 OCV
18	Fuel Tank(s)	x½	1-4 on 1d6	-8 OCV

*: See page 40 regarding the effect of loss of wheels. Any optional effect rolled is in addition to the loss of Ground Movement described there.

Front Attack: Roll 2d6+1 Side Attack: Roll 3d6 Rear Attack: Roll 2d6+6

Motorcycle Optional Effects are the same as for Automobiles. You can also use this Hit Location Table for bicycles.

OPTIONAL HELICOPTER HIT LOCATION TABLE

Roll	Location	BODYx	Effect	To Hit
3-4	Cockpit	x2	1-2 on 1d6	-8 OCV
5-6	Main Rotor	x½	1-3 on 1d6	-8 OCV
6-7	Sensors/Communications	x1	1-2 on 1d6	-5 OCV
8-9	Engine	x1 ½	1-3 on 1d6	-6 OCV
10-11	Main Body	x1	1 on 1d6	-3 OCV
12	Occupants/Cargo	x½	1-2 on 1d6	-5 OCV
13-14	Rear Rotor	x½	1-3 on 1d6	-8 OCV
15-17	Military Systems*	x1	1-2 on 1d6	-6 OCV
18	Fuel Tank(s)	x½	1-4 on 1d6	-8 OCV

*: If none, reroll until you obtain a different result, or consider this an Occupants/Cargo result.

Front Attack: Roll 2d6+1 Side Attack: Roll 3d6 Rear Attack: Roll 2d6+6



HELICOPTER HIT LOCATION OPTIONAL EFFECTS

Roll	Cockpit Effects	Roll	Occupants/Cargo Effects
1	1-2 minor NPC crewmen killed or badly injured (if none, no effect)	1	4-24% of Vehicle's cargo destroyed or badly damaged
2	Windshield damaged; pilot and crew cannot see outside the Vehicle with Sight Group Senses	2	Vehicle suffers 1-6% casualties among the occupants
3	1 important NPC officer killed or badly injured (if there's one pilot, he is affected)	3	Vehicle suffers 2-12% casualties among the occupants
4	1-6 minor NPC crewmen killed or badly injured (if none, no effect)	4	Vehicle suffers 3-18% casualties among the occupants
5	1-3 important NPC officers killed (if there's just one pilot, he suffers the effect)	5	Vehicle suffers 4-24% casualties among the occupants
6	Command center loses all power, or has all physical access cut off	6	Personnel support system (a bathroom, medical facility, lounge, or the like) is damaged or destroyed; if appropriate, all Skill Rolls using its equipment suffer a -2 penalty
Roll	Main Rotor Effects	Roll	Rear Rotor Effects
1	Vehicle loses one Noncombat Movement multiple	1	-1 to all Combat Piloting rolls
2	Vehicle loses two Noncombat Movement multiples (if it only has one, it loses that one and 1d6 inches of Flight)	2	-2 to all Combat Piloting rolls
3	Vehicle loses 5" of Flight	3	-3 to all Combat Piloting rolls
4	Vehicle loses 10" of Flight	4	-4 to all Combat Piloting rolls
5	Vehicle loses 20" of Flight	5	-5 to all Combat Piloting rolls
6	Vehicle loses all use of main rotor and falls to the ground at standard falling velocity.	6	Helicopter completely unsteerable
Roll	Sensors/Communications Effects	Roll	Military Systems Effects
1	Vehicle's interior communication system disabled for 1d6 Turns	1	One weapon suffers a loss of 40-90% of its Active Points
2	-1 to all Systems Operation rolls using the communications systems	2	One electronic countermeasures/counter-countermeasures system disabled or destroyed
3	-1 to all Systems Operation rolls using the sensors (such as radar)	3	Two weapons each suffer a loss of 10-60% of their Active Points (if plane has only one weapon, apply result 1)
4	-3 to all Systems Operation rolls using the communications systems	4	Cascading internal explosion; roll randomly on Helicopter Hit Location Table and inflict 1d6 BODY damage to resulting system/section (no defense applies)
5	-3 to all Systems Operation rolls using the sensors	5	-2 OCV for all Vehicle attacks
6	All sensors and/or communications systems totally inoperable	6	-4 OCV for all Vehicle attacks
Roll	Engine Effects	Roll	Fuel Tank(s) Effects
1	Vehicle loses one Noncombat Movement multiple	1	Vehicle loses 3-18% of its fuel at the rate of 1% per Segment.
2	Internal explosion; Vehicle suffers 1d6 BODY of generalized damage (no Hit Location; no defense applies)	2	Vehicle loses 4-24% of its fuel at the rate of 1% per Segment.
3	Vehicle loses 5" of Flight	3	Vehicle loses 5-30% of its fuel at the rate of 1% per Segment.
4	Vehicle loses 10" of Flight	4	Vehicle loses 6-36% of its fuel at the rate of 1% per Segment.
5	Vehicle loses 20" of Flight	5	Minor explosion; Vehicle suffers 2d6 Killing generalized damage (no Hit Location; no defense applies)
6	Vehicle loses all engines and cannot move; if airborne, it begins to descend, and pilot must make Control Roll at -3 every Phase to control the descent	6	Massive explosion; Vehicle suffers 4d6 Killing generalized damage (no Hit Location; no defense applies)
Roll	Main Body Effects		
1	Vehicle suffers 2-12% casualties among the occupants		
2	Vehicle loses 2 DEF		
3	Vehicle loses 5 STR		
4	Vehicle loses 10 STR		
5	Vehicle loses 20 STR		
6	Cascading internal explosion; roll randomly on Helicopter Hit Location Table and inflict 1d6 BODY damage to resulting system/section (no defense applies)		

OPTIONAL MECH HIT LOCATION TABLE

Roll	Location	BODYx	Effect	To Hit
3-5	Head/Cockpit	x1 ½	1-2 on 1d6	-8 OCV
6	Hands	x½	1-2 on 1d6	-6 OCV
7-8	Arms	x1	1-2 on 1d6	-5 OCV
9-10	Engine	x1 ½	1-3 on 1d6	-6 OCV
11-12	Main Body/Torso	x1	1-2 on 1d6	-3 OCV
13	Military Systems	x1	1-2 on 1d6	-6 OCV
14	Upper Legs	x1	1-2 on 1d6	-4 OCV
15-17	Lower Legs/Feet	x½	1-2 on 1d6	-6 OCV
18	Fuel Tank(s)	x½	1-4 on 1d6	-8 OCV

Front Attack: Roll 2d6+1 Side Attack: Roll 3d6 Rear Attack: Roll 2d6+6



MECH HIT LOCATION OPTIONAL EFFECTS

Roll	Head/Cockpit Effects
1	1-2 minor NPC crewmen killed or badly injured (if none, no effect)
2	Windshield damaged; pilot and crew cannot see outside the Vehicle with Sight Group Senses
3	1 important NPC officer killed or badly injured (if there's just one pilot, he suffers the effect)
4	1-6 minor NPC crewmen killed or badly injured (if none, no effect)
5	1-3 important NPC officers killed (if there's just one pilot, he suffers the effect)
6	Command center loses all power, or has all physical access cut off

Roll	Hands and Arms Effects*
1	-1 OCV in HTH Combat, or with any hand-held weapon
2	Vehicle must make a DEX Roll at -2 each Phase to hold on to anything
3	-2 OCV in HTH Combat, or with any hand-held weapon
4	Vehicle must make a DEX Roll at -4 each Phase to hold on to anything
5	-4 OCV in HTH Combat, or with any hand-held weapon
6	Vehicle cannot grasp anything with its hands (but can still hit opponents with punches)

*: Both Hands and Arms use this effects table; the GM decides whether multiple results are cumulative, or only the worst applies (typically the former).

Roll	Engine Effects
1	Vehicle loses one Noncombat Movement multiple
2	Internal explosion; Vehicle suffers 1d6 BODY of generalized damage (no Hit Location; no defense applies)
3	Vehicle loses 5" of Ground Movement (or other mode of movement of GM's choice)
4	Vehicle loses 10" of Ground Movement (or other mode of movement of GM's choice)
5	Vehicle loses 20" of Ground Movement (or other mode of movement of GM's choice)
6	Vehicle loses all engines and cannot use any mode of movement

Roll	Main Body/Torso Effects
1	Operator suffers 1d6 of dice of Normal Damage (only his personal defenses apply)
2	Vehicle loses 2 DEF
3	Vehicle loses 5 STR
4	Vehicle loses 10 STR
5	Vehicle loses 20 STR
6	Cascading internal explosion; roll randomly on Mech (Humanoid) Hit Location Table and inflict 1d6 BODY damage to resulting system/section (no defense applies)

Roll	Military Systems Effects
1	One weapon suffers a loss of 40-90% of its Active Points
2	One electronic countermeasures/counter-countermeasures system disabled or destroyed
3	Two weapons each suffer a loss of 10-60% of their Active Points (if plane has only one weapon, apply result 1)
4	Cascading internal explosion; roll randomly on Mech (Humanoid) Hit Location Table and inflict 1d6 BODY damage to resulting system/section (no defense applies)
5	-2 OCV for all Vehicle attacks
6	-4 OCV for all Vehicle attacks

Roll	Upper Legs and Lower Legs Effects*
1	-1 DCV
2	Vehicle loses 2d6 inches of Ground Movement
3	-2 DCV
4	Vehicle loses 4d6 inches of Ground Movement
5	-4 DCV
6	Mech cannot use Ground Movement, Leaping, or any other mode of movement requiring legs

*: Both Legs locations use this effects table; the GM decides whether multiple results are cumulative, or only the worst applies (typically the former).

Roll	Fuel Tank(s) Effects
1	Vehicle loses 3-18% of its fuel at the rate of 1% per Segment.
2	Vehicle loses 4-24% of its fuel at the rate of 1% per Segment.
3	Vehicle loses 5-30% of its fuel at the rate of 1% per Segment.
4	Vehicle loses 6-36% of its fuel at the rate of 1% per Segment.
5	Minor explosion; Vehicle suffers 1 ½d6 Killing generalized damage (no Hit Location; no defense applies)
6	Massive explosion; Vehicle suffers 3d6 Killing generalized damage (no Hit Location; no defense applies)

OPTIONAL SHIP HIT LOCATION TABLE

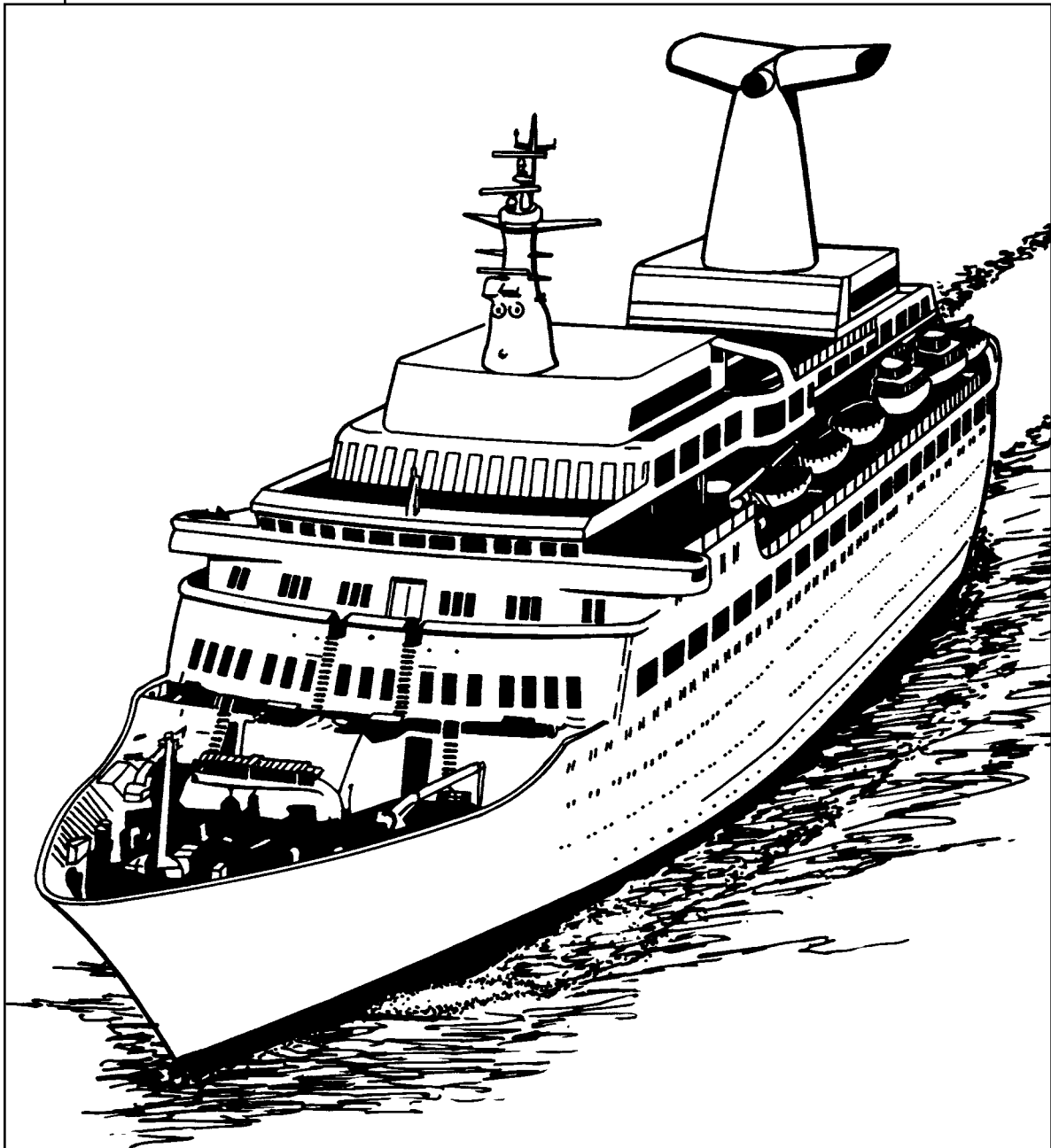
Roll	Location	BODYx	Effect	To Hit
3-4	Keel	x1½	1-2 on 1d6	-7 OCV
5-7	Engine/Sails/Propulsion*	x1½	1-3 on 1d6	-6 OCV
8-11	Hull	x1	1-2 on 1d6	-3 OCV
12-13	Occupants/Cargo	x½	1-2 on 1d6	-5 OCV
14-15	Military Systems†	x1	1-2 on 1d6	-6 OCV
16-17	Rudder	x1	1-2 on 1d6	-7 OCV
18	Fuel Tank(s)*	x½	1-4 on 1d6	-8 OCV

*: For rowed boats and other non-motorized small watercraft, an Engine/Propulsion result represents damage to the oars, sails, or the like. Reduce the BODYx to x1, and the Optional Effect to 1-2 on 1d6. If the ship has no Fuel Tank(s), reroll that result.

For sailing vessels, roll 1d6. A 1 indicates a hit on a mast; a 2-6 a hit on the sails themselves. Resolve damage to masts and sails using the rules on pages 58-59; do not subtract the damage from the Vehicle's overall BODY. In either case, the BODYx is only x1, and there is no optional effect.

†: If the ship has no Military Systems, reroll this result, or consider it a hit on the bridge (use the "Command Center" result on the Starship Hit Location Table).

Front Attack: Roll 2d6+1 Side Attack: Roll 3d6 Rear Attack: Roll 2d6+6



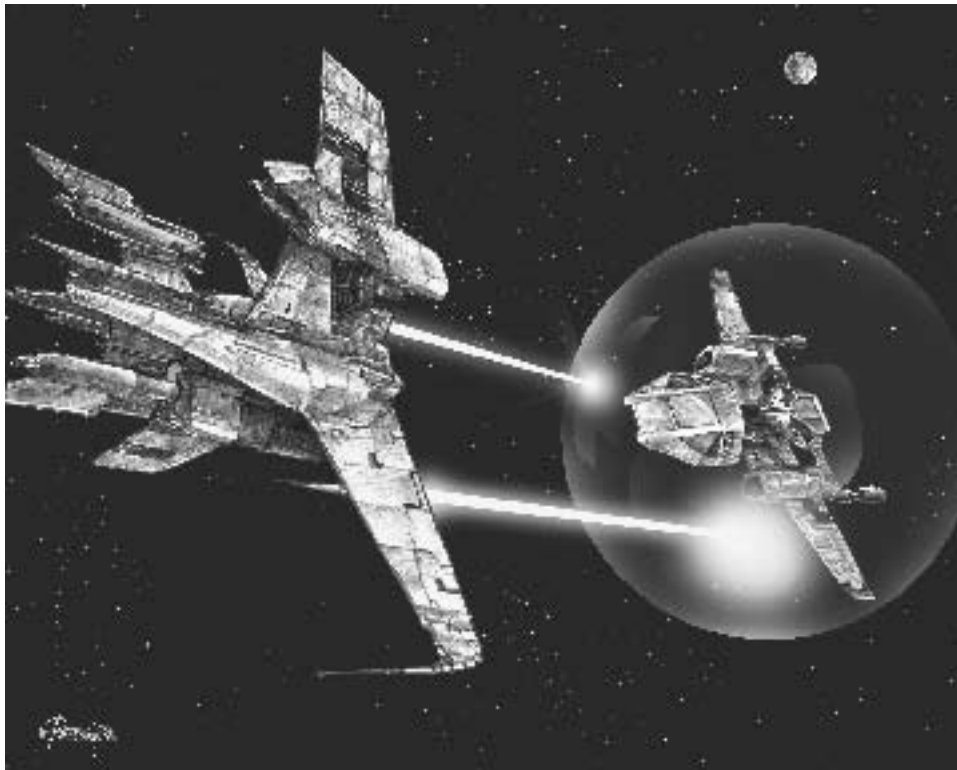
SHIP HIT LOCATION OPTIONAL EFFECTS

Roll	Keel Effects	Roll	Occupants/Cargo Effects
1	Ship begins leaking, and will sink in 2d12 Hours unless preventive measures are taken; reduce Swimming by 1" per Hour	1	4-24% of Vehicle's cargo destroyed or badly damaged
2	-1 to all Combat Driving rolls	2	Vehicle suffers 1-6% casualties among the occupants
3	Ship begins leaking, and will sink in 2d6 x 10 Minutes unless preventive measures are taken; reduce Swimming by 1" per 10 Minutes	3	Vehicle suffers 2-12% casualties among the occupants
4	-2 to all Combat Driving rolls	4	Vehicle suffers 3-18% casualties among the occupants
5	-3 to all Combat Driving rolls	5	Vehicle suffers 4-24% casualties among the occupants
6	Operator cannot steer Vehicle at all; ship is adrift	6	-2 to all Control Rolls (in addition to any driver suffers for being injured, if applicable)
Roll	Engine/Sails/Propulsion Effects	Roll	Military Systems Effects
1	Vehicle loses one Noncombat Movement multiple	1	One weapon suffers a loss of 40-90% of its Active Points
2	Vehicle loses two Noncombat Movement multiples (if not applicable, -1 to Control Rolls)	2	One electronic countermeasures/counter-countermeasures system disabled or destroyed
3	Vehicle loses 2" of Swimming	3	Two weapons each suffer a loss of 10-60% of their Active Points (if plane has only one weapon, apply result 1)
4	Vehicle loses 4" of Swimming	4	Cascading internal explosion; roll randomly on Ship Hit Location Table and inflict 1d6 BODY damage to resulting system/section (no defense applies)
5	Vehicle loses 8" of Swimming	5	-2 OCV for all Vehicle attacks
6	-2 to all Control Rolls	6	-4 OCV for all Vehicle attacks
Roll	Hull Effects	Roll	Fuel Tank(s) Effects
1	Vehicle suffers 2-12% casualties among the occupants	1	Vehicle loses 3-18% of its fuel at the rate of 1% per Segment.
2	Vehicle loses 2 DEF	2	Vehicle loses 4-24% of its fuel at the rate of 1% per Segment.
3	Vehicle loses 5 STR	3	Vehicle loses 5-30% of its fuel at the rate of 1% per Segment.
4	Vehicle loses 10 STR	4	Vehicle loses 6-36% of its fuel at the rate of 1% per Segment.
5	Ship begins leaking, taking on 1-3 cubic hexes of water per Minute unless the crew takes preventive measures	5	Minor explosion; Vehicle suffers 1 ½d6 Killing generalized damage (no Hit Location; no defense applies)
6	Ship begins leaking, taking on 1d6+1 cubic hexes of water per Minute unless the crew takes preventive measures	6	Massive explosion; Vehicle suffers 3d6 Killing generalized damage (no Hit Location; no defense applies)

OPTIONAL STARSHIP HIT LOCATION TABLE

Roll	Location	BODYx	Effect	To Hit
3	Command Center	x2	1-2 on 1d6	-8 OCV
4-5	Sensors/Communications	x1	1-2 on 1d6	-5 OCV
6-7	Piloting Systems	x½	1-2 on 1d6	-5 OCV
8-9	Engines/Power Systems	x1 ½	1-3 on 1d6	-6 OCV
10-11	Main Body	x1	1 on 1d6	-3 OCV
12	Occupants/Cargo	x½	1-2 on 1d6	-5 OCV
13	Computer	x1	1-3 on 1d6	-8 OCV
14-15	Weapon Systems	x1	1 on 1d6	-4 OCV
16-17	Defense Systems	x1	1 on 1d6	-6 OCV
18	Life Support	x½	1 on 1d6	-8 OCV

Front Attack: Roll 2d6+1 Side Attack: Roll 3d6 Rear Attack: Roll 2d6+6



STARSHIP HIT LOCATION OPTIONAL EFFECTS

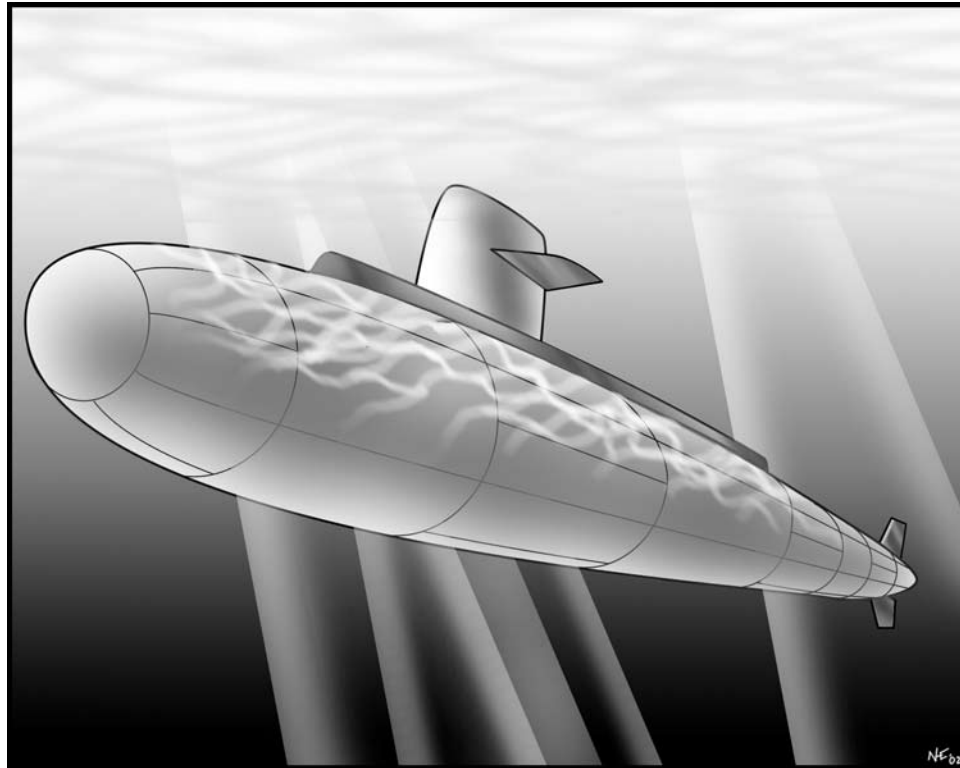
Roll	Command Center Effects	Roll	Occupants/Cargo Effects
1	1-2 minor NPC crewmen killed or badly injured	1	4-24% of Vehicle's cargo destroyed or badly damaged
2	Viewing apparatus damaged; pilot and crew cannot view space outside the Vehicle with Sight Group Senses	2	Ship suffers 1-6% casualties among the occupants
3	1 important NPC officer killed or badly injured	3	Ship suffers 2-12% casualties among the occupants
4	1-6 minor NPC crewmen killed or badly injured	4	Ship suffers 3-18% casualties among the occupants
5	1-3 important NPC officers killed	5	Ship loses 5-30% of some consumable (breathing gases, fuel, food, or the like)
6	Command center loses all power, or has all physical access cut off	6	Sickbay damaged; all Skill Rolls using its equipment suffer a -2 penalty
Roll	Sensors/Communications Effects	Roll	Computer Effects
1	Ship's interior communication system disabled for 1d6 Turns	1	Ship loses 1 SPD
2	-1 to all Systems Operation rolls using the communications systems	2	Ship loses 5 DEX
3	-1 to all Systems Operation rolls using the sensors	3	Computer loses 5 INT (and EGO, if it's an AI)
4	-3 to all Systems Operation rolls using the communications systems	4	Computer loses 2d6 programs (chosen randomly by the GM)
5	-3 to all Systems Operation rolls using the sensors	5	All Skill Rolls involving or requiring computer use suffer a -3 penalty
6	All sensors and/or communications systems totally inoperable	6	Ship completely inoperable unless it has a backup computer
Roll	Piloting Systems Effects	Roll	Weapon Systems Effects
1	Thrusters inoperable for 1d6 Hours	1	One weapon suffers a -2 OCV penalty
2	-1 to all Combat Piloting rolls	2	One weapon loses -4 DC of effect
3	Navigation computer, and navigation functions of main computer, inoperable for 1d6 Hours	3	One weapon develops an Activation Roll 11- Burnout
4	-2 to all Combat Piloting rolls	4	One weapon without Charges loses outside power; it has only 1d6 Charges for the remainder of the battle
5	-3 to all Combat Piloting rolls	5	One weapon becomes completely inoperable
6	Piloting systems completely disabled; pilot cannot steer Vehicle at all; Vehicle adrift	6	One weapon explodes, doing its damage to the person firing it
Roll	Engine/Power Systems Effects	Roll	Defense Systems Effects
1	Ship loses one Noncombat Movement multiple	1	Defense system malfunctions, causing a -2 to all Systems Operation rolls using the sensors
2	Ship's main power generation system loses one-third of its power-generating capacity (<i>i.e.</i> , reduce the END of its Endurance Reserve by one-third)	2	One defense system loses 20 Active Points' worth of effect
3	Ship loses 5" of Flight	3	One defense system develops an Activation Roll 11- Burnout
4	Ship loses 10" of Flight	4	One defense system without Charges loses outside power; it has only 2d6+2 Charges for the remainder of the battle
5	Ship loses 20" of Flight	5	One defense system becomes completely inoperable
6	Ships loses all engines and cannot move except with half thrusters	6	One defense system explodes; roll randomly on Vehicle Hit Location Table and inflict 1d6 BODY damage to it (no defense applies)
Roll	Main Body Effects	Roll	Life Support Effects
1	Ship suffers 2-12% casualties among the occupants	1	Ship loses 4-24% of its breathing gases
2	Ship loses 2 DEF	2	Ship loses 10-60% of its breathing gases
3	Ship loses 5 STR	3	Explosive decompression; one chamber of the Vehicle is opened to space, and all its inhabitants are sucked out into the void (see <i>Star Hero</i> , page 285)
4	Ship loses 10 STR	4	Artificial gravity becomes inoperable
5	Ship loses 20 STR	5	Backup life support system destroyed or badly damaged (if no such system on Vehicle, re-roll)
6	Cascading internal explosion; roll randomly on Starship Hit Location Table and inflict 1d6 BODY damage to resulting system/section (no defense applies)	6	All life support systems become inoperable; everyone on the Vehicle suffocates within 1d6 Minutes unless a backup system is available

OPTIONAL SUBMARINE HIT LOCATION TABLE

Roll	Location	BODYx	Effect	To Hit
3	Command Center	x2	1-2 on 1d6	-8 OCV
4-5	Sensors/Communications	x1	1-2 on 1d6	-5 OCV
6-7	Engine/Propulsion	x1 ½	1-3 on 1d6	-6 OCV
8-11	Hull	x1	1-2 on 1d6	-3 OCV
12-13	Occupants/Cargo	x½	1-2 on 1d6	-5 OCV
14-15	Military Systems*	x1	1-2 on 1d6	-6 OCV
16-17	Control Surfaces	x½	1-2 on 1d6	-5 OCV
18	Fuel Tank(s)*	x½	1-4 on 1d6	-8 OCV

*: If the ship has no Military Systems, reroll this result.

Front Attack: Roll 2d6+1 Side Attack: Roll 3d6 Rear Attack: Roll 2d6+6



SUBMARINE HIT LOCATION OPTIONAL EFFECTS

Roll	Command Center Effects	Roll	Occupants/Cargo Effects
1	1-2 minor NPC crewmen killed or badly injured	1	4-24% of Vehicle's cargo destroyed or badly damaged
2	Periscope damaged; pilot and crew cannot see outside the Vehicle with Sight Group Senses (or must make Skill Rolls each Phase to use periscope)	2	Vehicle suffers 1-6% casualties among the occupants
3	1 important NPC officer killed or badly injured	3	Vehicle suffers 2-12% casualties among the occupants
4	1-6 minor NPC crewmen killed or badly injured	4	Vehicle suffers 3-18% casualties among the occupants
5	1-3 important NPC officers killed	5	Vehicle suffers 4-24% casualties among the occupants
6	Command center loses all power, or has all physical access cut off	6	-2 to all Control Rolls (in addition to any driver suffers for being injured, if applicable)
Roll	Sensors/Communications Effects	Roll	Military Systems Effects
1	Boat's interior communication system disabled for 1d6 Turns	1	One weapon suffers a loss of 40-90% of its Active Points
2	-1 to all Systems Operation rolls using the communications systems	2	One electronic countermeasures/counter-countermeasures system disabled or destroyed
3	-1 to all Systems Operation rolls using the sensors	3	Two weapons each suffer a loss of 10-60% of their Active Points (if plane has only one weapon, apply result 1)
4	-3 to all Systems Operation rolls using the communications systems	4	Cascading internal explosion; roll randomly on Ship Hit Location Table and inflict 1d6 BODY damage to resulting system/section (no defense applies)
5	-3 to all Systems Operation rolls using the sensors	5	-2 OCV for all Vehicle attacks
6	All sensors and/or communications systems totally inoperable	6	-4 OCV for all Vehicle attacks
Roll	Engine/Propulsion Effects	Roll	Control Surfaces Effects
1	Vehicle loses one Noncombat Movement multiple	1	-2 to all Combat Piloting rolls to ascend or descend
2	Vehicle loses two Noncombat Movement multiples (if not applicable, -1 to Control Rolls)	2	-1 to all Combat Piloting rolls
3	Vehicle loses 2" of Swimming	3	-4 to all Combat Piloting rolls to ascend or descend
4	Vehicle loses 4" of Swimming	4	-2 to all Combat Piloting rolls
5	Vehicle loses 8" of Swimming	5	-3 to all Combat Piloting rolls
6	-2 to all Control Rolls	6	Steering systems completely disabled; boat is adrift
Roll	Hull Effects	Roll	Fuel Tank(s) Effects
1	Vehicle suffers 2-12% casualties among the occupants	1	Vehicle loses 3-18% of its fuel at the rate of 1% per Segment.
2	Vehicle loses 2 DEF	2	Vehicle loses 4-24% of its fuel at the rate of 1% per Segment.
3	Vehicle loses 5 STR	3	Vehicle loses 5-30% of its fuel at the rate of 1% per Segment.
4	Vehicle loses 10 STR	4	Vehicle loses 6-36% of its fuel at the rate of 1% per Segment.
5	Boat begins leaking, and will sink in 2d12 Hours unless preventive measures are taken; reduce Swimming by 1" per Hour	5	Minor explosion; Vehicle suffers 1 ½d6 Killing generalized damage (no Hit Location; no defense applies)
6	Boat begins leaking, and will sink in 2d6 x 10 Minutes unless preventive measures are taken; reduce Swimming by 1" per 10 Minutes	6	Massive explosion; Vehicle suffers 3d6 Killing generalized damage (no Hit Location; no defense applies)

OPTIONAL TANK HIT LOCATION TABLE

Roll	Location	BODYx	Effect	To Hit
3-4	Treads	x1	1-2 on 1d6	-7 OCV
5-6	Front Suspension	x1	1-2 on 1d6	-5 OCV
7-9	Engine/Drive Train	x1 ½	1-3 on 1d6	-6 OCV
10-11	Main Body	x1	1-2 on 1d6	-3 OCV
12-13	Military Systems	x1	1-2 on 1d6	-6 OCV
14-17	Rear Suspension	x1	1-2 on 1d6	-5 OCV
18	Fuel Tank(s)	x½	1-4 on 1d6	-8 OCV

Front Attack: Roll 2d6+1 Side Attack: Roll 3d6 Rear Attack: Roll 2d6+6

TANK HIT LOCATION OPTIONAL EFFECTS

Roll	Treads Effects	Roll	Military Systems Effects
1	Vehicle loses an additional 1-6% of Ground Movement	1	One weapon suffers a loss of 40-90% of its Active Points
2	Vehicle loses an additional 2-12% of Ground Movement	2	One electronic countermeasures/counter-countermeasures system disabled or destroyed
3	Vehicle loses an additional 3-18% of Ground Movement	3	Two weapons each suffer a loss of 10-60% of their Active Points (if plane has only one weapon, apply result 1)
4	-1 to all Control Rolls	4	Turret becomes unable to turn (or, at the GM's option, requires a Full Phase to turn up to 180 degrees)
5	-2 to all Control Rolls	5	-2 OCV for all Vehicle attacks
6	-4 to all Control Rolls	6	-4 OCV for all Vehicle attacks
Roll	Suspension (Front, Rear)	Roll	Fuel Tank(s) Effects
1	Vehicle loses 5 STR	1	Vehicle loses 3-18% of its fuel at the rate of 1% per Segment.
2	Vehicle loses 10 STR	2	Vehicle loses 4-24% of its fuel at the rate of 1% per Segment.
3	Vehicle loses 20 STR	3	Vehicle loses 5-30% of its fuel at the rate of 1% per Segment.
4	-1 to all Control Rolls	4	Vehicle loses 6-36% of its fuel at the rate of 1% per Segment.
5	-2 to all Control Rolls	5	Minor explosion; Vehicle suffers 1 ½d6 Killing generalized damage (no Hit Location; no defense applies)
6	-4 to all Control Rolls	6	Massive explosion; Vehicle suffers 3d6 Killing generalized damage (no Hit Location; no defense applies)
Roll	Engine/Drive Train Effects		
1	Vehicle loses one Noncombat Movement multiple		
2	Vehicle loses two Noncombat Movement multiples (if it only has one, it loses that one and 1d6 inches of Ground Movement)		
3	Vehicle loses 5" of Ground Movement		
4	Vehicle loses 10" of Ground Movement		
5	Vehicle loses 20" of Ground Movement		
6	-2 to all Control Rolls		
Roll	Main Body Effects		
1	Vehicle suffers 2-12% casualties among the occupants		
2	Vehicle loses 2 DEF		
3	Vehicle loses 5 STR		
4	Vehicle loses 10 STR		
5	Vehicle loses 20 STR		
6	Vehicle's deceleration rate reduced by 1d6-3 (minimum of 1) inches per hex		

Other Damage Effects

At the GM's option, Vehicles may also suffer the effects of Wounding, Impairing, Disabling, and/or Bleeding.

WOUNDING

The Wounding rules can apply to Vehicles with a minor alteration: the Vehicle (or, more accurately, its operator) must make a Combat Driving/Piloting roll (not an EGO Roll) at the -1 per 2 BODY suffered penalty. If the roll fails, the effects of the damage prevent the Vehicle from taking any offensive action in its next Phase. If you're using the Complex Vehicle Actions system, this only applies to the Vehicle itself; occupants operating weapons and performing other tasks on the Vehicle may still act normally.

IMPAIRING AND DISABLING

When a Vehicle takes Impairing damage, one of its systems or pieces of equipment, determined at random by the GM (often by using the appropriate Hit Location table), is damaged directly. Reduce the system's effectiveness by 5 Active Points for each point of BODY damage the attack does to the Vehicle (after DEF, but before the BODYx multiplier). This can include the INT of the onboard computer, the EGO of an AI, or an occupant of the Vehicle (think of the operator and other occupants as "systems" in this case). If a Vehicle has limbs, the limbs themselves are subject to Impairment. Impaired limbs on Vehicles take the same effects as on regular characters.

Disabling damage is handled as with Impairing damage, except that the damaged device is automatically destroyed (or rendered nonfunctional). It may even be severed from the Vehicle, at the GM's option.

BLEEDING

The Bleeding rules can apply to Vehicles, if you consider them not literally as loss of blood, but loss of functionality, parts, vital fluids, and the like. The Bleeding rules apply normally. The Vehicle of course loses no STUN, but you must roll for STUN loss to determine if a 6 results, indicating a loss of 1 BODY. (At the GM's option, loss of BODY may occur more frequently, such as on a roll of 5-6 or 4-6.) Characters can use an appropriate Skill (Mechanics, Electronics, or the like) to stop the Bleeding the same way Paramedics stops characters from Bleeding.

REPAIRING DAMAGE

Vehicles do not "heal" on their own — they have to be repaired. While some advanced Vehicles have self-repair systems (Healing Regeneration, or Computers with waldos and appropriate Skills, for example), most have to be repaired by characters.

REPAIRING OVERALL DAMAGE

The standard rule for repairs, stated on page 85 of the *Hero System 5th Edition, Revised*, is that damage can be repaired at the rate of 1 BODY per day, but that the GM can alter this if he sees fit. In most campaigns and situations, you can interpret this to mean 1 BODY per person making repairs per day, so

that if three characters fix a Vehicle, they can restore 3 BODY to it per day. Characters may specify what parts of the Vehicle they want to work on first: "Let's start by repairing the damage to the weapons, so we can use them if those cannibal motorcyclists come back to try to steal our food again."

When it's possible for large numbers of characters — such as the engineering crew of a starship — to work on Vehicle repairs, it may make more sense for the GM to use the Crew Skill rules described on page 175. Otherwise, even enormous amounts of damage can be quickly repaired, which may not be appropriate for the game.

The standard rate of repair assumes characters have access to proper tools, a supply of spare and replacement parts, and so forth. If those things aren't available, the GM should reduce the number of BODY repairable per day.

In many situations, the GM can simply assume that general Vehicle repairs succeed, but in other cases (particularly where there's a deadline), a Skill Roll is appropriate. Mechanics is the appropriate Skill for general Vehicle repairs. However, depending on circumstances, Computer Programming, Electronics, Systems Operation, Weaponsmith, or various PSs or SSs might be better — or might act as Complementary Skills. At the GM's option, the Skill Roll suffers a penalty of -1 per 2 BODY damage the Vehicle has sustained.

REPAIRING SYSTEM DAMAGE

Sometimes mid-combat repairs to damaged systems are the only thing keeping a Vehicle fighting long enough to win the battle! Assuming a system hasn't been totally destroyed by being reduced to 0 BODY (which means it has to be replaced), characters can initiate repairs by making rolls using Mechanics (or any other Skill the GM deems appropriate given the system or technology involved). Making repairs typically requires a minimum of 1 Turn (often longer), and the roll suffers a penalty of -1 per 2 BODY of damage done. For every two points by which the roll succeeds, the character makes a quick repair to the system, restoring "1 BODY" of damage. This repair is temporary; later, when time allows, full repairs must be made. Once a repair is made, the GM rolls on the Device Malfunction Table (*Hero System 5th Edition, Revised*, page 449) to see if that was enough to get the system working again.

The repair does not restore any BODY to the system for purposes of suffering further damage — it only restores BODY for purposes of keeping the system functioning properly. (True repairs follow the standard rule stated above for general repairs.) If the system suffers further damage, the repairs are ruined and BODY damage accumulates from the point where the character began repairs.

Example: *Lt. McDermott needs to repair his Laser Cannon so he can go on fighting. It has 20 BODY, but it's taken 12 BODY damage and stopped working. Using his Weaponsmith (Energy Weapons) 14-, he tries to jury-rig a quick fix so he can get back to the battle. This takes him 1 Turn, and he suffers a -6 penalty to his roll due to the 12 BODY of damage. He rolls a 4, making the roll by*

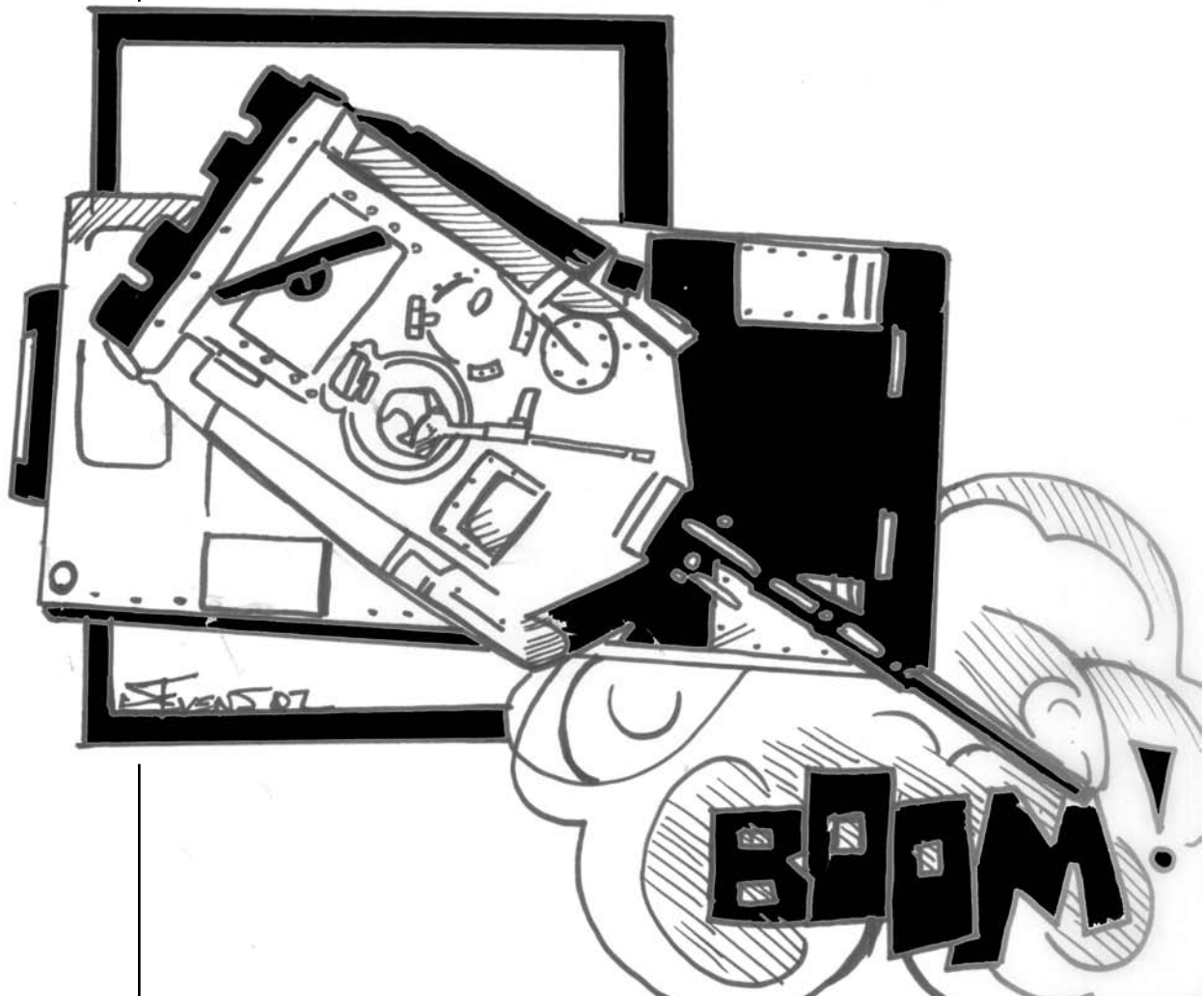
4. That repairs 2 BODY of damage. The GM rolls on the Device Malfunction Table, and succeeds; the laser is working again! However, if it suffers more damage, the "2 BODY" repaired instantly vanishes, and damage starts accumulating again, adding to the 12 BODY already inflicted.

VEHICULAR PUSHING

If a Vehicle has a system or piece of equipment that costs END, in appropriate situations it may Push to increase the effectiveness of that system. Even in Heroic campaigns, GMs should normally allow at least 10 Character Points' worth of Pushing for Vehi-

cle equipment, with no need for an EGO Roll. However, the GM may require a Systems Operation roll to route the power successfully, and/or an Electronics or Mechanics roll to keep from damaging the system with the pulse of extra power.

If a Vehicle ability or piece of equipment does not cost END, at the GM's option the operator can still "Push" it — make it more effective by properly and cleverly operating it. This requires a Combat Driving/Piloting roll. If the operator fails the roll, the Vehicle cannot Push. If he succeeds exactly, it may Push for 1 Character Point. For ever 2 points beyond that by which he makes the roll, the Vehicle may Push for +1 Character Point, to a maximum of 5 points.



OPTIONAL COMBAT RULES



This section provides expanded or optional rules for various forms of Vehicle combat, including chases and dogfighting.

CHASES AND PURSUITS

Chases involving Vehicles — usually cars — are an important feature of many action-adventure stories, and thus of many types of games as well. Here are some general rules and guidelines for them.

A chase or pursuit occurs when one Vehicle gets behind another Vehicle and attempts to follow it or catch it, despite the lead Vehicle's efforts to get away or foil the pursuit. In game terms, a chase results when one Vehicle (the pursuer) gets behind another Vehicle (the lead Vehicle) and declares its intention to initiate a chase. The benefit to chasing a Vehicle is that the pursuer has the ability to attack the lead Vehicle from behind, which halves the lead Vehicle's DCV.

During a chase, the pursuer automatically loses initiative to the lead Vehicle when they both have a Phase on the same Segment — the pursuer must Hold its Action until right after the lead Vehicle moves (it can Hold until later in the Segment if it wishes). This applies even if the one of the Vehicles chooses to attack instead of move. Each Vehicle acts normally on Phases it has which the other Vehicle does not, but the pursuer must be careful not to move past the lead Vehicle (at which point it loses the ability to attack from behind). Typically, the pursuer attempts to match the lead Vehicle's velocity as closely as it can, though the rules do not require this.

The pursuer must follow when the lead Vehicle attempts to evade pursuit or break off the chase by maneuvering. When the lead Vehicle moves or maneuvers, the pursuer must perform the same type of movement, or same Vehicle Maneuver, to keep up with it. This includes making any Control Rolls the lead Vehicle makes. If the lead Vehicle fails its Control Roll, the pursuer can ordinarily continue to follow it without making a Control Roll itself. If the lead Vehicle makes its Control Roll, the pursuer must make a Control Roll as well, and must make it by the same margin as the lead Vehicle. For example, if the lead Vehicle makes its Control Roll by 4, the pursuer must make its Control Roll by 4 as well.

If the pursuer fails its Control Roll, the chase breaks off (and other results of failing a Control Roll may apply; see page 171). This means two

things. First, the pursuer fails to perform the same movement or maneuver the lead Vehicle did. As always, the GM determines the exact effects of a failed Control Roll, but in this situation, at the very least the pursuer should be considered to have lost Line Of Sight on the rear of the lead Vehicle. Second, the pursuer cannot attempt to re-initiate the chase (if desired) until it next has a Phase in a Segment after the Segment in which it failed its Control Roll — and if the lead Vehicle also has a Phase in that Segment, the lead Vehicle still gets to act first as described above, even though the chase has ended. That typically, but not always, gives the lead Vehicle a chance to get further away from the pursuer... or to turn the tables and become the pursuer itself!

A pursuer may re-initiate a terminated chase the same way he starts one: by getting into position behind the lead Vehicle and declaring a chase. Of course, the lead Vehicle may take advantage of the end of the first chase to make it difficult for the pursuer to do so....

The Random Road Generator

Gamemasters running car chases can use the following system to generate stretches of road at random. If necessary, the GM can adapt these rules to create "terrain" for other types of chases, but that's usually unnecessary due to the relatively featureless nature of bodies of water, open air, and outer space.

A GM may be uncertain of exactly where a car chase is going to go for any one (or all) of three main reasons: he hasn't mapped it out in advance; the PCs drive somewhere he hadn't expected; or the car chase goes beyond the boundaries of his mapped or planned-out area. The last reason is particularly common, since Vehicle combat usually involves so much space that it's impossible to completely map out the necessary area(s). Therefore, the GM has two choices: he can either make up new roads and terrain off the top of his head, or he can use the Random Road Generator provided below to randomly determine what roads are available for the PCs and NPCs to use.

The Random Road Generator assumes the car chase is taking place in an urban area of some sort. For more rural areas, the open highway, or other places where the Generator would not work properly, the GM can either create his own Generator or can make the new roads up as he goes along.

The GM should roll on the Random Road Generator at the beginning of each Turn, so he

knows in advance what's coming up that Turn (as much as possible, anyway, given players' abilities to do the unexpected). He should report any visible changes in the road and traffic or other hazards to the players.

STEP ONE: STARTING THE CHASE

Before the chase begins, the GM needs to determine what the road conditions are like. This is not really something he can determine randomly; instead, he needs to work it out on his own. He should consider the following factors:

- What type of street are the characters on? Is it urban, rural, an alley, a freeway? Is the road in good or bad condition? Does the weather or any other environmental factor make driving more difficult?
- How many lanes does the street have (in both directions)? Is it a one-way or a two-way street? A major or minor thoroughfare?
- Is the road curved or straight? If it is curved, how sharply? Are there any intersections?

EVENTS AND ENCOUNTERS TABLE

Roll (3d6)	Event Or Encounter	Notes
3-7	Road changes angle (if straight, it curves; if curved, it straightens)	The GM should randomly determine how sharp any curves are and what direction they curve in
8	Hazard or Obstacle (one)	Check Hazards and Obstacles Table
9	Add or lose a lane (GM's choice)	
10-11	Intersection	Check Intersections Table
12-13	Hazard or Obstacle (two or more)	Check Hazards and Obstacles Table
14-18	Intersection	Check Intersections Table

INTERSECTIONS TABLE

Roll (3d6)	Type Of Intersection	Notes
3	Traffic Circle	
4	Y Intersection, fork	The road forks evenly. This result may also indicate a traffic island or any other object which splits lanes of traffic.
5	Y Intersection, sharp, to the right	Some types of highway on- and off-ramps are Y Intersections (the exact type depends upon what direction the driving character is approaching the ramp from)
6	Y Intersection, sharp, to the left	
7	Y Intersection, wide, to the right	
8	Y Intersection, wide, to the left	
9	T Intersection, dead end	The road the characters are on dead-ends into another road.
10	T Intersection, to the right	
11	T intersection, to the left	
12-17	Cross Intersection	A four-way intersection where two roads cross one another; there will definitely be a stoplight or a stop sign.
18	Unusual Intersection	Whatever the GM can think up — an intersection of three or more roads, an unusual kind of traffic island, or the like.

■ How busy or occupied is the street, in terms of both traffic and pedestrians? What kinds of businesses, buildings, or other objects line the road?

■ How far ahead can the characters see?

STEP TWO: EVENTS AND ENCOUNTERS

Each Turn the GM should make 1-3 rolls on the accompanying Events And Encounters Table to determine what events or encounters come up in the Turn. Then he should decide just where to place them and how to use them. He should ignore or change any results which do not seem appropriate or exciting. For example, in a city built on a gridwork pattern, like Manhattan or Phoenix, curved streets are (relatively) rare, and characters with City Knowledge will be familiar with where stoplights are and which roads are major thoroughfares. Therefore, the GM should ignore results which don't reflect this "style" of city. Similarly, in a city like San Francisco, hills occur more frequently than normal.

Intersections Table

Use this table to determine what types of intersections the characters come across. The GM should assign each intersecting road an appropriate number of lanes. Turning onto an intersecting road may involve a Control Roll (if the turn is particularly sharp); crossing an intersecting road may involve a Stoplight/Stop Sign modifier (see the Hazards and Obstacles Table).

Hazards And Obstacles Table

The roads and sidewalks of the city are not waiting empty for the characters to conduct car chases — they contain traffic and many other obstacles and hazards for the characters to encounter and try to avoid. The chart below lists some of the most common ones; the GM should add to this list as he sees fit. If the GM does not want to simply choose an obstacle or hazard, he can randomly select one by rolling 3d6.

Drivers have two basic choices when they encounter a hazard or an obstacle: they can try to go around it, or they can go through it. Trying to swerve around it typically requires an appropriate Vehicle Maneuver (see page 178).

Sometimes a car can't avoid an obstacle; it has to simply drive through it or over it. If the driver decides to try to crash through an obstacle, he has two choices. First, he can try to use his car's Casual Strength to "push the obstacle aside" and continue unimpeded (*i.e.*, with no loss of movement or damage to the vehicle). Second, he can do a Move Through on the obstacle (this constitutes an Attack Action, of course). If the driver tries to use his Vehicle's Casual Strength and fails, his maneuver automatically becomes a Move Through.

If a Vehicle encounters more than one obstacle or hazard in a particular Phase, there are two ways the GM can handle the situation. Either he can add all applicable modifiers together and have the driver make one Control Roll (the preferred method); or he can have the driver make a separate roll for each obstacle, applying the corresponding modifier to each roll. In the latter case, a Vehicle should be allowed to perform two (or more)

HAZARDS AND OBSTACLES TABLE

Roll	Hazard Or Obstacle	Modifier	Notes
3	Elevated Structure	See Notes	This hazard indicates the characters are driving underneath an elevated structure of some sort, such as a bridge or an elevated railway. The columns or abutments supporting the structure may be a hazard. Depending on the columns' location, size, and spacing, driving through or among them should impose a -1 to -5 modifier to Control Rolls. If the columns are located to the side of the road, they are not an immediate hazard, but a Vehicle could be rammed or forced into them.
4	Edge	None	This hazard means the characters are driving next to a steep drop, such as a cliffside, a bridge, a steep incline, a pier, an overpass, or the edge of a lake. There is no modifier for this per se, but the characters need to be aware of it when they maneuver their cars (especially with regard to ramming or forcing other vehicles over the edge).
5	Dead End, Major Barrier	See Notes	Like a Dead End, Minor Barrier, except that the barrier may have as much DEF and BODY as the GM desires. Examples include a brick wall, a tractor-trailer truck which completely blocks an alleyway, a police car barricade, and similar obstacles.
6	Dead End, Minor Barrier	See Notes	This obstacle indicates the road the character is on has come to a dead end or is completely blocked by some minor barrier, such as a chain-link fence. This barrier should not have more than DEF 3, BODY 3. The only way a driver can avoid this obstacle is to see it in time and take an alternate route; if such a route is available, use normal turning modifiers to determine how hard it is to take. Otherwise, the only choices are to crash through the barrier or stop before hitting it.
7	Hill	None	Hills do not affect the driver's Control Rolls, but may affect velocity (see the rules on page 238 of the <i>Hero System 5th Edition</i> regarding the effect of gravity on movement). The tops of steep Hills can also be used as "ramps" for Jumping (see page 212).
8	Obstacle, Large	-3 to -4	Like a Medium Obstacle, but much larger and/or tougher. Large Obstacles often cannot be driven around, they can only be crashed through. Examples include cement barriers erected between opposite freeway lanes, a major accident, or a dumpster.
9	Obstacle, Low	-0 to -1	This indicates some sort of obstacle which is low enough or small enough for the character to drive over, but big enough to be a potential problem. Examples include a curb, a large pothole, a cinderblock, an open manhole, or a speed bump. The GM should choose an obstacle appropriate for the location and situation, but whatever it is, swerving to avoid it (or driving right over it with no effect) should not impose more than a -1 penalty on a Control Roll (it may not require a roll at all). If a car is out of control and hits a Low Obstacle, it may flip.
10	Obstacle, Medium	-2 to -3	Like a Low Obstacle, but larger and more of a problem for the driver. A Medium Obstacle may be large enough that it cannot be driven over, but must be avoided or crashed through. If it can be avoided, apply the listed penalty to the driver's Control Roll. Examples of Medium Obstacles include a fence, some large traffic islands, a parked car, or a minor accident which blocks traffic.
11	Traffic, Light	-0 to -1	Traffic is the most common obstacle and hazard of all. How easily a driver can avoid other vehicles (both in his lane, and sometimes the opposite lane as well!) depends upon the heaviness of the traffic. Light Traffic indicates there are few other cars on the road, and driving around them is fairly easy. If the GM wants to make things particularly difficult on the driver, two or more vehicles may block off lanes entirely by driving next to one another (forcing the driver to go around them by using the opposite lane, the sidewalk, the shoulder, the median, and so forth); or, individual vehicles (especially large ones, like tractor-trailers) may be treated as Medium or Large Obstacles to be avoided with a separate roll.
12	Traffic, Medium	-2 to -3	Like Light Traffic, but slightly heavier. The chances of encountering situations which require the driver to take "unusual steps" to avoid (such as having to drive on the sidewalk or through a building) are proportionately higher.
13	Pedestrians	-1 to -3	Pedestrians are an obstacle which may be encountered on the street itself, the sidewalk, when driving through a building, and so forth. If the driver wants to avoid them, the penalty to his roll depends upon the number of pedestrians. If the GM wants to make things especially difficult for the driver, a pedestrian or two may panic or be unable to get out of the way quickly, requiring the driver to make a separate Control Roll to avoid them.
14-15	Stop Light/Stop Sign	-0 to -3	This hazard indicates that the driver has reached an intersection where he would normally have to stop. (Roll the intersection at random on the Intersection Table.) Assuming he decides to keep going, the Control Roll modifier depends upon how heavy the oncoming traffic is. If the driver wants to merge into the traffic instead of crossing through it, the modifier for doing so safely is -1. In either case, a failed roll indicates a collision with another car.
16	Traffic, Heavy	-3 to -4	Like Medium Traffic, but heavier. Most rush-hour traffic qualifies as Heavy Traffic.
17	Traffic, Jammed	None	This indicates traffic which has come to a complete standstill for some reason (gridlock, a wreck, and so forth). A driver cannot go through a Traffic Jam (unless he is on a motorcycle); he can only crash into it or drive around it.
18	Roadwork	-1 to -4	This obstacle and/or hazard indicates the road the character is driving on is being repaired or worked on. Roadwork is essentially a form of Obstacle, and should be dealt with as such. For example, repaving would probably only be like a Low Obstacle, a ditch for laying cable or sewer pipe might be a Medium Obstacle, and a major excavation would be a Large Obstacle. Depending upon the nature of the Roadwork, driving into it may damage or stop a vehicle. Some types of Roadwork may also cut off one or more lanes of traffic, increasing the danger to drivers. If there are workmen on the jobsite, treat them as Pedestrians and add that modifier to this one.

See sidebar next page for suggested obstacles.

OBSTACLES

Sidewalks: Sample obstacles and hazards for sidewalks include: fire hydrants; lampposts; mailboxes; newsracks; newsstands; parking meters; pedestrians/bicyclists; pushcarts/kiosks; roadwork; signs; statues; telephone poles; trashcans.

Offroad: Sample obstacles and hazards for offroad areas (such as parks) include: boulders; creeks/streams; lakes; large furry animals; picnickers/athletes; rough or uneven terrain; small furry animals; trees/woods.

Vehicle Maneuvers if necessary, even though they ordinarily constitute Attack Actions.

The obstacles and hazards listed on the accompanying table are the sort found in urban settings. Obstacles on highways or rural roads would be different, as would offroad obstacles, sidewalk obstacles, and obstacles in plazas and buildings. If necessary, the GM can adapt the rules for Low, Medium, and Large Obstacles to describe the hazards and obstacles encountered in those situations. If an obstacle or hazard is not appropriate for the environment (like a Stop Light/Stop Sign result on an interstate highway), reroll.

Options Table

The GM can use the accompanying Options Table to find out where the characters could drive other than on the road itself. This table is most useful when the characters are confronted with an obstacle or hazard they have to drive around, but the GM can also use it to generate “scenery” during the chase. At the beginning of each Turn, the GM should make one or two rolls on this table and tell the characters what optional routes they can see ahead.

STUNTS AND MANEUVERS

One of the most exciting things about Vehicle chases and maneuvering are the stunts operators get to attempt. Of course, the downside to this is that if the operator fails (*i.e.*, misses his Control Roll), a collision usually results.

The following are some examples of stunts and daring maneuvers Vehicle operators can attempt. Most of them are for ground vehicles, but you can easily adapt them to other types of vehicles if appropriate.

DRIVING ON TWO WHEELS

This stunt allows a driver to drive a ground vehicle that has three or more wheels on just two wheels on one side of the vehicle. This makes it possible to slip through small alleys and similar obstacles. Getting the car up on two wheels requires a Control Roll. If the driver has a small object to use as a “ramp” (such as a curb), the roll suffers a -2 penalty; if he has no ramp, the penalty is -4. If the Vehicle is larger than Size 4, there is an additional -1 penalty. Thereafter, the driver has to make an unmodified Control Roll each Phase to keep the vehicle on two wheels. While on two wheels, the vehicle can only move at ¼ its normal Combat movement, cannot accelerate or use Noncombat movement, and is at ½ DCV. Returning the vehicle to all of its wheels takes a Half Phase, but requires no roll.

JUMPING

Jumping over obstacles (chasms, other cars, and so forth) is one of the most commonly-seen car chase stunts. In the *Hero System*, how far a Vehicle can jump is a function of two things: the Vehicle’s velocity and its Size. The formula for calculating the maximum length a Vehicle can jump is:

$$\text{(Velocity in inches per Turn/25) + KB Modifier = Inches Jumped}$$

In this formula, a Vehicle’s velocity depends on how many inches it would move per Turn at its present rate of movement. To simulate its Size, use its Knockback Modifier (which is a negative number, so “adding” it actually decreases the length of the jump). If the result is 0 or less, the Vehicle cannot jump; if the result is 1” or more, that’s how far the Vehicle can jump.

Vehicles with Leaping may add their inches of Leaping to their base jumping distance. Thus, a Size 1 motorcycle with SPD 4 moving 33” a Phase (132” per Turn) can jump 4”: $132/25 = 5$, and the motorcycle’s Knockback Modifier is -1. If the motorcycle had 5” Leaping, it could jump 9” total. (A Vehicle may buy Leaping with the -1 Limitation, *Only Adds To Jumping*.)

This formula assumes the jumping Vehicle has some sort of “ramp” to assist its takeoff. Any reasonably steep object strong enough to support the Vehicle will do; examples include a steep hilltop, a ramp-shaped mound of dirt, or a half-opened drawbridge. If the Vehicle has to jump from a flat surface, halve the total number of inches it can jump (if it can jump at all).

Jumping does not require a Control Roll, but landing safely does. If the driver succeeds with a Control Roll at -1 for every 5” jumped, the Vehicle and its occupants land safe and unharmed. If he fails the roll, the Vehicle and its occupants take 1d6 Normal Damage for every 5” jumped (the damage applies to the vehicle’s tires, suspension, and/or chassis; refer to the appropriate Vehicle Hit Location table).

SLIDING UNDERNEATH BARRIERS

Motorcyclists may be able to “lay the bike down” and slide underneath some kinds of obstacles rather than swerving around them or hitting them. A motorcyclist can only slide underneath barriers which are raised at least ½” off of the ground (the classic example is the trailer of a tractor-trailer truck). To do this unharmed, the driver must make a Control Roll at a penalty of -1 for every 25” of Ground Movement the motorcycle has per Turn based on its current rate of movement. If the roll succeeds, driver and motorcycle have slid under the obstacle safely; if it fails, the driver and cycle take 1d6 Normal Damage for every 25” per Turn of Ground Movement. Either way, it takes at least one Full Phase to right the motorcycle.

OPTIONS TABLE

Roll	Option	Examples
3-4	Nonroad Path	Bike trail; driveway; golf cart path; pier; railroad tracks
5-7	Offroad Area	Abandoned lot; beach; campus; dirt lot; lawn; open field; park
8-11	Sidewalk	
12-14	Paved Area	Outdoor mall; parking lot; plaza/square
15-18	Indoor Area	Church; mall; school; small business; store

FIGHTING ON TOP OF VEHICLES

It's not uncommon for adventurers and their adversaries to get into fights on top of moving vehicles — typically trains, but sometimes also cars, hovercraft, and even planes.

If two characters fight on top of a moving Vehicle, each character must make a DEX Roll every Phase to keep his balance (this takes no time). If he succeeds, he remains firmly on top of the Vehicle, but is at -2 OCV and -2 DCV (and must, of course, beware Knockback!). If he fails the roll by 1-3, he falls, but may make another DEX Roll to grab on to something, and then a STR Roll or Climbing roll (GM's choice) to pull himself back up on top of the Vehicle (this takes a Full Phase — and of course his opponent may not let him try to climb back up unhindered...). While holding on for dear life and pulling himself back up on top of the Vehicle, a character is at ½ OCV, ½ DCV.

Additionally, a character who's hit while fighting on top of a Vehicle must make a DEX Roll (again, this takes no time) at a penalty of -1 per 2 BODY damage rolled on the dice (regardless of how much the character actually suffers after he applies his defenses). If he succeeds, he remains on top of the Vehicle; if he fails, he falls off, though he may grab for a handhold as described above. If the character takes Knockback from an attack, typically he does not get a roll to grab for a handhold, but the GM may allow it if appropriate.

In either case, if a character falls off a moving Vehicle and hits the ground, roll damage as if the Vehicle had performed a Move By on him. If he hits something (like a tree or a wall) either while on top of the Vehicle or as he falls, roll damage as if the Vehicle had performed a Move Through on him.

Characters may also try to leap from moving vehicle to moving vehicle as they fight. To jump safely between Vehicles, a character has to roll to hit the Vehicle he wants to land on. This constitutes an Attack Action, though the character may combine it with a Move By/Through if he wants to leap into or onto someone (he may also combine it with a Dive For Cover, but if so, must succeed with both the Dive For Cover roll and the roll described below to accomplish the maneuver). The Vehicle has its base DCV, +1 for every full hex the character has to leap (if the character tries to perform a Move Through/By while leaping, use the target's DCV, with the same bonus for inches leaped). If the "Attack" Roll succeeds, the character has landed safely. If he misses by 1, he has caught onto the edge of the Vehicle and is holding on for dear life (he can pull himself up on top as described above, but that's a Full Phase Action that has to wait for his next Phase). If he misses by 2 or more, he falls, taking damage as described above. The driver of the target Vehicle may realize what the character



is trying to do and deliberately try to maneuver out of his way by performing a maneuver of some sort; this may add to the vehicle's DCV or make the character's leap fail outright.

Fighting While Hanging On

Sometimes two characters both fall off the top of a Vehicle and fight while hanging on to the side of it. You can resolve this as you would a fight between two characters using Climbing (*Hero System 5th Edition, Revised*, pages 52, 379).

Being Dragged Along

Sometimes a character involved in a fight on top of a ground vehicle gets knocked off and dragged along — or perhaps someone ties him up behind a Vehicle and deliberately drags him over the ground. In this case, for each of the Vehicle's Phases, the hapless character takes a number of dice of Normal Damage equal to the Vehicle's velocity divided by 5. Any Skill Rolls the character makes while in this situation are at -1 per every full 5" of Vehicle velocity.

OPTIONAL NON-MAPPED VEHICLE COMBAT

It's not always best to play out vehicular combat on a hex map — Vehicles move extremely quickly, and are often "off the map" in only a matter of Segments. Similarly, it can be extremely tedious to manage a running chase between two Vehicles with a map.

Gamemasters who want to simplify combat can keep track of the distance between the two Vehicles. An important value for this is MAX, or the total distance a Vehicle could cover in a Turn.

MAX = Vehicle's SPD x Maximum Noncombat Movement

A driver can change the distance between the Vehicles or lose a pursuer by succeeding a Combat Driving/Piloting Versus Combat Driving/Piloting contest. Here are two examples of non-mapped Vehicle combat, Dogfight Combat and Intercept Combat (both for use with Vehicle combats which take place in three dimensions, such as aerial, space, or submarine combat).

Dogfight Combat

Whenever Vehicles are at close range, the GM can use Dogfight Combat. Vehicles can enter a Dogfight whenever the range between them is less than their combined MAX.

A "dogfight" is a pilot's term to describe close-in air combat where the planes circle like fighting dogs trying to snap at each other's backs. Dogfight Combat simplifies all of the combat maneuvering of two circling opponents down to several die rolls. Vehicles fighting at long range while moving at Noncombat Movement speeds use the rules for Intercept Combat (see below).

You conduct dogfights in full Turns; each dogfight Turn equals one full Turn on the ground. All you need to keep track of in a dogfight is the number of Turns needed to Escape (discussed later), each Vehicle's current velocity, and, most importantly, the relative positions of the Vehicles. There are four different positions in a dogfight: neutral, head on, side on, and tail chase.

When a dogfight starts, the GM can set the initial position of all the Vehicles, or determine it randomly. During a dogfight, each player rolls his Combat Piloting roll. If no pilot makes his roll, the Vehicles are in a neutral position and the next Turn starts.

If at least one pilot makes his roll, the pilot who made his Combat Piloting roll by the greater amount becomes the attacker. Subtract the amount

DOGFIGHTING PILOTING ROLL MODIFIERS

Bonus	Condition
+1	To attacker's roll, if the number of attackers outnumber the defenders
+1	To attacker's roll, for every 2x the attackers outnumber the defenders
+1	If your Vehicle's current velocity is faster than your opponent's Vehicle's current velocity
+1	For every 2x your Vehicle's current speed is faster than your opponent's Vehicle's current speed
+1	If you were the attacker in a side on position last Turn
+2	If you were the attacker in a tail chase last Turn
+1	If you are Surprising your opponent
-2	If you are attempting to Escape
-2	If the other pilot has successfully executed an Escape

DOGFIGHT TABLE

Attacker - Defender	Relative Position
+0 to +1	Both Vehicles neutral; neither may fire
+2 to +3	Both Vehicles are head on; both may fire once
+4 to +5	Attacker faces Defender's side; both may fire once
+6 or +7	Attacker is tail chasing the Defender; attacker may fire once
+8 or more	Attacker is tail chasing the Defender; attacker may fire as many times as he has SPD

the other pilot made his roll by (this can be negative) from the amount the attacker made his roll by. This number gives you the relative positions of the aircraft from the Dogfight Table.

Each pilot's roll is modified by several factors, listed in the Dogfighting Piloting Roll Modifiers table.

The Dogfight Table assumes both Vehicles can only fire in their front 180 degree arc; the GM should make special allowances for Vehicles which can attack to the rear, or in other directions. Also, in a head-on position, the attacker may elect to fire, in which case the defender gets to fire back at him that Turn. Alternately, the attacker may elect to evade, in which case neither pilot gets to fire that Turn.

The most important part of a dogfight is shooting the other Vehicle down. Use the normal combat rules, but determine range by the Vehicles' velocities, and apply special Attack Roll modifiers (see Gunnery Modifiers Table) to represent the high speed fleeting shots which are available in a dogfight.

Each position in Dogfight Combat has an OCV modifier and a range between targets figured as a multiple of the attacking Vehicle's current velocity. To find the range, multiply the attacking Vehicle's current velocity by the number listed in the Range column of the Gunnery Modifiers Table, relative to the position. The Gunnery Modifiers Table also lists any special OCV modifiers for either side.

LEAVING A DOGFIGHT

There are several ways out of a Dogfight. If both pilots break off, the Dogfight ends. If one pilot wishes to break off and the other doesn't, it's more complicated. The pilot who wants to leave must execute one or more Escapes.

Cover of some kind can normally be found, even in an aerial battle. Clouds, the sun, large trees, or friendly fire can all help a pilot lose his pursuer. In space, ducking into the nearest meteor swarm or asteroid field is always a good move; in a submarine battle, captains may be able to use thermal differentials and other underwater phenomena to hide from an enemy's sonar.

Before the Dogfight begins, the GM should determine how many Turns of Escape are necessary for a Vehicle to leave the Dogfight. The

more cluttered the battlefield, the fewer Escapes needed. If the GM doesn't want to decide, he can roll 1d6 and use that as the number of Escapes necessary to break off combat.

A pilot executes an Escape by declaring "Escape" before the Turn begins. Both pilots roll normally. If the Escaping pilot wins the roll or has a tie, he has successfully made one Escape. If the other pilot wins, combat proceeds normally. If the Escaping pilot has a higher current velocity, he gets credit for an Escape even if he lost the roll. Losing does not force the pilot to take a minus on his Combat Piloting roll next Turn, and has no effect on the fire directed at him.

After the pilot executes his required number of Escapes, the Dogfight ends. Depending on the situation, the fight may move on to an Intercept Combat.

The number of Escapes a pilot has executed is cumulative; that is, a pilot may execute an Escape early in the fight, and then execute another Escape later in the fight and have credit for two Escapes.

INTERCEPT COMBAT

Use Intercept Combat only when two Vehicles are at long range. Intercept Combat is executed in full Turns. You must keep track of range, target position, and target velocity in Intercept Combat.

There are two conditions where Vehicles may be in Intercept Combat. First, two Vehicles flying at each other but still at a range greater than their combined MAX can engage in Intercept Combat. Second, two Vehicles may engage in Intercept Combat after Escaping from a Dogfight; in that case, the range starts at the Vehicles' combined velocities.

Intercept Combat starts by defining the range between targets. The quality of the sensory equipment (radar, sonar, long-range sensors, and so forth) carried on the Vehicles dictates the range at which Intercept Combat begins (or ends). So long as the Vehicles could theoretically perceive each other they are within range, and if one wishes to fight, they are in Intercept Combat.

Next the GM must define the Vehicles' Intercept Velocities. Positive Intercept Velocities represent moving towards the enemy, negative Intercept Velocities represent moving away from the enemy. The Vehicle's Intercept Velocity is equal to plus or minus its MAX (see below).

To conduct Intercept Combat, follow these steps:

(1) Declare maneuver (Close, Jink, or Disengage). Close means to fly towards the enemy, Jink means



to circle or maneuver to deny the enemy a shot, and Disengage means to fly away from the enemy. The Intercept Velocity of a closing Vehicle is equal to its MAX, the Intercept Velocity of a jinking Vehicle is 0, and the Intercept Velocity of a disengaging Vehicle is minus its MAX.

(2) Determine the facing of the Vehicles. Each Vehicle's maneuver determines which face he shows to the enemy. Closing Vehicles show their front to the enemy. Disengaging Vehicles show their rear to the enemy. Jinking Vehicles roll on the Jinking Facing Table to determine their facing.

(3) Determine Range between enemy Vehicles. Subtract each Vehicle's Intercept Velocity from the Range. (Remember that subtracting a negative number is equal to adding.) If the range becomes negative the Vehicles have passed. Multiply the range by -1 to make it positive again.

(4) Make Attack Rolls. Each player can fire any or all of his weapons once per Turn (a player must make a separate Attack Roll for each weapon unless his character uses a multiple-Power attack). Be sure to check the maximum range of a weapon to see if the enemy is in range.

(5) Repeat steps 1-4 until both Vehicles break off, or the Vehicles are out of sensory range.

GUNNERY MODIFIERS TABLE

Relative Position	Attacker's OCV Modifier	Defender's OCV Modifier	Range
Head on	-2	-4	x1
Side ons	-4	-4	x2
Tail chase +6, +7	-4*	-4*	x2
Tail chase +8	-4*	-4*	x1
Tail chase +9 or more	-0	-4*	x½

*Guns mounted to the rear, or with 360 degree field of fire, may fire at an attacker in a tail chase.

JINKING FACING TABLE

1d6 Roll	Facing
1-2	Front
3-4	Side
5-6	Rear

A Vehicle may only attack if it is showing its front or side to the enemy. If the Vehicle is showing its side it takes a -4 OCV because of the difficulty of the shot. This assumes the Vehicle can only fire in the front 180 degrees. The GM must make allowances for Vehicles which can fire to the rear.

Unless the Vehicles have very special weapons with long range mods the GM may normally dispense with Intercept Combat and go right into Dogfighting. If a Vehicle is specially equipped for long range combat it can use Intercept Combat to take advantage of its weapons.

MISCELLANEOUS COMBAT RULES

Here are a few additional rules covering situations that sometimes arise in Vehicle combat.

COMBINING VEHICLES

Combining Vehicles, like some mecha, raise certain questions and considerations in combat. See page 107 for general information about combining.

Distributing Damage

When a group of Vehicles combines into a larger one, does battle, takes damage, and then separates, the GM must determine how to distribute the damage among the component Vehicles. The simplest method (and probably the best in campaigns that want fast, easy Vehicle combat) is to keep track of the overall BODY damage to the combined Vehicle, and then distribute that damage equally among the component Vehicles when they separate. On the other hand, if the campaign uses the Vehicle Hit Location rules (page 189), then the GM should know which Hit Locations on the combined Vehicle each component forms. Then he keeps track of the damage by Location, and when the components split up, the ones who formed the Locations that took damage still have that damage.

Similar considerations apply if one or more component Vehicles have suffered damage prior to combining. If the combined Vehicle's BODY is equal to, or greater than, the total BODY of all component Vehicles, any damage to a component accrues directly to the combined Vehicle. For example, suppose the Phobos Gladiator consists of six component Vehicles, each with 12 BODY, and has a total of 72 BODY. If one component has suffered 6 BODY damage, and another has taken 3 BODY damage, then when all five form the Phobos Gladiator, it has only 63 BODY (72-9).

If the combined Vehicle's BODY is not equal to or greater than the total component BODY, the GM should determine what percentage a component Vehicle's BODY is to the combined Vehicle's BODY, and then apply that percentage of damage taken to the combined Vehicle. For example, Shining War-

rior Epsilon is a combined Vehicle with 48 BODY. Each of its components has 24 BODY. Since 24 is 50% of 48, 50% (half) of any damage a component sustains accrues to Shining Warrior Epsilon when it's formed. If one component has taken 15 BODY, then 7 BODY of that damage applies to Shining Warrior Epsilon.

In either case, if the total damage taken by the combined Vehicle as a result of previously-suffered damage to its components exceeds the combined Vehicle's BODY, the components cannot combine.

Adjustment Powers

If an attacker uses Adjustment Powers against a combined Vehicle, divide the effect up among the components as equally as possible when they separate. For example, if the combined Vehicle received +9 DEX from an Aid DEX, when its five components separate, four get +2 DEX and one (determined randomly) would only get +1.

If a component has been affected by an Adjustment Power prior to combining, apply the result directly to the combined Vehicle. If the components separate before the effect wears off, it divides equally as specified above.

Unavailable Component Vehicles

Sometimes a Vehicle wants to combine, but all of its components are not available. In this case, one of two things happens:

1. The available components form the combined Vehicle, but all of its powers and abilities are proportionately weaker than it would be if it had all components (or, perhaps some powers and abilities simply aren't available to it).
2. The components cannot combine.

The GM determines which result applies, based on the nature of the components and the combined Vehicle. Some combined Vehicles have Limitations that affect this decision (see page 107).

CRUSHING DAMAGE

Ground vehicles are often heavy, and when they move over something, they may crush it or break through it. For example, a tank may be too heavy for a bridge to support, and a mech might leave deep footprints in the ground. To calculate the crushing damage a Vehicle inflicts, determine the STR required to lift the Vehicle. Then use that STR to apply damage to whatever it's crushing (to save time, you may want to apply the Standard Effect Rule, and have the STR do 1 BODY and 3 STUN damage per d6). As always, the GM may modify this rule to prevent abuse, or in the interest of game balance, common sense, and/or dramatic sense. In particular, a Vehicle cannot do both a Move Through and crushing damage to something it runs over; typically only the Move Through would apply — crushing damage is more appropriate for things like roads, bridges, and the like.



9 WHEELMEN, STICK-JOCKEYS: VEHICLE CHARACTERS

A vehicle is nothing without its operator (and sometimes its crew). While the rest of this book discusses Vehicles themselves, this chapter looks at the people who drive, fly, and sail them. Although just about any character can own and operate a Vehicle

if he wants, some characters' focus on a Vehicle — their car, or starship, or jet (and the skill with which they operate it) — is what makes them special and distinctive. This chapter contains plenty of suggestions for abilities such characters might have, or things they can do with their Vehicles.

CHARACTER ARCHETYPES



Many Vehicle-oriented characters fall into one or more of several archetypes. Some (particularly if they're NPCs) fit into these archetypes precisely, while others (including many PCs) use the archetype as a "starting point" and then branch out to become more well-rounded characters. Vehicle-oriented archetypes include:



The Chauffeur

"Just sit back and relax, sir. I'll have you there in no time."

— Jennifer Hidalgo

The Chauffeur drives (or sometimes flies or sails) other characters or goods around. He could be a limousine driver, airline pilot, cab driver, truck driver, ferry pilot, starship helmsman, or the like. Typically he has good (but not necessarily great) Vehicle control Skills, at least a little ability to repair or upgrade his vehicle of choice, one or more Area Knowledges of his "territory," and a few contacts. He's usually not an active combatant, but may have a few fighting skills.

Though this archetype is most often a Follower or other NPC, it's appropriate for a PC in a campaign where the person(s) the Chauffeur works for are also PCs. In this case the Chauffeur is usually known as the Wheelman instead. Player character Chauffeurs typically have more Skills and abilities related to combat and other non-vehicular subjects than NPC Chauffeurs.

The Inventor

"This baby is state of the art. I improved on the UNTIL design that you stole and worked in a few surprises of my own."

— Orion, *Underworld Gadgeteer*



This archetype, almost always an NPC, is a character who designs and creates Vehicles. Instead of operating them himself, he builds them for someone — such as the PCs, or a secret government agency. However, his Vehicles are his "babies," and he's constantly fussing at the PCs for mistreating or damaging them. He has high rolls on Skills like Computer Programming, Electronics, Inventor, Mechanics, Science Skills, and Weaponsmith, but usually no Vehicle operation Skills other than a few common TFs (at most). A Psychological Limitation reflecting his cantankerous concern for his creations may be appropriate, as may the *Subject To Orders* Social Limitation if he works for a large organization.

The PC version of this archetype is often known as the Tinkerer. As much a Vehicle operator as a designer, he's constantly "under the hood" of his Vehicle, finding ways to get just a little more speed or operating efficiency out of it. His tech Skills usually aren't quite as good as those of a pure Inventor, but he makes up for that with good Vehicle operation Skills.

The Mechanic

"You've never driven anything like it. UNTIL engine, UNTIL suspension ... the works. Just bring her back in one piece."

— Lita Kalenowski, *superteam mechanic*



Another NPC-oriented archetype, the Mechanic (also called the Grease Monkey) is a character who specializes in maintaining, repairing, and improving Vehicles. He might be a crusty old repair guy down at the local filling station, a maintenance engineer on a starship, or a technician hired by a superteam to keep its Superjet and Supercar in proper working order. "He" is actually often a she; female Mechanics (inevitably pretty, once they wash off the grease and grime and change out of their coveralls) often appear in adventure stories and games.

The Mechanic usually has a high Mechanics roll (obviously), and may also be well-versed in Demolitions, Electronics, Weaponsmith, and various engineering-related Science Skills. He may have minimal Vehicle operation Skills. Psychological Limitations like *Prefers Machines To People* or *Shy* are often appropriate — but so are indications of more boisterous or cruder personality types, like *Skirtchaser* or *Male Chauvinist Pig*.



The Racer

"Get me a few more horsepower, and I know I can beat this guy."

— Chris Jones, *stock car driver*

The Racer has a need for speed. He simply has to have the fastest Vehicle around, and he takes every opportunity to show off just how fast it is, and what a good driver he is. He typically has a high DEX, a high Combat Driving/Piloting roll, and perhaps some Skill Levels he can apply to his Vehicle. He may have some combat-oriented Skills, but he's more interested in driving (or flying) fast and well than he is in fighting. Racers typically have Psychological Limitations like *Gunslinger Mentality*, *Must Be The Fastest*, *Overconfidence*, and *Thrillseeker*.



The Smuggler

“I’m on vacation, officer. Lovely planet you’ve got here.”

— Jarin McDermott, space smuggler

The Smuggler uses his Vehicle (typically a starship, boat, or plane) to sneak people and contraband into places it’s not supposed to be. He may accomplish this by flying fast and low to the ground to avoid detection, or by trying to pass himself off as operating a normal Vehicle (which really has concealed cargo storage areas; see page 18). In addition to his Vehicle-operating Skills, Concealment, Streetwise, and Trading, which often have high rolls, he usually has a generous helping of con man-type Skills, such as Bribery, Forgery, Gambling, Shadowing, Sleight Of Hand, and Stealth. Tougher Smugglers usually have plenty of combat-oriented Skills, though most Smugglers would just as soon run from trouble as fight. Psychological Limitations such as Greedy or Thrillseeker are appropriate, as are Hunteds (the authorities, disgruntled former customers) and Social Limitation (a criminal record).

Of course, not all Smugglers are necessarily criminals (in the standard sense of the word). For example, during war, blockade runners are heroes to one side, and smugglers often become spies, using their skills to sneak secret information across enemy lines.

The Stick Jockey

“Watch this — I’ll lose him with a barrel roll!”

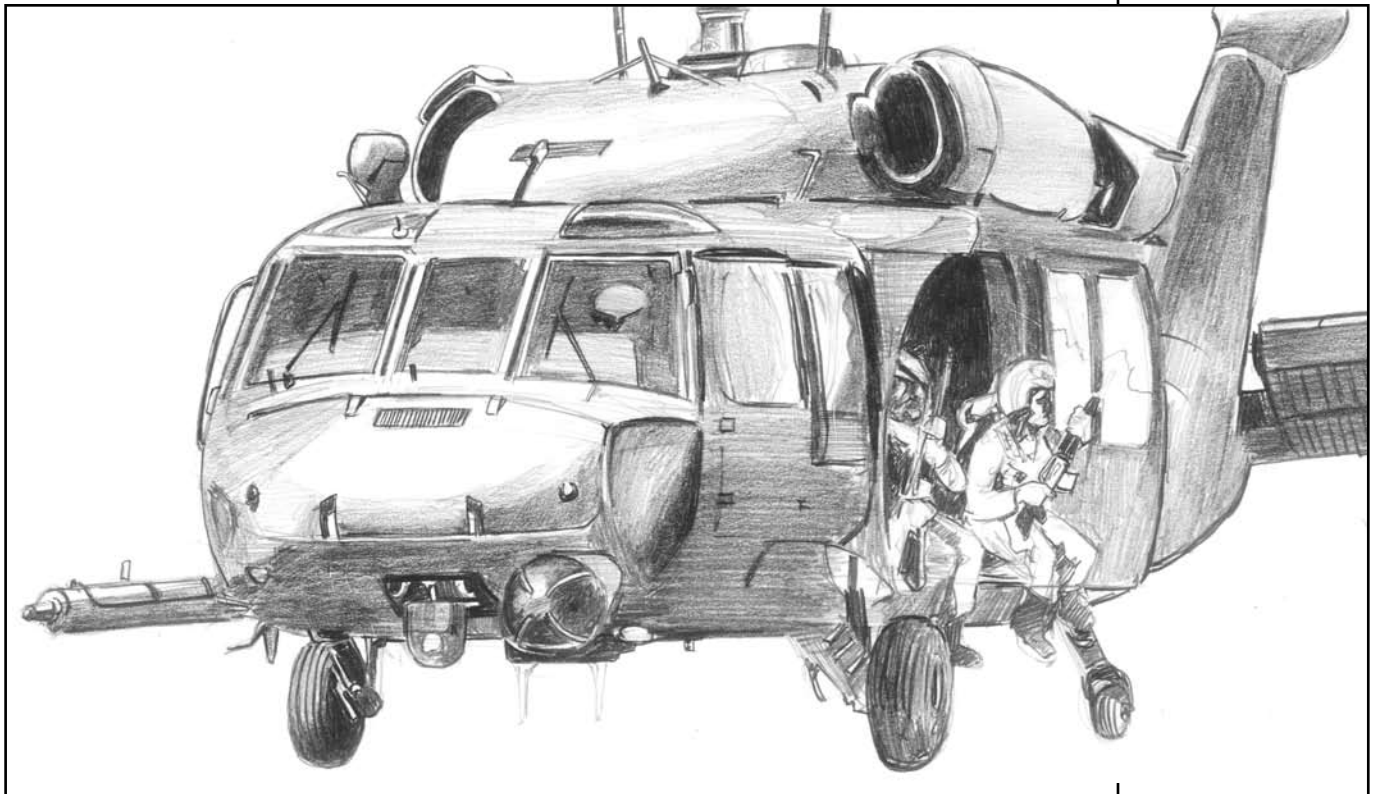
— Jake ‘Barnstormer’ Barnes, pilot



The Stick Jockey is a hotshot pilot — a daredevil flyer who’s not only skilled at operating a plane or starship, but can’t ever seem to do things the calm, simple way. Eager for thrills, excitement, and the chance to test his Skills, the Stick Jockey pushes himself and his Vehicle to the limit as he engages in dogfights, flies at top speed through asteroid fields, plays “chicken” with other pilots, and attempts stunts no sane pilot would even contemplate. Stick Jockeys are often young, making up for their lack of experience with raw talent.

The Stick Jockey has a high Combat Piloting roll — often one of the highest in the campaign — along with a smattering of Vehicle repair and maintenance Skills (and, if appropriate to the campaign, combat Skills, including WF: Vehicle Weapons). His DEX and SPD are high; he may buy extra Characteristics that only apply when he’s flying his Vehicle (to match its DEX and SPD), or Skill Levels he can apply to the Vehicle (see page 220).

Several Disadvantages are common among Stick Jockeys. First and foremost are Psychological Limitations like *Arrogant*, *Daredevil*, *Gunslinger Mentality*, *Maverick*, *Overconfidence*, or *Thrillseeker*. A Reputation that makes other pilots challenge him to races or duels is also appropriate (so is a Reputation Perk), as are Hunteds (defeated enemies) and Rivalries (with other pilots).



CHARACTER CREATION



EXAMPLE POWERS: SKILL LEVELS

Deft Jinking: +4 DCV, Usable By Other (any Vehicle of up to 50 tons; +2½) (70 Active Points); Only For An Aircraft Character Is Flying (-2), Requires A Combat Piloting Roll (-1 per 20 Active Points; -¼). Total cost: 21 points.

Hotshot Driver: +3 DCV, Usable By Other (any Vehicle of up to 3.2 tons; +1 ½) (37 Active Points); Only For A Ground Vehicle Character Is Driving (-2). Total cost: 12 points.

Skilled Driver: +2 with Ground Movement, Usable By Other (any Vehicle of up to 3.2 tons; +1 ½) (15 Active Points); Only For A Ground Vehicle Character Is Driving (-2). Total cost: 5 points.

Here are some suggestions and special rules about building and playing Vehicle-oriented characters.

CHARACTERISTICS

Vehicle-oriented characters usually have high DEX and SPD. In some cases, they buy extra DEX and SPD with the Limitation *Only When Operating Vehicles* (-½). This is a good way for a character to make his DEX match or exceed that of high-performance Vehicles, so the Vehicle's effective DEX and SPD remain high.

Similarly, Vehicle-oriented characters may want to buy the ability to make Vehicles more responsive as a way of simulating their high degree of skill and control. You can construct an ability like this one of two ways: as Characteristics bought as Powers with the same Usable By Others structure discussed for DCV Levels (see below); or as an Aid to DEX and/or SPD with the Limitations *Others Only* (-½) and *Only For Vehicles* (-1).

SKILLS

Skills tend to define a Vehicle-oriented character more than any other game element. Obviously he needs a high roll with Combat Driving/Piloting, but plenty of other Skills are useful for a well-developed Vehicle character. If both a Vehicle and its operator have the same Skill, the GM may, if appropriate, allow one to use its Skill as a Complementary Skill for the other.

Skills requiring no special explanation for how they apply to or with Vehicles (such as Computer Programming and Mechanics) are not discussed here.

ANALYZE

Analyze Construction, Analyze Technology, and especially Analyze Vehicle are all appropriate for Vehicle-oriented characters. They allow a character to evaluate, and perhaps determine the vulnerabilities of, other Vehicles and the like. For example, a successful Analyze Vehicle roll would tell a driver whether his opponent's car is faster or better armed than his own.

AUTOFIRE SKILLS

Generally, a character with these Skills may not use them with Vehicle weapons, unless those weapons have the *Uses Character OCV Not Vehicle OCV* Power Modifier (page 181). However, the GM may allow a character to buy these Skills specifi-

cally for use with vehicular weapons, in which case they would apply only to Vehicle weapons and not to personal Autofire weapons.

CLIMBING

Climbing is often a handy Skill for the operators of Vehicles large enough to crawl or climb on — starships, naval warships, and the like. When a character gets involved in a fight atop a Vehicle, his Climbing roll may be the only thing that keeps him alive (see page 213).

COMBAT DRIVING AND COMBAT PILOTING

Obviously, every Vehicle-oriented character takes one or both of these Skills — they define the character type, after all. See page 169 for information on how they're used.

As noted in the *Hero System 5th Edition, Revised*, Combat Driving applies to Vehicles that move in two dimensions (such as ground vehicles and ships), and Combat Piloting to Vehicles that move in three dimensions (aircraft, spacecraft, and submarines). However, in Vehicle-oriented campaigns, GMs may want to divide these Skills up a little more, or create new ones appropriate to the game. Combat Sailing might replace Combat Driving for surface watercraft, while Combat Space Piloting and Combat Submarining become the Skill for starships and submarines, respectively (leaving Combat Piloting just for aircraft). In a mecha campaign, characters might need Mecha Piloting to fight using mecha, with Combat Driving an option for characters who can drive ordinary ground vehicles with skill.

COMBAT SKILL LEVELS, PENALTY SKILL LEVELS, AND SKILL LEVELS

A Combat Skill Level with [Vehicle]'s Weapons (all the weapons on a particular Vehicle) is a 3-point Level, and can only be applied to OCV. A CSL with Vehicular Weaponry (any type of Vehicle-mounted weapon) is a 5-point Level, and can only be applied to OCV. Typically, either type of CSL applies only to Ranged attacks, but may apply to HTH Combat instead (or as well) if the Vehicle has HTH attacks (as many mecha do). If the Vehicle's attacks are all Ranged, one of these CSLs does not apply to Move Bys or Move Throughs (sideswiping and ramming), but characters can buy CSLs separately to represent their talent for running into things. An 8-point CSL with All Combat would apply to ramming and sideswiping, but again, only applies to OCV. Of course, any of these Levels only increase the character's OCV with vehicular

attacks; they don't apply to the Vehicle itself or anyone else using its equipment.

Characters can buy DCV Levels or Movement Skill Levels that apply to Vehicles, but this gets expensive because they must be made Usable By Others — the Vehicle is a separate “character” from the character, in effect, so the Levels must be “granted” to the Vehicle by the character. When buying the *Usable By Others* Advantage, don't forget to increase it to account for the Vehicle's mass — the upper limit on mass defines what sorts of Vehicles the character can apply the Levels to. However, the character can apply a -2 Limitation, *Only For [Vehicle Type] Character Is Driving*, to reduce the cost; Requires A Skill Roll may also be appropriate. See the accompanying sidebar for some examples. Granting the Levels to the Vehicle is a Zero-Phase Action; the “Attack Roll” succeeds automatically.

These same rules apply, generally, to Penalty Skill Levels and Skill Levels. “Vehicular Weaponry” constitutes a “tight group” for PSLs; all of a Vehicle's Skills constitute a “group of similar Skills,” unless the Vehicle has three or fewer Skills.

Standard Levels In Vehicle Combat

A character who has personal CSLs can use them in Vehicle combat if he attacks with his personal attacks. For example, a superhero who has +3 OCV with Flame Blast can use those CSLs if he's attacking a Vehicle with that power, or riding in a Vehicle while blasting at another Vehicle.

A character who has 5-point CSLs with Ranged Combat, 8-point CSLs with All Combat, or 10-point Overall Levels can apply them to increase his OCV with a Vehicle's ranged attacks. The latter two types also apply to increase OCV with HTH attacks (including, for example, ramming); a Vehicle with lots of HTH Combat attacks (such as many mecha) could buy 5-point CSLs to increase OCV in HTH Combat. He can also apply them to increase the damage caused by the attacks he makes. He cannot apply them to increase the Vehicle's DCV. However, if he is being attacked by another character in the Vehicle he's in, he could apply them to increase his own DCV against that other character's attacks, if appropriate.

A character who has Penalty Skill Levels appropriate for a vehicular weapon (such as Range Skill Levels or Targeting Skill Levels) may apply them to that weapon, unless the GM forbids this based on considerations of game balance, “realism”/common sense, or the like.

DEFENSE MANEUVER

A Vehicle operator with this Skill cannot use it while operating his Vehicle, unless he buys the *Usable By Other* Advantage as described above regarding Combat Skill Levels. However, the GM should forbid this in most situations; it rarely makes sense for a character's defensive ability to apply when he's strapped into a Vehicle. Only in campaigns featuring humanoid mecha that can use Martial Arts should characters buy this sort of ability.



KNOWLEDGE SKILLS

Vehicle operators are as likely as other characters to have KSs. Knowledge Skills about Vehicles, such as KS: American Automobiles, KS: Jetfighters, or KS: Submarines, are particularly appropriate for Vehicle-oriented characters.

In a campaign featuring a lot of vehicular action and Vehicle-oriented characters, KS: The Vehicle World may be valuable. It represents a character's knowledge of the world of Vehicle enthusiasts — who's who, who holds what records, what different types of specialized vehicles can do, where to go for the best spare parts, who's a skilled mechanic and who doesn't know as much as he thinks he does, and so forth. It's just like KS: The Martial World, KS: The Mystic World, KS: The Espionage World, and many other such “subculture KSs,” but for vehicles and their people. If necessary, the GM could even subdivide it into multiple KSs, requiring characters to buy KS: The Ground Vehicle World, KS: The Spacecraft World, and so forth.

MARTIAL ARTS

Vehicles generally cannot buy Martial Arts, though GMs may allow some humanoid mecha to do so. In some cases characters can use their Martial Arts with certain types of Vehicles, such as humanoid mecha. This requires the GM's permission, and the character has to buy the *Use Art With Vehicle Weapon Element* for his fighting style. Some campaigns might even feature specific martial arts styles designed solely for use with mecha, to take advantage of their size and power.



NAVIGATION

Navigation is a crucial Skill for Vehicle operators who travel long distances or explore regions they're not familiar with. When on a trip, a character typically makes one Navigation roll at the beginning (to ensure he gets off on the right heading), and periodically thereafter as the GM thinks necessary. At a minimum, one Navigation roll per day is appropriate; in confusing conditions, multiple daily rolls (even as many as one per hour) may be necessary.

If a character fails a Navigation roll by 1-3, he realizes something's not right and can try again after a short while (such as 1 Minute or 20 Minutes). If he fails by 4 or more, he's not only off-course, he doesn't realize it (at least for a few hours, or until he sees [or fails to see] some landmark). The more he fails by, the more off-course he goes. As always, common sense should apply; for example, if the character can see the rising sun, he knows which direction east is, no matter how badly he fails the roll.

A character can also use Navigation to plan a journey that's optimal in some way — such as the fastest or most fuel-efficient route. This requires a Navigation roll at a -1 penalty. He still has to make Navigation rolls along the way to follow his planned route.

Navigation may serve as a Required Skill Roll for long-range attacks, such as some missiles.

PROFESSIONAL SKILLS

Many Vehicle-oriented characters who aren't full-fledged mechanics take PS: [Type Of Vehicle] Operations. This grants them a general knowledge of how their Vehicle (or a specified type of vehicle, such as airplanes) works, and allows them to make temporary minor repairs and the like.

The crewmembers on a sailing vessel often have PS: Sailing, which reflects their knowledge of

how to perform the tasks necessary to operate a wind-powered watercraft. This is an INT-based PS, though in appropriate situations the GM may require a DEX-based roll instead (such as when a character has to tie a knot properly). PS: Sailing differs from Transport Familiarity in that it doesn't necessarily allow a character to steer or pilot a sailed watercraft; it's a Skill for the crew that mans the ship so the captain (who does have the appropriate TF) can steer it.

RAPID ATTACK

The GM may require that characters buy this Skill not only for HTH Combat and Ranged Combat, but for Vehicle Combat as well. In that case, it would apply to both Rapid Fire and Sweep when performed with vehicular weaponry/attacks.

SHADOWING

Characters in Vehicles often try to shadow other vehicles — “Follow that taxi!” is a cliched action movie phrase.

In this situation, the Vehicle operator's Shadowing Skill is what matters; Vehicles themselves don't have Shadowing.

If a Vehicle operator is Shadowing another Vehicle on a road with lots of traffic, Shadowing works normally; the character may even get a bonus to his roll if there's enough traffic to “blend in” with. Following another Vehicle on a road with little or no traffic is much more difficult (-1 to -4 penalty). The same rules apply to Shadowing a pedestrian — if he stays in areas with lots of vehicles, vehicular Shadowing is easy; otherwise, it's hard to remain undetected.

SYSTEMS OPERATION

In Vehicle-oriented campaigns, this Skill becomes quite important. To prevent every character from being equally skilled at operating all types of equipment, the GM may wish to “subdivide” Systems Operation. Examples of this can be found on page 563 of the *Hero System 5th Edition, Revised* and page 47 of *Star Hero*. Gamemasters may also want to consider breaking the Skill down by culture, species, technology level, or the like.

TRANSPORT FAMILIARITY

This Skill is, obviously, an important one for Vehicle-oriented campaigns. If necessary, the GM may want to break it down even further, to create diversity among characters. For example, in a science fiction setting, each of the subcategories listed under Science Fiction & Space Vehicles might become its own 2-point TF category (see *Star Hero*, pages 47-48).

A character who's paid Character Points for a Vehicle does not need a TF to operate it; since he paid points for it, he knows how to use it. However, this does not extend to other Vehicles of that same type. Paying points for a motorcycle does not give

a character TF: Two-Wheeled Motorized Ground Vehicles, it just gives him the ability to drive that one motorcycle. It also gives him the standard 8-roll for maneuvering and Control Rolls.

If a character has a Vehicle that has multiple modes of movement and/or can operate in multiple environments — for example, an Omniplane that can fly in air, fly in space, or work underwater as a submarine — the GM may allow him to simply buy a 1-point “just this one vehicle” TF. However, some GMs may consider that abusive, and require the character to buy multiple TFs (one appropriate to each mode/environment).

If a character has multiple Vehicles (or access to multiple Vehicles due to his membership as part of a team or the like), the GM may allow him to buy a single 2-point TF with “all my Vehicles” or “all Vehicles my team uses.” However, some GMs may consider that abusive, and require the character to buy an individual TF for any type of Vehicle he wants to operate. At the very least, a character who’s allowed to buy the single 2-point TF should have a reasonable explanation for why he can drive the team’s car or motorcycle, but not any other car or motorcycle.

WEAPON FAMILIARITY

As noted on pages 75-76 of the *Hero System 5th Edition, Revised*, characters can buy a WF with Vehicle Weapons for any specific type of vehicle (such as an Abrams tank, or a Hornet fighter plane) for 1 Character Point. Gamemasters may, if desired, allow characters to buy 2-point WF categories with all types of weapons on all vehicles of a particular type. See the accompanying sidebar for some examples. Using this system, a character in a Vehicle-oriented campaign can shift from Vehicle to Vehicle without worrying about Unfamiliar Weapon penalties.

PERQUISITES

Most Perquisites are no less appropriate for Vehicle operators than for other character types. A few warrant special attention.

FOLLOWER

In some cases, a character with a Vehicle requiring a crew may buy the crew as Followers. For example, a wilderness courier in a post-holocaust setting might have a gunner who sits next to him; the courier, who drives the Vehicle, is the main character, and the gunner is his sidekick (Follower).

FRINGE BENEFIT

In most societies, owning/operating a vehicle may require a license. The following Fringe Benefits, some of which are new, reflect this:

Driver’s License (0 points)

Chauffeur’s License (1 point) (requires appropriate Vehicle operation license as well)

International Driver’s License (1 point)

Large Ship License (1 point)

Motorcycle License (1 point)

Pilot’s License (1 point)

Starship License (1 point)

Chauffeur’s License, Large Ship License, and Motorcycle License all indicate that the character has received the special training and license required to operate large or unusual Vehicles (such as limousines, tractor-trailer trucks, freighters, and motorcycles).

VEHICLES

In most campaigns, characters who want special Vehicles have to pay Character Points for them. Heroic campaigns allow character to buy standard civilian Vehicles with money, and may even allow characters to purchase special Vehicles with money (particularly if every character has one). Gamemasters for Superheroic campaigns often allow characters to buy standard civilian Vehicles with money as well. “Standard civilian Vehicle” in these cases almost always means a character’s everyday automobile, with no special equipment or abilities whatsoever. You could consider these “Everyman Vehicles,” if you like. (See also *Money And Vehicles*, below.)

Buying Vehicles

If characters must pay Character Points for a Vehicle, the minimum cost of a Vehicle is 1 point, even if the Vehicle’s Disadvantages reduce its cost to 0 or below.

If a character wants a “stock” Vehicle (a normal, commercially-available model) but with a few adjustments or extra pieces of equipment, typically he must pay Character Points for the entire Vehicle. He can’t obtain a standard civilian Vehicle for free, then just pay for the “upgrades” he wants (unless the GM permits this).

If a character buys both a Vehicle and a Base, he must buy them separately. He cannot apply the “+5 points doubles the number of Vehicles” rule and make some of them Bases instead of Vehicles. However, he may vary the type of Vehicle. If a character buys eight 200-point Vehicles, he could make them all the same type of 200-point car — or he could have three different 200-point cars, two 200-point motorcycles, and three 200-point watercraft of various types. And of course, not all Vehicles have to be built on the full point value; one could be just a 150-point Vehicle (unless the GM prefers otherwise). (This rule generally does not apply to Vehicles buying other Vehicles; see page 20.)

Characters typically should not purchase Vehicles through Power Frameworks. However, with the GM’s permission, a character with a “Gadget Pool” Variable Power Pool might buy a Vehicle with it. If so, the cost of the Vehicle for Pool purposes is its full cost, not the cost divided by five which the character would pay if he bought the Vehicle separately.

When calculating a character’s total points for purposes of determining when he has to start

VEHICLE WEAPON FAMILIARITIES

Each of these categories is a 2-point category which may be purchased as a group.

Airplane Weapons

Airplane Guns
Airplane Missiles
Dropped Bombs

Automobile Weapons

Automobile Beam Weapons
Automobile Dropped Weapons
Automobile Grenade Launchers
Automobile Guns
Automobile Incendiary Weapons
Automobile Missiles

Helicopter Weapons

Helicopter Grenade Launchers
Helicopter Guns
Helicopter Missiles
Dropped Bombs

Mecha Weapons

Mecha Beam Weapons
Mecha Guns
Mecha Hand-Held Ranged Weapons
Mecha Hands
Mecha Melee Weapons
Mecha Missiles

Modern Naval Vessel Weapons

Naval Guns
Naval Missiles
Naval Torpedoes

Sailing Ship Weapons

Light Cannons
Medium Cannons
Large Cannons
Ship-Based Siege Weapons

Starship Weapons

Starship Beam Weapons
Starship Guns
Starship Missiles

Submarine Weapons

Submarine-Launched Missiles
Submarine Torpedoes

Continued from last page

Tank Weapons

Tank Grenade Launchers

Tank Main Guns

Tank Missiles

Tank Secondary Guns

paying the 1-for-1 cost for a Vehicle, do not include the points spent on the Vehicle itself. For example, in a campaign with characters built on 350 points, if a character is built on 330 points and wants to spend his remaining 20 points on a Vehicle, he must start paying on a 1-for-1 basis when the Vehicle's full cost exceeds 330 points. Gamemasters desiring a simpler rule should use the campaign's starting point totals for characters as the break-point. For example, if all characters in the campaign start with a total of up to 350 points, then any character can buy a Vehicle of up to 350 points at the 1-for-5 rate; at 351 and above, the 1-for-1 rate applies.

Gamemasters who want to make buying a Vehicle easier for characters should consider changing the cost of the Perk. Instead of 1 Character Point for 5 Character Points' worth of Vehicle, you could increase the ratio to 1-for-10, or even 1-for-20. This may or may not include waiving the rule that all points in the Vehicle more than the character's own points cost 1-for-1.

Money And Vehicles

At the GM's option, the following rules may apply in campaigns where characters can buy Vehicles with money. In essence, the Character Point value of a Vehicle the character can buy depends on his personal wealth (as indicated by the Money Perk). These rules are best applied to the most

common type of "civilian" Vehicles in the campaign, which usually means ground vehicles (cars).

A character who's Poor or Destitute cannot buy a Vehicle at all — or, at most, can acquire an old junker that doesn't work more than half the time. (At best, this would be a Vehicle costing up to 10 Character Points, and it should have a lot of Disadvantages.)

A character with Middle Class income can have a Vehicle costing up to 20 Character Points (*i.e.*, a Vehicle built on 100 Character Points, plus points from Disadvantages). If the character wants a Vehicle that costs more than 20 points, he must pay for the difference with Character Points.

Characters who pay for the *Money Perk* can add the value of their Money to the 20 points for Middle Class. Thus, a Well Off character can have a Vehicle costing up to 25 Character Points, while a Filthy Rich one can have a Vehicle costing up to 35 Character Points.

These rules only apply as long as the Vehicle remains relatively "normal." As soon as the character starts to significantly modify it for combat or adventuring purposes, including mounting any weapons on it, these rules don't apply and he has to pay for the whole thing with Character Points. The GM determines what constitutes a "significant" modification.

TALENTS

Generally, all Talents are appropriate for Vehicle-oriented characters (though this may depend on the campaign). A few require special provisions.

ENVIRONMENTAL MOVEMENT

Of the sample forms of Environmental Movement given in the *Hero System 5th Edition, Revised* (sidebar, page 90), the one most likely for Vehicle operators is Zero-G Training, which has many applications in and around space Vehicles (see *Star Hero* for more information). The interiors of large Vehicles may provide an opportunity to use Aquatic Movement or Supreme Balance.

Here are two other forms of Environmental Movement Vehicle operators might have:

Crawlspace Ace: No OCV or DCV penalties in cluttered or cramped area (4 points).

Master Climber: Counteracts up to -3 worth of DCV penalties while climbing (4 points).

LIGHTNING REFLEXES

Lightning Reflexes at the 2-point level is a good way to make a low-DEX operator's DEX equal that of his Vehicle, so that for initiative purposes the Vehicle's effective DEX equals its own DEX, not the operator's lower DEX (see page 181).



DISADVANTAGES

Here are a few notes on Disadvantages appropriate for Vehicle-oriented characters.

DEPENDENT NON-PLAYER CHARACTER

Vehicle-oriented characters who focus more on operating Vehicles than on building them may have an inventor, mechanic, engineer, or tinkerer working for them who counts as a DNPC. Similarly, the owner of a large Vehicle could have the Vehicle's crew as a group DNPC. Both types of DNPCs count as having Useful Noncombat Skills.

HUNTED

In fiction, there's hardly a Vehicle-oriented character who hasn't acquired an enemy or two during the course of his career. Hunted is the perfect way to represent this, even if the GM prefers to develop the adversarial relationship after the game starts (*i.e.*, to make the Hunted the main villain of an early adventure, and then take things from there). Typically the Hunter is himself a Vehicle-oriented character, or he employs Vehicle operators who can attack and harass the PC. And don't forget the danger of indirect attacks! Covertly sabotaging a PC's Vehicle may prove more effective than sending goons to attack him.

PSYCHOLOGICAL LIMITATION

Here are some specifics on Psychological Limitations common among Vehicle-oriented characters.

Compulsive Tinkerer (Common, Moderate; 10 points)

This character can't resist "fixing" or "improving" Vehicles — either his own, or someone else's. If he's not working on his own Vehicle, he's planting little surprises in someone else's (pleasant ones — or at least that's the intent). At least once per adventure, and often more frequently, the GM should have the character make an EGO Roll at +5. If he fails, the GM randomly determines what system or piece of equipment on the character's (or a comrade's) Vehicle has most recently been the subject of the compulsive tinkerer's obsession. During the game, something bad happens to that system (it may work better than normal for a while, too, but inevitably something goes wrong... and at the worst possible moment).

Gunslinger Mentality (Common, Strong; 15 points)

A character with this Psychological Limitation (also sometimes phrased as *Must Be The Fastest*) must challenge any operator of a similar type of Vehicle whom he hears referred to

admiringly, who demonstrates great ability in his presence, or whose Vehicle has many of the same criteria as his own. He simply must know which of the two is the better operator or has the better Vehicle. If the character is particularly unscrupulous, he may trick the character into competing, or kidnap the opponent's DNPCs and friends to force him to compete or fight.

Hot-Dogger (Common, Strong; 15 points)

A character with this Psychological Limitation has such confidence in his own abilities (and his Vehicle) that he shows off and takes risks with his Vehicle that other characters avoid. He wants to "push the envelope," going further, higher, faster. It's distinct from Overconfidence in that it only pertains to the operation of the character's Vehicle; he's not necessarily more likely to act confidently or take risks when he's away from it.

Thrillseeker (Common, Strong; 15 points)

Also known as *Daredevil*, this Psychological Limitation represents a character who's an adrenaline junkie. He'll take risks and expose himself to danger (both with and without his Vehicle) for the sheer "rush" of getting into, and safely out of, such situations. When a dangerous situation arises, he has to make an EGO Roll to avoid tackling it right away. Like Hot-Dogger, Thrillseeker is particularly common among pilots (both air and space), who are often portrayed in fiction as hot-headed, rebellious showoffs (though their level of skill usually justifies their attitudes to some extent).

REPUTATION

Reputation is a relatively common Disadvantage among Vehicle-oriented characters, particularly in settings where characters with Gunslinger Mentality are around. A character with a Reputation frequently finds himself challenged by these people, who want to build a positive reputation of their own for defeating or beating him. Other possible negative Reputations associated with Vehicle-oriented characters include *Chokes Under Pressure* and *Vicious Fighter*.

RIVALRY

Vehicle operators are a contentious and competitive lot, regardless of the setting. Seemingly by unspoken agreement, they establish friendly (and not-so-friendly) rivalries among themselves. Even if they're working on the same team, they often seek the same position, woo the same romantic interests, or pursue some other often common but mutually exclusive goal. A Rivalry is the perfect way to represent this.

POWERS FOR VEHICLE-ORIENTED CHARACTERS

Though Vehicle operators are usually Heroic-level characters (even in many Superheroic games), they may have abilities best built with powers. For example, a wheelman in a Cyberpunk game could interface directly with his Vehicle (or, more accurately, its built-in computer) using a dataport implanted in his brain; he could buy this as a Mind Link (with several Limitations). A character with preternatural mechanical abilities might convince the GM to let him buy Healing BODY, Vehicles Only (-1), *Extra Time* (Extra Phase or longer), defined as "super-fast repairs." In a setting with magic, characters could possess all sorts of vehicle-oriented spells. It all depends on the nature of the campaign and the characters.

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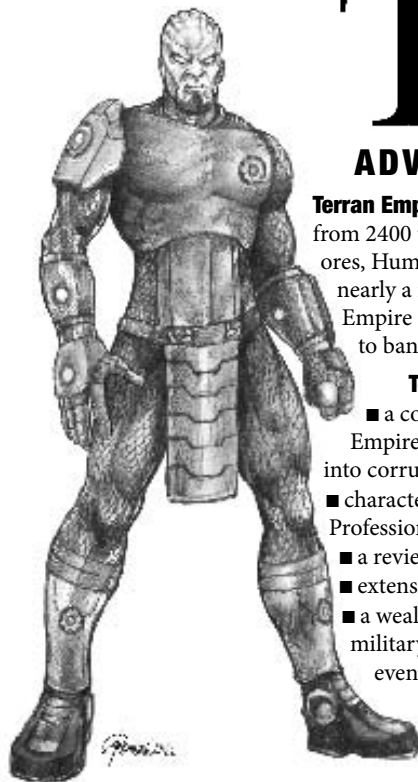
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