

SHADOWRUN®

7910

RIGGER 1™



FASA
CORPORATION

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Published by FASA Corp.
1100 W. Cermak Road · Suite B305
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Dedication

To all the Shadowrun players both new and old that helped, cajoled, advised and most of all, were patient and supporting while we revised and updated all the advanced Shadowrun books to 3rd Edition. Thank you ... now on to the stories.

MM.

INTRODUCTION

Rigger 3 is the advanced rule and gear book for grease monkeys, gearheads and anyone else who plugs their brain into a vehicle or drone. Full of options, rules expansions and updates for rigging and drone use in *Shadowrun, Third Edition (SR3)*, *Rigger 3 (R3)* also offers information on non-riggers and the use of vehicles, a quick-resolution vehicle-combat system for situations that demand fast results and a more realistic collision system.

Along with a significant percentage of new material, *Rigger 3* represents a compilation of material that was originally published in various now-out-of-print *Shadowrun* books or is based on previous editions of the *Shadowrun* rules. This includes material from *Rigger 2*, *Rigger Black Book*, *Fields of Fire*, *Street Samurai Catalog*, *Aztlán*, *Cyberpirates* and *Neo-Anarchist's Guide to Real Life*. Any references in this book to the *Shadowrun* rules refers to *SR3*. Other rule books that may be referenced in this book are *Shadowrun Companion (SRComp)*, *Man & Machine: Cyberware (M&M)*, the *Matrix (Matrix)*, and *Cannon Companion (CC)*.

Rigger 3 begins with *Life In the Fast Lane*, a look at vehicles in ordinary life. The way a vehicle is used in 2061 is addressed here, from license, registration and insurance to the electronic interfaces and even automated driving. The uses of GridGuide (for both the legal driver and the rigger trying to dodge Lone Star) are covered, along with remote vehicle access, hacking a vehicle and even normal safety systems. The chapter finishes with a “who’s who” of vehicle manufacturers.

All of the attributes, skills (including some new ones), edges, flaws, dice pools and resources that are important to a rigger are discussed in *The Rigger*. The gear and implants a rigger needs in order to truly rig a vehicle or a drone are also covered, as well as rules for maintenance overhead and lifestyle reductions.

Sensors and Electronic Warfare covers the means by which riggers can detect or hide from their friends and foes. Rules for adding and upgrading components, sensor dead zones, ships and long-range sensors and even sonar rules are included. Electronic warfare is expanded to give players a choice of attacks and defenses, from jamming a signal to overriding a signal and taking command of someone else’s drones and vehicles.

A rigger’s most unique tools are drones. The *Drones* section gives more options for using drones, including rules for using autosofts—dedicated software that allows drones a bit of freedom and intelligence. It’s only a small step from a drone with an autosoft to a full-fledged robot, rules for which are also covered in this chapter.

Riggers can “drive” just about anything, and that includes specially created security systems. These *Security Riggers* are a strong line of defense against shadowrunners and are able to control a building like others do a vehicle. Rules for decking a rigged security system are also covered.

The chapter on *Ships and Subs* introduces the really big naval ships, as well as the undersea vehicles that have become

more and more important as aquaspheres have become more common. New attributes, such as Hull, Bulwark and Sonar are introduced and defined, with rules for ship combat and damage that run the gamut from ramming and boarding to taking on water and sinking.

Special Vehicle Rules are all of the rules that are unique to a specific vehicle or type of vehicle. This section contains advanced attribute rules for Fuel, Economy, Landing/Takeoff Profile and Setup/Breakdown Time. Vehicle stress—the amount of unseen damage a rigger puts on a vehicle—is also covered. Finally, rules are included for lifting and pulling objects, trailers, long distance hauling, mechanical arms and legs, hovercraft, aircraft and suborbitals.

Advanced Rules covers the optional rules for a campaign-level *Shadowrun* game, such as fuel rules for variable-fuel consumption and fuel grades, optional rules for long-term maintenance, edges and flaws for vehicles and vehicle subsystem damage. Other advanced rules cover remote control decks as well as electronic warfare. In addition, two alternate rules systems have been added for vehicle combat. The first is a simple system to integrate vehicles into standard combat and the second is a revised ramming and collision system. Both of these systems can be mixed with standard *SR3* rules.

New Toys is more gear for the gearhead. Weapons include rockets, missiles, torpedoes and even harpoon guns. There are accessories for remote control decks, new cyberware packages, cyberdeck enhancements, and all the wild and wacky tools of the trade—from autosofts to oil-slick sprayers and morphing license plates.

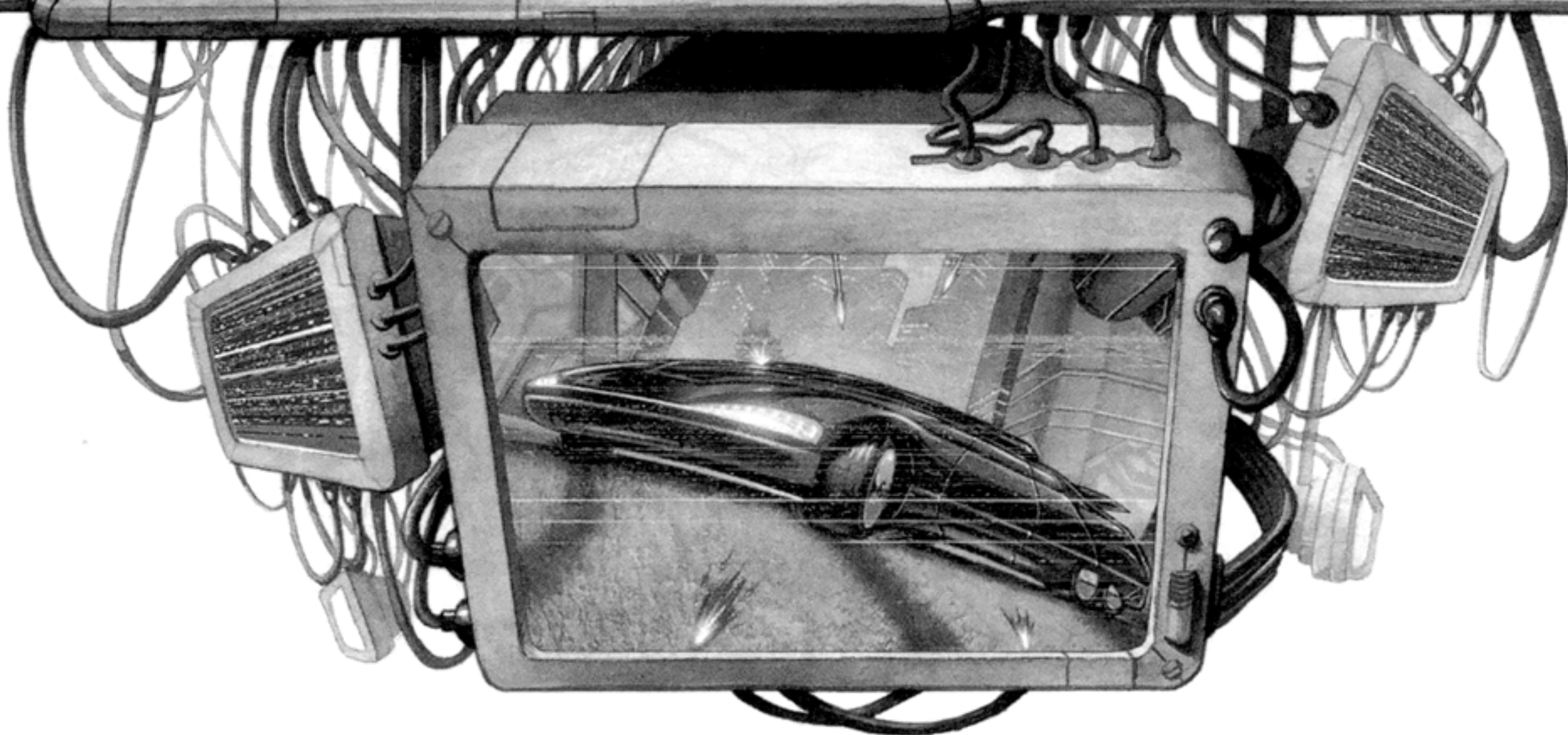
There’s nothing a rigger likes more than to build his own vehicle. The *Vehicle Design* chapter gives the player all the tools to do just that, from the chassis to the power plant. This chapter also includes all the design details a player needs.

While designing a vehicle is cool, however, there are still plenty of modifications and customizations that a player can slap on an existing vehicle. *Vehicle Customization* covers this essential topic with nearly 100 different modifications—from ejector seats to state-of-the-art armor, to nitrous-oxide injectors for that last burst of speed. Rules are included for using shadow mechanics, finding parts and determining the time it takes to install them.

The *Vehicle List* is a complete listing of vehicles, updated to conform with the rules presented in *Rigger 3*. The list includes not only the stats for the vehicles, but expanded descriptions as well as the names of similar models not presented. Rules on locating likely vehicles to “liberate” from their current owners are also included here.

Finally, the book concludes with the Chassis and Power Plant Tables for use with vehicle design, a remote-control network/vehicle record sheet as well as some of the more useful tables for reference.

LIFE IN THE FAST LANE



Vehicles (as well as their cousins, drones) get taken for granted in the *Shadowrun* universe. They lack the gleam of cyberware, the glitter of magic, and the hype of the Matrix. Yet without them the world would come to a grinding halt, as no one and nothing would be able to get to where it needs to go. If magic is the soul of Sixth World society and the Matrix is its brains, then vehicles are its blood.

This section describes the role of vehicles in everyday life in the *Shadowrun* world.

VEHICLES AND ORDINARY LIFE

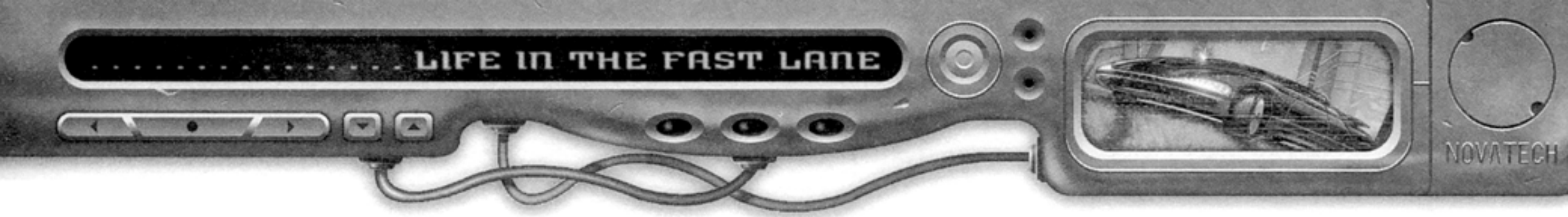
For a number of reasons, there are not as many personally owned automobiles in use today as during the beginning of the twenty-first century. The availability of cheap, safe and fast public transportation is primarily responsible—it is much more economical than paying fuel, repair and insurance costs for maintaining a vehicle and eliminates worries about being carjacked or gridlocked. And with the explosion of gated, self-sufficient enclaves, arcologies and the capability to telecommute to work, the need for autos in many people's lives has been drastically reduced. Smog and other visible aspects of pollution have also increased environmental awareness, swaying the decisions of many would-be car owners.

Due to the demands of modern city life, economical subcompacts and motorcycles have proven much more popular than gas-guzzling pickups and SUVs. Vehicles just big enough to fit one or two people and a small amount of baggage are easier to park and maintain, and they typically operate on cheaper electrical power or methane combustion.

This is not to say that fast or powerful gas-burning autos have fallen by the wayside. Gas (or more properly various varieties of diesel) powered vehicles are still common enough to annoy hard-core environmentalists but are typically relegated to cargo trucks and high-performance sports cars. Even the most environmentally unsound vehicle of 2061 is still far more fuel efficient, with cleaner emissions, than almost any vehicle produced in the late twentieth century.

Despite these changes, in many circles, owning a vehicle is still considered a status symbol or an essential part of personal freedom. Go-gangs and nomads especially espouse the independence and thrill inherent in prowling the blacktop, and many other subcultures revel in the driving spirit.





LICENSES AND REGISTRATION

Though typically ignored or bypassed by shadowrunners, a large amount of paperwork is required to legally drive or own a vehicle. From a simple license to drive to having the proper insurance on your thunderbird, knowing what you are at least supposed to falsify can save a rigger many a lonely night in jail.

Licenses

Most countries require licenses to operate anything larger than a powered scooter. The requirements for getting a license vary but typically require some sort of skills test and a written exam on the local traffic laws. As with any other important information, vehicle operator licenses are tied to a person's SIN and are stored on their registered credsticks. The license information also includes operator restrictions (glasses, vehicle classifications, and so on) as well as accident histories, traffic violations, license revocations and any other information the local licenser deems necessary. Licenses are also tied to the person's bank account, so that fees for traffic violations can be automatically deducted.

Piloting licenses have far more stringent requirements, especially for the larger aircraft, helicopters, and thunderbirds. Depending on the size and complexity of the craft, requirements can range from a few hours of class time and simsense simulation to thousands of hours of flight time on smaller aircraft and rigorous examinations that may take days.

Many countries and extraterritorial corps maintain reciprocity agreements for properly licensed citizens, meaning that in many cases a person does not require retesting and certification to drive in another region. This is the case with most countries in North America and Europe.

Vehicle Registration

Most legal jurisdictions require the owner of a vehicle to register it. This establishes ownership of the vehicle, provides you with license plates and is a prerequisite for insurance. Like licenses, registration info is also recorded on a person's registered credstick. Registration fees are typically quite small—about 50 nuyen per vehicle, per year on average. Being caught without proper registration for your vehicle (which also means you obviously don't have insurance) is a sure way of getting your vehicle immediately impounded.

Vehicle registration is usually linked to other information, such as the owner's SIN, the vehicle's transponder code and possibly the vehicle's cellular commcode.

License and Registration Hacking

Both licenses and vehicle registration may be forged, though the task is extremely difficult and best handled by underworld specialists. The costs for acquiring forgeries is the same as forging credsticks, as described under *Forging Credsticks and IDs*, p. 239, SR3.

Modifying someone's existing driving record is almost as difficult, requiring the infiltration and modification of the secure files of the appropriate DMV or vehicle licensing agency. Such hosts are usually rated Orange-Hard or Red-Average and are well protected against Matrix intruders.

INSURANCE

Insurance is a requirement for virtually every type of license and is one of the most expensive parts of owning a vehicle. As a general rule, baseline insurance costs 1 percent of the vehicle's base price per year. Full coverage (which means you are covered even if an accident was your own fault) will typically cost between 2 and 3 percent of the vehicle's base price per year. Accidents and traffic tickets can greatly increase the rates.

However, if the vehicle is involved in an accident then the insurance will cover repairs, or in some cases replacement of the vehicle. Insurance does not cover damages to a vehicle that was involved in illegal activity at the time it was involved in an accident. Driving without insurance is typically serious enough to warrant your license being revoked, your car impounded or your account slapped with a hefty fine (sometimes all three).

GETTING AROUND

Like everything that technology touches, transport is also more complex in the 2060s.

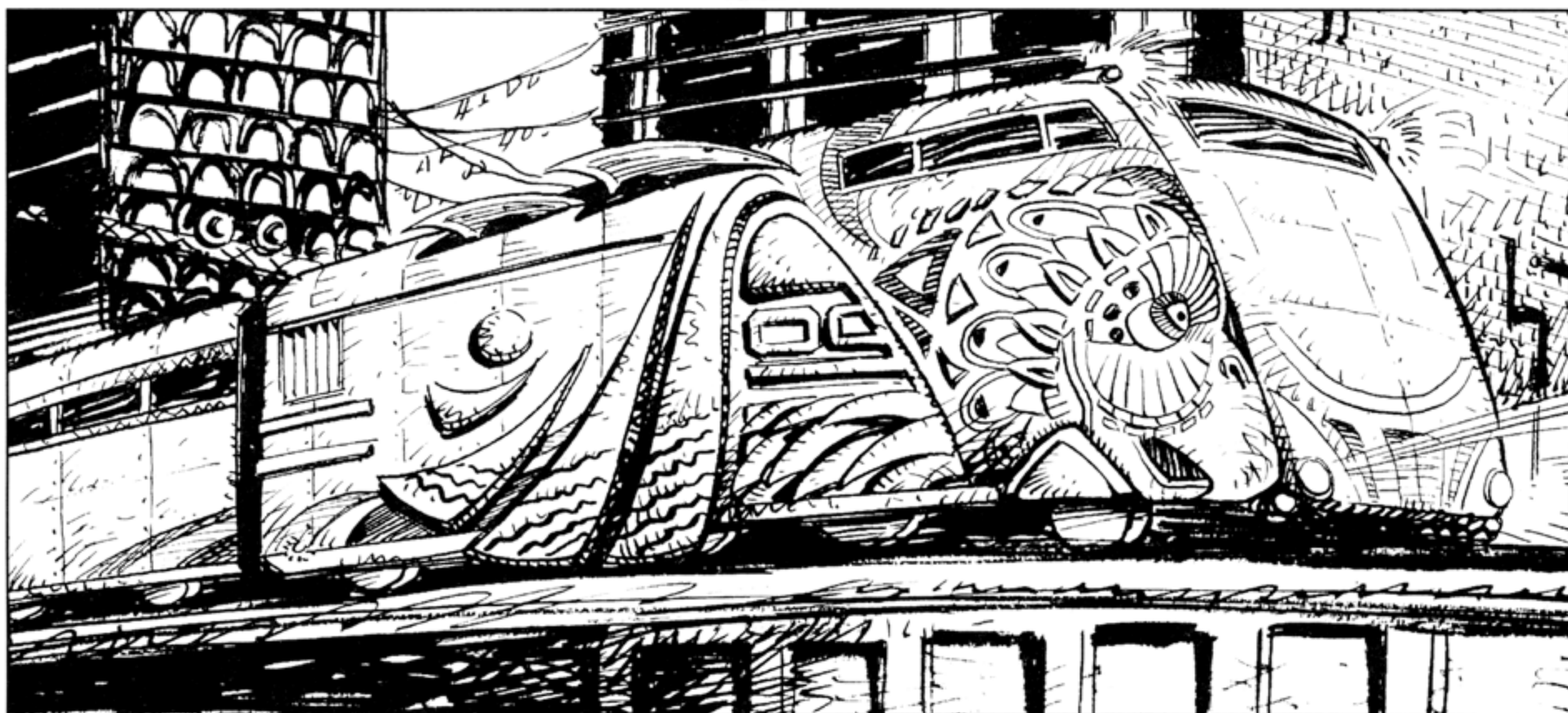
Roads and Highways

Around the world, road traffic management hasn't changed much over the years. Colored lights and signs are still used to regulate manual traffic, and various countries still drive on their particular side of the road (left in England, Hong Kong, Australia and Japan, right everywhere else). Most sprawling metroplexes have adopted traffic management and navigation systems such as GridGuide (see p. 15) to avoid traffic jams and divert vehicles around accidents. Systems such as Gridlink (see p. 16) provide electric vehicles with power directly from the road. Major roadways incorporate lanes specifically for use by drones and self-driving vehicles, minimizing the traffic hazards posed by chaotic, manually driven vehicles. Despite these measures, traffic jams are still a common occurrence, especially when the grid systems suffer a glitch or fail outright.

Public Transportation and Taxi Services

To quickly move masses of people around, especially during rush hour periods, every sprawl maintains a fleet of buses. Subways, elevated trains and monorails are also used as driving alternatives. Depending on the city or neighborhood, these systems may be spotless or littered with garbage and decorated with graffiti. Though cheap, such systems can be mazelike to outsiders and are often prowled by con artists and thieves. Cameras and Panicbuttons are the most common security measures, though some systems also employ drones, armed guards and guard dogs.

Taxis remain a common sight in cities around the globe, easily summoned with a Matrix message or found in swarms in downtown areas. Minivan taxis now outnumber car taxis, as they carry more passengers and cargo and can fit trolls. To protect against carjacking and other crimes, the driver's compartment is separated from the passengers with mirrored bullet-proof glass (Barrier Rating 8), and the doors are electronically controlled by the driver. Some taxis carry systems allowing them to non-lethally disable troublesome passengers, such as



Neuro-Stun delivery systems or taser pads in the seats. Interior cameras are also common, with images either being recorded or transmitted elsewhere.

Automated drone taxis are increasingly common, significantly cutting down the manpower costs for taxi companies. These autotaxis are a favorite target of vandals and gangers, so cab companies tend to restrict their operations to neighborhoods with good security ratings.

Helicopter, tilt-rotor and lighter-than-air taxi services are more popular than ever, especially among the corporate jet set. Many corp enclaves run their own air taxi operations, allowing their workers to commute high above the unwashed masses in rush hour traffic.

Very few taxi services will venture into the Barrens or similar no-go zones with Lone Star security ratings of D, E, or Z (p.108, *New Seattle*), as those that do rarely return. A few daring riggers operate specialty taxi services specifically for these areas, running under colorful names like "Combat Cab" and offering their services in the shadows. These riggers operate armed and armored vehicles and certainly don't advertise. The rates are high, but worth it when walking isn't an option.

Railways, Waterways and Airlines

Standard rail lines continue to operate throughout the world, though in North America they are generally relegated to cargo transport duties. In Europe, it's common for passengers to use standard rail lines for travel between cities and countries.

Monorails, which are wider trains mounted or suspended from a single narrow guideway, have replaced standard trains and subways in many areas. Monorails tend to be more reliable, safer, more cost effective and generally quieter.

Maglev trains, which are magnetically levitated and propelled monorails, can attain much higher speeds and are used to provide passenger service between cities.

Boats and ships have changed little over the years, though faster-model hydrofoils are increasingly popular for ferry services. Mini and micro submersibles are very fashionable among the corporate elite, though they lack the appeal and cost effectiveness to become widely used.

Long-distance air travel has become much quicker with the advent of high speed civil transport (HSCT) jets, suborbital planes and semiballistics. HSCTs are supersonic passenger craft modeled on the Concorde of the previous century, traveling about 3 times the speed of the sound. Suborbital planes use powerful SCRAMjet engines to climb to the very top of the atmosphere, 48 kilometers up, achieving speeds close to Mach 25. Semiballistics are more rocket than plane. They take off and land like other jets, but after takeoff they angle their noses to near-vertical positions and fire engines that take the craft on parabolic arcs out of the atmosphere and into space. Travel from Seattle to Tokyo, a long four hours on a speedy HSCT, takes less than one hour on a semiballistic or suborbital craft.

MODERN HAZARDS

Though modern technology has improved the safety standards of many forms of transportation, the increasing disparity between the underclass and the megacorps, along with the nastier pollution and developments of the Awakened world, have led to an increase in the amount of travel hazards.

Go-Gangs and Highway Bandits

The most common threat to a driver in the sprawl arises from predatory go-gangs. At night, the highways become a playground for violent gangers. Taking to the streets on the backs of fast and cheap motorcycles, go-gangs fight over turf, terrorize norms for fun and play cat and mouse with the cops. Carjacking, robbery (or "toll-charging") and assault are common activities, though pastimes such as jousting and drag rac-



ing are also popular. Occasionally, gangs have been known to set up roadblocks or even to hack into grids to divert vehicles into ambushes.

Similarly, open stretches of roadway in rural and outland areas are also prime grounds for roving biker gangs and nomads. These ruffians tend to operate larger and more heavily armed machinery, especially vehicles that are suited for off-roading.

The response of security agencies to these threats has been varied. Because policing all of the roadways is logistically impossible, many police simply issue travel advisories and allow the gangsters to have the streets at night. Naturally, prosperous neighborhoods and enclaves are closed off to keep any criminal elements from getting within. Some security agencies make attempts to crack down on go-gangs, using drones to track and monitor them and sweeping into affected areas with massive displays of force. Heavily fortified random roadblocks are a common occurrence, both to intimidate gangs and to ensnare unregistered drivers and smugglers. Unmarked police vehicles are more common than ever, especially given photovoltaic paint schemes that allow them to instantly “mark” themselves as necessary.

Corporate Extraterritoriality

Along with Balkanization and the subsequent proliferation of borders and fences, corporate extraterritoriality has created even more “off limits” areas to those without credentials. This has primarily been an issue in downtown sprawls, where extraterritorial megacorp buildings enforce their own territorial airspace (extending in a cone over their facility to the height of 1,200 meters) and have been known to shoot down trespassers with missiles or worse. Corps are required to clearly identify their territories to prevent accidental trespassers from getting blown out of the friendly skies.

Conditions and Glitches

The Awakened world offers a never ending stream of new hazards to vehicle operators. Many Awakened critters seem to view vehicles as canned snacks and others are simply not familiar enough with metahumanity to get out of the way of an oncoming vehicle. A host of non-paranormal dangers must also be considered, from glass-etching acid rain to troll-sized potholes. The traffic management grids are plagued by problems and crashes, and a single glitch can create a jam that takes hours to untangle—or even forces a vehicle to be abandoned from lack of power.

WIRED WHEELS

Within the past fifty years technology has changed the basic automobile radically. From self-driving autonavigation systems to eco-friendly electric fuel cells, vehicles in 2061 do things that Henry Ford or Bjorn Saab could only imagine in their wildest dreams. Furthermore, social changes brought about by the information revolution, the Awakening, and global Balkanization have altered most people’s driving habits, which the corps have taken into account as well.

CONTROL SYSTEMS

A great many vehicles are still operated the old fashioned way with a human operator at the wheel, pressing pedals, shifting gears and so forth. But vehicles that are equipped with datajack ports (see p. 128) can also be controlled by an operator via a datajack, through a reel-out fiberoptic cable. If the vehicle is also equipped with a rigger adaptation black box (see p. 130), a user with vehicle control rig cyberware may “go into the machine.” Note that vehicles with these options still feature their manual controls, unless the Removed Manual Controls design option (see p. 118) is taken.

Virtual Dashboard

A character who jacks into a vehicle with a datajack experiences a “virtual dashboard.” On a virtual dashboard, simsense generated controls and displays augment the character’s physical awareness. Sensory inputs (like thermographic images and radar scans) and other display information overlay themselves over the windshield or side windows in a “heads-up display” fashion. Simsense-generated buttons, levers, and other controls appear on blank surfaces in the cabin interior (or sometimes floating in mid-air) and can be made to minimize or disappear at the user’s desires. However, the character can still physically see and hear everything going on (mostly in the cabin interior) and still retains physical control of his own body.

Operating a vehicle through the virtual dashboard incurs several advantages and disadvantages, as described under *Datajacks*, p. 25.

Man in the Machine

Rigging a vehicle is an entire stage beyond the virtual dashboard. When a rigger goes in the machine, the experience is vastly different. All perception of the physical world melts away and the rigger loses control of her physical body. The vehicle *becomes* her body, and bodily actions serve as symbolic commands for various vehicle operations. The specific simsense details tend to vary from model to model. One model might overlay sensory data over a three-dimensional bird’s-eye view, while another will opt for a multifaceted display window a la a fly’s-eye view.

For more details on rigging a vehicle, see *Vehicle Control Rig*, p. 26.

Other Control Systems

If a vehicle is equipped with remote control adaptation (see p. 130), then it may be operated as a drone by a rigger with a remote control deck. Drones may be controlled via captain’s chair mode (see p. 154, *SR3*), in a similar manner as the virtual dashboard. In this case, however, pop-up windows appear suspended in midair around the user, showing the point of view of any and all drones, a bird’s-eye overlay of the drones positions, or any other display information the user wishes to see. If a rigger (assuming she has the VCR implant) wants to directly control a drone, she makes a virtual leap through a window and goes into the machine—hence the term “jumping into a drone.” A rigger engaged in a captain’s chair still maintains physical contact with her immediate environment; however many riggers usually “blank out” physical inputs to eliminate distractions and focus all their attention on their drones.



Metahuman Adjusted Controls

Because dwarfs and trolls face difficulty when operating vehicles designed for standard human body sizes, vehicles must be modified to fit their unusual forms. See *Adjusted Controls*, p. 127, for details on this option.

SAFETY SYSTEMS

Commercially sold vehicles are required by law to feature seat belts and air bags for forward-compartment passengers; many jurisdictions also require travelers to wear seatbelts or risk hefty fines. Air bags are frequently disabled by both security personnel and shadowrunners, as a minor collision may set them off—a serious hindrance in the middle of a chase. Seat belts and air bags may also make it difficult to escape a crashed vehicle in a hurry.

To prevent the targeting of a vehicle's occupants by line of sight magic, most modern vehicles use mirrored or darkly tinted windows.

A number of other safety systems are available as vehicle customizations (p. 122), including advanced passenger protection systems, crash cages, roll bars, enviroseal systems and even life support. Some vehicles incorporate armor, and may feature specialized defenses such as concealed armor or smart armor systems.

Safety System Rules

Whenever a vehicle suffers Moderate or higher damage from a collision or Serious or higher damage from some other source, roll 1D6 for each air bag. On a result of 1–3, the air bag inflates, pinning the passenger and obstructing line of sight for a full Combat Turn. Air bags automatically go off whenever a vehicle's Condition Monitor reaches "Destroyed."

If a character is protected by a seat belt or air bag during a collision or crash, the Damage Level suffered by the passenger is reduced by one level.

Seat belts normally require a Complex Action to put on and a Simple Action to take off. A character secured by a seat belt and/or air bag must make a successful Strength (4) Test to escape from a crashed vehicle.

Air bags may be easily disabled with an appropriate Vehicle B/R (4) Test, with a base time of 5 minutes. Note that motorcycles do not have seat belts or air bags.

SECURITY SYSTEMS

In 2061, keys are no longer used to gain entrance to or start vehicles. Standard maglocks are used instead, secured with passcodes, passcards or biometric prints. The security system protecting a vehicle may be instructed to sound an audible alarm or silently contact the police, depending on the system. Security systems that shock the intruder with electricity or set off explosives are also available through certain underworld dealers.

Some security systems use the vehicle's sensors to identify anyone who approaches too closely to the vehicle and will issue an audible alert to intruders who are not carrying a magnetically detectable passcard. Most of these messages are pre-recorded, but some riggers program slightly more menacing

proximity warnings. These systems may also be programmed to take action if an intruder actually makes contact with the vehicle. Many security systems are issued with a simple radio transmitter that allows the user to activate or deactivate the system at a close range. Advanced systems also allow a user to start the vehicle or manipulate its onboard systems via radio.

Vehicle security systems and options are described in detail on p. 150. Systems like GridGuide offer additional vehicle security options, described on p. 151.

Breaking Into and Hotwiring Vehicles

To break into a vehicle, the vehicle's external maglock must be defeated through standard means (see p. 235, *SR3*), as well as any additional features of the security system. Likewise, if the maglock on the vehicle's controls is defeated (whether manual, datajack or rigged), the vehicle may be started, driven and otherwise manipulated.

ELECTRONIC SYSTEMS

Cruising just ain't right if you don't have a set of deep bass speakers and a cranked-to-the-max stereo system. FM/AM radios are a thing of the past, replaced with easy access music chip players, Matrix audiocasts and interior trideo sets. Though accessing a sim while operating a vehicle is illegal, many vehicles do sport simdecks for passengers. Almost any electronic device can be plugged into a vehicle through an electronics port (see p. 146), allowing it to draw power directly from the vehicle's power plant.

Onboard Computers

In 2061, every vehicle (including motorcycles) comes equipped with an onboard computers, which is automatically linked to the vehicle's autonav, sensors, security system, datajack port and/or rigger adaptation. Like any standard household computer, these computers can be used to store data, run simple applications and so on. Though basic computers only feature 100 Mp of storage memory, extra memory may be purchased at a cost of 20 nuyen per MP.

Matrix Links

Most vehicles in the world of *Shadowrun* are also equipped with a Matrix connection. Each onboard computer features a built-in cellphone, accessible through controls on the dashboard, or the virtual dashboard. As long as this cellphone is registered to a user's Matrix service provider (MSP) account (see p. 36, *Matrix*), this phone can be used to make and receive calls, pages, faxes and so on. It can also be used to access the Matrix in tortoise mode (see p. 42, *Matrix*). However, these onboard phones do not have enough bandwidth to handle full simsense Matrix connections; a character who wishes to access the Matrix using a cyberterminal or cyberdeck from the vehicle needs a wireless link of some sort (usually cellular or satellite, see p. 60–61, *Matrix*).

Dealer MSPs

Many auto companies and dealers operate their own MSP services specifically directed at the needs of vehicle operators.



Most companies will provide an MSP account free for one year with a new vehicle purchase, though additional time or new accounts can also be purchased. These accounts allow Matrix channels (see *MSP Services*, p. 35, *Matrix*) to be accessed via trid units directly from the vehicle. Many of these vehicle MSPs offer additional services, such as downloadable autonav map files, weather and traffic reports, emergency service assistance and concierge services such as arranging hotel reservations or locating nearby restaurants.

Vehicle Transponders

The built-in cellphone within each vehicle also doubles as a transponder, continuously broadcasting the vehicle's unique transponder code, license number, vehicle model and speed to the surrounding area. If the vehicle has an autonav GPS system, the transponder will also broadcast its coordinates and direction.

These transponders serve several purposes. First, they serve as an additional level of safety by allowing vehicles to be more easily identified by autonav systems. Reduce the Signature of transponder-broadcasting vehicles by 1. Secondly, they interact with traffic management systems such as GridGuide (p. 15), allowing the vehicle to be recognized by and take advantage of such systems. Thirdly, they allow vehicles to be monitored and identified by law-enforcement, who can scan for moving violations through GridGuide and similar systems.

Naturally, both security agencies and shadowrunners view the transponder as a detriment, and so either disable the transponder via the onboard computer or manually disconnect it. Some jurisdictions require vehicles to have working transponders. Should a vehicle be detected by GridGuide or a similar system without one, the vehicle's license plate will be scanned and the vehicle's owner will be notified by email of the problem—along with a seven-day fix-it ticket.

For jamming and electronic warfare purposes, consider vehicle transponders to have a Flux rating of 1. Aircraft and ships carry transponders that broadcast over a longer distance, and so have a Flux rating of 3.

LICENSE PLATES

Most license plates are essentially identical to their counterparts of over 60 years, simple plates of metal with embossed alphanumeric characters. In most areas it is required to have license plates both in the front and rear of the vehicle so that automated cameras can reliably identify the vehicle. Though some states toyed around with placing laser-scanable barcodes on license plates, image recognition technology has improved to the point where the alphanumeric plates are easier to capture and identify with video.

Police often conduct random sweeps looking for cars that have been reported stolen or plates which do not match the vehicle.

FULLY LOADED

The systems and options described above are just the beginning of the many features available to vehicles in the world of *Shadowrun*. Many other options can be had, from convertible tops to energy-charging SunCell batteries. These

options are detailed under *Vehicle Design* and *Vehicle Customization*, pp. 102–55.

AUTOMATED DRIVING

Metahumans are slaves to convenience, and nothing is easier than sitting back and letting your car do the navigation and driving for you.

AUTONAV SYSTEMS

Virtually every vehicle that flies, floats or rolls incorporates some form of autonavigation (commonly shortened to “autonav”) system in it. The simplest autonav is a collision-avoidance system that uses proximity detectors (typically ultrasonic detectors) to detect if a large object (like a car or person) gets too close and reflexively swerves the vehicle away or slows it down if that happens. This is a standard feature on most vehicles, even motorcycles, due to state safety regulations.

For more details on autonav systems, see p. 127.

Self-Driving Autonav

Though collision-avoidance systems can temporarily take control of a vehicle to avoid an accident, they aren't “self-driving.” Self-driving systems that can drive from point A to point B without driver supervision are fairly common, but they're generally not a “standard feature.” Most self-driving autonavs work closely in conjunction with area navigation and traffic control systems such as GridGuide (see p. 15). Even motorcycles can take advantage of self-driving autonavs, though they require specialized gyroscopic and balancing gear (see p. 129).

Should a self-driving autonav system fail, the driver will be notified and control automatically reverts back to manual. If the driver is non-responsive, the vehicle pulls itself over and sends an emergency call.

Autonav GPS

The famous global positioning system (GPS) is still an important part of modern transportation systems. The principle of GPS is simple. An extensive network of satellites orbits above the earth, each broadcasting its own unique signal. On the ground, a GPS receiver picks up the signals from at least four satellites and uses triangulation to calculate its position on the ground, including latitude, longitude and even elevation. By itself this doesn't mean much, but when that data is cross-referenced with a map (on paper or chip) a user can know where he is, with varying degrees of precision. All autonav systems at Rating 2 or higher carry GPS receivers.

Despite its success and staying power, GPS has its drawbacks. The aging satellites in the constellation have to broadcast over a wide area, which results in a relatively weak signal that can be easily drowned out or shielded. For all intents and purposes, GPS is practically useless underground or inside (where solid matter can block the signal), as well as within any major urban sprawl, which has too much electronic noise to allow a clear signal. For jamming and electronic warfare purposes, consider GPS signals to have a Flux rating of 2.





GRIDGUIDE

GridGuide is a navigational system used in various sprawls, particularly in the Americas and along both sides of the Pacific Rim. GridGuide combines the position-locating capabilities of the autonav GPS system with the information-distribution of a Matrix host to effectively manage a megaplex's traffic flow and regulation.

GRIDGUIDE COMPONENTS

GridGuide uses a network of sensor suites attached to cellular towers and street poles strategically placed along highways and major street routes and intersections. Each sensor suite is comprised of three components: a transponder antenna, directional radar and a video camera.

GridGuide suites have a Sensor rating of 1.

Transponders

The transponders receive and send signals to all of the active vehicles on the street. Each transponder broadcasts its physical location, allowing a vehicle's autonav to triangulate its position. The antennas also pick up the transponder signals of vehicles on the street, identifying them and logging the data on the GridGuide Matrix host.

GridGuide transponders have a Flux rating of 1; they are easily jammed.

Directional Radar

Directional radar is used to monitor traffic, individual speeds and the number of vehicles in individual lanes. This data is logged within the Matrix and used to calculate the relative volume of traffic within an area. When a certain threshold of vehicles is reached, GridGuide begins diverting traffic through other channels.

Video

Video cameras are also used to monitor traffic, with one at the end of each street. These cameras are also angled to capture license plates. Video footage is frequently requested by law enforcement as the cameras often capture recordings of street crimes. For this reason, GridGuide video cameras are a prime target of gangsters and vandals. These cameras typically have thick casings to protect them from these frequent attacks.

GRIDGUIDE HOSTS

The area covered by a GridGuide system is broken down into regions, each managed by a separate GridGuide Matrix host. GridGuide hosts are usually contained within a PLTG managed by the governing municipality. These hosts process all of the data concerning traffic for that area and re-route vehicles to avoid jams and congestion.

From a Matrix viewpoint, these hosts feature massive holographic maps, with each known vehicle indicated by an icon. An intruder can learn much from these hosts, as described under *Hacking GridGuide* (p. 16).

TRAFFIC MANAGEMENT

Every street in a megaplex has a maximum "traffic rating"—the maximum number of vehicles that can be on a specific road at any given moment. The task of GridGuide is to keep every single street in the 'plex below its rating.

More importantly, the system has to react to traffic accidents, emergency responses and road construction. In the event of a wreck, GridGuide is the first to know. It dispatches police, rescue crews and even tow trucks to the site of the accident. For those drivers who desire to rely on manual controls the system will transmit data on the current status of the route being taken and even make polite suggestions for alternate routes. During the course of your drive to work, GridGuide may have to reroute your vehicle multiple times depending on the dynamics of the morning commute.

The system is also responsible for metered street parking throughout the sprawl. When GridGuide detects a vehicle parking in a metered area, it records the time from when the vehicle is turned off until it moves from the spot. As soon as the vehicle departs, the total parking time is automatically deducted from the account of the vehicle's registered owner. If there aren't sufficient funds in the account, a ticket is sent to the individual via email.

LAW-ENFORCEMENT USES

GridGuide has a number of applications for use by law-enforcement personnel. Police are no longer tied up with traffic regulation duties, as the GridGuide does it for them. GridGuide automates the process for speeding tickets and moving violations, as offenders are immediately detected and fined. Fines are automatically deducted from the registered owner's account, as are license points (if applicable in that area). On the plus side, motorists are no longer hampered by traffic stops and court appearances. GridGuide, autonav and sensor data are all the proof needed. Instead, they get a friendly warning through their onboard computer, and everything else is automatic.

GridGuide also gives priority to emergency vehicles that are responding to a situation, such as police cars, fire trucks and ambulances. GridGuide will automatically switch traffic signals and route other traffic out of the way of emergency vehicles en route. In the event of vehicle pursuit scenarios, GridGuide will also route traffic away to avoid potential harm to law-abiding citizens.

GridGuide also keeps records of the routes taken by vehicles, duration of trips and so on. This information can be used to place a suspect at the scene of a crime.

COVERAGE

Systems such as GridGuide are intended to cover an entire sprawl, but even at their optimal performance they still fall short. GridGuide systems typically monitor only major traffic arteries within a metroplex—alleys, parking lots and garages are not monitored. GridGuide systems are sometimes used in non-urban areas along highways and national roadways, though coverage tends to be spottier over larger and more remote areas.



And GridGuide can work its magic only in areas where it is properly maintained, meaning that many run-down areas of sprawl have limited or non-existent coverage. For example, the Barrens of Seattle have no GridGuide presence, and system hardware in the rougher areas of Auburn and Everett is usually in a state of disrepair. The lower the security rating for an area, the less system coverage there is going to be. Areas with a C rating will have inconsistent coverage at best, areas rated D or Z will have no GridGuide at all.

Because of the system's Orwellian potential, GridGuide sensor suites are frequent targets of vandals. The video cameras are the first to go. They're easy to spot, have some resale value and they seem to offer gangsters challenging targets for marksmanship practice. Transponder antennas often end up being torn off and used to fly pennants on gang vehicles. There are even a couple of gangs that use stolen GridGuide directional radar units as perimeter security for their headquarters.

GridGuide is not the only system of its type. ALI, which stands for *Autofahrer Leit- und Informationensystem* (German for "driver guidance and information system") is a regional navigation system first developed in Germany. It's popular in continental Europe, the Middle East, and parts of Africa. In most aspects, GridGuide and ALI operate in the same manner, though ALI also covers large sections of autobahn roadway.

GRIDGUIDE AND ELECTRONIC WARFARE

Transponder signals are fairly weak so most uses of jamming and electronic warfare will wreak havoc on GridGuide, easily blacking out an entire city block or more. Electronic deception (see p. 32) can also be used to feed false transponder data. If the operator is good enough, he or she can even create a sizeable number of transponder ghosts that will cause GridGuide to reroute traffic in a vain attempt to maintain the maximum traffic flow rating. This can serve to create a clear escape path for an intrepid runner or make it very difficult for security ground units to converge effectively on a suspect.

HACKING GRIDGUIDE

GridGuide hosts are a sweet target for deckers, as they carry a wealth of data on vehicle movement. A hacker in a GridGuide host can conceivably locate a vehicle and track it through the sprawl or even redirect it if it's using autonav. Traffic data within the host can also be falsified so that it feeds manually driven vehicles fake navigational data.

Because the potential for wreaking havoc and injury by messing with GridGuide is quite high, GridGuide hosts are well protected, usually rated Red-Hard. These hosts are almost always crawling with security deckers of Equal or Superior ratings (see *Creating Prime Runners*, p. 83, *SRComp*). Black IC is often used, and each host has at least one backup host (if not a third) for its data and tasks.

If a decker bypasses these defenses, he has many options. To locate a specific vehicle's data requires a Locate Slave operation. To monitor transmissions and data to and from the vehicle requires a Monitor Slave operation. This data can be manipulated with a successful Edit Slave operation. If the vehicle does not have autonav GPS to pinpoint its actual position, its physical

location can be determined with a Triangulate operation. If the vehicle is being piloted by autonav, then commands can be issued to it with a successful Control Slave operation; this can be used to force a vehicle into an accident or onto a new course. Other commands may similarly be issued to the onboard computer, as described under *Remote Vehicle Access*, below. Logged information on a vehicle's movements can be found through a Locate File operation and changed or erased with an Edit File operation.

GRIDLINK

The GridLink system is often tied into a GridGuide but can be deployed separately. GridLink allows electric vehicles to drive without using much or any of their own power. Electromagnetic coils are built into the roadway and interact with a GridLink unit (see p. 126) on the vehicle. The field interaction produces an electric current that is enough to power the vehicle under normal conditions. Most systems are calibrated to allow only enough power to restrict vehicles to maximum speeds of 10 kph over the speed limit.

Due to the physical structure of the GridLink, roadway damage can reduce the performance of the system. The coils are watertight, so mild weather doesn't affect them, but frost heaves, earthquakes and anything else that can alter a roadbed can cause outages. Crashes of heavy vehicles that can tear up a roadway can damage the system as well. Roadway construction has to be coordinated to ensure the power routing is not interrupted.

Vehicles equipped with GridLink need not worry about power consumption while traveling in the better areas of a city (Security Rating B or higher), so long as they stay under the local speed limit. If a vehicle exceeds the speed limit, GridLink cannot provide enough power and the vehicle must rely on its own power source. Sometimes, especially in larger cities during rush hour, the GridLink power grid overloads and crashes, leaving many motorists stranded (or at least those who have not recharged their vehicle batteries lately).

The GridLink system is metered and users are identified through their GridLink units. The monthly charges are automatically deducted from the user's account. Though rates may vary from city to city, the average monthly charge for GridLink service is equal to 10 nuyen divided by the vehicle's Economy rating (see p. 62 for more information on Economy).

REMOTE VEHICLE ACCESS

The interconnected nature of modern vehicles means they are accessible or vulnerable (depending on how you look at it) to remote manipulation. A vehicle's onboard computer can be remotely accessed through a cellphone or any other wireless link. To do so, the remote user must know the vehicle's comm-code and the computer's passcode or the appropriate passkey. Each vehicle computer has a special access passcode installed by the manufacturer. This allows the dealer's MSP to remotely access the vehicle for diagnostics and emergency services. Though this passcode is allegedly secure, a clever hacker may be able to track it down. Security agencies have also been known to use these passcodes for surreptitious surveillance



and tracking. For these reasons, many shadowrunners disable the passcodes. This requires a Computer (8) Test.

Quite a bit of info can be obtained remotely from a vehicle's computer: sensor information and feeds, diagnostic reports and malfunctions, programmed autonav info and so on. The computer can also be instructed to remotely manipulate the vehicle's locks, turn on headlights and turn the engine on. Dealer MSPs will sometimes use their passcodes to perform diagnostics, remotely unlock doors for stranded customers and so on. Most dealer MSP services also have an emergency notification that alerts them when an air bag has been deployed; the MSP immediately remotely activates the cellphone's speaker mode to query the vehicle's occupants, remotely accesses the vehicle's sensor input and alerts the nearest emergency services.

VEHICLE TERMINATION CHIP

An additional "public security" feature included in commercially sold vehicle computers is the vehicle termination chip. When this chip receives the proper vehicle termination code (received through the computer via cellphone or autonav) it will shut the vehicle down and lock the occupants inside. In theory, this allows police to remotely deactivate a stolen or runaway vehicle, thus reducing the risks inherent in car chases. While this has greatly reduced the amount of carjackings, it obviously opens up other disturbing possibilities.

As soon as a vehicle termination chip receives the code, it executes a series of overriding instructions. First, all other inputs are immediately locked out—steering, accelerator, brakes, electronic door locks, windows and even communication systems (including panicbuttons) no longer respond to the operator's input. Second, the autonav is activated and given control of the vehicle. Third, the autonav is either instructed to stop or execute a single programmed route. If the car does not have a self-driving autonav, it simply decelerates safely until stopping. To reactivate the vehicle, the termination code simply needs to be sent a second time.

Naturally, this chip is the first thing any self-respecting rigger removes from her vehicles and drones. However, shadowrunners have learned to employ this device as readily as the police and have even been known to surreptitiously install this chip in vehicles that lack one. For more details on the vehicle termination chip, see p. 101.

Like transponder codes and other vehicle data, vehicle termination codes are stored away on protected DMV Matrix hosts; these hosts are rated Red-Hard.

HACKING YOUR VEHICLE

Shadowrunners aren't in the habit of allowing police to turn their vehicles off, nor are they likely to allow a system like GridGuide to slow them down.

HACKING VEHICLE TRANSPONDERS

Because operating a vehicle without a transponder is considered suspicious, runners have invented several alternatives to simply disabling transponders.

Fake Transponders

One option is to have a decker whip up a fictitious transponder registration. As long as the transponder code matches what's in the DMV database, no one is likely to notice the difference. To insert the false transponder code, the decker needs to penetrate the host (typically Orange-Hard or Red-Average), and perform successful Locate File and Edit File operations. The transponder itself must also be reprogrammed through the vehicle's computer, requiring a successful Computer (Programming) (6) Test and a base time of 10 minutes.

Transponder Libraries

Another alternative is having a registration library hooked up to the transponder. A registration library is simply a program that continually overwrites the transponder code with a fictitious one, usually every few seconds. This makes it difficult for security to zero in on the vehicle's location. Transponder library chips are detailed on p. 100.

HACKING LICENSE PLATES

The simplest way to prevent your license plate being used against you is to simply remove it or cover it with enough muck to make it illegible. Each of these time-honored methods tends to be suspicious, and both can get you pulled over by the police.

Stealing License Plates

Stealing a license plate from another car is easy, requiring only a screwdriver and a minute or so. However, if a police vehicle or drone scans the vehicle, the model of the car may not match and/or the transponder information may conflict. Consequently, this ruse works best when a decker infiltrates the appropriate DMV host and alters the data so that it matches (requiring a Locate File and Edit File operation in an Orange-Hard or Red-Average host).

Morphing Plates

The high-tech solution to the license plate problem is to use a "morphing plate." As described on p. 99, morphing plates use smart materials that can be shaped into embossed characters, though a close examination will show that it is not a real plate. Morphing plates can be linked to a transponder library, to automatically correspond with whatever transponder code info your library chip is transmitting at the moment.

SPOOFING GRIDGUIDE VIDEO

Many shadowrunners simply accept the fact that their vehicles are going to be caught on GridGuide video. They get in the habit of either ditching their cars after runs or using stolen cars instead.

Using chameleon paint to disguise a vehicle is another option. Chameleon paint is a form of paint that alters its pigmentation as a reaction to electrostatic discharges. Chameleon paint can't be controlled as well as ruthenium paint, but it enables a driver to quickly change a vehicle's paint job. Chameleon paint is detailed on p. 153.



MESSING WITH VEHICLE TERMINATION CHIPS

Most runners deal with these chips by simply disconnecting them and considering it a closed subject. Disconnecting a chip requires a Computer (6) Test to simply disable it via the onboard computer or an Electronics B/R (5) Test to physically remove it, both with a base time of 10 minutes. Termination codes are hardwired into the vehicle termination chip, and so cannot be reprogrammed; an entirely new chip must be used instead.

However, there are those who don't like the idea of some slag jacking their ride—and who can blame them. These runners instead meddle with the system so that the chip cannot be reached through standard vehicle remote access, but can be activated through a different wireless link. To do this, they simply isolate the termination chip, so that when input comes through the cellphone or autonav to activate it, the computer can't find it. They then set up the chip to receive input from another linked device—usually a radio or cellphone of their own choosing—so that they can still activate it if they need to. This operation requires both a Computer (Programming) (6) Test and an Electronics B/R (5) Test, each with a base time of 30 minutes.

DRONES

As described on p. 154, *SR3*, the most basic definition of a drone is a vehicle designed to function without the need of a physical operator. This broad definition covers everything from conduit crawlers no bigger than one's hand to automatic driverless city taxis, all the way up to massive unmanned road trains that can drive from coast to coast at all hours, stopping only to refuel.

Many drones perform their functions away from the public eye. Most can be found in industrial plants and facilities, generally performing tasks that are considered too difficult or dangerous for ordinary metahumans. Most industrial tasks are so routine and automatic, they warrant little supervision. Controlling industrial drones is usually administered by a slave node in the plant's Matrix host system. While technically possible, it is rare for a rigger to actually "jump" into an industrial drone, due to their low combat value and limited mobility.

Though some drones ply the roads, rails, waterways or airways like ordinary vehicles, their occurrence is relatively uncommon. Though they're more than competent drivers, drones sharing the highways with flesh-and-blood drivers makes traffic regulators (and the general public) nervous. In the event of serious accidents, drone drivers can lead to some messy legal and media entanglements. On the road, drones usually fill one of two functions. The first is long-distance hauling, where drivers could risk sleep deprivation from long hours. The second is intra-city taxi service, where routes are pre-programmed and can be easily marked and identified.

While drones may be unpopular on the roadways, they are very popular for managing and maintaining them. Many traffic police units, including Lone Star, employ drones as stand-in traffic lights, thus rendering obsolete the traffic cop directing traffic with only a whistle and arm signals. Drones are also excellent at constructing, maintaining and repairing roads, rails and waterways, and they're certainly more productive than traditional union road crews that stand around during the summer in hard hats and orange vests while holding up traffic. Drones are also suitable for other municipal services, such as fire protection and cable servicing (both electrical and Matrix).

Rescue crews use drones to check for gas or chemical leaks and search inside crashed vehicles for survivors. They are sent out to check for structural damage of bridges and sewer tunnels. Submersible drones can check for survivors of boating accidents or cars that crash into waterways.

House-cleaning drones have slowly begun to work themselves into people's homes, though they generally remain too expensive for lower income households. Among the elite, anthroform butlers and man servants are in vogue, as are exotically designed drone "pets."

The drones that most shadowrunners are familiar with, however, are those used for surveillance and security work. Surveillance drones are the more common of the two, used for legitimate purposes such as reporting, traffic watch and weather observation, as well as shadier ends such as espionage and paparazzi photography.

Most shadowrunners are well acquainted with armed security drones, as well. Armed drones are widely used in restricted access areas, where all that's expected of them is to patrol a well-known perimeter and react to anyone who's not supposed to be there. Despite their superior battle potential, armed drones are not popular in the ranks of most militaries. War is a notoriously unpredictable situation, and, as demonstrated in many Desert War episodes, drones have difficulty adapting to the rapid and sudden changes that occur on the modern battlefield. Many tacticians are also less than enamored with the notion of employing killing machines with no human supervision side-by-side with friendly troops or near civilians.

THE POWER PLAYERS

Building vehicles is a resource-intensive business that requires large amounts of capital, labor and raw materials. Only the biggest companies dominate the various vehicle fields—automotive, aeronautics and naval tech.

Of all the assorted fields and specializations, only two companies dominate across the board in all major fields: Ares Macrotechnology and Saeder-Krupp. Most of the other megacorps, as well as a few second-tier corps, tend to specialize in one area, only dabbling in others.

POLE POSITION: ARES MACROTECHNOLOGY

With the takeover of General Motors in 2059, Ares has cemented its reputation as *the* number one vehicle manufacturer in the world. Even before buying out GM, Ares had solidified its position in the aerospace industry through its buyout of NASA from the United States. Additionally, General Dynamics (a subsidiary of Ares Arms), has strong market share in the shipbuilding industry. The buyout of GM added the well known brands of luxury cars (Buick, Cadillac and Pontiac, to name a few), trucks (GMC), and components (AC Delco, Powertrain). Other lesser-known subsidiaries of Ares include Mostrans, the Russian hovercraft manufacturer, and Pratt & Whitney, the venerable maker of aircraft engines.

HOT PURSUIT: SAEDER-KRUPP

It's no surprise that this European industrial conglomerate is in second place behind Ares. Built around the nucleus of the well-known Bavarian automaker BMW, Saeder-Krupp counts among its subsidiaries Messerschmidt-Kawasaki, the Eurocar automaker consortium, Vulkan, and GIAT Industries. Additionally, Saeder-Krupp maintains a lot of behind-the-scenes clout through its ownership of various component manufacturers. The only thing that keeps Saeder-Krupp from challenging Ares as vehicle king is the Eurocorp's focus towards traditional heavy industrial goods and services, such as power generation, manufacturing equipment, and resource mining.

ROAD WARRIORS

Surprisingly, the leaders of the automotive industry (behind the Big Two, of course) are mostly second-tier AA corps. Only Mitsuhamma stands out as the AAA leader in automobiles besides Ares and Saeder-Krupp. One possible explanation is that auto manufacturing tends to be capital-intensive, while most of the megacorps prefer to have their fingers in every pie. Consequently, few can concentrate enough to be a major force in the automotive industry.

Chrysler-Nissan

This odd marriage of an American automaker and its Japanese competitor in 2038 has made for some strange bedfellows. Although Chrysler (which also owns the European automaker Daimler-Benz as well) remains nominally in control of the conglomerate, Nissan is the real power behind the throne here. Since its merger, Chrysler-Nissan has sought continuous expansion of its market share in the auto industry, exemplified by its recent assimilation of Toyota in 2060.

Ford

As the only member of the Big Three American automakers to remain independent, Ford finds itself caught between a rock and hard place. Ford has managed to survive by playing Ares and Chrysler-Nissan against each other. Additionally, Ford has diversified by making inroads in the vehicle components industry, as well as expanding outside the North American market through its ownership of the European Motor Company, maker of low-price European vehicles such as Opel, Peugeot, Skoda, Jaguar, Range Rover and Citroën. It also gained a presence in the Far East by buying out Mazda and Kia. Ford also retains the exclusive and lucrative contracts for manufacturing certain DocWagon and Lone Star vehicles, despite the best attempts from other corps to steal them away.

Mitsuhamma

While Mitsuhamma owns or makes few brand-name autos, it maintains an indirect presence in the automotive industry through its production of auto components, particularly drones, robots, and electronic control systems. Mitsuhamma is also the leader in the development of the vehicle control rig implant and other riggerware. Mitsuhamma is still pretty sore over being trumped by Ares' development of the BattleTac IVIS and FDDM drone systems and is looking to produce its own competing line in response.

Third Gear

The remainder of the automotive market is fought over by numerous corporations, ranging in size from AAA to A. The only two other megacorps to have any notable presence are Aztechnology and Renraku. Noteworthy second-tier corps include Saab and Daiatsu-Caterpillar. Third-tier multinationals include Honda and Mitsubishi, both of whom have their fingers in other markets through the manufacture of combustion engines for other vehicle models (Honda in marine technologies and Mitsubishi in aeronautics).



Other groups worth mentioning are the assorted makers of specialty automotive components, everything from autonav systems to pressure transducers to thermostats. Most of these widget-makers tend to be very small, from third-tier multinationals to unrated national plants. Because of their small size and individual niche markets, they have remained independent of the big players. However, the large majority are bound to the big shots through habitual associations and contractual ties. (For example, Delphi Harrison, a Michigan-based components-maker, is independently owned and operated. But through its business contracts with GM, it has practically become another subsidiary of Ares Macrotechnology.)

THE WILD BLUE YONDER

Although the aerospace industry covers both aeronautics (aviation technology) and space development, both branches have their own special requirements, lines of research and production bases. Consequently both branches have their own different sets of movers and shakers.

The aeronautical industry is another field that is curiously dominated by second-tier AA corps. Leading the way (after Ares and Saeder-Krupp, of course) are two West Coast corporations, the Seattle-based Federated Boeing and the California-based Lockheed Corporation. Trailing closely is Novatech, which has lost ground trying to shore up its assets after splitting from Fuchi.

Federated Boeing

As the largest independent aircraft manufacturer, Federated Boeing is best known for its various lines of commercial aircraft and suborbitals. The main corporation generally focuses on the production of commercial birds and military support aircraft (such as cargo planes, fuel tankers, and electronic warfare). Production of combat fighters, bombers, and ground-attack aircraft falls under its subsidiary, McDonnell Douglas.

Lockheed

This warbird maker is actually an amalgamation of four different aeronautical companies: Lockheed, Martin Marietta, Northrup, and Grumman. As such, insiders and pundits often refer to Lockheed by its nickname of "LockMart-North." Lockheed is known predominantly for its production of fixed-wing combat aircraft, but it has also diversified into the production of aerial drones (fixed, rotor, and vector-thrust), autogyros, and ultralights, in combat and non-combat models.

Lockheed also has many assets in avionics and piloting displays, largely leveraged off its defense business. Lockheed owns many small companies which specialize in everything from heads-up displays to smart auto-pilot systems to advanced radars.

Novatech

Although Novatech makes very few aircraft, it still remains a force to be reckoned with in the aeronautical

industry through its development of avionics and propulsion systems. Through its subsidiary Walker Aerodesign, Novatech possesses a large market share of aviation electronics and navigation systems. The few aircraft models Novatech does produce are hypersonic HSCT carriers and suborbital aircraft.

Novatech also owns many former Fuchi assets involved in programming flight radars and design software.

Sikorsky-Bell

This commercial partnership between American helicopter manufacturers Sikorsky and BeLTV, along with Kamov Aeronautics, has produced a giant that has practically cornered the rotary-wing and tilt-wing market. Its main competitors in helicopters include the Italian-based multinational Agusta-Cierva and Hughes (maker of the well known Stallion and Airstar helicopters).

On the Tarmac

Several other AAA and AA corps also have their fingers in the aeronautical industry. These include the German conglomerate IFMU, Airbus, Renraku Asia, Aztechnology (through its subsidiaries Embraer and Dassault), and the British arms manufacturer IWS.

ANCHORS AWAY

Because of the immense capital required to build a ship, only the largest companies are involved in the development of naval and marine technology. Shipbuilding and watercraft have labored in obscurity for a long time, but the recent race spurred by Dunkelzahn's will to build an underwater arcology has brought it back into the spotlight again.

Kvaerner-Maersk

Perhaps the biggest news is the merger of the Norwegian-based Kvaerner and the Danish Maersk shipbuilding companies. In response to the new interest in naval technology-caused by Dunkelzahn's will, as well as the threat of mutual competitor Shiawase acquiring Fuchi Pan-Europa, it's believed these two Scandinavian corps merged for mutual protection. The merger of the two has resulted in the largest shipbuilding company in the world, eclipsing even both Ares and Saeder-Krupp's shipbuilding operations.

Shiawase

The maker of the first corporate warship after the establishment of extraterritoriality, Shiawase had been known for a long time as the dominant shipbuilding company in the world. Recently, however, Shiawase has seen its market share diminish, with the merger of the two largest AA shipbuilders, as well as the entry of Yamatetsu and Wuxing into the scene. Shiawase specializes primarily in the construction of heavy surface ships for both commercial and military purposes.

Yamatetsu

Having been a minor player in naval technology, Yamatetsu's shipbuilding division has taken a sudden surge forward, following the contract from the Draco Foundation for building the first self-sustaining aquacology. Furthermore, joint cooperation with the Russian navy has helped this megacorp to launch its Naval Technologies division. Its expertise in submarines and other underwater vehicles has given Yamatetsu a slight edge over its maritime competitors.

Renraku

Renraku, led by its Australasia division, holds the advantage in this field in the development and production of small watercraft. Renraku also has some expertise in submarine technology, though it remains in the middle of the pack as far as this specialization is concerned.

Proteus AG

Although its North Sea Arkoblocks give Proteus impressive knowledge about building offshore aquacologies, its knowledge of building vessels to get to them (both surface and subsurface) is somewhat lackluster. Though satisfactory, Proteus' shipbuilding capability is still average, compared to its competitors.

Wuxing

With shipping as one of its core businesses, Wuxing has been more of an end-user than a maker of watercraft. Since winning a seat on the Corporate Court, this Hong Kong megacorp has been acquiring more shipbuilding assets. Earlier in 2061 Wuxing won the contract to build six new *SooHong*-class destroyers for the Canton Confederation.

OTHER SPECIALISTS

In a field as diverse as vehicles, there's plenty of room for a corp to make a name for itself by dominating in a specialty market. The following companies do just that, focusing on a few specialty products.

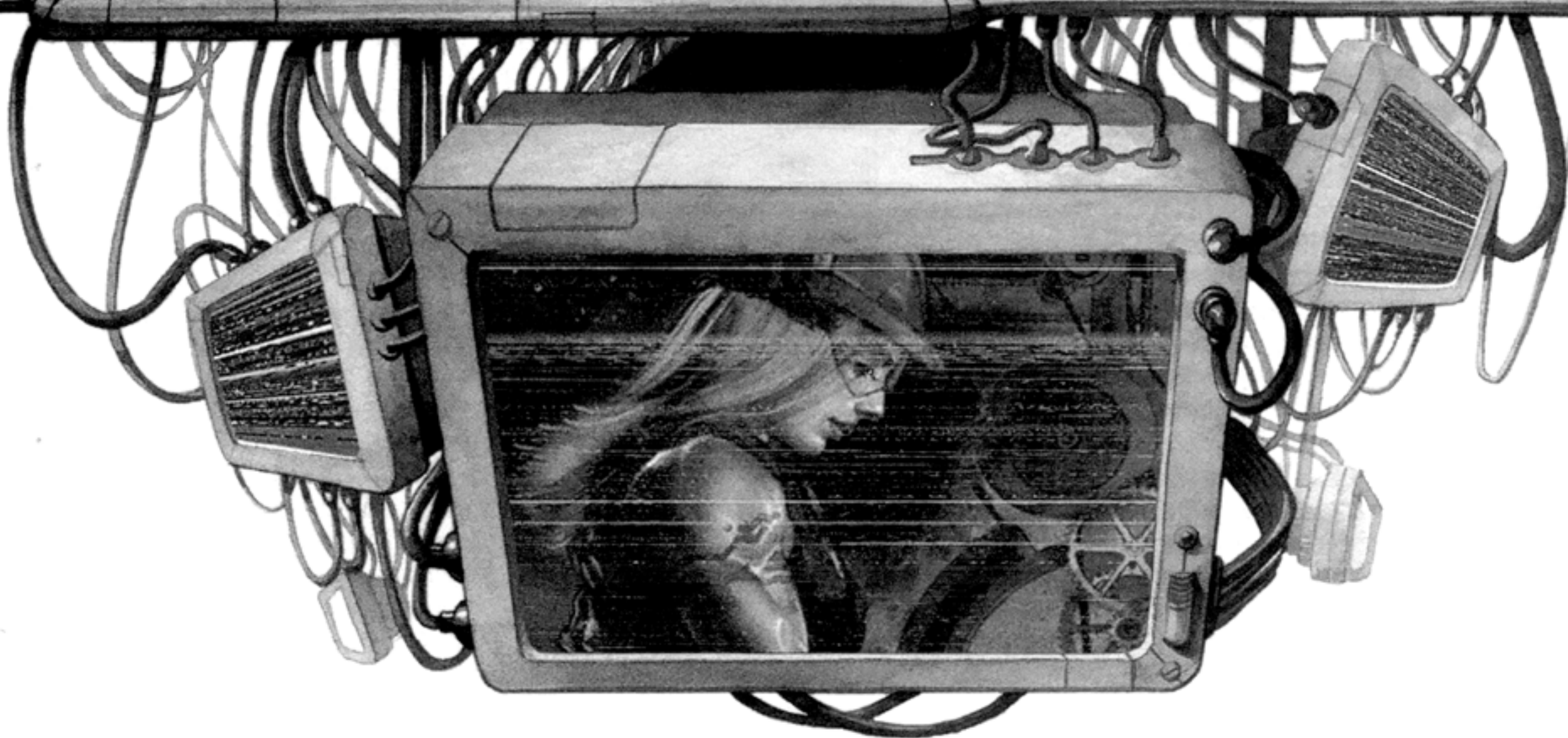
Ruhrmetall

Though living in the shadow of its next-door neighbor Saeder-Krupp, this German industrial has made a name for itself in the development and production of heavy construction vehicles, rail cars and locomotives, and armored combat vehicles. In fact, Ruhrmetall dominates the rail industry in Eurasia and Africa; Ruhrmetall locomotives are a common sight on railroads from Johannesburg to Vladivostok.

Mesametric

This Sioux construction company made its debut in 2058 with the Kodiak, an excavation drone useful for both construction and military purposes. Since then Mesametric has been posting record growth in the construction industry, as well as becoming the dominant producer of military vehicles for the Sioux and Pueblo Nations.

THE RIGGER



Neither fish nor fowl, neither decker nor street warrior, the rigger may be the most unique and misunderstood character in the *Shadowrun* universe. This chapter strips the rigger down to the numbers and rebuilds him to illustrate the process of creating a rigger character.

CREATING A RIGGER CHARACTER

Either the priority system (p. 54, *SR3*) or the point-based system (p. 20, *SRComp*) can be used to create rigger characters.

In the world of *Shadowrun*, anyone who can get a license can drive a car, and many people operate other vehicles as well. But riggers stand apart from standard vehicle users simply because they can *become* the vehicle and control it in ways that a non-rigger can't. Just as deckers are the elite of cyberspace, so riggers are the masters of the roadways.

Riggers come from all walks of life. They drive taxis and trucks, pilot ships and aircraft. They operate camera drones for media crews. Riggers can be found running automated factories with small armies of drones or assisting construction crews with heavy equipment. Police and security agencies, emergency services and the military also make ample use of riggers. As a profession, riggers tend to be workhorses. Too specialized and technological to be considered blue-collar, their hands-on duties and support roles don't qualify them as white-collar professionals either (though their pay might). Many riggers work long hours for years on end, simply to pay off the costs of the cyberware and permits that allow them to be a rigger in the first place. Others find themselves perpetual indentured servants to the corp that hired them and fronted the cash.

Riggers also thrive in the underworld. Many go-gangers or hot rod-infatuated teenagers develop the driving abilities, mechanical skills and reflexes to become professional shadowrunners or criminals. Mob syndicates and influential gangs rely heavily on smugglers to keep their illegal goods in stock, and no one smuggles better than a t-bird jammer.

Both men and women are attracted to rigging, lured by the need for speed or the curiosity that drives them to tear an engine block apart and reassemble it again.





Riggers of all metatypes fill their own niches. Dwarfs are ideal for operating small vehicles, while orks and trolls often take rigging jobs in the shipping and construction fields, where their physical size and strength is a huge benefit. Ultimately, however, it is not the rigger's physical shell that counts. When piloting a drone or controlling a building's security system, it is reaction time, strength of will and pure skill that are crucial for the task.

CHOOSING ATTRIBUTES

When creating a rigger character, Reaction is the most important attribute as it determines a rigger's Control Pool and is the linked attribute for most Vehicle skills. Reaction is based on Quickness and Intelligence, making these attributes important as well. Of the two, Intelligence is especially useful. It is used for perceiving through sensors and it is the linked attribute for Gunnery (the skill used when firing vehicle-mounted weapons) and most technically oriented skills. Willpower is also useful to riggers, especially when they are facing dump shock, ASIST overload or are mentally wrestling another rigger for control of a rigged security system.

CHOOSING SKILLS

Riggers must be proficient in a number of different skills if they want to stay in biz beyond their first runs. For obvious reasons, Vehicle skills are the most important for a rigger to possess. Other skills, such as the various Build/Repair skills, Gunnery and Electronics skills can also prove very useful. Because there are so many Vehicle and Build/Repair skills, rigger characters may be better off placing skills at a higher priority than attributes during character creation.

Build/Repair Skills

Characters use Build/Repair skills for modifying and upgrading vehicles, as well as for repairing damaged vehicles. In addition to the standard Vehicle B/R skills, characters or their mechanics may need the Electronics or Computer B/R skill to install or repair certain vehicle components such as drone pilot programs, electronic countermeasures (ECM) and drive-by-wire systems.

If a particular installation or repair task calls for Skill tests with more than one B/R skill, the character must succeed in all tests to successfully complete the specified task.

If one required B/R test succeeds and another fails, the character can repeat the failed test, but the target number increases by 1 for each subsequent test. The test target number does not return to its original value until the player character increases his or her B/R skill.

When reducing the base time required to accomplish a specific task, a player can combine the successes generated on all required tests. However, if any required test produces a result of all 1s, the entire attempt at the task suffers a disastrous failure.

Electronics Skill

Certain specializations of the Electronics skill are especially useful to riggers. The Control Systems specialization of the

Electronics active skill applies to actions while working with a remote control deck, while the Electronic Warfare specialization applies when conducting MIJI (see *Electronic Warfare*, p. 35).

NEW SKILLS

Listed below are some new active skills and specializations. The linked attribute for active skills, or the parent active skill in the case of specializations, appears in parentheses after the skill or concentration name.

Mechanical Arm Operation (Reaction)

This skill governs the control of articulated arms and other mechanical limbs to grab, carry, pick items up, punch and so on.

Default: Reaction, Walker

Specializations: By vehicle type

Semiballistic (Reaction)

The Semiballistic skill covers the piloting of rocket-boosted parabolic aircraft used for quick international flights. The Semiballistic skill is grouped with Winged Aircraft, Rotor Craft, Suborbital, Vector-Thrust Aircraft, and Lighter-than-Air Aircraft. (B/R)

Default: Winged Aircraft, Rotor Craft, Suborbital, Vector-Thrust Aircraft, and Lighter-than-Air Aircraft

Specializations: By specific vehicle type, Remote Operation

Suborbital (Reaction)

The Suborbital skill covers the piloting of suborbital aircraft (see p. 71). Suborbital skill is grouped with Winged Aircraft, Rotor Craft, Semiballistic, Vector-Thrust Aircraft, and Lighter-than-Air Aircraft. (B/R)

Default: Winged Aircraft, Rotor Craft, Semiballistic, Vector-Thrust Aircraft, and Lighter-than-Air Aircraft

Specializations: By specific vehicle type, Remote Operation

Tracks (Reaction)

The Tracks skill covers tracked ground vehicles, such as tanks and bulldozers. Tracks skill is grouped with Car skill. (B/R)

Default: Car

Specializations: By specific vehicle type, Remote Operation

Vehicle Tactics (Specialization of Small Unit Tactics)

The Vehicle Tactics specialization of the Small Unit Tactics active skill (p. 47, *M&M*) helps characters coordinate the tactics of small groups of vehicles. The specialization works in conjunction with the new BattleTac IVIS system, which enhances the coordination between drones performing a common mission. For more information on the use of this specialization, see *The BattleTac IVIS System* (p. 96).

Walkers (Reaction)

The Walker skill governs the operation of vehicles and drones that use mechanical legs to move around. (B/R)

Default: Reaction, Mechanical Arm Operation

Specializations: By specific vehicle type, Remote Operation



OPTIONAL VEHICLE SPECIALIZATION RULE

If a gamemaster allows this rule, characters can take a specific vehicle maneuver specialization—Accelerating/Braking, Positioning, Ramming, Hiding—for each Vehicle skill (Bike, Car, Rotor Aircraft and so on). This specialization applies whenever the character makes a Driving Test for that maneuver when operating that sort of vehicle. For example, a character who wishes to ram his Eurocar Westwind into a truck can use the Car (Ramming) specialization when making his Driving Test. The various vehicle maneuver actions are described on pp. 141–145, *SR3*.

CHOOSING RESOURCES

Rigger characters require a lot of nuyen during character creation, both to buy the quality implants they need (specifically a datajack and vehicle control rig) and to acquire and outfit their vehicles, drones and remote control decks. Resources should be a top priority of rigger characters, contending only with skills for top priority.

Contacts

When choosing contacts, a mechanic (see p. 257, *SR3*) should be a rigger's first choice, as a rigger is always in need of used vehicles, parts and repairs. Other contacts such as technicians, fixers, smugglers and arms dealers can be useful to riggers, especially when it comes to acquiring vehicle weapons, tech toys and other expensive and illegal goods.

Lifestyle and Vehicles

As described on p. 240, *SR3*, lifestyles of Middle and higher help to pay the costs of upkeep and owning vehicles. Note that a character does not receive a vehicle merely because he purchases a lifestyle—the vehicle itself must be bought with the character's Resources or acquired during game play. The lifestyle merely covers costs such as gas, parking and basic maintenance for a single vehicle owned by the character; if the character does not own a vehicle, it accounts for costs of taxis, bus and train fare and limo service fees. For more details, see *Maintenance and Overhead*, p. 28.

DICE POOLS

A number of different pools—specifically, the Control Pool and Combat Pool—come into play when a rigger is jacked into a machine. The new IVIS Pool applies when using drones equipped with the IVIS system. The following rules for Dice Pools supplement the Dice Pool rules presented on pp. 43–44 of *SR3*.

Control Pool

As described on p. 44, *SR3*, Control Pool dice may be added to any test that deals strictly with the control of a rigged vehicle. They may be used on Maneuver Tests and Dodge or Damage Resistance Tests to avoid damage from attacks against a character's vehicle, but they may not be used for tests made when firing vehicle weapons or using vehicle sensors. Control Pool dice may not be used for operating sensors or electronic warfare, nor by a rigger operating a remote control network from the captain's chair mode.

Task Pool

Task Pool dice that are derived from implantation of an encephalon or cerebral booster (see pp. 20–21 and 72, *M&M*) may be used on Build/Repair Tests, as well as any Computer or Electronics Tests. This is particularly important to riggers, as it helps in controlling drones and waging electronic warfare (see *Drones*, p. 45, and *Electronic Warfare*, p. 35).

Task Pool dice derived from a chipjack expert driver (see p. 19, *M&M*) apply only to the relevant skill or specialization slotted in the chipjack.

IVIS Pool

The IVIS Pool is available to riggers controlling drones equipped with the BattleTac IVIS system. When using the IVIS system, the rigger may use IVIS Pool dice to augment tests made when his drones are performing group tasks. For more information, see *The BattleTac IVIS System*, page 96.

EDGES AND FLAWS

Many of the edges and flaws presented on p. 15, *SRComp*, can affect a rigger and/or use of a vehicle. Specifically, the edges and flaws Vehicle Empathy, Jack Itch, Simsense Vertigo, Blind, Deaf, Gremlins, Spike Resistance, Sensitive Neural Structure, Sense of Direction and Home Ground may either improve a rigger's capabilities or inhibit them in unfortunate ways. Likewise, the Attribute edge may affect a rigger's Control Pool by affecting his Reaction. Many people have developed Phobias to robots and drones, which counts as a Common Condition. This robophobia is usually the result of a traumatic experience with automated machines and is especially common among victims of the Renraku Arcology nightmare.

RIGGING AND IMPLANTS

Datajack and vehicle control rig implants are essential to rigger characters. Many other implants, such as orientation systems and skillwires, can also affect a riggers' performance.

DATAJACKS

Any character with a datajack (rigger or not) can jack into a vehicle that has a datajack port (see p. 128). Characters with datajacks can also operate remote-control networks through the captain's chair mode.

Whenever a character is jacked into a vehicle in the virtual dashboard mode (see p. 11), the character gains a +1 Reaction bonus to all vehicle-related tasks. However, the character gains a +1 modifier to perform any action other than controlling the vehicle (for example, shooting a pistol out the driver's side window).

Trodes

Trodes are electrode nets that slip over a user's head (for more information, see p. 17, *Matrix*). A user wearing trodes can jack into a vehicle with a datajack port or run a remote control deck from the captain's chair, but he gets no Reaction bonuses. Trode users cannot "go into the machine" or "jump" into a drone. VCRs cannot interact with trodes in any manner whatsoever.



THE VEHICLE CONTROL RIG

The vehicle control rig (VCR) cyberware implant (see p. 301, *SR3*) sets the rigger apart from all other *Shadowrun* characters. Without this piece of cyberware, the rigger is just another character who can drive a car. The VCR translates the rigger's neural impulses into various vehicle commands—stop, accelerate, turn left, fire turret gun, perform sensor sweep and so on—so that the vehicle responds almost instantaneously to the rigger's mental command.

A vehicle control rig gives the rigger a Control Pool, as well as conferring Reaction and Initiative bonuses for vehicle and drone combat. Reaction and Initiative bonuses normally provided by other factors do not apply; the VCR is the only source of such bonuses for a rigger engaged in vehicle and drone combat.

How It Works

Basically, the VCR uses signals from the middle brain to control and coordinate the many different and complex systems of a vehicle. When *simsense* was invented during the 2020s, scientists re-discovered an interesting fact about the human brain: the middle brain (specifically, the thalamus, pons, and cerebellum) is an incredible data-coordinator and can automatically route almost millions of different stimuli from different parts of the body to the proper sections of the cerebral cortex. More importantly, the middle brain is responsible for maintaining balance, which means making sure that hundreds of different muscles are working together in sync.

What the VCR implant harnesses the raw data-coordinating and synchronization power of the middle brain (normally dedicated to maintaining balance and body coordination) to a complex electro/mechanical system, such as a vehicle or security system. This is why modifiers for defaulting from Vehicle skills to Reaction are reduced by half when jacked into a VCR. However, the limiting factor of a VCR is the "bandwidth" of the man-machine link. The processing power of the brain is much, much greater than the implant connection is capable of handling. Higher-rated implants (Level 2 and 3 VCRs) are wired more extensively to the middle brain (and thus cost more Essence), so they can exploit more of the brain's processing power.

Unfortunately, the cyberware required to fully exploit the parallel-processing capability of the middle brain, leaves the brain vulnerable to neural backlash. Of course, there are some "noise" filters to remove ASIST spikes from background noise. But the spike amplitude from vehicle destruction or dump shock is much, much stronger than such filters can handle.

VCR Effects

To gain the full benefits of the VCR (Control Pool and increased reflexes while driving, as detailed on p. 301, *SR3*), two components must be present: the VCR implant and rigger adaptation of the vehicle (p. 130). If one or both of these are missing, then the driver does not gain Control Pool or increased reflexes while driving.

When a rigger goes in the machine, the *simsense* experience commands the rigger's attention. Both remote control decks and rigger adaptation units include RAS override units



(see p. 21, *M&M*). A rigger can override the simsense through sheer concentration to assume temporary control of her body, should the need arise. However, doing so imposes a +8 modifier on all physical actions and Perception Tests.

Note that VCR bonuses do not apply to a rigger operating a remote control network through the captain's chair mode. However, a rigger doing so still receives +1 Reaction bonus to all vehicle-related tasks, as well as a +1 modifier when performing any action other than controlling drones and vehicles.

ASIST BACKLASH

Certain attacks, such as particle beams or lightning spells, inflict electrical damage on the object of the attack. Should such an attack hit a vehicle controlled cybernetically (whether by virtual dashboard, captain's chair or directly in the machine), it creates a massive ASIST surge that can cause massive neural damage. In some cases, this ASIST backlash can literally burn out the rigger's brain.

The ASIST backlash rule applies whenever a cybernetically controlled vehicle is hit by an electrically-based attack. This includes the Zapper static discharge rocket (p. 44, *CC*), the ANDREWS particle beam system (p. 86), the Lightning Bolt spell (p. 197, *SR3*) or any other spell with Lightning elemental effects (p. 52, *MITS*). If an electrical attack is successful in inflicting damage on a vehicle or drone (i.e., the vehicle's Damage Resistance doesn't stage it below L), the character must make a Willpower Test to resist damage. The Power of the attack is 4 plus the rating of the character's VCR implant (if applicable). If the character is controlling a drone by remote control, reduce the Power by 2. The Damage Level is one level higher than the Damage Level sustained by the vehicle after the Damage Resistance Test. (If the net damage level is naval scale, increase the Power by 2 for each step.) Characters controlling a vehicle or drone in the virtual dashboard or captain's chair mode treat this damage as Stun. Riggers directly controlling a vehicle treat this damage as Physical damage.

If a vehicle takes Serious or Deadly damage from an electrical attack, a rigger in control of it must resist damage only from ASIST backlash. He does not have to resist damage transferred from the vehicle (see *Rigger Damage*, p. 145, *SR3*).

Monkeywrench, a drone rigger, is directly controlling a GM-Nissan Doberman drone providing fire support for his teammates, who are trying to escape from an unsuccessful run into the Renraku Arcology. As the drone rounds a corner, a mage bursts through a nearby lab door and casts a 6D Lightning Bolt spell at the Doberman. Ken, Monkeywrench's player, rolls 2 successes on the Dodge Test and 2 successes on the Damage Resistance Test, which stages this damage down to M. However, because it was an electrical attack, Monkeywrench must also resist damage from ASIST backlash.

Monkeywrench has a Rating 2 VCR, so the Power of the attack is 4 + 2, or 6. However, Monkeywrench is controlling the Doberman remotely, which reduces this back down to 4. The Doberman sustained Moderate damage,

so the Damage Level is one step higher, or Serious. Since Monkeywrench was directly controlling the Doberman, this is treated as Physical damage. So Ken must make Monkeywrench's Damage Resistance Test against 4S Physical Damage.

RIGGING AND OTHER IMPLANTS

Because of the way VCRs interact with the brain, certain types of cyberware and bioware don't have the same effects during rigging as they do during normal physical actions, as described below.

Cerebral Booster

Indirect enhancement of Reaction from the cerebral booster (through its boost to Intelligence) *does* apply while a rigger is jacked into a vehicle or remote control deck.

Reflex Boosters

Unless otherwise noted, implants that boost a character's physical Quickness, Reaction or Initiative will not affect a rigger's Reaction or Control Pool while rigging. These include the adrenal pump, cyberlimb enhancements, enhanced articulation, move-by-wire, muscle toner, reaction enhancers, suprathyroid gland, synaptic accelerator and wired reflexes. Boosted reflexes are also not compatible with VCRs, and cannot be implanted in the same person.

Simrigs

While simrigs and VCRs can be implanted in the same person, a simrig in "playback" mode cannot be activated at the same time a character is rigging through his VCR.

Skillwires and Activesofts

Because control of a rigged vehicle takes place entirely within a rigger's brain, skillwires do not work for a rigger who has gone into the machine. In other words, a rigger directly controlling a vehicle cannot use activesofts. Likewise a character who is remotely piloting a vehicle cannot use skillwires and activesofts.

Note that a character who is physically driving a vehicle while jacked into the virtual dashboard can use skillwires and activesofts to drive, because he is still exerting some manual control. In this case, however, the activesoft would override his natural driving ability, so he would not be able to use his natural Vehicle skills or Control Pool for actions with that vehicle.

Nothing prevents a rigger from accessing or using knowsofts or datasofts while rigging.

Smartlink Systems

When jacked in, a rigger can use smartgun bonuses with vehicle weapons that have smartgun links. The VCR substitutes for the eye display and simsense rig components. The VCR also handles the I/O connection between the rigger and the vehicle, but the vehicle requires a smartlink integration kit (see p. 139) to complete the path to the weapon itself. Remember that the weapon itself must have a smartgun adapter (p. 281, *SR3*) also.



Vehicle gunners who do not have a VCR need the full smartlink package to take advantage of smartgun-equipped vehicle weapons. The smartlink integration kit is still needed to bridge the connection between the gunner and the weapon.

Tactical Computers

If a rigger uses a tactical computer (p. 22, *M&M*) while he is inside a vehicle, he cannot use sensory input from his natural physical or cybernetic senses, because they are blocked out by the VCR's RAS override. Additionally, each point of Sensor rating of the vehicle can be counted as an extra sensory feed. As with all uses of the tactical computer, only those senses that are applicable to the combat situation count.

OTHER IMPLANTS

A number of implants special applications for a rigger's duties. The cranial remote deck and other riggerware detailed on pp. 23–25, *M&M*, allow a rigger to control drones via implants, so that he is not burdened with extraneous gear and can operate discreetly. The cyberlimb signal booster (p. 40, *M&M*) is a

useful accessory to such implants, increasing the rigger's range and signal power. The orientation system (p. 18, *M&M*) is another useful rigger tool, especially when linked to a vehicle's auton-av or GridGuide. This combination increases the rigger's ability to navigate, locate routes, create maps and so on.

RIGGING AND CYBERMANCY

Cybermancy allows a character to possess more cyberware than his Essence Attribute would normally permit. (For basic rules governing cyberware and Essence, see p. 296, *SR3*. For basic cybermancy rules, see p. 50, *M&M*).

Most riggers shouldn't need to take enough cyberware to make cybermancy necessary, unless they want to improve their performance outside of vehicles. Riggers who choose cybermancy may experience a dangerous side effect during rigging—increased susceptibility to “getting lost in the details” (p. 58, *M&M*).

Because riggers trade the neural sensations of their bodies for those of a machine, they are likely to get lost within their machines while rigging and forget that they are human. Consequently, a rigger's invoked memory stimulator, or IMS, will kick in far more frequently than that of a non-rigger cyberzombie.

Rigger-zombies get lost in the details whenever all roll results are successes on a Perception Test with a modified target number of 4 or more (instead of 5 or more). In addition, the IMS kicks in after the player fails only two consecutive Willpower Tests to escape this condition, rather than five consecutive failures.

RIGGING AND MAGIC

Despite popular misconceptions and stereotypes, most Awakened individuals suffer no handicap that keeps them from using simsense technology. Despite this fact, it is rare for Awakened individuals to become riggers, purely because the requisite cyberware and Essence loss is quite damaging to their Awakened nature. Some burned-out magicians have turned to rigging as a new focus. There are even some examples of people with Awakened potential who spoiled their Talent with rigger cyberware before they knew they had it.

There are a few adept powers that can affect a rigger's actions: Combat Sense, Enhanced Perception and the attribute and skill-improvement powers. Physical spells that affect a character's Intelligence or Reaction impact a rigger's Reaction and Control Pool.

Magic can also have varying effects in vehicle combat, as detailed on pp. 150–51, *SR3*.

MAINTENANCE AND OVERHEAD

Equipment is like contacts; if you don't take care of it, it won't take care of you. Even under normal operation, vehicles require periodic maintenance checks to stay running. Considering the extreme pedal-to-the-metal paces that riggers put their vehicles through, maintenance becomes especially important.

Note that the following maintenance rules are NOT the same as the SOTA rules presented on pp. 85–87, *SRComp*.

$$\text{Cost Value} \div 100 + (\text{Stress Points of past month} \times 10) = \text{Monthly Overhead}$$

Josie Cruise owns four vehicles: a rigged and heavily modified Hughes Stallion, a rigged and modified Leyland-Rover van, an unmodified Eurocar Westwind 2000 and an off-the-shelf Aztechnology GCR-23C Crawler drone. During a month when those vehicles incur no Stress Points, their overhead cost would be calculated as follows:

Vehicle	Cost Value	1% of Cost Value
Modified Hughes Stallion	500,000	5,000
Modified Leyland-Rover van	40,000	400
Eurocar Westwind 2000	100,000	1,000
Aztechnology GCR-23C Crawler drone	1,250	13

Total Overhead Cost = 6,413¥

SOTA reflects the relative obsolescence of a machine compared to the technology curve. The maintenance rules below reflect real degradation caused by normal use.

MAINTENANCE COSTS

The overhead cost of a vehicle includes costs for routine maintenance (oil changes, periodic mileage checks, semi-annual and annual services and so on), fuel consumption and storage. To determine a vehicle's monthly overhead, first calculate the vehicle's cost value. The cost value is equal to the vehicle's base nuyen value plus the value of all of its accessories and modifications. (The base nuyen value is the amount listed in the appropriate sourcebook, not the final price the character paid for the vehicle, which is altered by Availability and Street Index.) The costs for all vehicles previously published in various *Shadowrun* sourcebooks appear in the *Vehicle List*, beginning on page 156.

Next, calculate the total number of Stress Points (see p. 62) that the vehicle has accumulated over the past month of game time. Individual gamemasters determine when vehicles incur Stress in their games.

The monthly overhead cost for a vehicle is equal to 1 percent of the vehicle's cost value (the cost value divided by 100), rounded up, plus ten times the Stress Points accumulated over the past month.

LIFESTYLE REDUCTIONS

Each lifestyle a rigger maintains may help cut the overhead costs of vehicle maintenance, as lifestyles incorporate such costs for vehicles and other transportation. A Middle lifestyle reduces total monthly overhead costs by 200 nuyen. High lifestyle reduces total monthly overhead costs by 1,500 nuyen, and a Luxury lifestyle reduces total monthly overhead

costs by 3,000 nuyen. Characters may distribute lifestyle discounts among their different vehicles as they see fit.

Josie Cruise normally lives a Middle lifestyle. Because Middle Lifestyle grants a 200¥ credit to overhead costs, her monthly overhead drops from 6,413 to 6,213¥ before applying any Karma.

After a successful run retrieving a rare tropical flower from the jungles of Amazonia, Josie's bonus allows her to boost her Lifestyle to Luxury level for six months. During those six months, Josie receives a 3,000¥ discount to her overhead costs, so her monthly overhead falls to 3,413¥ before spending Karma.

Neglecting Overhead

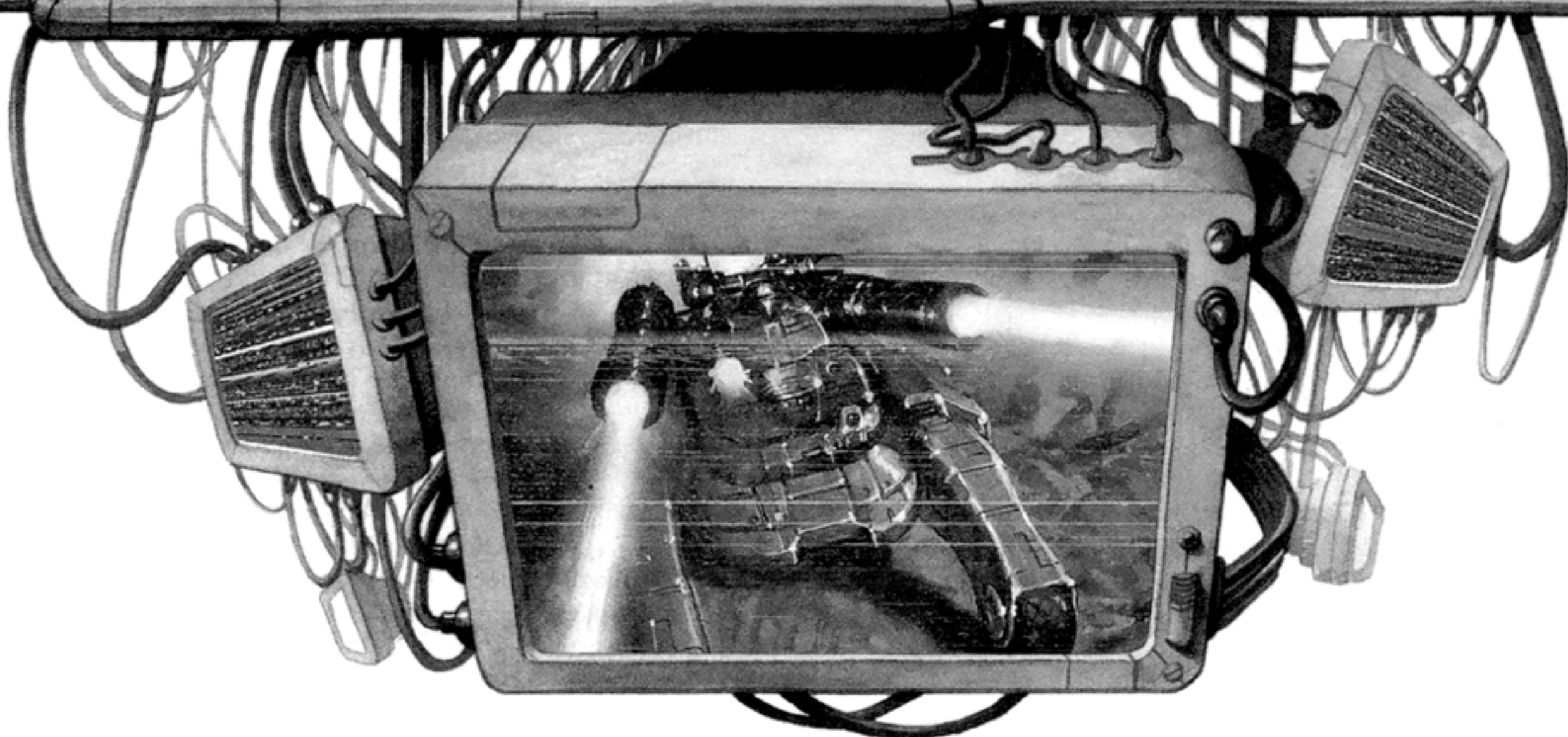
If a character neglects to perform maintenance, his vehicles are more likely to break down. For each month that a vehicle misses maintenance, apply a -1 cumulative modifier to any Stress Tests (see p. 62) the vehicle makes. The longer the vehicle goes without maintenance, the more likely it is to fail a Stress Test.

A character can eliminate this modifier by putting in some extra maintenance work. In addition to maintenance costs for the current month, a character can pay the overhead cost for a missed month. The character must also succeed in a Vehicle Build/Repair (4) Test, with a base time of 2 hours. If successful, the Stress Test modifier is reduced by 1. If the test fails, the nuyen is spent but the lack of regular maintenance has still not been compensated for. More than one month of neglected maintenance can be made up for in this manner, though maintenance costs and a Vehicle B/R Test are required for each month.

After an unresolved misunderstanding with the UCAS Air Force over Seattle airspace, Josie Cruise is forced to hide out for two months in the Council Lands while the heat blows over. Because she left her Eurocar Westwind in storage in a Tacoma long-term garage, she is forced to skip maintenance on the sports car. As a result, the Westwind will receive a -2 on any Stress Tests.

When Josie gets back to the Seattle metroplex, she does some work on it to make up for the lack of attention. She spends an extra 1,000¥ and succeeds in a Car B/R (4) Test for the first missed month, reducing its Stress Test modifier to -1. She spends another 1,000¥ for the second missed month, but rolls badly and fails the test. The -1 modifier for that month still remains, until she has the time and nuyen to make another test.

SENSORS AND ELECTRONIC WARFARE



This section provides new sensor rules that supplement the basic *Shadowrun* sensor rules beginning on p. 135, *SR3*. The section includes new rules for sonar, electronic deception, electronic warfare and signal jamming.

SPECIAL SENSOR RULES

Sensors are the primary—heck, the *only*—method a rigger has of perceiving the world outside her vehicle. She uses them to see, hear and feel the environment surrounding her vehicle, from the pedestrian at the crosswalk to the cop car screaming down the street. Sensors enable a rigger to identify and attack targets kilometers away, visually monitor two different locations at the same time, or catch a crooked corp operator on chip.

A vehicle's Sensor rating measures the overall capability of a vehicle's sensors to detect outside objects. The rating number indicates how many dice the vehicle's controlling player may use for Sensor Tests, as well as the components included in the vehicle's sensor systems.

The following rules provide guidance for using sensors in special situations. For basic sensor rules, see p. 135, *SR3*.

ADDING/UPGRADING COMPONENTS

Players may upgrade or add specific sensor components to their characters' vehicles. For example, a player may install flare-compensation sensors to a Rating 4 or lower sensor system or boost a sensor system's telescopic magnification.

The parts cost for such upgrades is equal to the original cost of the sensors times .10, multiplied by the number of levels the player intends to boost the system for the upgrade. Sensor costs appear in *Vehicle Customization* on p. 142.

For rules on adding/upgrading components, see p. 135, *SR3*.

Skyrie wants to add 150x magnification capacity (available at Level 3) to her spotter drone's Level 1 sensors. Skyrie's a little short of cash right now, so she decides to upgrade the magnification only, rather than the entire sensor system.





The base price of the spotter's Level 1 sensors is 5,000 nuyen. Skyrie wants to boost the vision-magnification subsystem by 2 levels, so the cost of the upgrade is 1,000 nuyen ($5,000 \times .10 = 500$; $500 \times 2 = 1,000$).

SENSOR DEAD ZONES

Natural terrain features can block sensors and create "dead zones," areas where vehicles, characters or other objects can hide from sensor detection.

If a gamemaster owns or has created a detailed topographical map of the playing area, he may designate any dead zones along the player characters' travel routes. Dead zones usually appear behind sharp changes in terrain contour, such as bluffs, ridge lines, depressions, and so on.

Any object inside a sensor dead zone cannot be detected by a Sensor Test, and dead zones themselves cannot be detected by Sensor Tests. However, a character can estimate the locations of possible dead zones by looking at a topographical map or the terrain display of a Rating 3 (or higher) autonav system. To estimate dead zone locations, the character must make an Intelligence (5) Test or a similar test using an appropriate Knowledge skill of the local area. If the test succeeds, the character accurately estimates the locations of dead zones. If the test fails, the character inaccurately estimates the locations.

FLUX AND SHIP SENSORS

Excess power from ship engines (see *Ships and Subs*, p. XX) can be used to boost the signals of ship electronic devices, thus increasing their transmission or scanning ranges and boosting their resistance to electronic warfare. Every ship electronic device, such as sensors, ECM, ECCM, communication systems and so on start with an initial maximum Flux. The initial maximum is equal to the device's rating multiplied by the vessel's Hull rating plus 1 (device rating $\times$ [Hull rating + 1]). The amount of Flux boosts provided by the ship's engine (see *Changing Flux Ratings*, p. 137, SR3) is equal to the vessel's Hull rating squared; no more than half the available Flux boost can go to any single electronic system.

The range of surface-scanning electronic systems is limited to 35 kilometers by the curvature of the Earth. This distance is often referred to as the horizon line. This range limitation does not apply to ship electronic devices interacting with aircraft (such as air search radar), nor does it apply to flying aircraft. A common naval tactic is to launch aircraft and send them to the horizon line to act as communications relays and forward sensors.

ELECTRONIC DECEPTION (ED)

Electronic deception (ED) systems produce false or misleading signals to enemy sensors. For example, ED can fool a sensor into thinking the target is flying at a different speed or in another direction; additionally, ED can confound any attempts to identify the target by its Signature.

If a vehicle possesses an active ED system, add the ED rating to the number of successes needed to detect or target the vehicle. If the Sensor Test fails, the gamemaster fabricates a false result that "fools" the sensor and its controlling player.

ED systems are area-effect systems, and their ranges depend on the Flux rating allocated to them. Consequently, an ED system may fool a sensor within its area of effect but will have no effect on sensors beyond its area of effect. Activating or deactivating ED counts as a Simple Action.

Monkeywrench has been hired to capture the elusive rigger Mirage. For the past six hours he's camped out by Gravelly Lake in Fort Lewis in his vehicle (Sensor Rating 4), waiting for Mirage to pass overhead on her run into Tacoma. Mirage is flying in her helicopter Shadowstorm, which has ED 4.

As soon as Mirage gets in range of Monkeywrench's sensors, the gamemaster asks Ken, Monkeywrench's player, to make an Active Sensor Test. (Shadowstorm has a Signature of 3, but the gamemaster doesn't tell Ken.) Ken rolls 4 dice and gets a 1, 4, 4 and 8, normally good for 3 successes. However, Mirage has activated Shadowstorm's ED system (ED 4), so Monkeywrench needs 7 successes to identify the target; Monkeywrench's sensors are fooled. The gamemaster informs Ken that Monkeywrench's sensors detect a small flying object—much too small to be a copter. Consequently, Monk goes back to watching the sky. He doesn't realize he's been tricked until he sees Mirage's copter flying past him.

ELECTRONIC COUNTER-DECEPTION (ECD)

Electronic counter-deception (ECD) systems use reality-checking measures, such as dead-reckoning navigation and power-attenuation monitors, to negate the effects of ED systems. Like its cousin ECCM, ECD affects specific vehicles rather than a general area.

ECD works by providing additional dice on Sensor Tests to generate more successes and overcome the effects of ED. (Players should use different-colored dice to differentiate them from regular Sensor dice.) When making a Sensor Test, the player rolls a number of dice equal to the Sensor rating, plus a number of dice equal to the ECD rating. When considering the effects of ED, subtract the ED rating from the total number of both Sensor and ECD successes. Successes from ECD dice apply only to ED and do not help affect the results of Sensor Tests.

Because ECD works by filtering out ED emissions, ECD drains power from a vehicle's electronic transmitter, thus reducing the effective ranges and jamming resistance of the vehicle's sensors. To reflect this, subtract the vehicle's ECD rating from its Flux rating. Activating or deactivating ECD counts as a Simple Action.

Monkeywrench makes another attempt at tracking Mirage a few days later. This time he's fitted his sensors with Rating 3 ECD.

When Shadowstorm gets in range of Monkeywrench's sensors, the gamemaster asks Ken, Monkeywrench's player, to make an Active Sensor Test. Ken rolls four red dice (for his Rating 4 sensors) and three blue dice (for his Rating 3 ECD). The red dice result in a 3, 3, 4 and 5, while the blue dice result in a 1, 4 and 9. Against Shadowstorm's

Signature of 3, this results in a total of 6 successes. Subtracting Shadowstorm's ED Rating of 4 results in 2 successes, good enough for a general contact. Monkeywrench detects a helicopter, but he can't get a good enough reading to distinguish what type it is.

Had Mirage not been flying with her ED active, Ken would have scored 4 successes on his Sensor Test, which would have resulted in a positive detailed contact. In this case, not only would Monkeywrench have been able to determine that the helicopter was an Augusta-Cierva Plutocrat, but he would have picked out enough details to conclude that it was, in fact, Shadowstorm.

SONAR

Regular sensor systems are useless for detecting objects underwater. Water absorbs light and electromagnetic energy at relatively shallow depths, and it confounds thermographic imaging as well. Consequently, ships rely on sonar to detect underwater objects. Sonar uses sound waves to detect objects.

Sonar systems are divided into two types: passive and active. Passive sonar systems monitor sounds made by external sources; the classification, range and bearing of a target is determined by the detected sound. Active sonar emits high-pitched sound signals and monitors their echoes to detect targets.

PASSIVE SONAR

Passive sonar systems monitor noises made by external sources (such as surface vessels, low flying aircraft, marine life, or other subs). Detected noises are then analyzed to determine the type, range, bearing and heading of the sound source.

Passive sonar works slightly differently than normal sensor systems. Instead of a detection range based on the power of the system, the range of a passive sonar system depends on the sound source of the target itself. A noisy target source, such as the diesel engine of a large freighter, can be heard from dozens of kilometers away; a nuclear submarine with a ducted waterjet drive can be detected only at short ranges.

To determine how far the sound of a target carries, use the following formula: 50 divided by the target's Sonar Signature. The result is the number of kilometers the sound carries. Only passive sonar systems within this range can detect the target.

Make a Sonar Test to determine if a passive sonar system detects a target. Use a number of dice equal to the sonar vessel's Sonar rating. The target number is the target's Sonar Signature rating, adjusted by the modifiers from the *Passive Sonar Modifiers* table.

The number of successes determines the result of the sonar detection attempt, as shown on the *Sonar Test Results* table.

PASSIVE SONAR MODIFIERS

Detecting vessel is a surface ship	+3
Distance to target is:	
less than 1/3 of maximum range	-1
between 1/3 and 2/3 of maximum range	0
between 2/3 and full maximum range	+2

SONAR TEST RESULTS

Number of Successes	Result
0	No contact. The ship does not detect the target.
1	Unknown contact. The vessel detects the target but cannot identify it.
2	Identified contact. The ship detects the target and identifies its general form (biological life form, surface ship, submarine or low flying aircraft).
3	Detailed contact. The vessel detects the target and identifies its specific form (whale, frigate, nuclear attack submarine, low altitude vehicle, etc.)
4 or more	The ship detects the target and identifies it by its unique features.

Passive Sonar Blind Spot

Every surface vessel and submarine has a "sonar blind spot" located at the rear of the vessel. This blind area, called the *baffles*, is a 120-degree arc extending from the vessel's stern. A vessel's passive sonar system cannot detect any target located in its baffles, unless it has a towed array sonar (see p. 148).

ACTIVE SONAR

Active sonar emits a high-pitched "ping" and monitors for echoes created when the sound waves bounce off target objects. Active sonar greatly improves a vessel's ability to detect other objects but also makes the vessel much more detectable itself.

To detect a target, the player controlling the active sonar vessel makes a Sonar Test. Use a number of dice equal to the vessel's Sonar rating. The target number is the target's Sonar Signature. Any vessel within range of the active sonar may be detected. Consult the *Sonar Test Results* table to determine the results of the test.

Active sonar operates in two modes: tactical pinging and yankee searches.

Tactical Pinging

In tactical-pinging mode, the range of an active sonar system is determined with the following formula: Sonar rating multiplied by 2,500. The result is the system range expressed in meters.

Whenever a vessel employs tactical pinging, a -2 modifier applies to all Sonar Signatures within the tactical pinging range, including the signature of the sonar vessel itself. This -2 modifier applies to both Sonar Tests and Gunnery Tests in underwater combat (see *Underwater Vehicle Combat*, p. 60).



Note that a vessel using tactical pinging can still detect contacts outside its tactical-pinging range by using passive sonar. However, the -2 Signature modifier does not apply to those contacts, as they are outside the active sonar range.

Signature modifiers from tactical pinging are cumulative but additional tactical-pinging sources provide only a slight increase. If a ship or sub is within the range of two or more tactical-pinging sources, it receives only an additional -1 modifier to its Sonar Signature for each additional tactical-pinging source. The maximum modifier is -4 .

After a daring raid against an Aztechnology offshore station in the waters off Corpus Christi, the infamous Hunley's Raiders pirate gang is on the run from the Aztlan navy. The Raiders are lurking in the depths of the Gulf of Aztlan in their submarine, the Captain Morgan, a Russian Vaneyev-class diesel/electric submarine (Sonar Signature 6).

Pursuing the Captain Morgan is an Aztlan nuclear attack submarine, the BAA Zacatecas (Sonar Signature 8). Confident of his own stealth and seeking an extra edge, the skipper of the Zacatecas orders his sonar section to commence tactical pinging with the boat's sonar set (Rating 4).

The range of the Zacatecas' pinging is 4 x 2,500, or 10,000 meters. When the Zacatecas' sonar goes active, the Sonar Signatures of all vessels within a 10,000-meter radius of the Zacatecas are reduced by 2 (including the Sonar Signature of the Zacatecas itself, which drops to 6). When the Zacatecas closes within 10,000 meters of the Captain Morgan, the pirate sub's Sonar Signature drops from 6 to 4.

At that point, an Aztlan anti-submarine helicopter decides to join the fight, using the active sonar from its dipping sonar array to locate the Captain Morgan. The helicopter's dipping sonar also has a Rating 4 (and thus a range of 10,000 meters), and the helicopter is hovering within 10,000 meters of both the Zacatecas and the Captain Morgan.

Because the Captain Morgan is within range of both the Zacatecas' active sonar and the helicopter's active dipping sonar, it receives a total modifier of -3 to its Sonar Signature (-2 from the Zacatecas's active sonar and -1 from the helicopter). That gives the Morgan a modified Sonar Signature of 3.

Likewise, the Zacatecas receives a -3 modifier to its Sonar Signature, reducing it from 8 to 5.

Yankee Searches

Yankee searches are full-power sonar blasts, the same as those used by twentieth-century naval vessels. A yankee search virtually assures the searching vessel of identifying all vessels in a local area but also assures that anyone else listening with sonar will detect the searching vessel.

Yankee searches have a Loudness rating that determines the search range. The base Loudness rating of a vessel is its Hull rating, but this may be increased through vehicle modifications. (Boats that do not have a Hull rating cannot make yankee searches.) Of course, a boat can always reduce its Loudness to prevent counter-detection. See the *Yankee Search Loudness Table* for Loudness ratings and their corresponding ranges. All vessels within the search range receive a negative modifier to their Sonar Signatures, as shown on the table. Additionally, all vessels within a radius equal to the search range multiplied by 3 receive additional dice to any Sonar Tests. The number of additional dice is equal to the sonar's Loudness rating.

YANKEE SEARCH LOUDNESS TABLE

Loudness Rating	Range	Sonar Signature Modifier
0	125 meters	0
1	500 meters	-1
2	1 km	-2
3	2 km	-3
4	3 km	-4
5	4.5 km	-5
6	6 km	-6
7	8 km	-7
8	10 km	-8
9	12.5 km	-9
10+	Loudness + 5 km	-10

Despite the best efforts of the Aztlan navy, the Captain Morgan has eluded detection. The frustrated skipper of the Aztlan hunter sub, the BAA Zacatecas, decides to pull out all the stops and unleashes a yankee search.

The Zacatecas has a maximum Loudness rating of 5 (its Hull rating) and isn't holding back. The maximum range of the yankee search is 4.5 kilometers. The Zacatecas receives 5 additional dice on its Sensor Test to locate the Morgan; additionally the Morgan's Signature is been reduced to 1 ($6 - 5$). However, the Morgan gets the same bonuses against the Zacatecas, and her crew is lining up a torpedo to take advantage of that reduced Signature.

CAVITATION

Air bubbles produced by a vessel's propeller or impeller blades create noise called *cavitation*. Cavitation is directly proportional to a vessel's power output and makes a vessel more "visible" to other sonar systems.

In game terms, whenever a sub or surface vessel is traveling faster than its Cavitation Threshold Speed, cavitation noise reduces its Sonar Signature by 2 (normal Signature, though, is unaffected). If a vessel is running over its normal Speed rating, then cavitation reduces its Sonar Signature by 4.

A submarine can reduce its cavitation noise by diving to a deeper depth, as the higher water pressure counteracts bubble

formation. Submarines running below 500 meters depth reduce their cavitation modifier by 1. Submarines running below 1,000 meters depth reduce their cavitation modifier by 2.

THERMOCLINES

Thermoclines are boundaries between warm solar-heated surface water and cold deep water. During World War II, when submarine technology had developed far enough to allow subs to dive beyond 400 feet, submarine crews discovered that they could evade detection by ship-based sonar by simply diving below a thermal layer.

In game terms, thermoclines occur roughly every 100 to 200 meters of depth (the interval varies depending on the local underwater topography, prevailing currents and other environmental factors, and is determined by the gamemaster). Active and passive sonar cannot detect objects on the other side of a thermal layer. On the other hand, torpedoes or drones that pass through a thermal layer may detect objects once they pass through the thermal layer.

Yankee searches can penetrate thermoclines, but a +8 Sonar Test modifier is applied when attempting to detect vessels on the other side of a thermocline. This modifier applies to both the user and any incidental listeners.

Detecting and mapping thermoclines is a relatively simple task for submarines. In a simsense rig, thermoclines appear as wavy grids of lines with different colors to indicate whether the thermocline is above or below the sub.

While the cat-and-mouse game is going on between the Zacatecas and the Captain Morgan, a Confederate submarine, the CSS Vicksburg, has been lurking beneath a thermocline 12 kilometers east of the Zacatecas. The Zacatecas' Sonar Signature, modified by its Loudness rating, is 3 (8 - 5). The Vicksburg suffers a +8 modifier for detecting through a thermocline, so its target number is 11 (3 + 8). However, it gets 5 extra dice on its Sensor Test because of the Zacatecas' yankee search, so it succeeds despite the modifier. The Vicksburg is now aware of its Aztlan counterpart, while the Zacatecas remains ignorant of the new threat, as the Vicksburg is outside the yankee search range.

ELECTRONIC WARFARE

Networks of remotely controlled drones are vulnerable to electronic warfare because they use control commands broadcast on radio frequencies. Electronic intruders can "jam" a network's command signals, override transmissions to and from drones and feed the network rigger false information.

Because of the special nature of the MSST protocol used by rigger remote-control networks, the rules for electronic warfare against remote-control networks differ from the rules for electronic countermeasures used against sensor systems or ordinary communication systems (see *Electronic Countermeasures*, p. 138, SR3).

Electronic warfare attempts may succeed to a variety of degrees. Unlike ECM, which totally disrupts a radio signal,





electronic warfare attempts may simply degrade the quality of the network and make command and control more difficult, or they may allow an intruder to take control of an opponent's drones. Complete signal disruption almost never occurs.

Electronic warfare is a two-step process. First, the intruder must intercept the signals of the targeted network and infiltrate it. Then the intruder may perform one of four more aggressive operations against the network—*meaconing*, *intrusion*, *jamming* or *interference*—collectively known as MIJI.

REMOTE-CONTROL NETWORK INFILTRATION

Network infiltration is the first step in conducting electronic warfare. Infiltration is a subtle assault that enables the intruding rigger to reconnoiter his intended target's activities before proceeding to more aggressive measures. Infiltration is not quite the same as the simple signal interception involved with scanning radio frequencies (see the description of scanner gear, p. 289, *SR3*). Whereas scanning is a passive eavesdropping exercise (like listening in on a telephone call), infiltration requires that the rigger communicate and subtly interact with the targeted remote-control network.

A rigger cannot conduct electronic warfare against a remote-control network unless he has intercepted the radio frequencies (and determined their frequency-hopping patterns) used by his target. This entails locating the shifting frequencies of the target network's command, simsense or system channels and infiltrating them.

Rigger Network Channels

Every remote-control network uses three types of channels: command, simsense and system channels.

The command channel relays messages that direct the movements and actions of the network's drones and relay situational information and intelligence between the remote-control deck and the drones.

The simsense channel routes audio, visual and simsense data between the drones, remote-control deck and rigger.

The system channel carries data that ensures network integrity and monitors drone status. The channel also routes data for auxiliary tasks such as indirect-fire attacks or smartlink signals.

Infiltrating Channels

To infiltrate any of these channels, the intruder must have enough power to transmit his own signals to the opposing deck. Both the targeted deck and the intruder's deck must be within range of each other (the range of an electronic device depends on its Flux Rating; see *Flux Rating and Range*, p. 137, *SR3*).

If these conditions are met, the intruder may attempt infiltration by rolling a number of dice equal to his Electronics (Electronic Warfare) skill against a Target Number 6. Apply a target number modifier equal to the difference between the target's remote-control deck rating and the rating of the intruder's protocol-emulation module (see p. 98). Infiltrating a remote-control network is a Complex Action and has a base time of 10 Combat Turns.

For each success generated on the test, the intruder infiltrates one of the network's channels. If the intruder has not

specified a channel, the gamemaster may select which channel is infiltrated. The intruding rigger can also expend successes to reduce the base time or sacrifice successes to increase his Intrusion Factor (see *Detecting Infiltration* below).

Channel infiltration allows the intruding rigger to eavesdrop and pick up all the information being transmitted via that channel with a Simple Action. Additionally, the infiltrator can expend a Complex Action to request specific information about the network that is normally transmitted on the channel. If the intruder infiltrates the simsense channel, the intruder can see, hear and sense anything that the targeted network's drones are monitoring with their sensors. If the intruder infiltrates the system channel, he can instantly get information on the position, direction of travel, ammunition and damage status of any drone in the network. Infiltrating the command channel enables the rigger to overhear commands issued from the network rigger to the network drones. Note that infiltrating riggers *cannot* issue commands to drones in the network, they can merely spy on the network and request data.

Defeating Deck Encryption

Many riggers encrypt their decks for an extra measure of security. Encryption on a remote-control deck is defeated differently than encryption on a rigged security system (see *The Security Rigger*, p. 45). If the targeted deck is fitted with encryption devices, the intruder must defeat the encryption before he can infiltrate the network. Use the rules for *Broadcast Encryption* on p. 289 of *SR3* to resolve the test.

If the decryption attempt fails, the targeted rigger realizes that someone is trying to infiltrate his network and places his network on alert. Apply a +2 target modifier to all subsequent infiltration tests made against the network. This modifier is cumulative with each unsuccessful attempt to defeat encryption.

Detecting Infiltration

Whenever a rigger infiltrates a remote-control network, the targeted rigger may notice the intrusion.

Each infiltrating rigger has a rating called Intrusion Factor. A rigger's Intrusion Factor is equal to his Electronics (Electronic Warfare) skill plus any successes allocated from his test to infiltrate the network. These successes may not be used for any other purpose.

As soon as a rigger infiltrates a network, or whenever he uses a Complex Action to request specific details from the network, the targeted network may detect his presence. The gamemaster makes a Success Test using the targeted network's deck rating against the intruder's Intrusion Factor. If the test succeeds, the network detects the intruder, alerts the rigger operating the network and goes on alert. The operating rigger may also check for infiltrators at any time by spending a Complex Action and making an Electronics (Electronic Warfare) Test against the intruder's Intrusion Factor. If he succeeds, he detects the intruder.

Defeating Infiltration

The only surefire method of getting rid of an infiltrating rigger is to switch over all of a remote-control network's fre-

quencies and prefix codes. While this method works, it is also time consuming and forces the rigger to put his network "on hold" until everything is reset.

The base time to switch the frequencies and codes on a network is equal to the network's deck rating x 2 Combat Turns. The rigger can reduce this time by making an Electronics (Control Systems) Test against a target number equal to the deck's rating. Divide the base time by the successes achieved on the test.

Once the switchover is started, the rigger is placed in the captain's chair and all of the drones in the network go on standby autopilot mode (drones that were issued commands may still act to complete their orders, directed by their Pilot ratings). The rigger may not issue new commands until the switchover is complete, and all Sensor and Perception Tests suffer a +2 modifier.

Any infiltrating riggers immediately lose communication with the network once the switchover begins. The intruder must make a new test to infiltrate the network, this time with a +2 target modifier (see *Infiltrating Channels*, p. 36).

Note that infiltrating riggers may not command a network to switchover codes—only the controlling rigger can do so.

Trixie is providing rigger cover for her shadowrunner team as they break into a corporate compound. While performing legwork, Trixie was informed by her fixer that the compound makes extensive use of drones. So on the night of the run, while her teammates are getting into position, Trixie attempts to infiltrate the compound's remote-control channels.

Trixie has a remote-control deck with a Rating 6 protocol-emulation module and a Flux Rating 8. The corporate remote-control network uses a Rating 3 remote-control deck with a Flux Rating 5. Because the compound's Flux rating is lower, she must be within 9 kilometers of the compound before she can attempt interception.

Trixie has an Electronics Skill 4, with an Electronic Warfare specialization of 6. She rolls 6 dice against a Target Number 6. This target number is reduced by 3 (her protocol-emulation module rating of 6 minus the network's deck rating of 3) to 3. Her test yields 4 successes. Trixie decides to use 2 of those successes to increase her Intrusion Factor from 6 to 8. Trixie uses her remaining 2 successes to infiltrate two channels, which the gamemaster determines as the simsense and system channel.

The targeted network then makes a test using 3 dice (its deck rating) against Trixie's Intrusion Factor of 8. It scores no successes, so Trixie remains undetected.

MIJI

MIJI (pronounced "mee-jee") is an acronym that stands for meaoning, intrusion, jamming and interference. Intrusion, jamming and interference are self-explanatory. Meaoning allows a rigger to introduce false signals into another rigger's network. It affects drones in much the same way a confusion spell affects a character. In each case, the intruder disrupts the targeted deck's transmissions and sends false signals to the network's deck and drones.

To perform MIJI, a rigger must first infiltrate the network (see *Remote-Control Network Infiltration*, p. 36). Both the rigger's deck and the remote-control network's deck must also be within communications range of each other.

The MIJI Test

To perform MIJI, the intruding rigger first declares which infiltrated channels he is targeting and spends a Complex Action. Both the intruder and the targeted rigger then make MIJI Tests in a Success Contest. If the intruder achieves more successes than the targeted rigger, the MIJI attempt succeeds. If the targeted rigger achieves more successes, the attempt fails.

The intruder rolls a number of dice equal to his Electronics (Electronic Warfare) skill against a target number equal to the ratings of the targeted remote-control deck. The intruder's Flux rating may be used as complementary skill dice for this part of the test.

Simultaneously, the targeted rigger rolls a number of dice equal to his Electronics (Electronic Warfare) skill, with complementary skill dice equal to his Flux rating. The targeted rigger's target number is equal to the rating of the intruder's protocol emulation-module (if the intruder is attempting meaoning, intrusion or interference). If the intruder is trying to jam the targeted network, the target number is equal to the ECM rating of the intruder's device.

MIJI Test Results

If the targeted rigger prevails, the network's channels remain open and clear. If the intruder prevails, he inflicts damage in the form of signal degradation on the targeted network channel. Record this degradation on the network's Signal Monitor (see p. 38), in the same way character damage is recorded on a character's Condition Monitor. Each net success in the Success Contest produces 1 box of signal degradation on the targeted network's Signal Monitor.

The specific operation attempted—meaoning, intrusion, jamming or interference—determines which network channel experiences the degradation. As the degradation level of a channel increases, different target number modifiers are applied to tests for actions controlled by the degraded channel. When all the boxes of a channel's Signal Monitor are filled, the intruder effectively shuts out the remote-control deck and can assume control of operations performed by that channel.

Whenever MIJI is used against a remote-control network, the targeted rigger knows immediately that he is under attack and knows that one of his channels has been infiltrated. The rigger can choose to switchover his frequencies and protocols to escape the MIJI attack (see *Defeating Infiltration* above); however, to do so he must suspend his drone operations and put his system on standby for a short period—something a corporate security rigger is loathe to do.

Meaoning

In a meaoning attack, an intruder attempts to degrade the targeted network's command or system channel integrity and introduce false system signals to degrade the Pilot ratings



SIGNAL CONDITION MONITORS

Command Channel		Simsense Channel		System Channel	
Channel Disengaged	☐	☐		☐	Channel Disengaged
	☐	☐		☐	
	☐	☐		☐	
	☐	☐		☐	
Serious Degradation	+3TN #	+3TN #		+3TN #	Serious Degradation
	☐	☐		☐	
	☐	☐		☐	
Moderate Degradation	+2TN #	+2TN #		+2TN #	Moderate Degradation
	☐	☐		☐	
	☐	☐		☐	
Light Degradation	+1TN #	+1TN #		+1TN #	Light Degradation
	☐	☐		☐	

of the network's drones. Meaconing has no effect on the simsense channel.

To perform a meaconing attack, an intruder must have a remote-control deck equipped with a rigger protocol-emulation module (see p. 98). The intruder must first infiltrate either the command or system channel. The intruder and the targeted rigger then make MIJI Tests in a Success Contest as described under *The MIJI Test*, p. 37.

Degradation modifiers generated by a successful meaconing attack apply to Driving Tests, Gunnery Tests and tests for other physical actions made with a drone's Pilot rating, as well as to IVIS Tests. They do not apply to Comprehension Tests made by drones trying to understand commands from the targeted rigger nor to drones directly controlled by a rigger.

After accomplishing its objective, Trixie's shadowrunner team makes its exit from the corporate compound. When several security drones suddenly attack the team, Trixie decides to use her remote-control deck to make a meaconing attack against the security network and reduce the drones' capabilities.

Trixie had previously infiltrated the simsense and system channels, but meaconing doesn't affect the simsense channel so Trixie targets the system channel. Her Electronics (Electronic Warfare) skill is 4 (6), so she rolls 6 dice against a Target Number 3 (the corp network's deck rating). She also receives 8 complementary dice (her deck's Flux Rating 8). She generates 5 total successes.

The corp rigger makes his half of the MIJI Success Contest, rolling his Electronics skill of 5 against a Target Number 6 (Trixie's protocol-emulation module rating). He rolls 5 extra complementary dice (for his Flux Rating 5). He generates only 1 success.

Trixie wins the Success Contest with 4 net successes, so the gamemaster marks off 4 boxes on the corp network's

system channel, which results in Moderate degradation. The corp drones now receive a +2 modifier to any actions they take.

Intrusion

In an intrusion attack, the infiltrator tries to feed false information into the targeted network. The information could be a false target for indirect fire on the system channel, bogus intelligence on the command channel or even a forged simsense clip on the simsense channel. For convenience, this falsified data is referred to as an "image," regardless of its actual form.

To attempt an intrusion, the intruder must possess a remote-control deck and a protocol-emulation module (for generating the false objects). Intrusion can be used against any of the three channels.

If the intruder prevails in the MIJI Test Success Contest, he creates the appropriate bogus image on the targeted network's appropriate channel. However, because this image is constructed on the fly, it's rather easy for an actual person to spot it as false. The targeted rigger should make an immediate Perception (4) Test to determine if he recognizes the image as bogus. Apply any appropriate degradation modifiers.

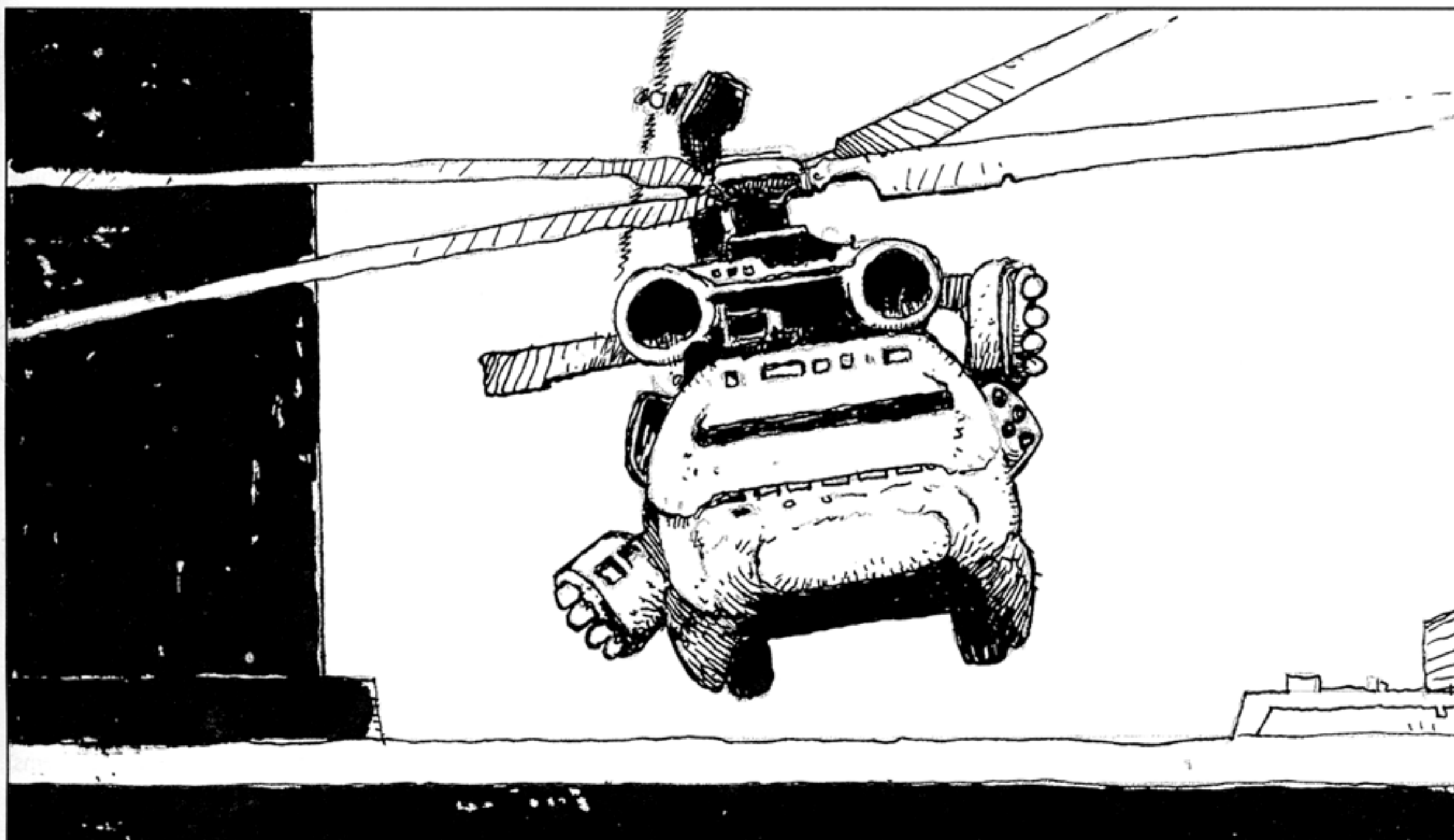
A successful Perception Test enables the targeted rigger to recognize the image as bogus, but his drones continue to regard it as real until he dispels the illusion. The targeted rigger can eliminate the false image by spending a Complex Action and using his ECCM to "clean away" the unauthorized signals. To do so, the rigger makes a test using his deck's ECCM rating against a target number equal to the rating of the intruding rigger's protocol-emulation module. If the rigger's successes equal or exceed the intruding rigger's net successes in the MIJI Test Success Contest, the image is eliminated.

If the rigger's Perception Test fails, he believes the image to be real and responds accordingly. Drones may be ordered to fire at targets that don't exist or may be sent in pursuit of an enemy that isn't there.

If desired, an intruder may create a more convincing computer-generated bogus object before making his intrusion attempt (or may have someone else do it). Generating the appropriate image takes a base time of 1D6 + 1 hours. The image crafter makes a Computer (Programming) (4) Test. The successes achieved are applied as a target number modifier to any Perception Tests made by the targeted rigger to spot the false image as bogus.

Josie Cruise is flying her team to an isolated Cross Technologies lab in her helicopter, Angelfire. Josie is bringing her team in from the north, so she plans to make an intrusion against the lab security network's system channel, then generate a false radar contact to the south to distract the lab's air-patrol drones. Josie successfully infiltrates the network and intercepts the system channel.

Josie had planned this distraction in advance, so before the run she spent some time on her computer generating images of enemy drones flying just above the treetops. It only took her 2 hours, and she achieved 3 successes with her Computer of 4 against the Target Number 4.



The *MJJI Test Success Contest* pits Josie (Electronics skill of 5, Flux 8, Protocol-Emulation Module Rating 6) against the lab's rigger and remote-control security system (Electronics 6, Deck Rating 4, Flux 6). Josie rolls 5 dice plus 8 complementary dice against a Target Number 4 and achieves 5 successes. The lab's rigger rolls 6 dice with 6 complementary dice against a Target Number 6 and generates 3 successes. Josie wins the Success Contest by 2 net successes. Consequently, the lab's patrol drones fly off to the south, leaving no one to intercept Angelfire as it approaches from the north.

Additionally, the gamemaster marks off 2 system-channel boxes on the lab network's Signal Monitor. That results in Light degradation. As a result, the lab's rigger must succeed in a Perception Test against a Target Number 8 (4 plus 3 successes from Josie's Computer (Programming) Test, plus 1 for the Light degradation) to recognize that the enemy drones are not real.

Jamming

In a jamming attack, the intruder uses electronic countermeasures (ECM) to flood the targeted network's channels with electronic noise—crude, but effective. The intruder must possess ECM and a remote-control deck to make a jamming attack.

If the intruder succeeds in the *MJJI Test Success Contest*, his ECM floods one of the targeted network's channels with electronic noise and degrades its signal quality. The intruder decides which channel is targeted; the effects of the jamming vary with each channel.

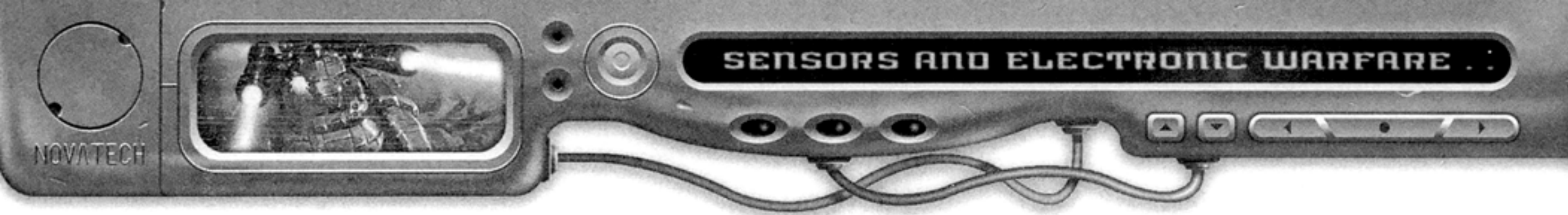
Command channel jamming causes degradation to command-channel signals and adds degradation target modifiers to drone Comprehension Tests (see *Issuing Commands*, p. 157, SR3) and IVIS Tests. If the degradation fills all 10 boxes on the command channel Signal Monitor, the drones are cut off from the network. They either carry out the last command given to them or maintain a holding pattern where they are, taking action only in self-defense.

Simsense channel jamming causes degradation to simsense channel signals and adds degradation target modifiers to all Perception Tests and Manual Gunnery Tests made by the rigger through the drone.

If a rigger is remotely rigging a drone through the deck, degradation modifiers on the simsense channel affect the rigger's target numbers and Initiative in the same way as standard damage modifiers. If a rigger is jumped into a drone when the carrier signal is lost for that drone (all 10 boxes are filled on the simsense channel Signal Monitor), the rigger also suffers dump shock (see *Dump Shock*, p. 156, SR3).

System channel jamming disrupts a network's indirect-fire coordination and affects the performance of its BattleTac fire-direction data manager system (see *New Toys*, p. 86). Degradation modifiers from the system channel Signal Monitor apply to Indirect Fire Gunnery Tests made with the network (see *Indirect Fire*, p. 99, *Cannon Companion*).

Degradation modifiers also counteract any smartlink bonuses when a rigger performs Manual Gunnery through a drone. Consequently, Moderate or higher degradation will cancel out smartlink modifiers altogether.



Interference

In an interference attack, the intruder tries to override the targeted network with his own signals. If the attempt succeeds, the intruder literally hijacks the network from the targeted rigger's control.

To make an interference attempt, the intruder must possess a remote-control deck with a protocol-emulation module. Interference affects the targeted network's system channel only; it has no effect on the command or simsense channels.

The interference MIJI Test Success Contest works a bit differently than other MIJI Tests. Specifically, the intruder's own system channel suffers degradation if he loses the test.

In the Combat Phase following the first MIJI Test, either the intruder or the defending rigger may spend a Complex Action to make an interference attack or counterattack and trigger another MIJI Test Success Contest. The players may make subsequent attacks and counterattacks until one of them manages to inflict 10 boxes worth of degradation on his opponent's system channel, or until a rigger exits the system. Whichever player achieves the required amount of damage first—or stays in the system after his opponent has exited—takes control of the opponent's entire network. The loser is shut out of the network and suffers dump shock (see *Dump Shock*, p. 156, SR3).

M.C. Jammer (Electronics Skill 5, Protocol-Emulation Module Rating 5, Flux 7) is making an interference attack after a successful infiltration of an Aztechnology remote-control network (Electronics skill 3, Deck Rating 6, Flux 4).

For the MIJI Test Success Contest, Jammer's player rolls 5 dice, plus 7 complementary dice, against a Target Number 6. The gamemaster rolls 3 dice, plus 4 complementary dice, against a Target Number 5. Jammer generates 1 success, while the gamemaster gets 3. The gamemaster fills in 2 (3 – 1) degradation boxes on Jammer's system channel Signal Monitor.

During the next Combat Phase, the Aztechnology rigger spends a Complex Action to counter the interference attempt. Jammer generates 2 successes on the opposed MIJI Test this time, and the gamemaster scores only 1. The gamemaster fills in 1 degradation box on Aztechnology's system channel Signal Monitor.

After two more interference tests, the Aztechnology rigger has 8 degradation boxes filled on his system channel Signal Monitor, while Jammer has 6 boxes filled on his own monitor. Jammer makes another interference attack, and both sides roll dice for the MIJI Test. Jammer's player rolls 4 successes, while the gamemaster gets none. That fills the remaining degradation boxes on the system channel of the Azzie rigger's Signal Monitor, so the Azzie rigger is dumped from his system. Jammer takes control of the network and immediately commands its drones to attack the Aztechnology guards.

REGENERATING MIJI DEGRADATION

Riggers may use ECCM to "heal" signal degradation caused by MIJI attacks and restore channel integrity.

To do so, the rigger must spend a Complex Action and make an ECCM Test against a target number equal to the intruder's device rating (either the intruder's protocol-emulation module or ECM rating, as appropriate to the MIJI attack) plus 3. The rigger may use Electronics (Electronic Warfare) skill dice as complementary dice for this test. For every 2 successes generated, reduce the degradation on the selected channel by 1 box on the channel's Signal Monitor. Riggers may regenerate only one channel at a time.

RE-CONNECTING LOST CARRIERS

When a remote-control deck loses a channel because of MIJI degradation, it loses the channel's carrier signal. To access the channel again, the deck must re-connect the carrier signal with that channel. Making the reconnection attempt expends one Complex Action.

Before attempting to re-connect a lost carrier signal, the rigger must first make an ECCM Test to regenerate any signal degradation and clear boxes filled on the Signal Monitor. At least one box must be clear before the rigger can attempt to re-connect the carrier signal.

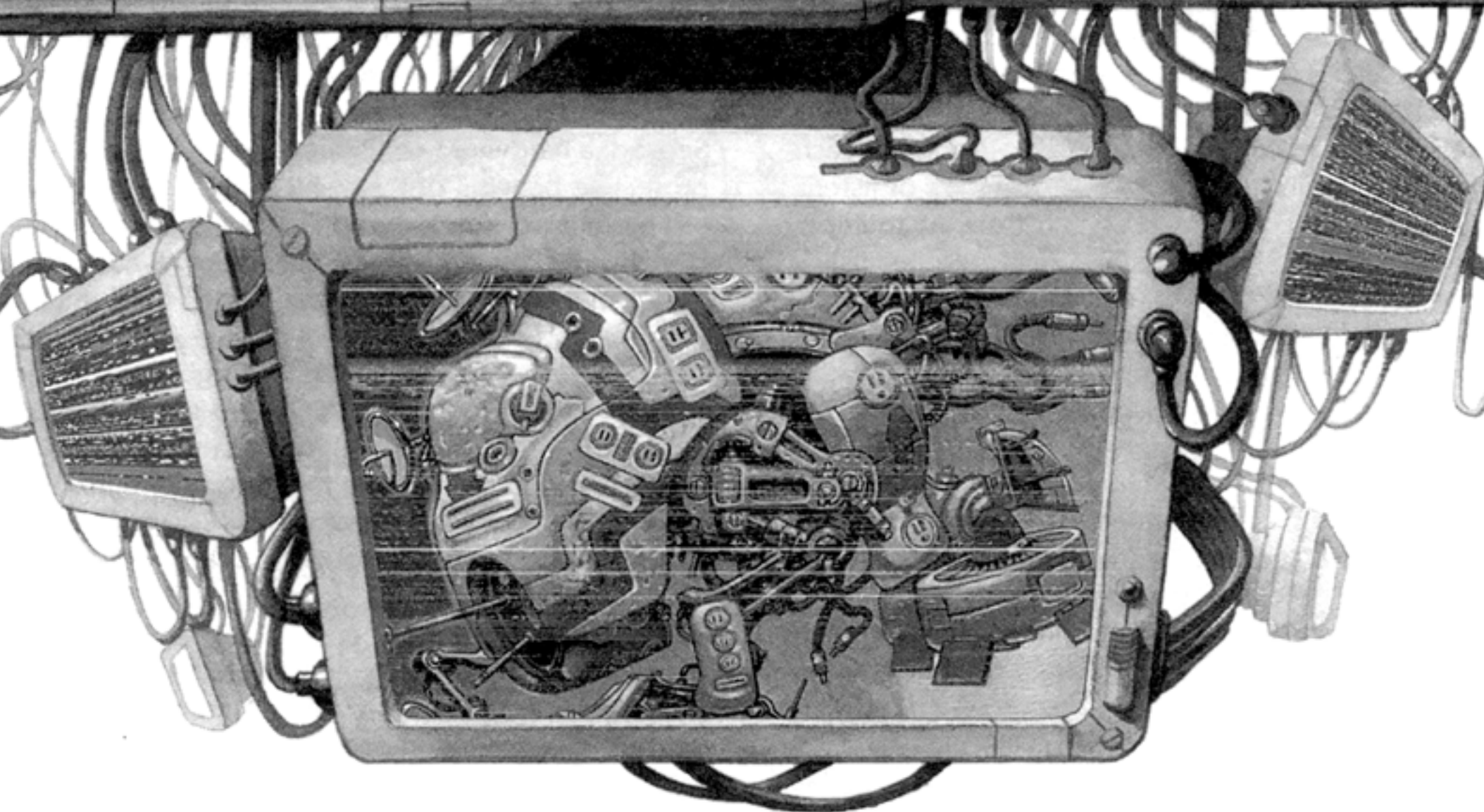
Then the rigger makes an Electronics (Control Systems) Test against a Target Number 4. If any degradation still exists on the channel, apply appropriate degradation modifiers. Any damage modifiers for Physical or Stun damage suffered by the rigger apply as well. If the number of successes exceeds the number of filled degradation boxes on the channel's Signal Monitor, the re-connection attempt succeeds.

REBOOTING A REMOTE-CONTROL NETWORK

As a last resort, a rigger who is still in control of his remote-control network's system channel can always shut down and "reboot." To do this, the rigger must first expend three consecutive Complex Actions to disaffiliate all the drones and shut the network down. Once the third Complex Action is spent, the remote-control network goes off the airwaves and each drone goes into autopilot standby mode.

A remote-control deck reboots and starts back up in a number of Combat Turns equal to its rating. Once a deck is up and running again, the controlling rigger must reconfigure each drone and re-establish the remote-control network (most likely using different frequencies and protocols). This process takes 10 Combat Turns. Once complete, the remote-control network is up and running again at full signal strength; any previous signal degradation is eliminated by the rebooting process.

DRONES



In the hands of a savvy rigger, a remote-control network becomes a powerful combat multiplier. A remote-control network and multiple drones enable a rigger to expand her intelligence coverage over an area, maintain better command and control of a runner team and provide backup fire support in a pinch.

A remote-control network is also an impressive piece of technology. One of the few man-portable devices capable of transmitting bandwidth-intensive simsense over the airwaves, it can manage multiple simsense feeds from multiple drones and evade radio eavesdropping and jamming attempts.

This section provides guidelines for employing drones and remote-control networks that supplement the basic drone rules provided on p. 154, *SR3*. The section also provides rules for the BattleTac IVIS system. Finally, it provides rules for robots, an emerging technology that has attracted much attention following the Renraku Shutdown.

One special type of remote-control network enables riggers to control building security systems. Rules for this type of remote-control network are provided in *The Security Rigger* (p. 45).

THE REMOTE-CONTROL NETWORK

Though rigger remote-control (RC) decks transmit data over the airwaves, they are not the same as ordinary radios. Comparing a remote-control deck to an ordinary radio is like comparing a Fairlight Excalibur to a primitive vacuum-tube computer.

RC decks use some of the same technology that is used for high-speed wireless Matrix access (p. 33, *Matrix*). They also employ a non-standard advanced protocol known as mobile-subscriber simsense technology (MSST) to send and receive data. MSST is a combination of specialized hardware and software components, so it cannot be imported into cyberdecks or ordinary radios.

For ease of management and security, MSST actually uses three separate radio channels to command and control drones: the command, simsense and system channels. To prevent eavesdroppers from intercepting any one of these three channels, remote-control decks use advanced frequency-hopping techniques, simultaneously switching all three bands across thousands of frequencies per second, according to complex mathematical algorithms keyed to the network's subscriber list (see p. 156,



SR3). For more information about how these channels operate, see *Electronic Warfare*, p. 35.

To avoid the confusion of multiple drones “talking” to the network at the same time, MSST uses a method of data handling called enhanced code-division multiple access (E-CDMA). In E-CDMA, a single string of data is divided into smaller packets, each dedicated to one specific drone. As each drone knows where it falls in the sequence and talks or listens at its appropriate time, the RC network can handle the multiple transmissions simultaneously. This is why a subscriber list is critically important to a network. It also explains why drones act during the same phase as the rigger; the sequencing discipline enforced by E-CDMA synchronizes the actions of the drones, causing them to work in unison.

SUBSCRIBER LISTS

Technically speaking, a subscriber list is software, little more than a database that matches drones to assigned digital call signs. A call sign determines the data-string segment to which the drone talks and listens and also keys the frequency-hopping algorithm, so drones know to switch to the right frequency at the right time.

Typically, subscriber lists are stored on special datafiles loaded into drones. The datafile configures the list to match the drones and the drones to match the list. Drones aren’t “plug-and-play,” and for very good reasons (SIGSEC, or signal security, comes to mind).

To configure a drone to a subscriber list, the datafile must be uploaded to the drone. This takes place through a digital-code fill module, which connects to the drone via a special data port. For both technical and security reasons, a digital-code fill module and its dataport are not compatible with standard datajacks or cyberdeck FUPS ports (p. 59, *Matrix*).

Configuring a Subscriber List

Programming a subscriber list takes several minutes. If doing so in a stressful or critical situation (anything that requires a Success Test), programming the list requires an Electronics (4) Test. To determine the base time required for the task, multiply the number of drones on the list by 2; the result is the base time expressed in minutes. A subscriber list not intended for immediate use may be stored on a code fill module.

Configuring a drone to a subscriber list (not to be confused with *affiliating* one to a list) requires the appropriate datafile. Accessing the appropriate file takes about 30 seconds and doesn’t require a skill test (assuming that the character performing the task has worked with drones before; if not, the character must successfully make an appropriate Vehicle Background (4) Test to complete the task).

Switching from one subscriber list to another requires the rigger to “reboot” the RC deck. Rebooting takes about 6 seconds, plus an additional 1 second for each drone on the new subscriber list (so rebooting with a new list of 6 drones takes 6 + 6, or 12 seconds, or 4 Combat Turns). Drones on the old list are immediately disaffiliated when “rebooting” begins. Drones on the new list are considered unsubscribed when “rebooting” finishes and must be affiliated, at the normal rate of 1 per Simple Action (see p. 157, SR3).

HARDWIRING A REMOTE-CONTROL DECK

Some riggers prefer to hardwire their remote-control decks directly to a vehicle, permanently joining the two together. Hardwiring a deck and vehicle provides three main benefits. First, a hardwired deck can draw power from the vehicle’s alternator or battery to augment its internal power source. Second, a hardwired configuration provides the rigger with the protective benefits of the vehicle while she is jacked into the remote-control network and enables the driver to run the vehicle while jacked into the RC deck. Finally, a hardwired remote deck can increase its Flux rating by half the vehicle’s Body rating, rounded down.

Vehicles must be adapted for rigger control and equipped with electronics ports (see p. 146) before they can be hardwired to remote decks. Vehicles that are hardwired to decks cannot be disaffiliated from their remote-control network.

See *Vehicle Customization*, p.122, for more information on adding a remote-control deck to a vehicle.

DUMP SHOCK

Dump shock occurs when a vehicle or drone directly controlled by a rigger is destroyed or cut off from the network. If a drone is operating in secondary mode and not under direct control of the rigger, its destruction will not dump a rigger out of the network. (However, the rigger may feel a *simsense* “twinge” that alerts her to the drone’s destruction.) Likewise, if a rigger is sitting in “the captain’s chair,” she is immune to dump shock unless the network is disrupted through electronic warfare (see *Electronic Warfare*, p. 35).

MULTIPLE RIGGER NETWORKS

Very large remote-control networks, such as those found on ships or fixed-site facilities, may be too complex for a single rigger to control. Additionally, teams of multiple riggers may work together to improve performance.

Remote-control networks capable of accommodating multiple riggers exist only on ships and fixed facilities. The hardware required to coordinate multiple cybernetically linked minds is far too heavy and bulky to be made portable. In these networks, a rigger may either sit in “the captain’s chair” and directly control one of the network’s affiliated drones or the rigger may wait on standby. A rigger on standby operates under the same limitations as a rigger connected via a hitcher jack; he may communicate with any of the other riggers with the network and perceive anything the rigger in the captain’s chair perceives, but he cannot issue commands or take control of a drone.

Only one rigger may assume control of the captain’s chair, and only one rigger may be in direct control of a particular drone at a time. If a rigger tries to take control of the captain’s chair or a drone that is already controlled by another rigger, the attempt fails. Engineers and technicians often refer to this one-drone/one-rigger rule as the “Rigger Exclusion Principle.”

If a drone is not under control by another rigger, the rigger in the captain’s chair may assign a rigger on standby to take control of that drone. A rigger controlling a drone can stop controlling the drone and return to standby mode. (The rigger in

the captain's chair can also remove a drone from a rigger's control without the consent of the rigger.) Similarly, if the captain's chair becomes vacant (either from the lead rigger taking direct control of a drone, jacking out or getting dumped), any rigger on standby may assume control. (The choice is normally voluntary, but in the event of disagreement, make an Opposed Willpower Test between the competing riggers. The winner assumes control of the captain's chair.)

THE BATTLETAC IVIS SYSTEM

The basic BattleTac enhances small-unit tactics among groups of soldiers. The BattleTac IVIS system (Inter-Vehicle Information System) enhances data-sharing capabilities between remote-control decks and drones. IVIS is used in conjunction with the Small Unit Tactics (Vehicle Tactics) skill.

IVIS enables a rigger to give a complex mission to a group of drones simultaneously and boosts the drones' ability to execute more complex and sophisticated tactics to accomplish their assigned tasks. In game terms, this increased ability is reflected by either extra dice for a drone's Comprehension Test or the creation of a drone-assisting dice pool.

To use the IVIS system, the remote-control deck or cranial remote deck must carry the master unit as an accessory. Additionally, only drones whose pilot systems have been modified to interact with BattleTac IVIS receive the benefits of this system. BattleTac IVIS gear is described on p. 96.

IVIS TEST

To use IVIS, the rigger makes a Small Unit Tactics (Vehicle Tactics) Test before making the Comprehension Test for the group of drones. The test takes a Target Number 5.

A rigger may use the successes generated by the IVIS Test to either add dice to the drone group's Comprehension Test, create a temporary dice pool called the IVIS Pool or both. For example, if a rigger's IVIS Test generates 5 successes, she may add 5 dice to the Comprehension Test or create a 5-dice IVIS Pool. She could also split the result in various combinations—for example, add 2 dice to the Comprehension Test and create a 3-dice IVIS Pool.

IVIS POOL

The IVIS Pool dice are shared by all drones within an IVIS group (the drones do not receive individual pools). The

group's IVIS Pool may be used on any action performed by any of the group's drones, including Sensor and Gunnery Tests. IVIS Pool dice refresh at the end of each Combat Turn until the drone group completes the assigned task or receives a new task. At either point, the IVIS Pool ceases to exist and the rigger must make a new IVIS Test to form another IVIS Pool for another task. IVIS Pool dice are not available to drones that a rigger has jumped into.

PILOT RATINGS

As described on p. 133, *SR3*, the Pilot rating of a drone represents its semi-autonomous decision-making capabilities. Pilot systems are advanced hardwired programs, tailored for each particular type of drone and built into the machines. Pilot ratings are used to determine how well a drone comprehends com-





mands from a rigger (see *Issuing Commands*, p. 157, *SR3*). If a rigger is not directly controlling a drone, then the Pilot rating is used in place of the rigger's skills and abilities for certain tests.

Gamemasters should exercise discretion when using the Pilot rating for tests. In most circumstances, pilot systems are programmed to maneuver drones (acting as the appropriate Vehicle skill), fire a vehicle's weapon systems (acting as Gunnery skill) and operate any other onboard devices (cameras and so forth). Pilot ratings are not programmed to handle much beyond these functions and should not be used as a stand-in for any other skills or abilities (autosofts and robotic functions are much better substitutes).

At the gamemaster's discretion, a drone that has been loaded with new weapons or equipment may require adjustments to its pilot systems to operate these new additions. Adjusting a drone's pilot systems is similar to upgrading a program (p. 81, *Matrix*) and requires a Computer (Programming) Test against the Pilot rating. However, gamemasters are encouraged to modify these requirements as they see fit.

AUTOSOFTS

Autosofts are dedicated software suites that combine advanced intelligence systems with a drone's built-in neural network, expanding its capabilities. In effect, autosofts provide a drone with new skills and abilities, similar to a skillsoft. Autosofts are essentially "plug-and-play" software chips that may be used in any drone equipped with an autosoft-interpretation system (see p. 142).

A drone may use only autosofts with ratings equal to or lower than its Pilot rating. Autosofts must also be loaded into the autosoft interpretation system's memory to be used. When a drone is simultaneously using multiple autosofts, the combined ratings of the autosofts may not exceed the drone's Pilot rating multiplied by 2.

Available autosoft programs are described on p. 98.

ROBOTS

A robot is an advanced form of drone. Like standard drones, robots possess Pilot ratings that represents the computer and software that gives the robot its limited autonomy. Unlike drones, robots contain advanced programming and computer technology that enables them to adjust to new situations by changing their algorithms. In effect, robots can "learn" and adapt their behavior to better fulfill their mission requirements.

To reflect this capability in game play, robots may use a dice pool called the Adaptation Pool. Robots also generate their own Initiative in combat.

Though they can act with limited autonomy, robots do not possess true intelligence. They have no self-awareness and cannot actually think for themselves.

ADAPTATION POOL

A robot's Adaptation Pool is equal to its Pilot rating. A robot can draw dice from its Adaptation Pool to augment any Success Test that a standard character would augment with Combat, Control or Task Pool dice, subject to its prime directive. As with

those pools, the Adaptation Pool refreshes at the start of each Combat Turn. Adaptation Pool dice are *not* available, however, if a rigger is directly controlling the robot.

Additionally, a robot equipped with BattleTac IVIS may also draw dice from an IVIS Pool. Dice from both pools may even be used simultaneously.

PRIME DIRECTIVE

A robot's adaptive programming is not unlimited. A robot can use its adaptive programming only when performing its primary function, also known as its prime directive. When performing tasks not related to its prime directive, it loses its ability to adapt to the situation.

A prime directive describes the functions that a robot may apply its Adaptation Pool to. Whenever a robot is performing a task that directly supports its prime directive, it receives the full benefit of its Adaptation Pool. Whenever a robot is performing a task that doesn't directly support its prime directive, it does not gain Adaptation Pool benefits.

INITIATIVE

Because robots can learn and adapt, they need not act simultaneously with the rigger like standard drones. To reflect this capability, robots have their own Reaction ratings and generate their own Initiative.

A robot's Reaction is equal to its Pilot rating multiplied by 2. Robots have base Initiative dice of 1D6, though this may be increased with the Robotic Reflexes design option (see p. 121, up to a maximum of 4D6).

Adaptation Pool and IVIS Pool dice may not be used for Initiative Tests.

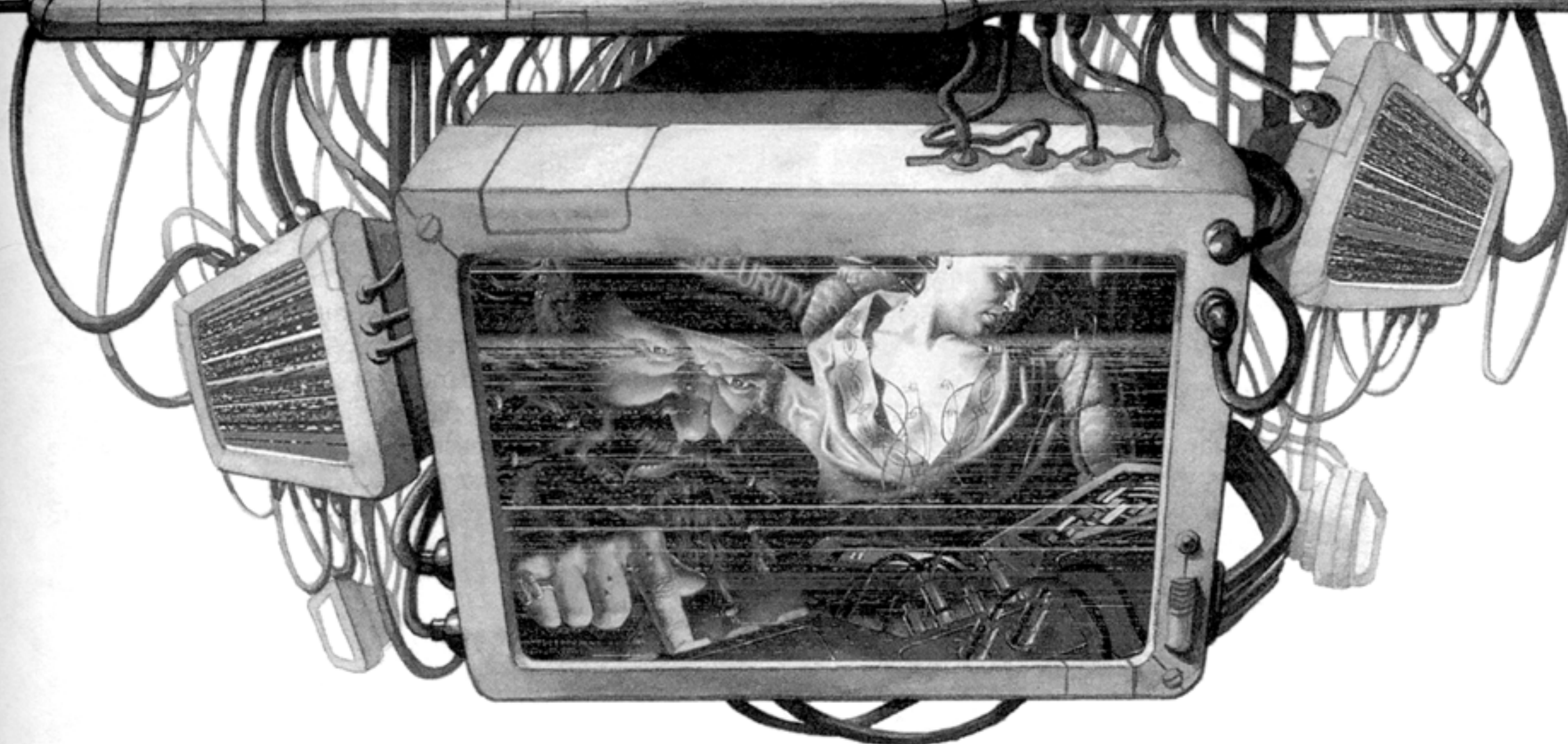
DRONES, ROBOTS AND THE MATRIX

Drones and robots are rarely linked to the Matrix, simply because the advanced protocols and design of remote-control networks and closed-circuit simsense (CCSS) security systems make such systems much better suited for operating such machines.

A Matrix user with a remote-control utility (p. 73, *Matrix*) can manipulate drones or the components and drones of a rigged security system through the Matrix, provided that a communications link has been established between the user and the drones or the security system. This link can be achieved through a wireless link (p. 33, *Matrix*), CCSS or a rigger remote-control deck hooked into the Matrix. In some automated factories, drones are monitored and operated in this manner. Some facilities even employ semi-intelligent know-bots (p. 147, *Matrix*) dedicated to coordinating rigged drones.

Though robotic pilots are similar to agent programs (see p. 88, *Matrix*), robots themselves are not capable of crafting personas and cruising the Matrix. Though they are rarely programmed to do so, the computer and piloting systems of drones and robots are capable of accessing the Matrix in tortoise mode (see p. 42, *Matrix*). In this case the pilot follows a simple programmed routine to download information such as weather reports, maps and so on; pilots are incapable of performing any other Matrix surfing or activities beyond such simple information retrieval.

SECURITY RIGGERS



Security riggers use closed-circuit simsense systems (CCSS) to control the security systems of entire buildings or facilities. CCSS allow a security rigger “drives” a vehicle. This is accomplished via a security control rig that translates the CCSS’ electronic signals into neuromuscular signals and vice versa. The security rigger literally “feels” the system components as if they were part of his own body. The closed-circuit system also gives the rigger control of all drones patrolling the site and enables him to automatically sense any event that the site’s security sensors detect.

Note that the existence of CCSS systems in no way invalidates or renders obsolete Matrix-based security systems. CCSS and Matrix security systems both have their own strengths and weaknesses and complement each other in certain instances. Matrix-based security systems excel in access control (determining who is allowed where) and traffic monitoring (tracking and logging who went where and when), but their responsiveness is poor. CCSS, on the other hand, are very good at maintaining virtual telepresence and threat response, but they have inferior traffic-monitoring abilities, especially in high-volume areas such as public places.

The choice of whether to use a Matrix-based security system or CCSS will reside with the site security manager (read: gamemaster). Some areas will have one and not the other. Some may maintain Matrix systems to protect one area and CCSS systems to protect other areas. And in some cases, a security manager may maintain both Matrix and rigged systems to protect the same areas.

CLOSED-CIRCUIT SIMSENSE SYSTEMS

Closed-circuit simsense systems incorporate a wide range of security toys and components designed to make life difficult for shadowrunners and criminals. The technological capabilities of a closed-circuit simsense system are indicated by its Security Value.

THE SECURITY VALUE

Rigged security systems have varying levels of technological capability and varying levels of vigilance. These two characteristics are measured by a system’s Technical Rating and Vigilance Code. The rating and code collectively form the system’s Security Value.



Technical Rating

The Technical Rating is a numerical value, from 1 to 10, that indicates the technological sophistication of the system. A Technical Rating 1 represents an antiquated, near-obsolete system that hasn't changed much since CCSS first came out. A Technical Rating 10 represents a modern, cutting-edge system with state-of-the-art components.

In game terms, the Technical Rating of a CCSS serves as the target number for a rigger who is attempting to break into the security system (see *Accessing a Security System*, p. 49). The Technical Rating also acts as the rating for the security rigger's remote-control deck, should an intruding rigger engage him in electronic warfare (see p. 35).

Vigilance Code

The Vigilance Code indicates the overall watchfulness and effectiveness of the security system. A facility can have the latest and greatest security equipment, but it really doesn't mean much if the company doesn't back it up with a thorough security plan, proficiently trained security riggers, adequate technician staffing and a proactive maintenance schedule. These and other intangible factors determine the system's Vigilance Code.

The Vigilance Code is expressed as a color—Blue, Green, Orange or Red. Each color corresponds to the number of successes an invading rigger must achieve during each step when accessing the security system (see p. 49). Note that the Vigilance Code does *not* apply during rigger combat or after a rigger has taken control of a rigged security system.

CCSS COMPONENTS

The heart of a CCSS is the system-control rig, a non-portable workstation designed somewhat like a remote-control deck only much, much larger and with the capacity to communicate and coordinate dozens of linked security-system components. The system-control rig is what the security rigger jacks into to become the "brain" of the CCSS. The system-control rig is usually located in a highly secure area of the facility—usually the security control room—and is locked and guarded.

A CCSS can be linked to a wide range of security-system components. Some components are standard and will be found in nearly all CCSS. A few others are optional. Ultimately, gamemasters determine the limitations, components and capabilities of security systems in their games.

Standard CCSS components include closed-circuit video or trideo, audio microphones, maglocks, door and window sensors, pressure pads and motion sensors, cyberware- and weapon-detection systems, chemical sniffers, radio transceivers (for communicating with security guards), gun emplacements and drones. CCSS systems may also incorporate scanners (p. 289, *SR3*) and near-field receivers to detect unauthorized radio broadcasts in their areas, as well as broadcast-decryption systems in case such transmissions are encoded. The ratings of these system components are usually equal to the CCSS' Technical Rating, though the gamemaster may modify them as he deems appropriate. For rules on detecting and bypassing security-system components, see p. 232, *SR3*, and p. 89, *SRComp*.

CCSS system-control rigs often incorporate a simlink and/or hitcher jacks, so that a secondary rigger can passively watch over the security rigger's shoulder.

Finally, many other building systems—heating, lighting, ventilation and so forth—are also tied into a CCSS and may be manipulated by the security rigger.

Drones

Rigged security systems employ closed-circuit simsense. All simsense and other sensory data is transmitted through hardwired connections, so that it can't be scanned or intercepted. Though a system's drones, gun emplacements and so forth are hardwired, they need not be stationary. Typically, hardwired drones and gun stations can move around on installed track systems (often on or near the ceiling) or may be connected via limited-range, reel-out extension fiberoptic lines. Hardwired drones and other components are not affected by electronic warfare. An intruding rigger must manually access a CCSS to seize control of its drones (see p. 49).

As some facilities prefer to maintain drones with greater mobility, it is not uncommon to find system-control rig workstations fitted with remote-control decks to control mobile drones. In such cases, CCSS is used for everything except the mobile drones, which are controlled through a remote network, usually from the captain's chair mode. The maximum number of drones a rigger can command is equal to the rating of the rigger's remote-control deck (i.e., the Technical Rating of the system). Drones operated in this manner are vulnerable to electronic warfare. (See *Drones*, p. 41).

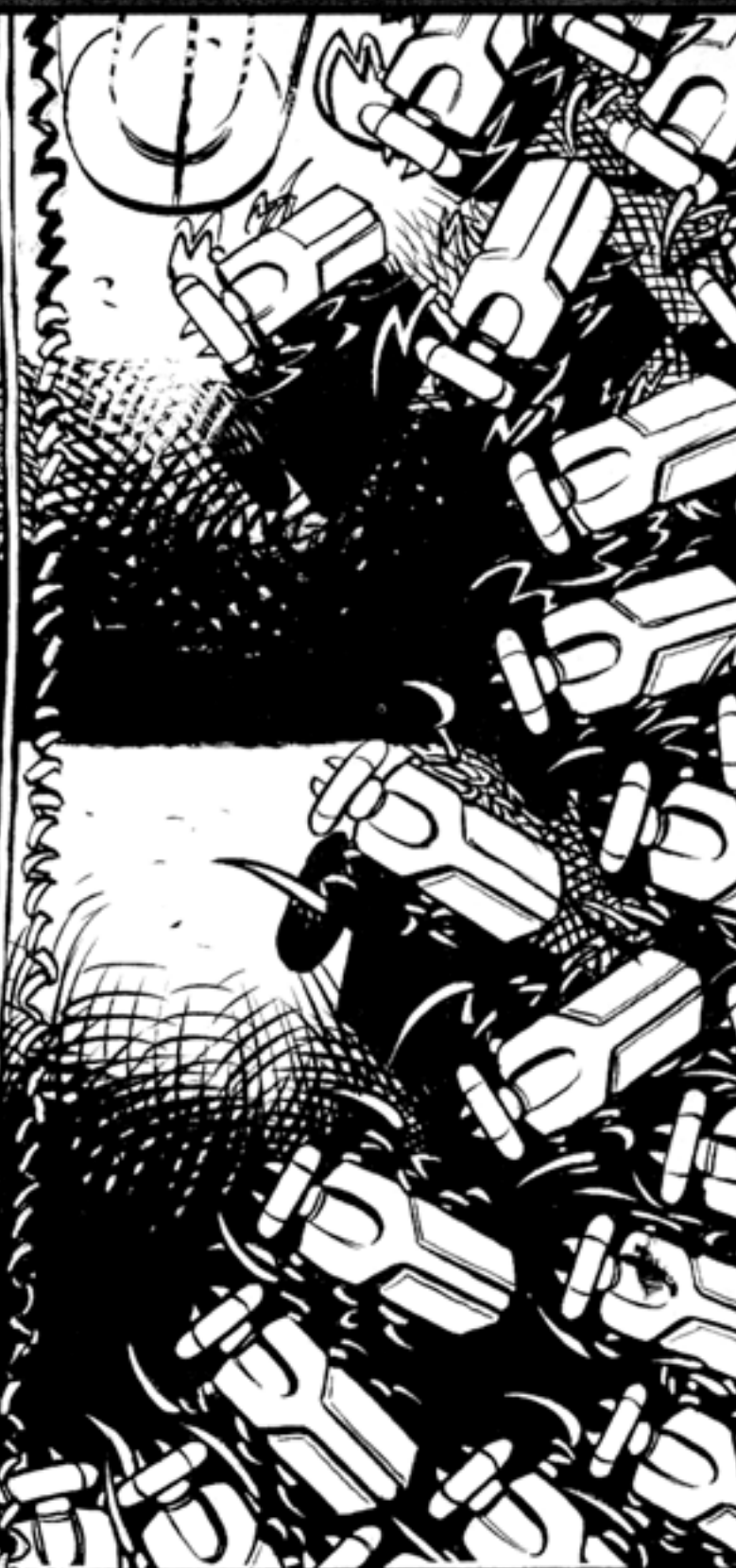
ACTIVE SECURITY RIGGERS

When a security rigger jacks into a CCSS and becomes "active," he is said to "assume the body." He gains the abilities to visualize a three-dimensional map of the security system under his control, experience the system's sensor input and status as physical sensations and control the system through neurological impulses.

Normally, the system's security devices—drones, weapon ports, security doors, gas vents, cameras and such—operate on "autopilot" when they are not under the rigger's active control. If a device detects an anomaly or an automatic alarm goes off, the security system's main computer contacts the security rigger, using sensory stimuli to get his attention.

PERCEPTION WITHIN A CCSS

The rigger experiences local radio traffic picked up by the system's sensors as auditory sensations. Individual sensor triggers, such as a CCSS-rigged door being opened and closed or unidentified personnel moving through a corridor, register as tactile sensations on the rigger's skin. The trigger's degree of importance determines the intensity of the sensation. Regular triggers, such as the opening of a door to a sensitive area, register as mere twitches on the skin, while more important triggers produce strong physical sensations—such as burning sensations—designed to convey the importance of the trigger to the rigger.



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When security riggers “jump” into particular components or component groups of a CCSS, their audio/visual perceptions shift into real-time perceptions of the vicinity immediately surrounding the component, to a maximum of any single room less than 100 square meters and any corridor less than 25 meters long. However, a rigger retains awareness of the overall security system through her tactile senses. Security riggers can jump into a drone or into the groups of active security measures and countermeasures in a particular site location, such as a room or a corridor. In the latter case, the rigger would take command of doors, climate control, gun ports and the like within that area.

Note that a rigger can perceive events only in the area covered by her CCSS. For example, a corporation might use several closed-circuit systems to cover different parts of a facility. If a rigged system covers only part of a facility, the rigger will not know what is going on in areas not covered by the CCSS.

Security Perception Tests

To determine whether a rigger recognizes important sensations, the gamemaster makes a secret Perception Test for the rigger whenever a significant trigger occurs. If the test succeeds, the rigger notices the trigger. Target numbers for the Perception Test appear in the Rigger Perception Tests Table.

RIGGER PERCEPTION TESTS TABLE

Trigger Condition	Perception Test Target Number
Security door/gate/window opened or closed	6
Successful maglock tampering	6 + successes achieved
Security device destroyed	4
Security device carefully deactivated	8
System on alert	-2

RIGGER BONUSES IN A CCSS

Security riggers automatically gain the Initiative bonuses conferred by the vehicle-control rig, as well as other cyberware described in *The Rigger* (p. 22). However, when riggers “assume the body,” they do not have access to any of their dice pools except the Karma Pool. Riggers gain full access to their dice pools when they jump into a drone, room or corridor, however.

If an intruding rigger accesses a CCSS, he also gains the Initiative bonus conferred by his VCR. Intruding riggers may use their Task Pools (but not Control Pools) to defeat encryption and adjust to system protocols.

If a security rigger and intruding rigger are engaged in rigger combat (see p. 50), both riggers may use their Control Pools.

ACTIONS IN A CCSS

Riggers may perform the following actions in a closed-circuit simsense system.

Free Actions

Activate/Deactivate Sensors: The rigger may activate or deactivate sensors for one drone. Activated sensors will be online at the start of the next Combat Turn.

Arm/Disarm a Weapon System: The rigger may arm or disarm one weapon system mounted on a drone or fixed weapon port.

Delay Action: Per standard combat rules.

Call up an Overall Status Report: The rigger may monitor the overall status of the security system.

Observe: The rigger may observe through any single drone, a single room's sensors or the sensors in a section of corridor. This is the same as the standard Free Action Observe (p. 105, SR3).

Speak a Word: A rigger may broadcast a message via intercom to a room, a group of rooms, a section of corridor or the entire facility. This action follows standard combat rules (p. 105, SR3).

Suppress Automatic Alarms: The rigger may suppress an automatic alarm within the limits described in Perception within a CCSS.

SIMPLE ACTIONS

Observe in Detail: The rigger may observe in detail (p. 106, SR3) through any single drone, room or section of corridor.

Jump into a Primary Drone: The rigger takes direct control of a single drone (see *Operative Modes*, p. 154, SR3).

Monitor Radio Traffic: The rigger may monitor radio communications on a single radio frequency.

COMPLEX ACTIONS

Control a Room: The rigger may take direct control of any weapon systems, security doors or other mechanical security systems in a single room or a section of corridor. Rigger bonuses and all dice pools apply in this mode (see *Rigger Bonuses in a CCSS*).

Fire a Weapon System: The rigger may fire an armed weapon mounted on a drone or a weapon port. Riggers can use their Combat Pool only with drones or rooms they are controlling directly (see *Rigger Bonuses in a CCSS*).

Issue a Command: The rigger may issue a command to a drone or a group of drones. The maximum number of drones a rigger can command is equal to the rating of the rigger's remote-control deck (see *Issuing Commands*, p. 157, SR3).

Operate a Drone: While jumped into a drone, the rigger may operate it as if she was driving it and use her Control Pool and rigger bonuses (see *Using Drones*, p. 154, SR3).

Turn On/Turn Off a Device: While directly controlling a room or corridor section, the rigger may turn on or off other unspecified devices such as gas vents, sprinkler systems and lights. The rigger can also adjust the setting of variable-setting devices such as thermostats and fans.



VIGILANCE CODE CRITERIA TABLE

Level	Number of Successes	Description
Blue	1	Low vigilance. A corporate rigger from the motor pool doubles as a security rigger on an on-call basis only. Drones and defensive systems use non-lethal weapons and ammunition.
Green	2	Moderate vigilance. The company employs a dedicated security rigger, but he works on an on-call basis. Use of deadly force by drones and automated defense systems is authorized only during a state of alert called by a (meta)human guard.
Amber	3	High vigilance. Full-time security riggers are jacked into the network 24 hours per day. The system is authorized to use deadly force, even if there is no active alert. All network communications are encrypted.
Red	4	Maximum vigilance. Security system and personnel are on constant, active alert. All network communications are encrypted.

ACCESSING A SECURITY SYSTEM

Unless a rigger can battle her way through legions of guards to access the security room where the security rigger operates (possible, but not very likely), she will have to wrest control of the security system from her opponent by accessing the network.

Unlike remote-control networks, which relay information via radio transmissions, CCSS security networks communicate via hardwired fiber-optic communication lines and underground or embedded power cables. Therefore, CCSS networks are not vulnerable to MIJI attacks. To wrest control of a CCSS network away from a security rigger, an intruding rigger must tap into the hard-wired network and defeat the controlling rigger in rigger combat. This process is divided into four steps, each a Complex Action:

1. Tap into a hardwire access point
2. Defeat encryption
3. Adjust to system configuration and protocols
4. Defeat controlling rigger in rigger combat

To perform these steps, the intruder needs the following gear:

- Remote-control deck
- Rigger protocol-emulation module
- Dataline tap (if necessary)
- Rigger-decryption module

STEP 1: TAP INTO A HARDWIRE ACCESS POINT

The rigger must find some point in the closed-circuit system into which he can tap. Most rigged systems are not accessible from outside the facility they protect, so the rigger will likely have to physically enter a protected area of the site to find such a point.

Any fixed device connected to the CCSS network (such as a camera, security door or gun port) can provide a suitable

hardwire access point. The device may need to be opened up first, which may require an Electronics B/R (4) Test or similar test—and which may alert the security rigger. To hook an RC deck into such a device, the intruding rigger will need a dataline tap (p. 290, SR3).

The rating of the tap must be equal to or higher than the intruder's RC deck rating, or the tap will not work. If the tap rating is less than the CCSS' Technical Rating, subtract the tap's rating from the Technical Rating. The result should be applied as a target number modifier to all actions the intruding rigger takes within the system.

Very rarely, rigged security systems have open slave ports scattered throughout the site to enable roving security riggers to connect RC decks directly into the system. Of course, intruders can also connect RC decks to such points without the need for dataline taps. However, open slave ports are usually heavily disguised, placed in inaccessible areas and protected with maglocks or other devices.

STEP 2: DEFEAT ENCRYPTION

Many rigged security systems use encryption on their hardwired CCSS transmissions. If an outside rigger runs into encryption, he can use a decryption module (see p. 98) and make a Decryption Test to decrypt the system's communications.

This test uses a number of dice equal to the decryption module's rating. A rigger may also use Electronics (Electronic Warfare) as a complementary skill. Task Pool dice may be used for this test. The test target number is the system's Encryption rating (usually equal to the system's Technical Rating).

The intruder manages to decrypt the system's communications if his test successes equal or exceed the successes listed for the system's Vigilance Code in the Vigilance Code Criteria Table. If he fails, the security system goes on alert.



STEP 3: ADJUST TO SYSTEM CONFIGURATION AND PROTOCOLS

Not all rigged systems use the same configuration and protocols. If a rigger intent on crashing a rigged security system manages to find out beforehand what protocols the targeted security system uses, she's in the clear. She can set her RC deck to those protocols and automatically sync with the system when she taps in; in this case, the intruding rigger automatically succeeds at this step.

If an intruding rigger doesn't know a system's protocols, she has to find out the hard way by tapping in and trying to identify and emulate them on the fly. To do this, a rigger must use the protocol-emulation module (see p. 98) installed on her RC deck.

To determine if the intruding rigger successfully uses her emulation module to sync with the system, she must make an Electronics (Electronic Warfare) Test, using a number of complementary dice equal to the protocol-emulation module rating. Task Pool dice may be used for this test. The target number is the system's Technical Rating.

The intruder adjusts to the protocols if her test successes equal or exceed the successes listed for the system's Vigilance Code in the Vigilance Code Criteria Table (p. 49). If she fails, the security system goes on alert.

STEP 4: DEFEAT CONTROLLING RIGGER IN RIGGER COMBAT

Once the intruding rigger has completed the preceding steps, she must immediately fight the security rigger for control of the system. Hardening, defensive programs and intrusion countermeasures have no effect on this combat, as rigged systems operate through hardware rather than software. The two riggers use hardware to attack each other and inflict real damage on one another. Rigger combat is conducted according to the following sequence:

Initiative

Each rigger rolls his rigged Initiative per the standard rules. The rigger with the highest result acts first. This roll can occur as part of the normal Combat Turn sequence. As in standard combat, a rigger acts during every tenth phase of the Combat Turn.

Attack/Disengage

The rigger who won the Initiative may choose to attack or disengage. Attacking requires a Complex Action.

If the rigger attacks, both opponents make an opposed Willpower Test. Both riggers may use Control Pool, though the number of dice used may not exceed the attacker's Willpower.

The rigger who generates greater net successes on the test does (Willpower)M Stun damage to his or her opponent. Increase the Damage Level by one level for every 2 successes generated. The losing rigger makes a Willpower Test to resist the damage, augmented by his or her Control Pool if the rigger desires. If either rigger is rendered unconscious by rigger combat (takes 10 boxes of damage), he or she is dumped out of the system and automatically surrenders control to the other rigger.

If either rigger decides to disengage, he or she jacks out of the system and surrenders control to the other rigger. Disengaging is a Free Action; re-entering the system requires a Complex Action.

Ending Combat

Combat proceeds until one of the two riggers disengages or passes out.

If the intruder manages to overcome the security rigger, the intruder can manipulate the rigged system and/or drones at will. Additionally, the intruder gains access to all of the information that had been available to the defeated security rigger.

Multiple Rigger Networks

If a CCSS is designed to incorporate multiple riggers (see p. 42), an intruder fights one of the security riggers at a time (the one in the captain's chair). Once that security rigger is defeated, another security rigger can attempt to wrestle control away from the intruder, using the same rigger combat rules.

Other Actions in Combat

If a security rigger and intruder are engaged in combat, neither can take any other actions until the combat has ended.

DECKING A RIGGED SYSTEM

It is possible to deck into a rigged CCSS, but a decker will never be able to control the system as efficiently as a rigger does (riggers interface directly into rigged systems, while deckers must modify the user interface and operating system with programs).

To deck a rigged system, a decker needs a cyberdeck outfitted with a system-control rig emulator (p. 95), a protocol-emulation module (p. 98) and a remote-control utility (see p. 73, *Matrix*). The decker performs Steps 1 and 4 of accessing a rigged system per standard rules (see *Accessing a Security System*, p. 49). If the system is encrypted, the decker can either utilize a decryption module or use a decrypt utility (p. 220, *SR3*) in its place.

Combat between a decker and a rigger in a rigged system follows the rigger combat rules, but the following restrictions apply to the decker:

- No Matrix programs may be used.
- The decker receives a +1 modifier on all tests. The decker's Reaction is reduced by 2, and he gains no extra Initiative dice from Response Increase or reality filters (but he does receive standard bonuses for running pure DNI).
- The decker has no Hacking Pool but receives a Control Pool equal to one-half (round up) of his emulation utility's rating.
- Both the decker and his icon take damage as if struck by non-lethal black IC (see p. 230, *SR3*). Armor utilities, Hardening and ICCM filters protect as normal.

SHIPS AND SUBS



This chapter provides expanded vehicle and rigger rules for waterborne and underwater vehicle operations. It focuses primarily on larger seafaring ships capable of long-range travel across the major seas and the world's oceans but also provides rules for submarine operations.

SHIP ATTRIBUTES

In the *Shadowrun* game system, a ship is defined as any waterborne vessel with an overall length greater than 50 meters and a displacement greater than 100 metric tons or 100,000 kilograms. Anything smaller (in length or tonnage) is classified as a boat. Also, wherever a rule refers to a vessel, it means the rule holds for both ships and boats. This definition holds true for both surface vessels and submarines.

Ships, which are capable of crossing major seas or oceans, can be very large vessels. A twentieth-century *Nimitz*-class aircraft carrier, for example—more than 300 meters long by 40 meters wide and displacing more than 95,000 metric tons of water—is capable of holding a small village inside its hull! Consequently, standard *Shadowrun* vehicle rules can be somewhat unwieldy when applied to ships. A *Nimitz*-class carrier would have an equivalent Body Rating of well over 100! Rolling a hundred dice for the Damage Resistance Test against an anti-ship missile (which could conceivably have a Power of 50 or greater) is not practical for a *Shadowrun* game.

To better incorporate ships in *Shadowrun* play, ships possess vehicle attributes different from the standard vehicle attributes listed in *SR3*. These new ship ratings and modified existing vehicle ratings are defined in the following text.

SPEED (CAVITATION THRESHOLD)

In addition to the normal Speed rating, every ship possesses a second rating called the *Cavitation Threshold*. Cavitation is the turbulence created by a ship's screws when the ship moves at high speeds. If a ship moves faster than its Cavitation Threshold, it creates enough cavitation noise to reduce its Sonar Signature. This makes the ship more vulnerable to sonar detection and torpedo attacks. For more information, see *Cavitation*, p. 34.



In a ship's statistics, the Cavitation Threshold comes after the normal Speed value and is enclosed in parenthesis.

Because of a boat's small size and the insignificant turbulence caused by the vessel's engine, boats do not have a Cavitation Threshold.

In maritime circles, sailors measure speed in terms of knots, or nautical miles per hour. One nautical mile is equal to 6,076 feet, 1.15 statute (land) miles, or 1.85 kilometers. So one knot is thus equal to approximately 1.15 miles per hour or 1.85 kilometers per hour. To calculate a ship's speed in knots, divide the Speed rating by 1.54.

HULL

Instead of Body, ships have Hull ratings. A ship's Hull rating represents the vehicle's size, weight and resistance to damage. The Hull rating functions exactly like the Body rating, except it works on a much larger scale. The Hull Table lists different hull ratings and corresponding ship tonnage ranges.

It is possible for vehicles other than ships or submarines to have Hull ratings. To have a Hull rating, a vehicle must have a tonnage greater than 100 metric tons and an overall length greater than 50 meters.

To calculate the number of hardpoints and firmpoints that can be mounted on a ship or other vessel with a Hull rating, take the square of the Hull and add 4, or $(\text{Hull} \times \text{Hull} + 4)$. The result is the number of "mount points" the vessel has; a hardpoint costs 2 mount points, while a firmpoint costs 1 mount point.

BULWARK

The Bulwark rating is the ship equivalent of the normal Armor rating and functions the same in ship combat. To convert Bulwark and Hull ratings into standard vehicle Armor or Barrier ratings, see *Ramming Ships*, p. 54.

SIGNATURE (NORMAL/SONAR)

Every ship has a Signature rating that consists of two numbers. The first number indicates the ship's normal Signature rating. This value is used for tests involving radar, thermographic imaging and other normal vehicle sensors. The second number

indicates its Sonar Signature, which reflects its vulnerability to detection and targeting by sonar systems. For more information on Sonar Signature, see *Sonar*, p. 33.

SONAR

The Sonar rating reflects the capability and sophistication of a ship's sonar systems, as well as the ship's waveform-analysis systems that identify sonar contacts. For more information, see *Sonar*, p. 33.

DEPTH

The Depth rating applies to submarines, mini subs, and all manner of underwater vessels, both boats and ships. The Depth rating indicates the maximum depth (in meters) that the vessel can safely dive to underwater. If a vehicle dives further than its Depth, it sustains damage from the crushing water pressure. For more information, see *Exceeding Depth Limits*, p. 60.

SHIP OPERATIONS

Because of their size and purpose, ships operate differently than normal vehicles. This section covers rules for operating ships outside of combat.

SHIP CREWS

Ships are big, complicated pieces of machinery that cannot be operated by a single individual, even if the ship is adapted for rigger operation. Though robotics, automated machinery and computer-integrated self-maintenance have significantly diminished the crew required to operate a ship, doing so still requires more than one person. A ship requires a crew to maintain it, repair it, manage its multiple functions and keep it sailing without interruption from breakdowns.

Vehicle crews are divided into four types, based on their function: helm, gunnery, comm and engineering.

Helm Crews

Helm crews (also known in naval terminology as "the conn") are responsible for piloting, maneuvering and navigating a ship. With the advances in autonavigation technologies such as GPS and SINS (Ship Inertial Navigational Systems), these tasks are increasingly performed by a single person, called the pilot, or by a ship's Autonav system. The pilot makes all Driving Tests required for vehicle operations or vehicle combat. Pilots may rig ships if they are rigger-adapted, or they may operate them manually or via datajacks.

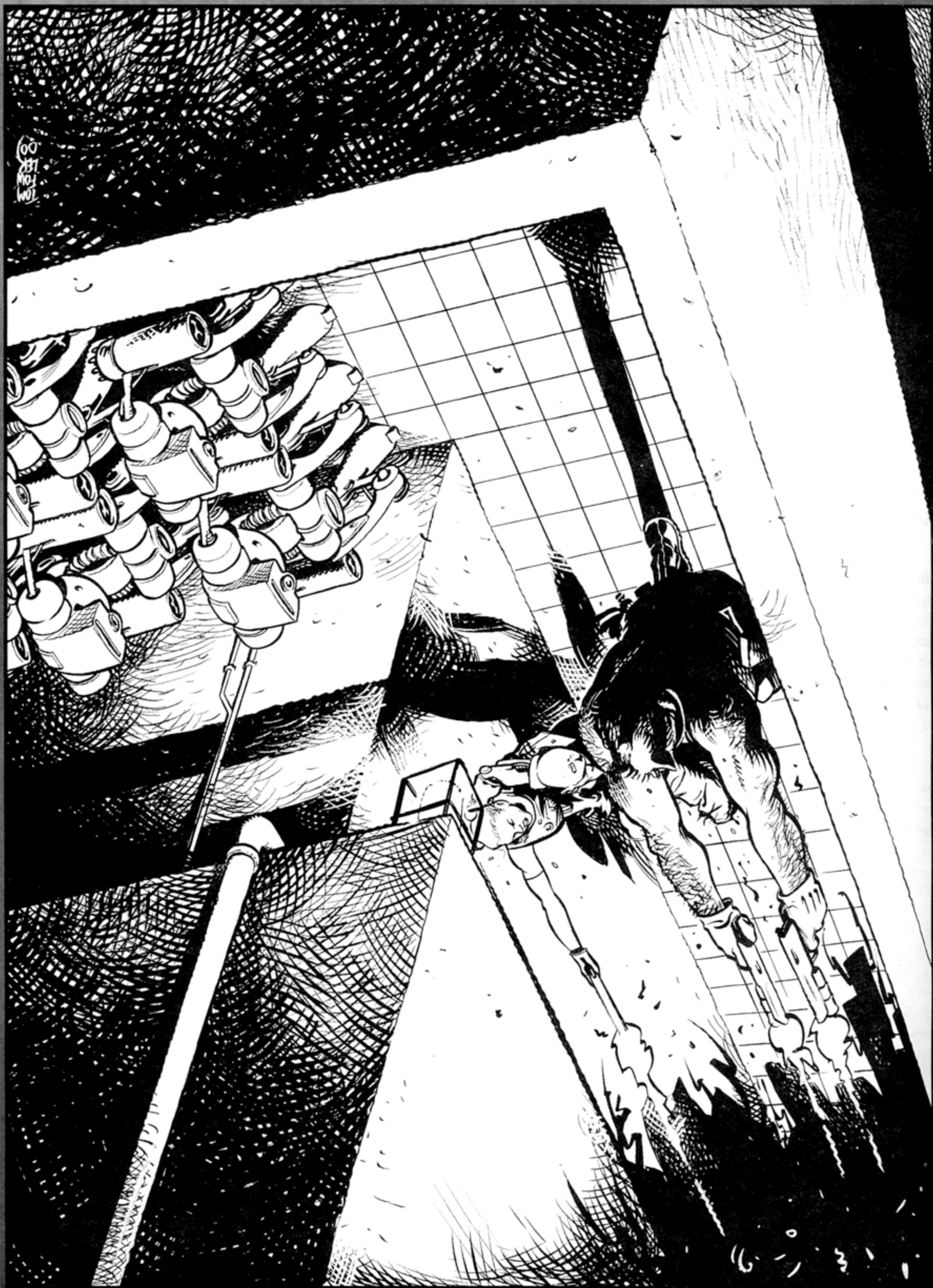
Gunnery Crews

Gunnery crews operate any weapon systems a ship possesses. Unless otherwise noted in a weapon's game statistics, each weapon system requires 1 operator. However, weapon systems on a ship can also operate under the structure of a rigger CCSS network known as the naval-weapons control network, with each separate "weapon" (gun turrets, air-attack missiles, surface-attack missiles, torpedoes and so on) counting as a "drone" in the network. For more information, see *Ship Weapon Systems*, p. 55.

HULL TABLE

Hull Rating	Ship Tonnage (in metric tons*)
1	100–200
2	201–500
3	501–1,000
4	1,001–5,000
5	5,001–10,000
6	10,001–25,000
7	25,000–50,000
8	50,001–100,000
9	100,001–250,000
10+	More than 250,000

*1 metric ton = 1,000 kilograms





TERRAIN TABLE

Boats

Terrain Type	Description
Open	Open water, such as lakes, seas and bays.
Normal	Water lightly cluttered with obstacles, such as major rivers and city harbors.
Restricted	Water with a considerable amount of dangerous obstacles (such as everglades or the dock areas of city piers).
Tight	Water littered with numerous dangerous obstacles, such as whitewater rapids, rocky shorelines, sandbars or extremely congested city harbors heavily populated with boat people such as those in Hong Kong, Venice or Miami.

Ships

Terrain Type	Description
Open	Open sea with no sight of land in visual range.
Normal	Waters dotted with islands, small islets or reefs within visual range. Waters within 1 nautical mile (2 kilometers) of shoreline.
Restricted	Waters heavily congested with islands and reefs. Bays leading into city harbors. Waters within 1/2 nautical mile (1 kilometer) of shore.
Tight	City harbors and shore areas.

Comm Crews

Comm crews are responsible for operating sensor, sonar, communications and electronic-warfare systems. On non-rigged ships, a separate crew is responsible for monitoring electronic systems, with one operator dedicated to each type of system (communications, sensors, ECM/ECCM and so on). However, if a ship is adapted for rigger adaptation, the ship pilot may operate all ship electronic systems through the vehicle rig. Note that an autonav cannot operate ship electronic systems.

Engineering Crews

Engineering crews are responsible for maintaining a ship, fixing any breakdowns and ensuring the ship runs correctly. The minimum engineering crew for a ship is determined with the following formula: $(\text{Hull rating} + 1)^2$.

If a ship fails to maintain its engineering crew minimum, it accumulates Stress and risks breaking down in mid-journey. For each unfilled position below the minimum, the ship accumulates a -1 modifier each day it is at sea; the modifier is applied to any Stress Tests it must make. So a ship at sea for 3 days with its engineering crew one person short suffers a -3 Stress Test modifier. When the Stress Test modifier reaches -10, the ship automatically takes 1 Stress Point and the modifier is reduced to zero (though it may begin accumulating again). Once a ship has regained a full engineering crew, each -1 modifier may be removed with a successful Ship B/R (4) Test and a base time of 24 hours.

TERRAIN

Terrain types are not the same for ships as they are for boats. Because ships are larger, they require more turning room. Additionally, ships have deeper beams and float lower in water, so they cannot enter shallow water. Terrain types for boats and ships are given on the Terrain Table.

These terrain tables assume the weather is fair, with light or no precipitation and only light winds below 25 mph. Marginal weather conditions (steady rain, thunder showers or moderate winds greater than 25 mph) reduce the terrain category by one step (Open to Normal, Normal to Restricted, Restricted to Tight). Severe weather conditions (severe thunderstorms or high winds short of gale force) reduce the terrain category by two steps. Major storms, such as gales, tropical storms and hurricanes reduce *all* terrain types to Tight.

SHIP COMBAT

Ship combat follows the vehicle combat rules presented on pp. 138-49, SR3.

VEHICLE POINTS

For ships, the Vehicle Point value (see p. 138, SR3) is a negative number, equal to $-(\text{Hull rating} \times 5)$.

RAMMING SHIPS

If a ship rams another ship, resolve the attack as a normal ramming maneuver (see p. 143, SR3). Use the ships' Hull ratings in place of Body ratings and substitute Bulwark ratings for Armor ratings wherever applicable. Any ship that sustains damage must make a Crash Test, unless the attack occurred in Open terrain.

If a boat (or any standard vehicle, for that matter) rams into a ship (or vice versa), things operate a little differently. If the ramming maneuver is successful, treat the result as if the boat had collided with a wall or barrier. The Barrier rating of the ship is determined as follows: $\text{Barrier rating} = (\text{Hull rating} + \text{Bulwark rating}) \times 8$.

If the boat does not penetrate the barrier, the ship takes no damage. On the other hand, if the vehicle breaks through, the ship takes Moderate damage. Any character in the ship's hold



near the point of penetration must make a Damage Resistance Test against (vehicle's Body + 3)M explosive damage. Reduce the Power by 1 for every 1 meter distance between the point of penetration and the character.

Note that a ship never crashes if it rams or is rammed by a boat (or any standard vehicle).

RUNNING AGROUND

Normally, watercraft do not crash unless they collide with obstacles jutting up from the water's surface. On the other hand, ships and boats can run aground in shallow water quite easily.

Ships and boats run the risk of running aground in Normal, Restricted and Tight terrain. Whenever a vessel fails a Crash Test, roll 1D6 and consult the Running Aground Table. If the result is lower than the number indicated, the vehicle has run aground. Otherwise, it crashes into an above-water object.

If a vehicle runs aground, it comes to a complete stop. The vehicle itself suffers Moderate damage from the crash, but the gamemaster may downgrade the damage to Light or upgrade it to Serious, depending on the terrain and the possible underwater obstacles on which the vessel could have run aground.

RUNNING AGROUND TABLE

Terrain Type	Vessel Runs Aground On a Result Of:
Normal	1
Restricted	2 or lower
Tight	3 or lower

BOARDING

To make a boarding attempt against a vessel, an attacker must first execute a positioning maneuver (pp. 142–43, *SR3*) to bring his own vessel directly alongside, adjacent to or above (in the case of aircraft) the targeted ship or boat. Approaching the target vehicle requires an entire Combat Turn. At the start of the next Combat Turn, characters may declare actions to board the other vessel.

On many occasions the deck heights of the attacking and defending vehicles may be uneven. If the attacking vehicle's deck height is more than one meter lower than the defending vehicle's, characters must climb or jump up the side of the vehicle to be boarded. Advanced rules on climbing and jumping are available on pp. 44–47, *SRComp*.

Because ships are slow, ponderous objects, most boarders use faster vehicles, such as small speedboats or helicopters.

SHIP WEAPON SYSTEMS

Ship weapon systems may be run with computer networks. Early weapon-control networks (such as the AEGIS weapon-command system) consisted of nothing more than an interconnected shipboard computer network. By the 2050s, however, closed-circuit simsense rigger networks, like those used in rigged closed-circuit security systems, had become the

standard for coordinating multiple ship weapons simultaneously. These rigger networks are known as naval-weapon control networks (NWCN) (see p. 138), and they follow the same rules as CCSS, with the exceptions noted below.

NWCN Control Stations

Each NWCN has a rating that denotes how many control stations the system includes. Each control station is responsible for monitoring and controlling a single weapon system, such as a turret (p. 139) or the launch-control system (p. 137) for a set of missiles or torpedoes.

In the case of guided munitions, such as missiles and torpedoes, the control station is responsible for directing the munitions to their targets. Consequently, the number of active missiles and torpedoes a ship can maintain at any single time is limited by the number of control stations dedicated to controlling the munitions.

Each control station has its own Pilot rating (equal to the NWCN rating), which operates like the Pilot rating of a drone. However, a live rigger operator can override the weapon's pilot system and directly control the weapons.

Riggers in a NWCN

Unlike most standard rigger networks, in which one rigger controls an entire network, ship weapon networks accommodate multiple riggers interacting in the network. In this configuration, one rigger may sit in the captain's chair (see p. 154, *SR3*), while other riggers directly operate separate control stations or drones. This allows one person to maintain overall control of the system, while subordinate riggers take direct control of weapons, allowing them to add their Control and Combat Pool Dice to any tests made with the weapon under their control.

For more details, see *Multiple Rigger Networks*, p. 42.

ANTI-SHIP MISSILE AND TORPEDO COMBAT

Naval combat in the twenty-first century consists of long-range battles fought over great distances. Gone are the days of rolling barrages, fired from twelve and sixteen-inch naval guns. Naval firepower is now a game of anti-ship missiles, launched from aircraft, submarines or other surface ships. While shorter ranged systems such as underwater torpedoes and conventional guns have their places, anti-ship missiles are the name of the game in the twenty-first century.

Anti-ship missile combat works differently than standard missile combat. Anti-ship missiles are capable of long-range attacks and are relatively slow flyers (most, in fact, are subsonic). For purposes of game resolution, torpedoes are treated the same way as anti-ship missiles.

Most importantly, riggers can use NWCNs (see p. 138) to directly guide anti-ship missiles and torpedoes to their targets. When a rigger "rides" an anti-ship missile in this manner, the rigger's Vehicle skill is used in place of the missile's Intelligence rating. Additionally, the rigger may add Control Pool dice to any Success Tests made for the missile/torpedo attack.

Prior to the missile striking the target, the NWCN safely "dismounts" the rigger from the missile, and she does not suffer dump shock.



EXTENDED-RANGE MISSILES AND TORPEDOES

Typically, anti-ship missiles and torpedoes have ranges greater than 10 kilometers. As a result, several turns may pass before such projectiles reach their targets. The extended-range missile/torpedo rule provides an alternate means for tracking missile combat when using such missiles/torpedoes and applies to all anti-ship missiles and torpedoes (see p. 93). (If desired, gamemasters may also use the extended-range missile/torpedo rule for ordinary rockets and missiles with ranges greater than 1 kilometer.)

Under the extended-range missile/torpedo rule, the gamemaster treats such projectiles as vehicles operating with one goal: to close in on their designated target (using the accelerate maneuver, p. 142, *SR3*) and then collide with it (using the ram maneuver, p. 143, *SR3*). If the projectile is guided by a NWCN, a rigger can directly control it as if she were directly controlling a drone.

Use the projectile's Intelligence rating for the Driving Tests required for these actions (or the controlling rigger's Vehicle skill if she is "riding" the projectile). All such projectiles have a

Handling Rating 4; the Initiative for the projectile is determined as follows: projectile's Intelligence Rating + 2D6. Unless otherwise specified, anti-surface missiles have a fixed speed of 1,000 meters per turn, and anti-air missiles have a fixed speed of 5,000 meters per turn.

ANTI-MISSILE DEFENSE SYSTEMS

Ships are relatively slow-moving, high-profile objects; consequently, they make particularly delectable targets for anti-vehicle missiles. Consequently, ships employ anti-missile defense systems.

Anti-missile defense systems come in two varieties: interceptor-missile systems and gun systems. Interceptor missiles are surface-to-air missiles used to destroy or knock incoming missiles off target. Gun systems consist of high-velocity mini-guns or directed energy weapons that simply destroy incoming missiles before they reach their intended targets.

When conducting missile defense, use the procedure employed when attacking an aircraft. Standard vehicle combat rules (plus the *Extended-Range Missile* rules) apply. Missile

defense succeeds if the ship's anti-missile defense weapons destroy the missile in mid-flight or cause the missile to make and fail a Crash Test.

SHIP DAMAGE

Use Condition Monitors to track damage to a ship accumulated from weapon hits.

Anti-ship weapons use a special Damage Code to indicate ship damage. The letter "N" attached to the end of the Damage Code indicates ship damage (or "naval" damage) codes. For example, a weapon with Damage Code of 10SN would indicate the weapon could do Serious Damage to a ship. Ships resist ship damage codes per standard rules, just as characters resist standard damage, with the following exceptions.

First, ships do not automatically stage the Damage Code down 1 level, as standard vehicles do against standard weapons. Additionally, use a ship's full Bulwark rating when reducing the Power of an attack against a ship.

ANTI-SHIP WEAPONS AND NORMAL DAMAGE

When anti-ship weapons are used against characters or vehicles, the weapon's ship Damage Code must be converted to a standard Damage Code and resolved as follows:

1. Multiply the weapon's Power by the number of Levels above Deadly and add 1. (For example, 2 for LN, 3 for MN, 4 for SN and 5 for DN).

2. Anti-ship weapons are area-effect weapons and lose Power at a rate of -1 per meter.

3. Resolve Damage Resistance Tests as normal. Every 2 successes stage damage down 1 level, from DN to SN, SN to MN, and so on. If the damage is staged below LN, it drops down to damage level D and is further staged down per standard rules. Naval (anti-ship) weapons are considered anti-vehicle weapons, so vehicles don't get the automatic Damage Level reduction.

If characters or vehicles cannot stage damage down to D or lower, they take a number of boxes of Physical Damage, as listed on the Ship Damage Table.

Depending on how many points of Body overflow a character has, he or she could theoretically survive a hit from an LN damage weapon. Ordinary characters would be killed instantly if they sustain a higher Damage Level, but some larger critters (such as juggernauts and dragons) might possibly survive.

Unless otherwise specified, anti-ship weapons can target and attack other ships. Ordinary vehicles (like aircraft and normal motorboats) have too small a sensor cross section to engage long-distance anti-ship weapons, and they are usually not worth wasting a 300,000¥+ anti-ship missile.

SHIPS AND NORMAL DAMAGE

In most cases, regular and standard anti-vehicle weapons have no effect when fired against ships. However, smaller-sized ships may be vulnerable to attacks from anti-vehicle weapons or even heavier firearms.

Whenever fire from a standard firearm or a non-naval anti-vehicle weapon (one with a damage code that does NOT have an "N" on the end), strikes a ship, resolve the damage as follows:

1. For standard weapons, reduce the damage level (L, M, S, D) by a number of steps equal to the ship's Hull rating + 1. For standard anti-vehicle weapons, reduce the damage level by a number of steps equal to the ship's Hull rating. If this reduces the damage level below L, the weapon has no effect. If not, then the end result is the equivalent base damage level on a naval scale (LN, MN, SN, DN).

2. For standard weapons, divide the weapon's Power by the ship's Bulwark rating + 1, rounding down. For standard anti-vehicle weapons, simply divide by the Bulwark rating. If the result is less than 2, round the result up to 2.

3. Resolve the Damage Resistance Test per standard rules.

SHIP DAMAGE TABLE

Damage Code	Boxes of Damage
LN	15
MN	21
SN	28
DN	36

A gang of pirates fires an AVM (Damage 16D) against a small trawler (Hull 2, Bulwark 1), and it strikes on one side. Before the trawler makes its Damage Resistance Test, the damage has to be converted to naval (anti-ship) damage code. First, the damage

level (D) is reduced by 3 steps (Hull 2 + 1) to L. Then, the AVM's Power (16) is divided by 2 (Bulwark 1 + 1). So the trawler makes its Damage Resistance Test against a Damage Code of 8LN.

Characters, cargo, and equipment below decks or inside the ship's superstructure are protected by the ship's hull. As stated in *Ramming Ships* on p. 54, the Barrier rating of the ship is determined as follows: Barrier rating = (Hull rating + Bulwark rating) x 8.

Characters above decks are out in the open. The ship protects them from attacks originating below their positions. However, they do not gain protection against attacks originating from above, unless they are taking cover behind large objects (such as tied-down cargo, cargo-bay doors, and so on) located on the deck.

DAMAGE CONTROL

During ship combat, crew members not manning weapons or performing combat-related support functions (such as electronic warfare) may stand ready as damage-control teams to patch hull leaks, extinguish ship fires, repair damaged electrical systems and so on. To be effective, a damage-control team must have a minimum number of team members equal to the ship's Hull Rating + 2.

If the ship is hit or otherwise takes damage, the damage-control team rushes into action. The controlling player makes a Build/Repair Test, using the highest Ship Build/Repair Skill of all the members of that team. If the damage-control team has more than the minimum required members, add 1 additional die to the Success Test for every two extra team members. Up



to 3 additional dice may be added in this manner. The target number and base time for repairing damage are provided on the Damage Control Table.

If the test results in at least 1 success, the Damage Level is reduced by 1 level. The Damage Level can never be reduced by more than 1 level through damage-control measures, however. Determine the time required for the damage-control repair as follows: Build/Repair Test successes ÷ treatment time. The result is the uninterrupted minutes the repairs take. Any serious interruption aborts the damage-control process, but it can be repeated.

If no successes are generated on the Build/Repair Test, the ship and crew cannot repair the damage. The crew will have to wait until it reaches port before attempting repairs (see *Ship Repair*).

If using the *Vehicle Subsystem Damage* rules (see p. 77), damage-control teams may choose to repair one subsystem instead of the entire ship. When repairing ship subsystems, 1 or more Build/Repair Test successes restores the subsystem to full operational capabilities.

TAKING ON WATER

If a ship or boat sustains Moderate or greater damage from a single attack, it automatically springs a hull leak and begins to take on water. At every 15-minute interval thereafter, the vessel takes 1 additional box of damage on its Condition Monitor. Submarines take this damage at 5-minute intervals.

DAMAGE CONTROL TABLE

Condition Level	Target Number	Repair Time
Light	4	60 minutes
Moderate	6	120 minutes
Serious	8	180 minutes
Target Number Modifiers		
Performing damage control under combat conditions		+1
Ship is a submarine		+2

The vessel continues to take on water until a damage-control team plugs the leak. A successful Build/Repair Test prevents the vessel from taking additional damage from the hull leak but does not reduce the original damage to the vessel.

SINKING

When all the damage boxes on a vessel's Condition Monitor are filled, its hull integrity is compromised beyond repair and the vessel begins to sink. Roll 4D6 and subtract 9 from the result. The final result is the number of minutes before the vessel sinks completely. If the result is 0 or lower, then the vessel sinks at the end of the current Combat Turn.

While a vessel is sinking, all of its systems are inoperative. If riggers are jacked into the ship when it begins to sink, they are dumped out of the system and suffer dump shock (see p.

156, *SR3*). Characters can use the sinking time to perform only non-vehicle actions, such as abandoning ship, launching life rafts or making a final stand against the opponent. After the ship has sunk, characters are in the water and must tread water or swim to another floating craft.

If characters are inside a ship when it finally sinks, they are trapped underwater. Characters must don underwater breathing gear, hold their breaths or drown.

For submarines, the sinking time denotes the crew's "breathing room." When the sinking time expires, all breathable air in the sub is used up.

SHIP REPAIR

While at sea, ships must use damage-control teams when attempting to repair ship damage. Other ship repairs may not be attempted until the vessel arrives in port.

Ship repairs use the standard *Vehicle Repair* rules on p. 149 of *SR3*, with a few exceptions. First, ship repair is much more manpower-intensive. For repairs to take place at all, a repair team must be formed. The minimum number of team members is determined as follows: Minimum repair crew = Hull Rating² x 3. When making the Ship Build/Repair Test, use the highest Ship Build/Repair skill of all the team members.

If the repair team has more than the minimum required members, add 1 additional die to the Success Test for every four extra team members. Up to 3 additional dice may be added in this manner.

The base time for a ship repair is determined as follows: Ship repair base time (in days) = Hull Rating x the number of damage boxes. A "day" of repair time consists of eight hours. Divide the base time by the number of successes generated to find the actual repair time. As with standard vehicle repair, repairs cannot start until replacement parts arrive in port.

A vessel is not available for duty while repairs are underway. If the vessel needs to be put to sea while repairs are underway, the repair team must spend an additional 4 hours (which do not count toward the repair time) making the ship seaworthy. Once the ship returns to port, repairs commence from the point they left off.

SHIPS AND MAGIC

Because of their immense size, special rules apply when casting magic at or against ships. Furthermore, some ships may serve as natural domains.

SORCERY

When combat spells and elemental manipulations are cast against ships, modify the spell/manipulation's Damage Code and resolve the damage as follows:

1. The target number for combat spells is determined as follows: Combat spell target number = ship's Object Resistance of 8 + (Hull rating x 2) + Bulwark rating. The target number for elemental manipulations is 4, per standard rules.

2. For combat spells, reduce the damage level (L, M, S, D) by a number of steps equal to the target's Hull rating. For elemental manipulation spells, reduce the damage by a number of steps equal to the target's Hull rating +1. If this reduces the damage level below L, the spell has no effect.

3. For elemental manipulation spells, divide the spell's Power by the ship's Bulwark rating + 1 (round down). If the result is less than 2, round the result up to 2.

4. Resolve Damage Resistance per standard rules.

SPIRITS

Spirit attacks are treated as normal attacks and are just as effective (or useless) as their mundane counterparts. The immunity to normal weapons power applies against naval weapons, but given the high Power of most naval weapons, this may not mean all that much.

Ships and Domains

In some ways a ship is more than a mere vehicle. It is also the place where its crew eats, sleeps and works together, forming a small community. Consequently, a large enough ship may constitute a domain. If a ship has been occupied for a suitable period, it is considered a hearth domain. This domain encompasses the interior of the ship, as well as the space above decks, up to the highest point of the ship. Above decks is also considered the domain of the sea and sky as well. Remember that nature spirits cannot enter other domains unless they are great form spirits.

Note that constituting a domain does not entitle a ship to any special magical protection. It is just as susceptible to spell or spirit attacks as any other ship. Likewise, ship-conjured hearth spirits are no different from other hearth spirits and suffer no special advantages or weaknesses.

Ships can have background counts, just like any other domains. Some notable examples include the USS *Constitution* (which is also rumored to be the personal domain of a free hearth spirit), HMS *Victory*, and, of course, the RMS *Titanic*.

SUBMARINES

The growth of various underwater industries and the steady rise in maritime piracy have led to the increased use of submarines in the *Shadowrun* universe. With the fall of the Soviet and American navies, enforcement of maritime law has waned, and pirate flotillas and rogue naval battle groups have terrorized surface ships. Even the resurgent Japanese Imperial Navy has found its fleet too small to cover the vast reaches and depths where pirates can hide.

The importance of submarines lies in their ability to avoid detection. When submerged, a sub is almost impossible to detect from the surface, and even underwater subs find it extremely difficult to detect one another. Certain pirate gangs or rogue naval crews make use of





UNDERWATER TERRAIN TABLE

Terrain Type	Description
Open	Very flat abyssal plain
Normal	Abyssal plain with some rolling hills
Restricted	Jagged terrain with steep hills, buttes, or other obstacles
Tight	Narrow canyons or crevasses

their sub's invisibility to make raids on merchant ships with near impunity.

This section provides special rules dealing with submarines and other underwater vehicles.

DEPTH

The Depth Rating of a sub denotes the maximum depth a submarine may safely dive. When underwater, submarines may be detected by sonar only.

Periscope Depth

A submarine submerged at periscope depth is barely below the surface. When submerged at periscope depth, a submarine can use all of its electronic systems, including sensors, normally. It can also scan the surface of the water visually, using a periscope mast.

When a submarine is at periscope depth, treat it as a surface ship. However, a +4 modifier applies to any visual Perception Tests or Sensor Tests made to detect or target the submarine. Submarines at periscope depth can be detected by sonar as well. In fact, sonar may prove more effective than visual or sensor scanning when detecting certain subs (particularly non-nuclear diesel/electric subs) at periscope depth.

Exceeding Depth Limits

Submarines are designed to keep the atmospheric pressure inside the vessel significantly lower than the outside water pressure. Consequently, they cannot operate safely beyond their maximum prescribed operational depths. Below that depth, the pressure differential exceeds the hull's capability, and the water pressure crushes the sub.

Whenever a submarine dives below its Depth rating, make a Body (6) Test or Hull (6) Test each turn, whichever is appropriate. If the test fails, the sub accumulates 1 box of damage on its Condition Monitor. Add a +1 modifier to the Success Test for every 100 meters below the Depth rating the sub dives.

UNDERWATER TERRAIN

Submarines on the surface or submerged at periscope depth (up to ten meters) follow the same guidelines for terrain types as surface ships. Between periscope depth and the sea bottom, terrain type is generally considered Open terrain, unless a considerable number of obstacles (schools of fish, ice-

bergs and so on) exist; in this case the gamemaster should follow guidelines similar to high-altitude aircraft, substituting clouds for the underwater obstacles or obscurants.

Submarines navigating very close to the sea bottom operate in terrain similar to that for low altitude aircraft on land. Some guidelines for sea bottom terrain are provided on the Underwater Terrain Table.

UNDERWATER DRONES

Because radio communication is difficult and unreliable underwater, drones intended for operation underwater must be connected to the rigger network by a communications cable. This limits the effective range of the drone to the length of the cable.

Occasionally, the cable connecting a drone to a ship may be cut, either intentionally by the rigger or unintentionally by sudden movements of the drone or the ship. To determine if a cable is cut by sudden movements, roll 2D6 whenever two or more dice on a Vehicle Test come up 1s. If the 2D6 result is less than or equal to the number of 1s produced by the Vehicle Test, then the cable has been cut during maneuvers.

If a rigger is directly controlling a drone when the cable is cut, the rigger suffers dump shock from losing the connection to the drone.

TORPEDOES

Like drones, torpedoes may be guided from their launch vessels via fiber-optic cables. Torpedoes follow the same rules for ship combat as do anti-ship missiles (see p. 55). Remember that guided torpedoes can be directed or controlled from the sub as long as the cable connection is intact. If the cable is broken (either intentionally or unintentionally), the torpedo is on its own.

UNDERWATER VEHICLE COMBAT

Underwater vehicle combat occurs whenever one or both combatants involved are submarines. In naval terminology, this type of combat is often called anti-submarine warfare (ASW).

Underwater vehicle combat follows the rules for *Sensor-Enhanced Gunnery* (see p. 152, SR3), except that the Sonar rating replaces the Sensor rating, and the Sonar Signature replaces the standard Signature rating.

Remember that submarines can break sonar contact by diving below a thermocline (see p. 35). While a thermocline may prevent the other combatant from "hearing" the sub, thermoclines provide no protection against torpedoes or other anti-submarine weapons.

If a vehicle knows the enemy sub is on the other side of the thermocline, it can still launch a torpedo, ASROC, or other anti-submarine weapon against it. However, the attack receives a +8 Blind Fire modifier (see p. 111, SR3).

SPECIAL VEHICLE RULES



This section covers special properties, attributes, and characteristics beyond the normal attributes defined in the *SR3* rulebook. It also includes rules designed to resolve unique or special vehicle operations, the use of special vehicle features such as mechanical arms and legs, and special rules for vehicles such as hovercraft, thunderbirds, and so on. Additionally, this section defines Stress, a new characteristic that measures the intangible effects of wear and tear.

SPECIAL VEHICLE ATTRIBUTES

The following attributes expand on the basic vehicle attributes listed on pp. 130-33 of *SR3*.

BODY

As described in *SR3*, a vehicle's Body rating represents a rough index of its mass. The Body Ratings Table (p. 62) lists Body Ratings for vehicles of various types and weights. The Nominal Value is the assumed weight value used for estimation purposes (for example, whenever a vehicle is carrying another). When designing new vehicles (see *Vehicle Design*, p.102), use this table as a guideline for estimating the approximate mass of the vehicle.

Some very small vehicles may be listed as having a Body of "0." Vehicles with a Body 0 cannot carry armor and are automatically destroyed if hit by a weapon.



BODY RATINGS TABLE

Body Rating	Weight Range*	Nominal Value*	Vehicles Falling in This Range
0	0–5 kg	2 kg	Very small, hand-held drones
1	5–75 kg	20 kg	Small drones, ranging from toaster-size to dwarf-size
2	75–300 kg	150 kg	Larger drones (human to troll-size), motorcycles
3	300–750 kg	500 kg	Automobiles, motorboats under 30 feet long, large fixed-wing drones
4	750 kg–2.5 tons	1.5 tons	Pickup trucks, SUVs, light trucks, single-engine aircraft, standard helicopters
5	2.5–7.5 tons	4 tons	Medium trucks, small yachts (30–50 feet)
6	7.5–20 tons	12 tons	Tractors, heavy trucks, Lear jets and twin engine aircraft, t-birds
7	20–30 tons	25 tons	Armored personnel carriers, fighter aircraft, cargo helicopters
8	30–45 tons	35 tons	Zeppelins, large yachts (50–100 feet), light tanks
9	45–60 tons	50 tons	Passenger airliners
10	60–100 tons	75 tons	Main battle tanks, long-haul or heavy-cargo airliners

* Weight in metric tons

FUEL

A vehicle's Fuel code describes the general type of fuel the vehicle uses and the size of its fuel tank. A two-part Fuel code that lists two fuel types and two tank capacities indicates that a vehicle uses two different fuel sources. In such cases, the first fuel type listed is the vehicle's primary fuel.

For more Fuel rules, see *Advanced Rules*, page 72.

ECONOMY

A vehicle's Economy Rating indicates how far the vehicle can travel on a given amount of fuel, measured in terms of kilometers per unit of fuel. For example, gasoline engines (which consume fuel by the liter) have an Economy Rating expressed as kilometers per liter. (As a point of comparison, 1 kilometer per liter is approximately 2.5 miles per gallon.) For more information on Economy, see *Variable Fuel Consumption*, p. 72.

Idle Economy

Idle Economy is a sub-rating of Economy and reflects how much fuel a vehicle consumes during a given period while idling in a stationary position. This rating is particularly important to drones, which may have to stay active on station while acting as spies or watchdogs.

To calculate the Idle Economy of a vehicle, multiply its Economy Rating by 7.5. If the vehicle is an aircraft in flight or a hovercraft in hover mode, multiply by 2 instead. The final result is the Idle Economy Rating, measured in terms of minutes per fuel unit consumed.

SET-UP/BREAKDOWN TIME

Set-Up/Breakdown Time is the time needed to configure a vehicle for operation and break it down for storage. Drones must spend one additional Combat Turn after configuration to warm up, regardless of the drone's Setup/Breakdown Time.

Drone Storage Requirements

An assembled drone requires a storage space in CF equal to $[(\text{Body} + 1.5) \times \text{Body}]$, rounded down.

Any drone with a Setup/Breakdown Time Rating can be disassembled for storage purposes; a disassembled drone requires a third of its regular storage space, rounded down.

Use the Body Ratings Table to estimate the weight of the drone for determining how much of a Load requirement it places on the carrying vehicle.

LANDING/TAKEOFF (L/T) PROFILE

A fixed-wing aircraft's Landing/Takeoff Profile describes the minimum runway distance the aircraft needs to take off and land. Landing/Takeoff Profiles fall into four categories: Normal, STOL (Short Takeoff/Landing), VSTOL (Very Short Takeoff/Landing), and VTOL (Vertical Takeoff/Landing). See *Aircraft*, p. 67, for more information.

ED/ECD

A vehicle's electronic-deception (ED) systems emit signals that fool sensors into misjudging the position, speed, heading or characteristics of the vehicle. ED increases the Signature of the vehicle for Sensor and Gunnery Tests made against it, but detecting ED is much more difficult than detecting ECM.

A vehicle's electronic counter-deception (ECD) systems consist of reality-checking electronic circuitry that counters the subtle signals of ED. ECD counteracts the modifiers imposed by ED.

For more information on the use of ED and ECD, see p. 32.

ADAPTATION POOL

The Adaptation Pool provides robots with dice they can use when performing actions on their own. For more information, see *Robots*, p. 44.

STRESS

A vehicle's Stress rating simulates the effects of wear and tear on the vehicle. Each time a character pushes a vehicle beyond its normal performance capabilities or loses control of a vehicle, the vehicle's Stress rating increases. Each time the Stress rating increases, the chances of spontaneous vehicle breakdowns or system failures increase as well.



INCURRING STRESS

All new vehicles start with a Stress Rating of 0. If a character obtains a used vehicle, it may have a higher Stress Rating—the gamemaster determines the exact rating.

A character's vehicle may incur Stress Points in two ways. First, the character may intentionally push the vehicle beyond its normal performance capabilities or by using extra dice for Driving Tests. Second, a vehicle may incur Stress if its driver fails a Driving Test according to the parameters of the Stress Rule of One, as described on p. 64.

Breaking the Speed Limit

A vehicle's Speed Rating indicates the maximum *sustained* speed the vehicle can handle without incurring damage. An aggressive driver can coax a vehicle up to 1.5 times its Speed Rating, but any time a vehicle exceeds its Speed Rating, it incurs 1 Stress Point.

Hard Deceleration

Whenever a character tries to decelerate a vehicle at a rate greater than 4 times its Acceleration, the driver must make a Crash Test (p. 132, SR3). If the vehicle's Body Rating exceeds the number of test successes, the vehicle takes Stress. Subtract the test successes from the Body Rating to determine how many Stress Points the vehicle takes.

Overloading

A vehicle's Load rating indicates the maximum cargo weight a vehicle can carry without damaging the vehicle. A vehicle can carry up to twice its normal Load Rating in cargo, but it incurs 1 Stress Point every hour or portion thereof it carries the excessive load. For more information, see *Long Distance Hauling*, p. 65.

Extra Dice for Driving Tests

A character can improve his chances of success on any Driving Test by adding extra dice to his roll in exchange for intentionally incurring Stress Points. For every 1 Stress Point incurred, the character may add 1 additional die to his Driving Test.

The number of Stress Points intentionally inflicted during a single action may not exceed the vehicle's Body Rating. For vehicles with Body Ratings of 1, controlling characters can intentionally inflict 1 Stress Point for 1 additional die. Treat ships or other vehicles with Hull Ratings as having a Body Rating of 10 for this purpose. Stress Points may not be intentionally inflicted on drones with Body Ratings of 0.

While running from the local corporate heat, Rigger X tries to negotiate a hairpin turn down a narrow alley.

Rigger X has no Control Pool dice available for the required Driving Test, so he decides to gain some extra



dice by intentionally inflicting Stress Points on his Eurocar Westwind. The Westwind has a Body Rating 3, so Rigger X can inflict only 3 Stress Points, which gains him 3 additional dice on his Driving Test.

Stress Rule of One

Any time a character really botches a Driving Test, his vehicle may incur Stress Points. A vehicle incurs 1D6 Stress Points whenever the number of 1s rolled on a Driving Test equals or exceeds the driver's Vehicle skill.

STRESS AND SYSTEM FAILURES

Stress may cause vehicle system failures in three circumstances.

First, system failure may occur whenever a driver fails a Driving Test. In this case, the gamemaster makes a Stress Test for the vehicle by rolling 2D6 against the vehicle's current Stress Rating. If vehicle maintenance is not being kept up-to-date, apply a modifier to the result (see *Neglecting Overhead*, p. 29). If the result is less than the vehicle's Stress rating, one major vehicle system suddenly fails, and the driver must make a Crash Test to avoid crashing.

Rigger X's player rolls the dice and fails the Driving Test. The gamemaster makes the required Stress Test and produces a result of 4. That result is higher than the Westwind's Stress Rating of 3, so the Stress Test produces no effect.

Second, system failure may result whenever a vehicle incurs Stress from the Stress Rule of One. If the vehicle's Stress Rating increases to twice the vehicle's Body Rating or greater, one major vehicle system (brakes, steering, transmission and so on) automatically fails. The gamemaster chooses the system that breaks down. The character must make a Crash Test to avoid crashing (see *Crashing*, pp. 147–148, SR3).

Finally, the gamemaster may call for a Stress Test any time the vehicle is running, as he deems appropriate.

Unfortunately, Rigger X's failed Driving Test produced five 1s, which equals his Car skill of 5, so the Stress Rule of One applies. The gamemaster rolls 1D6 and generates a result of 4, which increases the Westwind's Stress rating to 7. The new rating of 7 is more than twice the Westwind's Body rating of 3, so the sports car automatically suffers a system failure.

The gamemaster decides that one of the Westwind's tires blows out as the car makes the hairpin turn, and Rigger X must now make a Crash Test to keep the sports car from slamming into the alley wall.

Reducing Stress

A vehicle's Stress Rating may be reduced only through a thorough maintenance overhaul in a vehicle facility (see p. 288, SR3).

To perform a maintenance overhaul, the character makes a Build/Repair Test against a target number equal to the vehicle's Stress rating plus 2. Every two successes reduce the Stress rat-

ing by 1. Eight work-hours is the base time for removing 1 Stress Point, 16 work-hours for 2 Stress Points, and so on. The Stress rating cannot be reduced lower than 1—once you push a vehicle beyond its limits, it never performs as well as it did before.

A maintenance overhaul costs 50 nuyen in replacement parts for each Stress Point removed, plus labor costs, if a mechanic performed the work.

LIFTING AND PULLING OBJECTS

Lifting is the act of raising an object from the ground into the air; pulling is the act of transporting an object over a distance. Only vehicles or drones equipped with a crane, winch or boom can lift objects, but any vehicle can pull an object along the ground, provided the object is attached to the vehicle with a tow bar, cables or some other device.

A vehicle or drone can safely lift or pull any object whose weight does not exceed the vehicle's Load Rating. Two or more vehicles can safely pull or lift a weight equal to the sum of their Load Ratings.

VEHICLE PULL TESTS

In certain conditions, a vehicle can lift or pull more weight than its Load Rating normally allows. Vehicle Pull Tests reflect a vehicle's capacity to lift or pull objects that weigh up to two times the vehicle's Load Ratings for short distances (less than half a kilometer). For example, use a Pull Test for such situations as a truck recovering a vehicle that is half buried in mud, using a vehicle's winch to pull the vehicle up a particularly steep cliff, a tugboat trying to dislodge a barge marooned on a sandbar and so on.

A Pull Test consists of a Body Test for the vehicle made against the appropriate target number from the Pull-Test Target Numbers/Modifiers Table (see p. 65). Players may also intentionally incur Stress Points to add extra dice for Pull Tests (see *Stress*, p. 63). If the Pull Test fails, the vehicle fails to lift or pull the object. However, the vehicle still incurs Stress and suffers other applicable side effects (see *Pull-Test Side Effects*, p. 65).

PULL TEST TABLE KEY

Bad conditions: Muddy roads, moderate rolling slopes and similar terrain constitute bad conditions for ground vehicles. In addition, inclement weather, such as rain or snow, may create bad conditions on level ground and dirt roads.

For aircraft, bad conditions include moderate cross winds, snow, rain or other precipitation. For boats pulling barges or floating objects, bad conditions include rough, moderately choppy waters.

Terrible conditions: Mud pits, quicksand, steep cliffs, marshes or flooded ground constitute terrible conditions for ground vehicles. In addition, inclement weather can transform normally bad conditions (see above) to terrible conditions. Severe weather, such as blizzards, severe thunderstorms or weather whipped up by a great nature spirit using its Storm power, can create terrible conditions in any terrain.

Terrible conditions for aircraft include severe storms, gale-force winds or rushing vertical air drafts. For boats, terrible conditions consist of storm-tossed waves.

Object stuck in ground: This modifier applies if the object being pulled or lifted is partially rooted or buried in the ground. The gamemaster sets the exact value of the modifier, based on how deeply the object is buried in the ground. For example, a Pull Test made to free a truck that is axle deep in mud would receive a +1 target modifier, while a test for a truck sunk halfway in soft earth would receive a +4 modifier.

Pulling without rollers: This modifier applies when a ground vehicle attempts to drag an object across the ground without some sort of rolling support (such as wheels) under the object. However, the gamemaster may waive this modifier if he judges that the ground is slick enough for frictionless pulling (such as an oil-covered or icy surface).

Vehicle braced in place: This modifier applies if a ground vehicle is braced with posts or some other device that prevents it from slipping. Bracing a vehicle or removing such braces takes 1 Combat Turn. Note that a braced vehicle is completely immobile.

PULL-TEST SIDE EFFECTS

Though successful Pull Tests enable vehicles to lift or carry a weight greater than their Load ratings, the effort of doing so reduces the vehicle's Speed rating during the action and inflicts Stress on the vehicle. These effects are described in the Pull-Test Side Effects Table.

In addition, any time a vehicle lifts or pulls a weight greater than 1.5 times its Load rating, the vehicle may incur an extra Stress Point. In such cases, the controlling character must make a Body (4) Test for the vehicle. If the test fails, the vehicle incurs 1 Stress Point in addition to any other Stress incurred during the test.

LONG-DISTANCE HAULING

A vehicle may pull or carry weight that exceeds its Load Rating over long distances (any distance over half a kilometer), but doing so puts incredible strain on the vehicle. Whenever a vehicle carries more weight than its Load Rating, reduce its Acceleration Rating by half. Additionally, for every hour or portion thereof that a vehicle carries weight greater than its Load, the player must make a Body (4) Test for the vehicle. If the test fails, the vehicle incurs 1 Stress Point. The gamemaster must also make a Stress Test. A vehicle cannot carry more weight than twice its Load Rating under any circumstances.

Long-distance hauling does not normally require a Pull Test. However, the gamemaster has the option of requiring a Pull Test at the beginning of the drive to see if the vehicle is able to start moving at all.

TRAILERS

In the *Shadowrun* vehicle system, a *trailer* is simply a vehicle incapable of moving itself, thus requiring another vehicle either to push or pull it along. This applies to all methods of travel, encompassing everything from a truck tractor pulling a cargo trailer, to a multiple-car rail train pulled by one or more

PULL TEST SIDE EFFECTS TABLE

Object Weight	Speed Reduction	Stress
Up to 1.5 x Load Rating	Half-speed	+1/hour
1.6 to 2 x Load Rating	Quarter speed	+1/minute

PULL TEST TARGET NUMBERS/MODIFIERS TABLE

Object Weight	Target Number
0 to 1 x Load Rating	3
1.1 to 1.5 x Load Rating	5
1.6 to 2 x Load Rating	8
Condition	Target Modifier
Bad conditions	+1
Terrible conditions	+3
Object stuck in ground	+1 to +4
Pulling without rollers (ground)	+4
Vehicle braced in place	-2

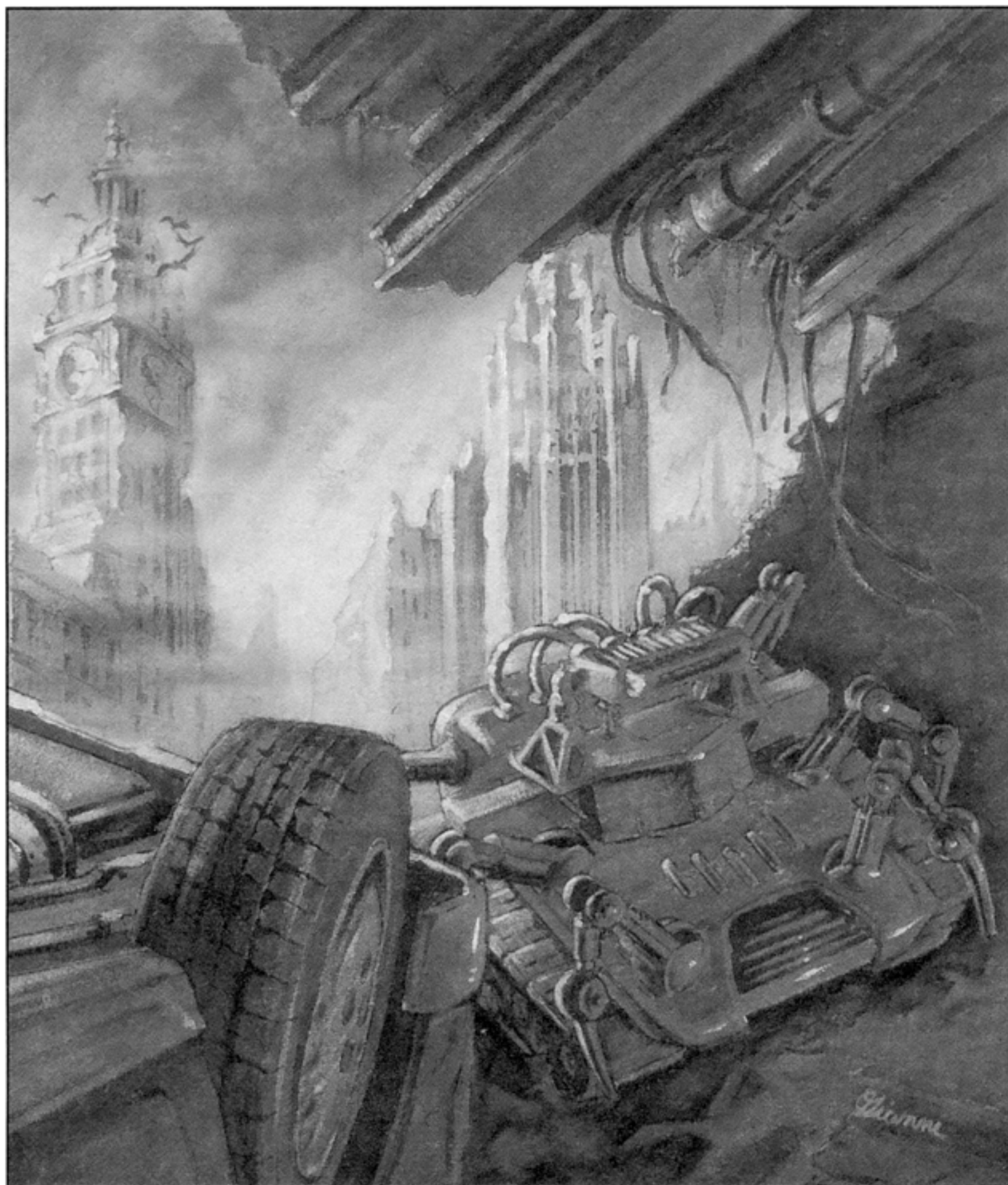
engines, to a barge pulled along by a tug, and even to a glider pulled by an airplane.

Whenever one or more vehicles (called *tractors* for reference) are pulling a trailer, the Load Ratings of all tractors are combined, to calculate the total weight the entire combination (called a *train* for reference) can pull. This may be distributed however the driver sees fit, though in most cases cargo space will dictate load arrangements. The Load Rating of a trailer indicates the amount of weight that an individual trailer can hold. No trailer can have a Body greater than the highest Body of all tractors involved.

Whenever two or more tractors are involved, one must be designated as the lead vehicle, which assumes central control of the entire train. The Handling Rating for the entire train is equal to the Handling of the lead vehicle plus 1, plus an additional +1 for every trailer in the train. The Signature for each vehicle in a train is also reduced by 2, down to a minimum of 1.

During vehicle combat, a trailer counts as a separate vehicle, with its own Body, Armor and Signature Ratings. When attacking a tractor-trailer combination, a character may declare which particular vehicle he is attacking, or the gamemaster may determine randomly which vehicle is hit by a successful attack. (During missile and sensor-enhanced gunnery, the attack will always target the vehicle with the lowest modified Signature, unless the attacker specifies which vehicle he is targeting.) Except for any Vehicle Tests that may be required after an attack, an attack on a trailer has no effect on the tractor, and vice versa.

When mounting weapons, trailers can mount heavier weapons, since they don't have to carry an engine. For every point of Body a trailer has, it can mount 1.5 points of firmpoints and hardpoints, rounded down. So a Body 1 trailer can only



mount 1 firm point; a Body 2 trailer can mount 3 firmpoints or a firmpoint and a hardpoint; a Body 3 trailer can mount 4 firmpoints, 2 hardpoints, or any combination of firmpoints and hardpoints that adds up to 4; and so on.

However, adding too many weapon mounts on a tractor-trailer combination will adversely affect its performance. If the total number of active (firing) weapon mounts on all tractors and trailers exceed the total Body of all tractors, the train must make a Crash Test at the end of the Combat Turn, with an additional +1 modifier for every "point" of weapon mounts over the sum.

An Ares Citymaster (Body 5) is pulling an experimental combat trailer (Body 4). Since the combat trailer has a Body of 4, it can carry up to 6 points worth of firmpoints and hardpoints; in this case, it's carrying 3 hardpoints, each of which is supporting a mini-turret.

That means the Citymaster-plus-trailer is carrying 10 points of weapons: 3 mini-turrets mounted on hardpoints

on the trailer for 6 points (3 x 2 per hardpoint = 6) plus a small turret on 2 hardpoints on the Citymaster itself for 4 points (2 x 2 per hardpoint). The weapons load exceeds the Citymaster's Body by 5, so if all the weapons are fired while the vehicle is moving, the driver must make a Crash Test (with a +5 modifier) at the end of the turn.

MONORAILS AND RAIL VEHICLES

Monorails and rail vehicles travel along fixed rail paths. Because the rails themselves help to stabilize and guide a rail train, trains ignore the +1 Handling modifier for each trailer being pulled. The Handling Rating of a rail train is equal to the Handling of the lead vehicle plus 1.

Though limited in maneuverability, a rail vehicle is by no means a sitting duck, as an engineer can throw off a would-be attacker's aim or tactical maneuver by speeding up or slowing down. Rail vehicles follow standard vehicle combat rules and have a Vehicle Points modifier of -10 (see p. 140, SR3).

In an intra-city public monorail (such as a subway), each car is self-powered and counts as a tractor. The forward-most car acts as the lead vehicle.

MECHANICAL ARMS AND LEGS

Some vehicles and many drones feature mechanical arms and legs. The following rules govern the use of vehicle appendages.

ARM TESTS

Most vehicles do not incorporate any sort of arm, so learning to use such arms falls into the realm of the Mechanical Arm Operation skill (see p. 24). Performing any sort of articulate motion (such as picking up an object, turning a switch and so on) with a vehicle's mechanical arm requires a successful Mechanical Arm Operation Test. The target number is the vehicle's Handling rating. If a rigger is controlling the vehicle, he may add a number of Control Pool dice up to the skill rating. If a rigger is not directly controlling a drone (see *Operative Modes*, p. 154, SR3) use the drone's Pilot Rating in place of the skill.

The gamemaster may decrease the base target number for simple tasks such as picking up a large object the arm can easily grip, or he can increase it for difficult tasks such as defusing a bomb with a drone's mechanical arm.



ARM SKILL TESTS

A character (or a drone's pilot system) may use a skill while operating a mechanical arm, such as using the Demolitions skill to defuse a bomb with a mechanical arm. In such cases, the operation's success is limited by the character's skill with mechanical arms, and to a lesser extent the vehicle's Handling.

When the Skill Test is made, a Mechanical Arm Operation Test must also be made by the character (or a Pilot Test by the drone). The target number is equal to the vehicle's Handling. The successes on the Skill Test may not exceed the successes achieved on the Mechanical Arm Operation Test (or Pilot) Test. Characters without the skill may default to the Reaction or Walker skill.

Sergeant York of Lone Star's Seattle division is trying to defuse a bomb found in the basement of the Seattle Space Needle. He's using a bomb-defusing drone (Handling 4), which is equipped with a set of mechanical arms. Sgt. York has Demolitions skill of 5 and Mechanical Arm Operation skill of 3.

The gamemaster sets the Demolitions Test target number at 4. Sgt. York rolls 5 dice and gets 3 successes. At the same time, he also makes a Mechanical Arm Operation (4) Test, and gets only 1 success. That means his Demolitions successes are limited to 1—luckily, that's all it takes. Sgt. York has some trouble with the arms, but he succeeds at disarming the bomb.

If York didn't have Mechanical Arm Operation skill, he would have to default to his Reaction of 5. His target number for that test would now be 8 (Handling 4 + 4 for defaulting). Rolling 5 dice, he fails the test. That means his unfamiliarity with the mechanical arms ruined his chances of disarming the bomb, and the bomb detonates prematurely. The drone is toast and the basement of the Needle is kinda beat up—but York, who is holed up fifty meters away in an armored van, is fine.

ARM MELEE ATTACKS

Characters may also use mechanical arms to make melee attacks against other characters. In this circumstance, the Mechanical Arm Operation skill is used as a Combat skill.

A vehicle with a high Handling rating may make melee attacks more difficult. To reflect this, increase the target number by 1 for each point that the vehicle's Handling rating exceeds 3. For example, if the vehicle has a Handling rating 4, add 1 to the target number. If the vehicle has a Handling rating 5, add 2 and so on.

The effective Power (Strength) of the attack is equal to the vehicle's Body squared (Body x Body). Arms can be modified to have higher Strength ratings (see p. 152).

MECHANICAL LEGS

Vehicles or drones that use mechanical legs to propel themselves may walk or run using the standard rules for walking and running (see p. 108, SR3). All modifiers that apply to walking or running characters also apply to walking or running vehicles.

Similarly, vehicles with legs use the standard character combat rules (see the *Combat* chapter in SR3) rather than the vehicle combat rules.

The listed Speed ratings for vehicles with legs represent Walking speeds. A vehicle's Running speed is equal to its Speed rating multiplied by 2.5.

A vehicle with legs may attempt to kick during melee combat. In this case, the Walker skill is used as the Combat skill, and the Attack Test suffers a +1 modifier for every point the vehicle's Handling exceeds 3. The pilot must also make an immediate Crash Test with a +2 modifier to avoid a fall.

AIR-CUSHION VEHICLES

Air-cushion vehicles (ACVs), more commonly known as hovercraft, cannot climb or pass across any significant slope, because they simply slide down such inclines. The gamemaster determines whether slopes in any given terrain affect hovercraft in this manner.

ACV TERRAIN CLASSIFICATIONS TABLE

Terrain	Description
Open	Relatively flat areas, including rolling plains, calm to slightly choppy water, and normal impassable flat terrain such as swamps, bogs and marshes
Normal	Similar to open terrain, except with scattered moderate obstacles such as light to dense brush, creek beds, mild slopes and so on
Restricted	Any terrain that demands moderately precise movement, such as suburban streets, winding roads, hills and medium/heavy woods
Tight	Any terrain that requires exceptionally precise maneuvering, including urban settings, badlands, dense woods and stormy seas

In addition, the buffering effects of an ACV's rubberized side skirts provide protection when a hovercraft crashes. As a result, ACV damage levels never exceed Serious damage when they crash (see *Vehicle Damage*, p. 145, SR3).

Because of their unique operating mode, terrain is defined differently for ACVs, as shown in the ACV Terrain Classifications Table.

AIRCRAFT

The following rules apply to all aircraft regardless of type, unless otherwise noted.



RUNWAY DISTANCES TABLE

Aircraft Profile	Takeoff Distance (in meters)	Landing Distance (in meters)
Normal	1,000/1,500	2,000/3,000
STOL (Short Takeoff/Landing)	250/625	500/1,250
VSTOL (Very Short Takeoff/Landing)	125/300	250/625
VTOL (Vertical Takeoff/Landing)	NA	NA

Combat Turn, but may make as many Piloting Tests as there are Combat Turns available before crashing.

NAPE-OF-EARTH (NOE) FLIGHT

Nape-of-earth (NOE) flight is the act of flying aircraft at very low heights. At these low altitudes, pilots can make use of the earth's terrain to hide from air-searching radar. On the other hand, pilots are also much more likely to crash.

Standard airplanes are flying NOE whenever they fly below an altitude of 100 meters. NOE altitude for drones is 20 meters or less. All aircraft and drones flying NOE are subject to the effects of the terrain they are passing over. An aircraft flying NOE also receives an additional +1 modifier to Sensor Tests against it, in addition to relevant ground terrain modifiers (p.136, SR3). However, because the aircraft is flying so close to the ground, a pilot must make a Crash Test (pp. 147-48, SR3) any time she fails a Piloting Test.

TAKEOFF/LANDING MODIFIERS TABLE

Condition	Modifier
Cross winds	+2
Heavy cross winds	+3
Rough or uneven surface	+1
STOL profile landing/takeoff	+1
VSTOL profile landing/takeoff	+3
Angled runway	-1
Catapult, arrestor cable or crash net in use	-2

TAKEOFF AND LANDING

Aircraft require a certain amount of flat space to take off or land. The exact amount depends on the aircraft's Landing/Takeoff profile and its load of cargo and passengers, as shown on the Runway Distances Table..

The first distance listed in each table category applies when an aircraft is carrying cargo and passengers that weigh less than its Load Rating. The second distance applies when the weight of cargo and passengers equals or exceeds the aircraft's Load Rating.

Note that vertical takeoff and landing (VTOL) aircraft do not require runways.

FLIGHT CEILING TABLE

Aircraft	Flight Ceiling (in meters)
Thunderbird*	1,500
Zeppelin	4,000
Helicopter†	6,000
Jet Propeller (Single engine)	12,000
Jet Propeller (Twin-engine & Airliner)	12,000
Jet Turbine Fixed Wing Aircraft	17,000
Fighter Aircraft	20,000

* Includes jump-jet fighters operating in vectored-thrust mode
† Includes tilt-wing aircraft operating in auto-rotation/hover mode

Taking Off/Landing on Unusual Surfaces

Any time a character attempts to land or perform a take-off from an irregular runway surface, in adverse weather conditions or in a combat situation, the controlling character must make a successful Driving Test to perform the action. Unusual runways include aircraft carrier decks, automobile highways, water surface landings (without float-plane adaptation), flat stretches of grassland and so on.

When taking off under such conditions, the test's base target number is 3. When landing, the base target number is 4. Any appropriate modifiers from the Takeoff/Landing Modifiers Table and the Driving Test Modifiers Table (p. 134, SR3) apply as well.

In addition, any character attempting to land or perform a takeoff from a rough or uneven surface must make a Damage Resistance Test against 6L Damage for the aircraft. This test reflects the damage caused to the craft's landing gear from rocks, gravel, potholes and other features of the rough surface.

TAKEOFF AND LANDING MODIFIERS TABLE KEY

Cross winds: The cross winds modifier applies when strong winds blow across the runway. The gamemaster determines when such conditions exist.

FLIGHT CEILINGS

The flight ceiling of an aircraft is the highest altitude the aircraft can reach. The Flight Ceiling Table, p. 68, lists various flight ceilings for different types of aircraft.

LAVs, zeppelins, and helicopters that attempt to rise above their flight ceilings find their upward movement halted, as they are unable to generate additional lift to rise higher.

If fixed-wing aircraft attempt to fly above their flight ceilings, their engines stall and they begin to plummet. In such cases the pilot must make a Piloting Test, using the plane's Handling Rating as the target number, to restart the engine before the plane crashes. The pilot can make only one Piloting Test per

Heavy cross winds: The heavy cross winds modifier applies when storm-generated winds blow across the runway. The gamemaster determines if such conditions exist.

Rough/uneven surface: This modifier applies when a character attempts to land or perform a takeoff from a rough, uneven or gravel surface. This modifier does not apply to unusual but smooth runway surfaces, such as aircraft carrier decks, calm water or asphalt roadways.

STOL/VSTOL landings/takeoffs: This modifier reflects the increased difficulty of STOL- and VSTOL-profile landings or takeoffs.

Angled deck: This modifier applies on flight decks designed at a deliberate cant to assist in landing. For more information, see the flight-deck design option, p. 119.

Catapult/arrestor cable system: This modifier applies if the runway surface is fitted with a catapult (for takeoff only) or an arrestor cable, crash net or other braking device (for landing only). Note that only aircraft equipped with a tailhook system can use either device. For more information, see the flight-deck design option, p. 119.

LOW-ALTITUDE VEHICLES (LAVS)

A LAV (or to use the common nickname, a thunderbird or t-bird) is a type of aircraft that relies primarily on directed jets of thrust more than aerodynamic lift (such as from wings). By generating lift and thrust this way, a LAV can maneuver in relatively tight terrain, carry heavier amounts of armor than normal aircraft and still maintain a relatively fast speed.

In most militaries, LAVs fulfill a number of air cavalry roles (namely forward screening, economy-of-force, and breakthrough-exploitation missions) as well as short-range close-air support. The amount of armor LAVs can carry enables them to shrug off the worst damage from most anti-aircraft guns and surface-to-air missiles, though LAV armor won't stop anti-tank weapons. Fortunately, ground-based anti-tank weapons have poor performance against aircraft, especially a moderately fast mover such as an LAV. On the other hand, a t-bird's worst nightmare is another airborne tank killer, such as an attack helicopter armed with anti-tank guided missiles.

Because of their design, LAVs operate under special limitations to their landing/takeoff profiles and stall speeds.

Takeoff/Landing Profile

A t-bird has a VSTOL profile, which means it needs a very short runway to takeoff and land (approximately 120 meters for takeoff and 240 meters for landing). However, this profile is not because of technological limitations, but rather for operational considerations. T-birds can make a VTOL landing or takeoff, but doing so generates an excessive amount of downward jet blast on the landing area. This jetwash in turn ends up causing damage to nearby personnel (namely support crews) and equipment, and it also makes it more difficult for a pilot to land or take off the t-bird. The runway requirement therefore is a safety precaution for the vehicle and supporting ground crew.

If a t-bird pilot needs to make a VTOL takeoff or landing, she must make a Piloting Test for taking off or landing on unusual surfaces. In addition to other modifiers, a +1 modifier

also applies for this special situation. If the test fails, the vehicle automatically acquires 2 points of vehicle Stress (p. 62). The takeoff or landing otherwise proceeds as normal.

Additionally, any exposed personnel or equipment within a fifteen meter radius of the t-bird must resist blast damage from the wave of hot jetwash. Characters must resist against 8M Physical damage. Impact armor applies against this damage, but characters cannot use Combat Pool dice to aid in the Damage Resistance Test. Additionally, any vehicle with a Body of 2 or less must also make a Damage Resistance Test if it is within the 15-meter blast zone. However, the damage reduction rule for vehicles applies, so vehicles only have to resist 4L vehicle damage.

Furthermore, characters within the blast zone must make a Body (4) Test, unless they are wearing helmets that incorporate special hearing protection (crew and flight helmets for aircraft incorporate this type of hearing protection). Failing the Body Test results in partial hearing loss, and the affected characters receive a +1 modifier to hearing-related Perception Tests. Note that cyber-ears with the dampener modification (p. 299, SR3) do NOT count as adequate hearing protection in this case; the air turbulence from the jetwash simply exceeds the cyberware's design limitations. (Fortunately, cyber-ears can always be replaced.)

Stall Speed

Although the engines of a t-bird allow it to levitate at a relatively low altitude, they do not have enough power to provide both lift and forward thrust. To compensate, t-birds mount short, stubby auxiliary wings (such as canards) to provide supplemental lift at high altitudes. However, these auxiliary wings provide only limited lift, so a high-flying t-bird consequently has a high stall speed.

However, when flying very close to the ground, a t-bird gains some auxiliary lift due to the ground-effects of air cushioning (the same method of lift that keeps hovercraft floating a few centimeters off the ground). Consequently, a t-bird does not need to rely on its auxiliary wings and so does not have a stall speed near ground level.

In game terms, the stall-speed of a t-bird applies only when the vehicle is flying at a height of 75 meters or higher. If a t-bird is flying at an altitude lower than 75 meters, the stall speed does not apply.

Keep in mind, however, that a t-bird flying below 75 meters is flying NOE and must also abide by the same terrain type and restrictions as ground vehicles.

SEMIBALLISTICS AND SUBORBITALS

Semiballistics and suborbitals are special types of hypersonic aircraft used for long distance, transglobal travel. Augmented with powerful rocket engines, both semiballistics and suborbitals are capable of temporarily leaving the atmosphere. However, neither craft can make the escape into low orbit without the assistance of booster rockets and external fuel tanks.

SEMIBALLISTICS

Semiballistics take their name from the way they use rocket boost and the earth's atmosphere to fly. Flying in a parabol-



the craft has entered its landing, or “terminal guidance” phase of its flight. The semiballistic is still traveling very fast; when it touches down on the runway, the semiballistic is still moving at a velocity of more 300 kilometers per hour! Semiballistics must rely on external aids (such as arrestor cables and crash nets) in addition to what little remaining fuel they have at landing to stop along the full length of the runway. Because of this, semiballistics receive top priority when making their landing approaches; they can’t be put into holding patterns.

Operating Semiballistics

It’s highly unlikely that characters will ever pilot a semiballistic, but if the occasion should arise, gamemasters should use the following rules.

Piloting a semiballistic requires the Semiballistic skill (see p. 24).

The listed Speed Rating of a semiballistic indicates the maneuvering speed that a semiballistic travels at when climbing to pre-launch altitude. Semiballistics can travel much faster than that, of course, but all rules and modifiers for exceeding a vehicle’s Speed Rating still apply.

When a semiballistic is preparing to make the launch out of the atmosphere, it takes a full minute (20 Combat Turns) for the craft to adjust its attitude and pitch to the proper position. During that time the semiballistic suffers an additional –10

modifier to its Maneuver Score. Once the semiballistic is in the proper position and begins making its ascent out the atmosphere, it is effectively out of vehicle combat; the semiballistic is traveling too fast for other vehicles to catch up! A semiballistic does not incur Stress from exceeding its Speed rating after it launches into sub-orbit.

For purposes of calculating travel time, a semiballistic has an equivalent ground speed of 12,000 kilometers per hour. So a semiballistic flight from Seattle to Tokyo (a distance of approximately 14,000 kilometers) takes approximately one hour and five minutes ($14,000 \div 12,000$). (A semiballistic’s actual speed is much faster, about 24,000 kph or Mach 19, but its flight path takes the semiballistic away from the earth’s surface.)

Traveling on a Semiballistic

It’s much more likely that characters will be traveling on semiballistics as passengers. The following rules apply to passengers aboard a semiballistic.

Between takeoff from the ground and achieving pre-launch altitude, semiballistics behave like normal aircraft, so characters

ic arc, semiballistics use flight profiles very similar to the intercontinental ballistic missiles maintained by the U.S. and Soviet Union during the Cold War. Though semiballistics have wings, they use them to maneuver only during re-entry and landing. For most of its flight, a semiballistic is so high up that the surrounding atmosphere is too thin to provide aerodynamic lift.

Semiballistics take off from the ground like normal aircraft under partial power from their engines. Once a semiballistic achieves a certain altitude (called the pre-launch altitude, usually 12,000 meters above sea level) and distance from populated areas, it angles its nose upwards and engages full power to make a sharp climb into the upper atmosphere. Usually a semiballistic achieves this position approximately a half hour after takeoff.

At approximately 90 kilometers altitude (just shy of low-earth orbit) the engines shut off (having expended more than 95 percent of the craft’s fuel). From that point on, gravity and inertia bring the semiballistic back down in freefall.

Once the semiballistic re-enters the atmosphere (at about 16,000 meters altitude), the semiballistic uses its wings to slow down and make slight corrections to its trajectory. At this point



may act normally within the craft. The walls of a semiballistic have an equivalent Barrier rating equal to $(\text{Hull} + \text{Bulwark}) \times 8$.

When a semiballistic launches out of the atmosphere, characters are subjected to strong G-forces that limit physical activity. At the beginning of launch, characters experience 1 G of acceleration, which increases by an additional G every five minutes to a maximum of 5 Gs. While under G-forces, characters receive a $+(G\text{-force} + 3)$ modifier to any physical Success Tests they make and must resist $(G\text{-force} + 5)L$ Stun damage every minute. Characters sitting in a passenger seat do not take Stun damage but still receive the modifier to physical Success Tests. Gamemasters may also choose to impose a Success Test with a target number of 1 (plus modifiers for G-force) for significant physical actions that normally do not require a Success Test (such as jacking in or readying a piece of equipment).

Once the semiballistic reaches the apogee (highest point) of its flight, the engines shut off and the craft goes into freefall. Inside the semiballistic, this creates an effect equivalent to a zero-gravity environment.

When a semiballistic enters its terminal guidance phase in preparation for landing, conditions return to normal flight characteristics (albeit very fast flight), so characters act normally within the craft during this phase. Because of the sudden braking that occurs during landing, characters who are not seated and buckled in when a semiballistic lands must make a Quickness (8) Test or resist 8S Physical damage.

Because semiballistics leave Earth's atmosphere, magicians traveling on one will enter a mana warp (see p. 86, *Magic in the Shadows*). At approximately the one-fifth mark of the journey (20 percent of the travel time elapsed), the Background Count starts at 1 and increases to 10 at a rate of 1 level per turn. The Background Count remains at 10 until the last fifth of the journey (80 percent of the travel time elapsed), at which point it drops by one level per turn.

Traveling on a semiballistic is expensive. Coach class tickets cost approximately 0.2 nuyen per kilometer, with a minimum travel distance of 4,000 kilometers. First class costs approximately 1 nuyen per kilometer.

SUBORBITALS

Suborbitals fly much like normal fixed wing aircraft. They take off normally like regular aircraft and climb at relatively normal angles and speeds until they reach an approved height and distance (which is called the transitional altitude and is usually 12,000 meters altitude and well away from any populated area, about a half-hour's flight time.) At that point, they fire powerful rocket-like engines (such as SCRAMjets) to accelerate and climb, reaching an altitude of approximately 23,000 meters. At this height the air is far too thin for normal jet combustion (hence the need for rocket engines). Suborbitals cruise at this height for the majority of their flights, until they are ready to descend. At that time suborbitals descend to intermediate altitudes (10 to 12 thousand meters) and then make their landing approaches in a manner identical to conventional airliners.

Unlike a semiballistic, a suborbital is not locked into its flight path when it makes its high-speed run. A suborbital pilot can change the suborbital's destination in mid-flight, or even

turn around and head back (assuming the craft has enough fuel). However, to make any maneuvers, a suborbital must drop out of high altitude back into the transitional altitude and slow back down to maneuvering speed. While in suborbital flight a suborbital is traveling at speeds in excess of 12,000 kilometers per hour, so a 3-second, 0.5-degree turn would subject the pilot to a force exceeding 8 Gs!

Operating Suborbitals

A character is more likely to survive a bareknuckle fight with a great dragon than to pilot a suborbital. However, if they do pilot one, the following special rules apply.

Flying a suborbital requires the Suborbital skill (see p.24).

The listed Speed Rating of a suborbital is the maximum speed a suborbital may travel at when making the climb to the transitional altitude; suborbitals can travel much faster than that, of course, but all rules and modifiers for exceeding a vehicle's Speed Rating still apply.

When a suborbital begins or ends its high-speed run, it takes 15 seconds (5 Combat Turns) for the plane to change its attitude and pitch from one travel mode to the other. During that time the suborbital suffers an additional -10 modifier to its Maneuver Score. A suborbital in the midst of its high-speed run cannot be engaged in vehicle combat, since it can outrun any other vehicle, and any other suborbital traveling at high speed can't maneuver to intercept. Suborbitals do not incur Stress while flying at high speed in sub-orbit.

All suborbitals have a maximum speed of 10,000 kilometers per hour (about Mach 8) while in suborbital flight. So that trip from Seattle to Tokyo (14,000 kilometers) would take about an hour and twenty-five minutes on a suborbital.

Traveling on a Suborbital

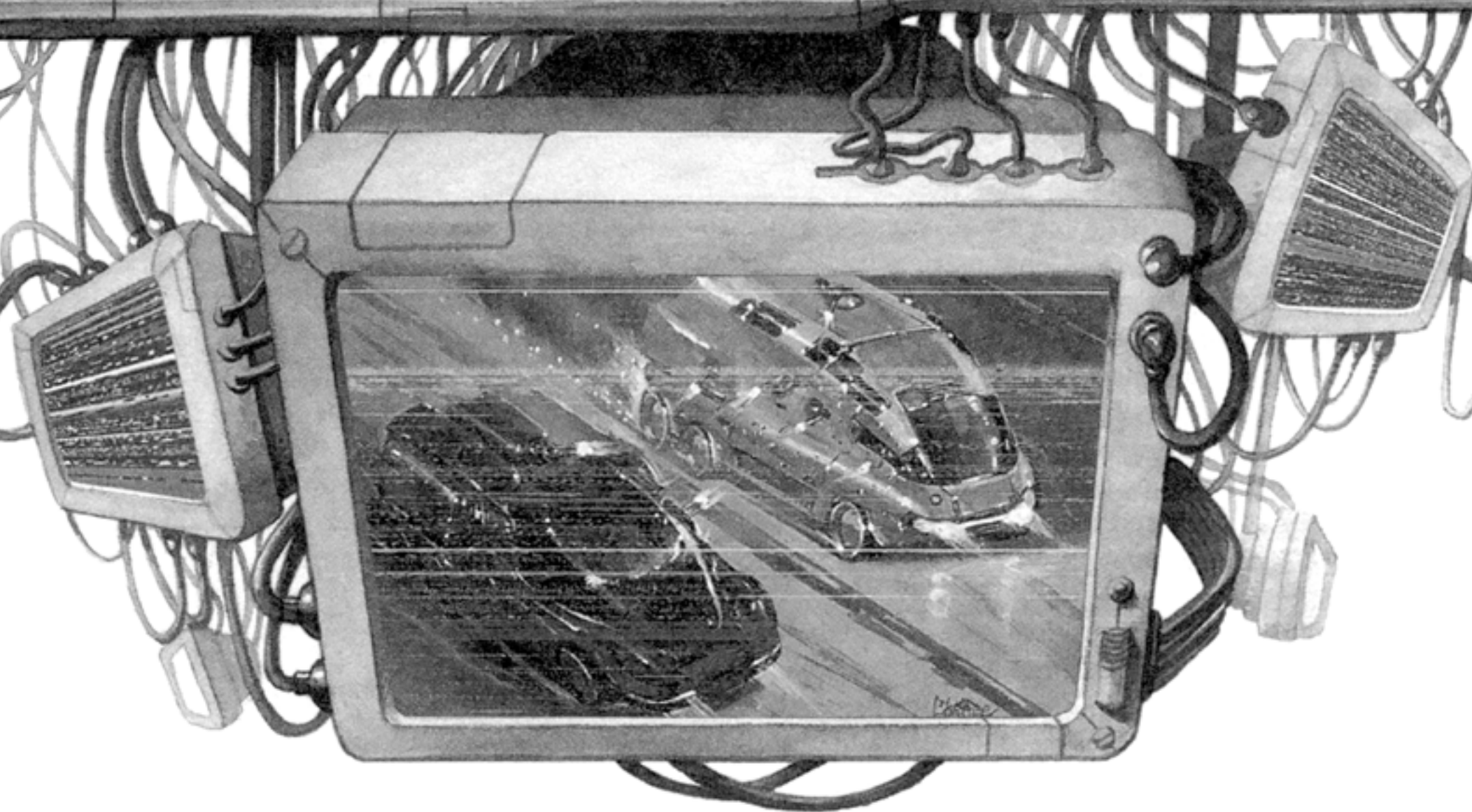
Suborbitals behave like standard aircraft when flying normally below the transitional altitude or during the high-speed run in sub-orbit, so characters may act normally during these situations. Suborbital walls have an equivalent Barrier Rating of $(\text{Hull} + \text{Bulwark}) \times 8$.

When a suborbital is beginning or leaving its high-speed run, however, passengers are temporarily subjected to G-force acceleration. At the beginning of ascent or descent, characters experience 1 G of acceleration, which increases at a rate of $+1$ G every five minutes, to a maximum of 3 Gs. At that point the G-force remains at 3 Gs for another five minutes, and then it drops off at a rate of -1 G per five minutes.

Suborbitals do not travel high enough to leave the atmosphere, so magicians do not face the risk of mana warp. However, suborbitals travel very quickly in sub-orbit, so astrally projecting characters (including spirits) must travel at the fast movement rate (p. 173, *SR3*) to keep up. And since suborbitals can fly as fast as 10,000 kilometers an hour, a magician or spirit must have a respective Magic or Force Rating of at least 10 to keep up.

Suborbital travel is slightly less expensive than semiballistic travel, but it is still pricey. A coach class ticket costs 0.15 nuyen per kilometer, while a first class ticket costs 0.75 nuyen per kilometer. Minimum travel distance is 4,000 kilometers.

ADVANCED RULES



The following advanced rules are for *Shadowrun* players who want more realism and additional levels of complexity (and math!) when running their rigger characters. This section offers game-play options that cover both the everyday and extraordinary situations characters may encounter when running the shadows.

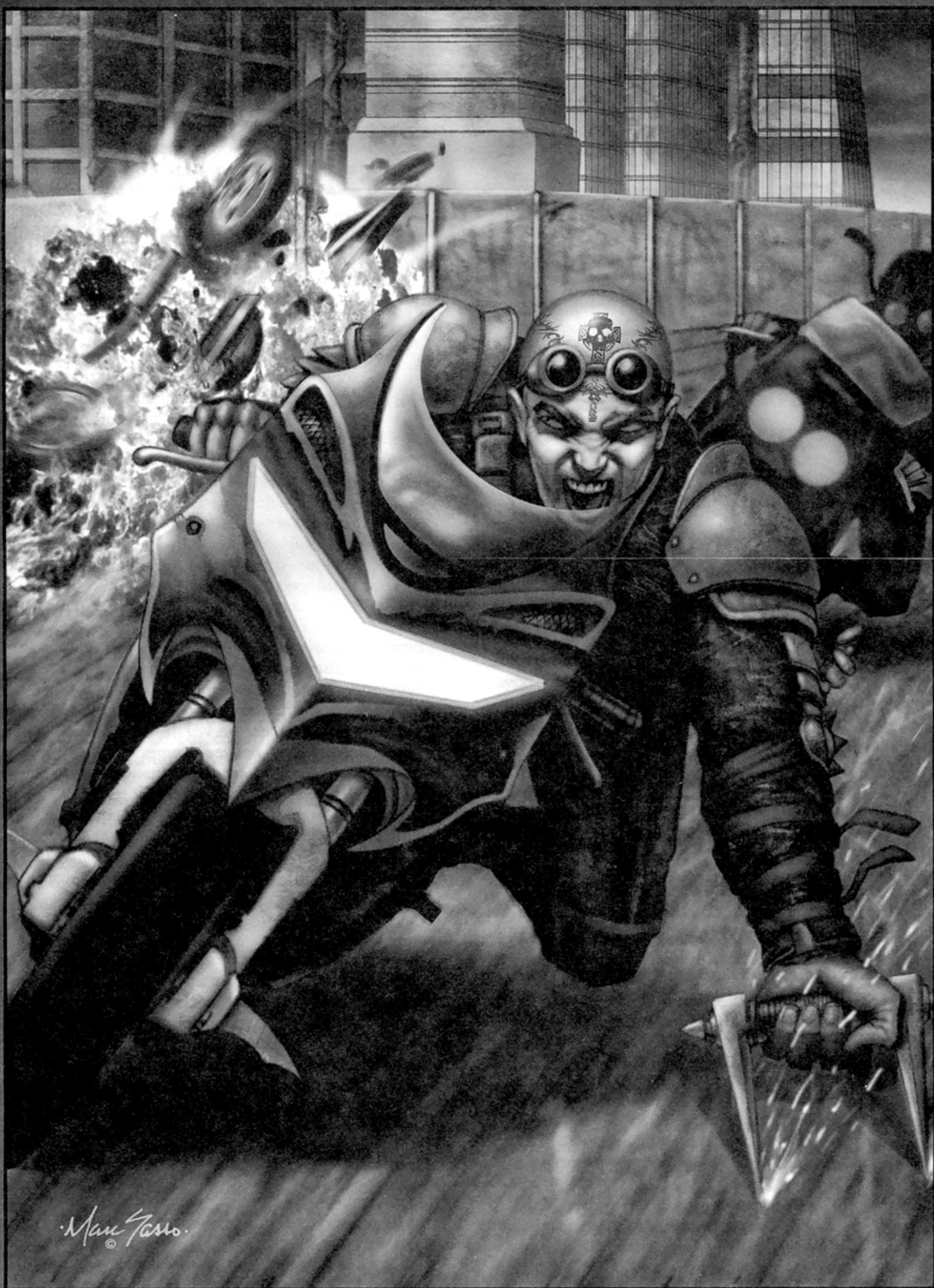
Because many of these options require substantial number-crunching and character upkeep, all of the rules presented in this section are considered *optional* rules. Players and gamemasters should review these rules and choose only those that will enhance their games enough to justify the extra work required.

This section includes rules for fuel grade and consumption, rules for maintenance and overhead during missions, quality factors (how well or poorly a vehicle is built), vehicle subsystem damage, additional gunnery rules covering a vehicle's electronic footprint, more detailed remote-control rules and additional options for electronic warfare.

VARIABLE FUEL CONSUMPTION

A vehicle's Economy Rating measures how much fuel a vehicle consumes when traveling at its standard Speed Rating. The Economy Rating is expressed as kilometers traveled per units of fuel consumed.

If a vehicle is traveling faster than its Speed Rating or is engaged in vehicle combat, it consumes fuel more rapidly than during normal operations. In this case, fuel consumption is expressed as a modified Economy Rating, as shown on the Economy Rating Table, p. 74.



Man Gasto.



ECONOMY RATING TABLE

Vehicle Speed	Economy Rating
Less than Speed Rating	Base Economy Rating
1 to 1.5 x Speed Rating	Base Economy Rating ÷ 2
Vehicle Combat	(Base Economy Rating ÷ 2) + .5

FLIGHT MANEUVERS TABLE

Maneuver	Multiplier
STOL takeoff	.8
If cargo exceeds Load rating	.7
STOL landing	.9
VSTOL takeoff	.7
If cargo exceeds Load rating	.55
VSTOL landing	.85
VTOL takeoff	.6
If cargo exceeds Load rating (tilt-wing aircraft)	.4
VTOL landing (tilt-wing aircraft)	.8

RUNNING OUT OF GAS

If a vehicle runs out of fuel, it loses speed each turn at a rate equal to its Acceleration Rating multiplied by 2. When the vehicle's speed reaches 0, it grinds to a halt. To determine how far the vehicle travels as it coasts to a stop, use the following formula:

$$\text{Coasting Distance} = (.75 \times \text{starting speed}^2) \div \text{vehicle's Acceleration rating}$$

A driver may try to coax more distance out of a coasting vehicle by making a Vehicle Test. For every 2 successes, the driver may extend the coasting distance by the vehicle's Acceleration Rating.

Zak is running a contraband shipment in his t-bird, the Gray Ghost, from the Pueblo Corporate Council into the CAS sector of the Denver Front Range Free Zone. Unfortunately, on the last leg of his run, he cuts the altitude a little too closely and rips the underside of his fuel tank, leaking fuel across the Rocky Mountains. As Zak begins his final approach into the CAS sector at 1,000 meters per turn, the Gray Ghost's engine sputters and dies, having consumed its last drop of fuel.

The Gray Ghost has an Acceleration of 100, so it loses speed each turn at a rate of 200 meters per turn. That means the t-bird will remain airborne for only 5 more turns. The t-bird will travel 7,500 meters before it comes to rest, as calculated with the coasting-distance formula:

$$(.75 \times 1,000^2) \div 100 = 7,500$$

Unfortunately, that will put the t-bird down over some very rough badlands. A little farther past the badlands, however, lies a stretch of flat grassland, so Zak tries to coax some more distance out of the Gray Ghost.

Zak has a Vector Thrust skill of 6, and he allocates 3 Control Pool dice to the Vehicle Test. The Gray Ghost has a Handling Rating of 4. All of the other modifiers cancel each other out, so the target number for the test is 4. Zak generates 5 successes. The t-bird's Acceleration (100) multiplied by 5 equals 500, so Zak manages to make the Gray Ghost coast for 8,000 meters before it stops, rather than 7,500.

AIRCRAFT MANEUVERS

The base Economy Rating for fixed-wing aircraft assumes that the aircraft is making a normal takeoff or landing. When performing shortened or vertical landings or takeoffs (STOL, VSTOL, or VTOL operations), aircraft consume more fuel than normal. During a STOL takeoff, for example, an aircraft burns 20 percent of its initial fuel supply. A plane that takes off carrying cargo that exceeds its Load Rating also consumes extra fuel. To determine how much of an aircraft's initial fuel supply remains after an aircraft performs one of these maneuvers, multiply the craft's initial fuel capacity by the appropriate multiplier given on the Flight Maneuvers Table.

These fuel-consumption rules do not apply to helicopters, zeppelins or LAVs.

Wu Pi, a "free entrepreneur" in the Hong Kong Corporate Enclave, is delivering a shipment of chips from the remote district of Tsuen Wan to prospective clients in Vladivostok, Russia. Wu's Embraer-Dassault Mistral can perform very short takeoffs and landings (VSTOL), and that's a good thing, because Wu needs to take off from a small plateau nestled between some very steep mountains. He's got about 150 meters of runway—just enough for a VSTOL takeoff.

The Mistral has a standard fuel capacity of 2,000 liters, so the VSTOL takeoff will leave it with 1,600 liters of fuel (2,000 x .8). The Mistral has an Economy Rating of 2 km per liter, so Wu Pi will be able to travel 3,200 kilometers after taking off.

Running Out of Gas

If an aircraft runs out of gas, the pilot must make a Crash Test when the vehicle's speed falls below its Stall Speed Rating. If the test succeeds, the pilot makes a successful emergency landing at the end of its deceleration. The vehicle suffers 1D6 Stress Points and must resist 6L damage. However, no damage occurs to the passengers or cargo.

If the Crash Test fails, the airplane crashes immediately. Resolve crash damage per standard rules. When calculating damage, use the aircraft's Stall Speed and assume the aircraft travels the distance already calculated for its deceleration.

As a t-bird, the Gray Ghost has about as much aerodynamic lift as a flying brick and has a Stall Speed of 600 meters/turn. Its initial speed was 1,000 meters per turn, and the t-bird is losing speed at a rate of 200 meters per



turn, so Zak must make a Crash Test two turns after running out of fuel.

For this test, Zak adds 4 Control Pool dice to his Vectored Thrust skill 6 and rolls 10 dice against a Target Number 4 (the t-bird's Handling Rating). The test yields 4 successes, so the Gray Ghost lands with a jolt and an ear-piercing screech—but the t-bird and Zak are both still in one piece.

DRONES

Drones consume fuel the entire time they are operating, even when they are not moving. Use a drone's second Economy Rating, called the Idle Economy Rating, to determine how much fuel a drone burns while in idle operation.

FUEL GRADES

In the current world, not all fuels are created equal. For example, gasoline is available in Regular, Plus, high-octane Super, unleaded, decaffeinated and so on. Jet fuel comes in even more flavors. Better fuel improves a vehicle's performance but costs more than regular fuel. Lower-grade fuel is cheaper than regular fuel but lowers performance.

To keep things simple, three grades of fuel are available in *Shadowrun*: cheap, regular and premium. Regular has no effect on a vehicle's performance or maintenance costs (see *Maintenance and Overhead*, pp. 28–29, for more information). All vehicles are assumed to use regular-grade fuel unless the player selects another grade. The effects of cheap and premium fuel are listed in the Fuel Grade Effects Table.

Gamemasters can also create other fuel grades if they wish. To determine the effects of other fuel grades on the vehicle's maintenance costs and Economy Rating, first determine the Acceleration increase or decrease the fuel provides. As a rule of thumb, custom fuel grades should not increase or decrease Acceleration by more than 5.

OPTEMPO RULES

The *Maintenance and Overhead* rules (pp. 28–29) assume that the rigger is operating his vehicle under the circumstances of a "typical" shadowrun (breaking into a reinforced corporate compound inside the city limits of a major metropolitan area such as Seattle, for example). For a rigger who undertakes other types of adventures (for example, smuggling, long-range operations, shadow trading in the Denver Front Range Free Zone and so on), players and gamemasters may choose to use the opera-

FUEL GRADE EFFECTS TABLE

Fuel Grade

Cheap

Effects

Reduce maintenance cost by 5 percent (multiply initial maintenance cost by .95 to determine new cost).
Reduce Acceleration rating by 2.
Reduce vehicle's Economy by 10 percent (multiply original Economy Rating by .9 to determine new Economy).

Premium

Increase maintenance cost by 5 percent (multiply initial maintenance cost by 1.05 to determine new cost).
Increase Acceleration Rating by 2.
Increase vehicle's Economy by 10 percent (multiply original Economy Rating by 1.1 to determine new Economy).

Acceleration increase

Custom Fuel Grades

Increase vehicle maintenance cost by 2 percent for each point of Acceleration increase.
Increase vehicle Economy Rating by 1 percent for each point of Acceleration increase.

Acceleration decrease

Decrease vehicle maintenance cost by 2 percent for each point of Acceleration decrease.
Decrease vehicle Economy Rating by 1 percent for each point of Acceleration decrease.

tions tempo, or "optempo," rules to calculate a rigger's maintenance, fuel and other overhead costs.

In military logistics, optempo is used to estimate the accrued costs for maintenance, fuel and overhead for a vehicle based on its mileage during a given period. The more mileage a vehicle accumulates (from deployments to hot spots, training exercises, and routine day-to-day use), the more fuel it burns, and the more wear-and-tear it accumulates. Conversely, a vehicle that spends most of its time sitting in the motor pool consumes virtually no fuel and requires far less maintenance than an active vehicle.

CALCULATING OPTEMPO RATES

To determine a vehicle's optempo rate, first calculate the base value of the vehicle and all its modifications using the prices provided in the *Vehicle List* (p. 156) *Vehicle Design* p. 102 and *Vehicle Customization* p. 122. Divide the base value figure (without Street Index) by 100,000; round off to the nearest tenth. The result is the optempo rate of the vehicle, expressed as nuyen per kilometer.

To calculate the optempo cost for a particular adventure, multiply the total number of kilometers traveled by a vehicle during the adventure by the optempo rate. The final result is the optempo cost for that vehicle for that adventure.

COMBINING OPTEMPO AND REGULAR MAINTENANCE

Gamemasters may choose to combine the standard maintenance and overhead rules with the optempo rules using one of the following options.



Splitting the Cost

To "split the cost," reduce both a vehicle's monthly overhead rate and optempo mileage rate by half. The character pays half the normal monthly maintenance cost on the vehicle, whether or not he uses it during the month, and pays half of the optempo costs incurred in that month.

Frequently Used Vehicles

Under this option, apply the optempo cost to vehicles that a character uses on a regular basis (for example, on every adventure). Use the standard overhead rate for vehicles that the character rarely uses (no more than once a month).

Significant Mileage

Under the significant-mileage option, optempo applies only to vehicles and drones that exceed a preset mileage threshold during an adventure. The gamemaster sets the mileage threshold but may use the following suggestions as a rule of thumb: 200 kilometers per adventure for regular vehicles and 50 kilometers per adventure for drones.

Vehicles that do not exceed the threshold can be maintained by paying their standard maintenance costs.

QUALITY FACTORS

What Edges and Flaws are to *Shadowrun* characters, Quality Factors are to vehicles. They represent intangible factors in a vehicle's manufacture—such as attention to detail, process controls and professional workmanship—that affect a vehicle's purchase cost, performance, durability and maintenance cost. Quality Factors that improve performance also increase the purchase price of a vehicle. Other factors reduce the purchase price but diminish the vehicle's performance.

Players select Quality Factors during the vehicle-design process (see *Vehicle Design*, p. 102). The Quality Factor modifier is applied to the vehicle's chassis mark-up multiplier when the player calculates the final vehicle cost (see *Determine Final Vehicle Cost*, p. 113). A vehicle cannot take a Quality Factor with a negative modifier if that modifier would reduce the chassis mark-up multiplier below 0.1.

In the interest of game balance, no vehicle should be designed using more than two Quality Factors.

The following entries describe available Quality Factors and their chassis mark-up modifiers.

COMPLEX CHASSIS

Modifier: -.30

A vehicle with a Complex Chassis has a poorly designed engine layout that makes work on the vehicle difficult.

Characters working on a vehicle with a Complex Chassis receive a +2 target number modifier to all Build/Repair Tests.

CUSTOM BUILT

Modifier: -.20

Custom Built vehicles have very special designs and frameworks. Consequently, modifications added later as vehicle customizations are more difficult to install. Double the parts



cost and base time for all vehicle modifications installed during vehicle customization on Custom Built vehicles.

FRAGILITY

Modifier: -.50 per level (maximum 2 levels)

A vehicle with Fragility is sensitive to overuse and breaks down easily.

For every level of Fragility, a vehicle receives a +1 target number modifier on Stress Tests (see *Stress*, p. 62).

LEMON

Modifier: -.15 per level (maximum 4 levels)

A Lemon is a poorly built and shoddily designed vehicle that costs more to maintain than it's worth.

For every level of Lemon, increase the Maintenance Cost of the vehicle by 25 percent. See *Maintenance and Overhead*, pp.28—29, for more information on vehicle maintenance costs.

MASTER WORKMANSHIP

Modifier: +.10 per level (maximum 3 levels)

A vehicle with the Master Workmanship factor is produced with loving attention to detail and craftsmanship. Because every part of the vehicle is expertly crafted and assembled, the vehicle runs better and suffers less damage from normal wear and tear, and so has much lower maintenance costs than a comparable vehicle of its type and price range.

For every level of Master Workmanship, reduce the vehicle's maintenance cost by 20 percent. See *Maintenance and Overhead*, pp.28—29, for more information on vehicle maintenance costs.

PASSENGER TRAP

Modifier: -.15

A vehicle with the Passenger Trap factor has substandard passenger safety measures because the manufacturer has cut corners to reduce the manufacturing cost of the vehicle.

Any passenger or driver in a Passenger Trap receives a +1 target modifier on Resistance Tests made for crashes or collisions.

This modifier does not apply to vehicles resisting vehicle damage or passengers resisting damage from weapon attacks.

PROTOTYPE MODEL/USED VEHICLE

Modifier: -.60

A Prototype Model vehicle is an experimental design built for evaluation and debugging. As such, it has a number of hidden surprises that won't be discovered until the vehicle is put through its paces. Similarly, a Used Vehicle may have hidden flaws that won't show up upon initial inspection or trial runs.

A Prototype Model/Used Vehicle starts out with 1D6 hidden Stress Points. These Stress Points are not revealed until Stress comes into play (either by the character pushing the limits of the vehicle or botching a Success Test under the Stress Rule of One). Gamemasters may reveal all of these hidden Stress Points at the first opportunity or dole them out over the course of an adventure or campaign. Once revealed, these

Stress Points are added to the vehicle's Stress Point total and may be reduced normally (see *Stress*, p. 62).

RUGGEDNESS

Modifier: +.50 per level (maximum 2 levels)

Ruggedness indicates that the vehicle is solidly built and can withstand an excessive amount of punishment from heavy use and abuse.

For every level of Ruggedness, a vehicle gains a -1 target number modifier on Stress Tests (see *Stress*, p. 62).

SAFETY CERTIFIED

Modifier: +.15

A Safety Certified vehicle incorporates additional features and safeguards that protect passengers in the event of a crash or collision.

Any passenger or driver riding in a Safety Certified vehicle receives a -1 target number modifier when making tests to resist damage from crashes or collisions. This modifier does not apply to vehicles resisting vehicle damage or passengers resisting damage from weapon attacks.

STREAMLINED LAYOUT

Modifier: +.25

A vehicle with Streamlined Layout has a well-designed engine and chassis layout, which makes working on the vehicle easier.

Characters working on a vehicle with Streamlined Layout receive a -1 target number modifier to all Build/Repair Tests.

VEHICLE SUBSYSTEM DAMAGE

Any time a vehicle sustains damage, one or more major subsystems may be damaged. The method for determining if this occurs is similar to determining wound effects, as described on p. 126, *M&M*.

To determine if subsystem damage occurs, compare the highest die roll result of the Damage Resistance Test to the number of boxes of damage inflicted by the attack after staging up or down. If the roll result equals or exceeds the number of damage boxes, the vehicle escapes subsystem damage. If the roll result is lower than the damage boxes, subtract it from the number of damage boxes and divide the result by 2 (round down). The final figure is the number of subsystems that are damaged.

For each damaged subsystem, roll 1D6 and consult Table 1 of the Vehicle Subsystem Damage Tables (see p. 78), or simply choose a category from Table 1. Next, consult the corresponding table and roll the appropriate number of dice (or simply choose) to determine the particular subsystem that is damaged. If the damaged vehicle is not equipped with the modification or feature that results from the dice roll, consider it a "no subsystem hit" for that particular result, or the gamemaster may roll again.

Finally, roll 1D6 and consult Table 8 (p. 79) to determine the extent of damage for each subsystem. Refer to the *Subsystem Damage Notes* (p. 78) for explanations of specific damage results. Systems not listed in the notes appear elsewhere in this book.

Design options cannot take damage.

VEHICLE SUBSYSTEM DAMAGE TABLES

Table 1: Major System Categories

1D6 Result	Category	Corresponding Table
1	Vehicle electronics	Table 2
2	Vehicle controls	Table 3
3	Accessories	Table 4
4	Weapon systems	Table 5
5	Engine	Table 6 (p. 79)
6	Chassis	Table 7 (p.79)

Table 2: Vehicle Electronics

1D6 Result	Category
1	ECM
2	ECCM
3	Sensor systems
4	Other electronics or roll again on this table
5	ECD
6	ED

Table 3: Vehicle Controls

1D6 Result	Category
1	Rigger control box
2	Autonav
3	Remote control linkup
4	Handling
5	Drive-by-wire system
6	Other control modification or roll again on this table

Table 4: Accessories

2D6 Result	Category
2	APPS system
3	Amphibious system
4	Anti-theft system
5	Communications gear
6	Drone rack
7	EnviroSeal
8	External cargo mount
9	Life support
10	Spotlight
11	Gamemaster's choice of any vehicle device or roll again on Table 1
12	Roll twice on Table 1

Table 5: Weapon Systems

1D6 Result	Category
1-2	Turret
3-4	Vehicle weapon
5-6	Target acquisition system

SUBSYSTEM DAMAGE NOTES

Aggravated Body Damage: The attack seriously weakens the infrastructure of the vehicle. For Light damage, reduce the vehicle's Body by 1 (except Body 1 vehicles, which suffer no loss). For Moderate damage, reduce the vehicle's Body to one-half its value, rounded up. For Serious damage, reduce the vehicle's Body to one-third its original value, rounded up. Deadly damage to the vehicle's Body destroys the vehicle, which automatically crashes.

The base cost for repairing a vehicle's Body depends on the component's Damage Level, as follows:

Damage Level	Base Repair Cost
Light	Original vehicle cost x .1
Moderate	Original vehicle cost x .2
Serious	Original vehicle cost x .4
Deadly	Original vehicle cost x .6

Armor-Defeating Hit: The attack reduces the effectiveness of the vehicle's armor. Light damage reduces the Armor Rating by 1, Moderate damage reduces Armor by 3, Serious damage reduces Armor by 6, and Deadly damage reduces the Armor Rating by 10. Armor Points lost in this manner are gone for good and can be recovered only by replacing the armor.

Note that this rule is separate from the Armor Degradation rules (p. 96, CC). At the gamemaster's discretion, both sets of rules may apply.

Engine Hit: The attack damages the engine, which in turn reduces the vehicle's Acceleration, Speed and Load Ratings. For Light damage, multiply the ratings by .9 and round down to calculate the new ratings. For Moderate damage, multiply the ratings by .7 and round down to calculate the new ratings. For Serious damage, multiply the ratings by .4 and round down to calculate the new ratings. If the engine suffers Deadly damage, the vehicle loses power and decelerates at a rate equal to twice its Acceleration, and the driver must make a Crash Test.

The base cost for engine repairs is determined by its Damage level, as follows:

Damage Level	Engine Repair Base Cost
Light, Moderate	(Vehicle base cost + engine customization cost) x .3
Serious, Deadly	(Vehicle base cost + engine customization cost) x .6

Fuel Tank: The attack causes a leak in the vehicle's fuel system. For Light damage, calculate the loss rate by multiplying the fuel remaining by .01. The result is the amount of fuel that leaks each turn. For Moderate damage, calculate the loss rate by multiplying the fuel remaining by .05. For Serious damage, calculate the loss rate by multiplying the fuel remaining by .1. If the fuel tank sustains Deadly damage, it ruptures and the driver must make a Crash Test. (Pyromaniac gamemasters may also check to see if the destruction of the fuel tank results in an electrical fire or fuel explosion.)

Damage Level Fuel-Tank Repair Base Cost
 Light, Moderate Original vehicle cost x .1
 Serious, Deadly Original vehicle cost x .3

Handling: The attack damages the primary vehicle control mechanisms. Increase the Handling of the vehicle by 1 for Light damage, 2 for Moderate damage and 3 for Serious damage. If the Handling sustains Deadly damage, the vehicle automatically crashes.

Passenger Compartment: The attack on the vehicle generates shrapnel in the passenger compartment. Passengers must make Damage Resistance Tests against Physical damage. The damage Power is equal to half the Power (round down) of the attack against the vehicle (after armor reductions), and the Damage Level is the result rolled on Table 8.

Rigger Control Box: The attack disrupts the rigger control hardware installed in the vehicle and triggers an ASIST backlash. The rigger must make a Damage Resistance Test against Physical damage. The Power is equal to the Power of the vehicle's attack (after Armor reductions), and the Damage Level is the result rolled on Table 8.

Target Acquisition System: The attack damages key sensor or electronic components relating to target-acquisition functions. Missiles, sensor-enhanced weapons and other smart weapons suffer a Damage Modifier based on the results of Table 8. If the target-acquisition system suffers Deadly damage, the vehicle cannot lock onto a target and is unable to fire smart weapons. "Dumb" weapons, such as rockets, cannons and firearms, are not affected.

The base cost for repairing the target-acquisition system is calculated as follows: Repair cost = Original Parts Cost of sensor system x .10 x Number of damage boxes.

Turret: The attack damages the servo-mechanism controlling the vehicle turret (if the vehicle has more than one turret, the gamemaster may select which is damaged). Weapons fired from that turret suffer a Damage Modifier based on the results

VEHICLE SUBSYSTEM DAMAGE TABLES (CONTINUED)

Table 6: Engine

1D6 Result	Category
1	Gridlink
2	Turbocharger/superconductive drive
3	Engine hit
4	Engine customization
5	Nitrous injector
6	SunCell

Table 7: Chassis

1D6 Result	Category
1	Fuel tank
2	Passenger compartment
3	Aggravated body damage
4	Armor Defeating Hit
5	Roll again on Table 1
6	Roll twice on Table 1

Table 8: Damage Severity

1D6 Result	Effect
1-2	Light damage. The damaged subsystem operates at reduced efficiency. Reduce by 1 any bonus or extra dice provided by the damaged modification or accessory. (If vehicle has no such bonuses or extra dice, apply a +1 target modifier to Success Tests made with the damaged device/system.)
3-4	Moderate damage. The damaged subsystem is suffering a serious malfunction. Reduce by half its original value any bonus or extra dice provided by the damaged modification or accessory. (If vehicle has no such bonuses or extra dice, apply a +3 target modifier to Success Tests made with the damaged device/system.)
5	Serious damage. Damaged vehicle accessories are inoperative but repairable.
6	Deadly damage. Subsystem is destroyed beyond repair. Accessories must be replaced completely.

of Table 8. If the turret suffers Deadly damage, it is rendered inoperative and frozen in place.

Balthazar is racing his Saab Dynamit (Body 3) away from the site of a shadowrun turned sour. Before he gets away, a security guard hits the Saab with a burst of gunfire from an assault rifle, nailing it for 4S damage. Balthazar rolls the car's 3 Body dice to resist the damage, rolling 1, 4 and 4. That's enough to stage the Damage Level down to Moderate, but not enough to avoid subsystem damage.

Balthazar's target number to avoid subsystem damage was 6 (the number of boxes of damage). His highest roll



was a 4, so his margin of failure is 2 ($6 - 4$). That means the Saab faces damage to one ($2 \div 2$) vehicle subsystem.

The gamemaster rolls 1D6 and consults Table 1, getting a 2—Vehicle Controls. He rolls again on Table 3, getting a 4—Handling. Rolling 1D6 on Table 8, the gamemaster gets a 4—Moderate damage. Consulting the Subsystem Damage Notes, the gamemaster sees that Moderate Handling damage raises the Saab's Handling by 2. The gamemaster tells Balthazar that the gunfire seems to have chewed up his rigger steering controls, making it more difficult to control the car's direction.

REPAIRING SUBSYSTEMS

When repairing modifications and accessories, use the standard vehicle-repair procedure with the following exceptions.

To determine the cost of repair parts, first multiply the number of damage boxes by .05. Then multiply the result by the Parts Cost of the modification or accessory.

The target number for the Repair Test is based on the level of damage (L, M, S or D) per standard rules. The base time for repair is equal to the base time for installing the modification or accessory.

See *Vehicle Customization* (p. 122) for more information about Parts Costs and base times for vehicle modifications and accessories.

ALTERNATE VEHICLE COMBAT RULES

Listed below are some optional rules that complement the rules for vehicle combat as described on pp. 138–141 of *SR3*.

INTEGRATING VEHICLES IN STANDARD COMBAT

In some circumstances, instead of resorting to vehicle combat, it may be easier to treat vehicles as non-player characters (NPCs) and resolve a conflict using standard combat rules. This is particularly true in circumstances where the number of characters on foot outnumber the number of vehicles in play, as in the case of two combat drones providing fire support for a group of shadowrunners fighting a security patrol.

To treat vehicles as NPCs, it is necessary to determine their Movement Rates. A vehicle's Walking Rate is equal to its Acceleration Rating. Its Running Rate is equal to its Speed Rating divided by its Handling (rounding down), down to a minimum of twice its Acceleration. A vehicle can move faster than its Running Rate in a Combat Turn, up to its Speed Rating, if its driver succeeds in a Vehicle Test. A driver expends a Complex Action to make this test.

During ranged combat, vehicles follow the standard vehicle gunnery rules. A rigger jacked into a vehicle or directly controlling a drone may make a Dodge Test using his or her Control Pool. If a drone or vehicle is not directly controlled by a pilot who is jacked in or rigged, it may not make a Dodge Test. Robots may use their Adaptation Pools to dodge, if they are programmed to avoid danger and recognize that they are in danger.

Unless a vehicle has mechanical arms or legs (see p. 66), it may not make melee attacks (though it may ram). However, characters may make melee attacks against vehicles (or against characters riding vehicles), as long as they are close enough to engage. Because vehicles themselves cannot counterattack, they suffer the full brunt of the melee attack, though standard rules for damaging vehicles apply.

Under this system, vehicles do not use a Maneuver Score. They also do not use any of the vehicle maneuvers described in *SR3*, with the exception of the ramming maneuver (p. 143, *SR3*). If a vehicle can move into contact with vehicle, character or barrier, it can make a Ramming Test. However, modifiers for Maneuver Score and speed should be ignored under these circumstances. Characters and vehicles who are the target of the ramming attempt may attempt to dodge. Calculate the damage code in the same manner as impact damage (pp. 145–46, *SR3*), using its Movement Rate as the equivalent speed.

All other vehicle actions (sensor tests, electronic warfare and so on) are handled per standard vehicle rules.



ALTERNATIVE RAMMING AND COLLISION DAMAGE

As an alternative to the ramming and collision damage rules provided in *SR3*, the following rules can be used. These rules expand the outcomes of ramming and collisions, and incorporate the relative weight difference between the two parties involved. These rules supplant the *Ramming* (p. 143, *SR3*), *Vehicle Damage From Impact* (p. 145, *SR3*) and *Vehicle-Pedestrian Collisions* (p. 148, *SR3*) rules.

The Ramming Test

Under these rules, the test to perform a ramming maneuver is conducted exactly as described on p. 143, *SR3*. Apply all of the appropriate modifiers from the Ramming Modifiers Table.

Determine Type of Collision

The direction of impact can have a significant effect on damage and speed. When a collision occurs, the gamemaster first determines the type of collision: head on, rear end, sideswipe or T-bone. If the character seeks a specific type of collision, the gamemaster may require that he first get in position with a successful Positioning Test (see p. 142, *SR3*).

Head On: The vehicles are moving towards each other immediately before the collision, and collide head on (or nearly so).

Rear End: Both vehicles are moving in the same direction, and one rams the slower moving one from behind.

Sideswipe: Both vehicles are moving roughly side by side, in the same or opposite directions, and ram each other along the side.

T-Bone: The vehicles collide perpendicularly, forming a "T" shape.

Vehicle Damage From Impact

In this system, collision damage depends on two factors: the relative speed between the two objects and the relative weight difference.

The base Damage Level is determined separately for each vehicle and depends on the comparison of one vehicle's Body Rating to another. For each vehicle, compare its Body relative to the other one and consult the Collision Damage Level Table. Treat vehicles with a Body of 0 as if their Body were 0.5.

The Power of the collision is based on the Speed of the vehicle(s), modified by the type of collision. The Collision Power Table indicates how to determine the effective speed. To determine the Power, divide this Speed by 10, rounding up.

Damage Resistance Tests are conducted as normal; characters may add Control Pool to these tests if they choose.

COLLISION DAMAGE LEVEL TABLE

Vehicle Body Is:

Twice the other vehicle's
More than the other vehicle's (but less than twice)
Equal to the other vehicle's
Less than the other vehicle's

Damage Level

Light (L)
Moderate (M)
Serious (S)
Destroyed (D)

COLLISION POWER TABLE

Collision Type

Head On
Rear End
Sideswipe
T-Bone

Power Equals:

(Combined speeds of both vehicles) ÷ 10
(The difference in speed between the vehicles) ÷ 10
(The higher Speed ÷ 2) ÷ 10
(The ramming vehicle's speed) ÷ 10

COLLISION SPEED CHANGES TABLE

Type of Collision

Head On

Rear End
Sideswipe
T-Bone

Speed Changes

If both vehicles survive or get destroyed, both speeds are reduced to 0. If one vehicle is destroyed, reduce the surviving vehicle's speed by the destroyed vehicle's speed.

Add the speed of the two vehicles and divide by 2. Both vehicles maintain their respective speeds. Both vehicle's speeds are reduced by half (round down).

Twitch is racing through the streets of Renton on his BMW Blitzen bike, trying to avoid police pursuit. Suddenly a speeding Lone Star Citymaster pulls in behind him—and rams! The gamemaster determines the Citymaster is making a Rear End collision against Twitch, and the Citymaster driver succeeds at his Ramming Test.

The Citymaster has Body 5 and has a current speed of 120 meters per turn. Twitch's Blitzen has a Body 2 and has a Speed of 80 meters per turn. For a Rear End collision, the Power is equal to the difference in speed (120 – 80 = 40) divided by 10 (40 ÷ 10 = 4). The Damage Level for Twitch's Blitzen is D, since the Blitzen's Body is less than the Citymaster's. The Citymaster's Damage Level is L, as its Body is more than twice the Blitzen's Body. So the Blitzen takes 4D while the Citymaster faces 4L.

If the collision had been Head On, the Power would be the combined Speeds (120 + 80 = 200) divided by 10, or 20 (200 ÷ 10). In this case, the Blitzen would be facing 20D and the Citymaster 20L.

Results From Collisions

In addition to vehicle damage and potential passenger damage (see p. 147, *SR3*), both vehicles involved in a collision must make an immediate Crash Test, modified for driver and



vehicle damage (p. 147, SR3). In addition, the vehicle's Speed is reduced, as noted on the Collision Speed Changes Table (p. 81).

Twitch survives being rear-ended by the Citymaster, but the Speed of both vehicles is affected by the collision. Because it was a Rear End collision, the speeds of the two vehicles are averaged. Both vehicles are now traveling along at 100 meters per turn ($120 + 80 = 200$, $200 \div 2 = 100$).

Walls and Barriers

When a vehicle collides with a wall, barrier or similar object, the vehicle's effective speed is considered its full speed (for a Head On or T-Bone collision) or half its speed (for a Sideswipe). Calculate the Power of the collision as follows:

Collision Power = vehicle Body + Armor + (effective speed $\div$ 10)

Compare this Power to the Barrier Effect Table (p. 124, SR3). If the vehicle creates a wide enough hole for it to pass through, it crashes through the barrier. Reduce its speed by an amount equal to the Barrier Rating $\times$ 10.

If the vehicle fails to create a wide enough hole or to destroy the barrier, it comes to a complete stop as if involved in a Head On or T-Bone collision. For Sideswipes, the vehicle's speed is reduced by the Barrier Rating $\times$ 10.

In either case, the vehicle must still resist damage. To determine the damage the vehicle sustains from the collision, use the Barrier Rating $\div$ 4 as the comparative Body on the Collision Damage Level Table (p. 81). Determine the Power using the vehicle's effective Speed $\div$ 10.

After all of this, the vehicle must also still make a Crash Test as a result of the collision.

Twitch decides he needs to get away from the Citymaster, so he decides to cut through a local mall. He chooses a department-store plate-glass window (Barrier Rating 2) for his entrance. The hotshot Citymaster driver recklessly follows, cutting through a low, heavy brick planter (Barrier Rating 12) toward the mall's thoroughfare. Both vehicles are making Head On collisions, so their effective Speeds are 100 meters per turn.

Twitch's Blitzen hits the glass with a Power of 12 (Body 2 + Armor 0 + [Speed 100 $\div$ 10]). Consulting the Barrier Effect Table, that Power of 12 exceeds 1 (half the Barrier Rating) by an increment of 11. That effectively reduces the Barrier Rating to 0. The plate glass shatters, and Twitch roars through.

The Blitzen suffers damage with a Power of 10 (Speed 100 $\div$ 10) and a Damage Level of Light (the Blitzen's Body of 2 is more than twice the barrier's effective Body of 0.5 [$2 \div 4$]). The Speed of Twitch's Blitzen is also reduced by 20 (Barrier Rating 2 $\times$ 10) to 80 ($100 - 20$) for crashing through the window. Luckily, Twitch also makes a successful Crash Test.

The Citymaster hits the planter with a Power of 25 (Body 5 + Armor 10 + [Speed 100 $\div$ 10]). That Power exceeds 6

(half the Barrier Rating) by an increment of 4, so the Barrier is reduced to 8 ($12 - 4$) and a 2-meter wide hole is created. Unfortunately, the gamemaster decides 2 meters isn't wide enough for the Citymaster to get through, so it comes to a stop, hung up on the smashed-up planter.

The Citymaster suffers damage with a power of 10 (Speed 100 $\div$ 10) and a Damage Level of Medium (its Body of 5 is higher than the barrier's effective Body of 3 [$12 \div 4$]). Even if it doesn't crash, it looks like Twitch has gotten the lead he needs to get away.

Vehicle-Pedestrian Collisions

Whenever a vehicle runs into a metahuman or critter, treat the pedestrian as having an equivalent Body of 1 for collision purposes. If the pedestrian has a Body Rating of 8 or higher, treat it as if it had a vehicle Body of 2. Otherwise, determine damage from the impact as described under *Vehicle Damage From Impact* (p. 81).

Vehicles do not have to make a Crash Test after striking an metahuman. They may strike a number of pedestrians equal to the vehicle's Body Rating in a single turn.

Just as he thinks he's in the clear, a mall-hopping pedestrian steps right into Twitch's path of escape. The gamemaster determines this a Head On collision, so the Power is equal to the Blitzen's Speed of 80 divided by 10, or 8 (the pedestrian has a Speed of 0). The Blitzen's Body is 2 and the pedestrian's effective Body is 1, so the bike faces Light damage and the mall-hopper Deadly.

If the mall-hopper takes Deadly damage (and Twitch doesn't crash), Twitch will roll right over him and continue on. Otherwise, Twitch's bike slams to a halt.

ALTERNATE SENSOR TESTS

If keeping track of the difference between Passive Sensor Tests and Active Sensor Tests (see p. 135, SR3) is too confusing, or if the gamemaster feels that Active Sensor Tests don't provide enough dice, the following alternate rules may be used.

Whenever a Sensor Test is called for, the rigger rolls his Intelligence just as if he were making a standard Perception Test. The rigger receives a number of complementary dice for this test equal to the vehicle's Sensor Rating. The target number to detect a vehicles or characters is equal to its Signature; apply all of the appropriate modifiers from the Sensor Test Modifiers Table (p. 136, SR3). The target number to notice other things (sounds, scenery changes, and so on) is 4, and standard Perception modifiers may apply (see p. 232, SR3). Drones and robots use their Pilot Ratings with complementary Sensor rating dice for Sensor Tests.

In any case, the number of successes achieved on the Sensor Test may not exceed the vehicle's Sensor Rating +1. Use the Sensor Test Results Table (p. 136, SR3) to determine results.

ADVANCED GUNNERY RULES

The following optional rules are designed to enhance the "realism" of shooting weapons at or from vehicles.



FOOTPRINT

The discharge of intense, raw electrical power from a vehicle's transmitters shines like a beacon on the electromagnetic spectrum. Consequently, vehicles with strong transmitters can easily be targeted by sensor-enhanced weapons.

The Footprint Rating reflects this increased "visibility." The Footprint Rating is subtracted from the target number on tests made against a vehicle or device's Signature. To determine a vehicle's Footprint, add the Flux Ratings of all its transmitters (radios, remote-control decks, sensors, ECM), divide the result by 10 and round to the nearest whole number.

Josie Cruise is conducting reconnaissance from her van. She is simultaneously operating a drone via a remote-control deck (Flux 8) and a short-wave radio (Flux 6) to keep in touch with her teammates. That gives her a Footprint Rating of 1, calculated as follows:

$[(8 + 6) \div 10] = 1.4$, rounded to nearest whole number = 1

The van's standard Signature is 4, so tests made against its Signature would use a Target Number 3 (4 - 1).

Reducing Footprint

A rigger can attempt to reduce her vehicle's Footprint Rating by making an Electronics (Electronic Warfare) Test against a target number equal to the Footprint Rating + 4. A

number of Task Pool dice may be used in this test up to the character's skill. For each success, reduce the vehicle's total Flux by 1, then re-calculate the Footprint Rating.

Each attempt to reduce Footprint requires a Complex Action. Riggers may make multiple attempts, and the effects of each attempt are cumulative. However, increase the target number by 2 on each additional attempt after the first.

Any time a test generates a result of all 1s, double the vehicle's total Flux and re-calculate the Footprint accordingly.

Josie Cruise wants to reduce her vehicle's Footprint Rating of 1, so she uses a Complex Action and makes an Electronics (Electronic Warfare) Test. She has Electronics 6 and a few Task Pool dice available. The target number is 5 (Footprint 1 + 4).

The test generates 6 successes, which reduces her vehicle's total Flux from 14 to 8. Recalculating the Footprint, $8 \div 10$ equals 0.8, which rounded to the nearest whole number yields a 1. So the Footprint rating remains the same.

Josie then uses another Complex Action and makes another test. Her test only generates 4 successes this time, so now the total Flux drops from 8 to 4. Calculating again, 4 divided by 10 equals 0.4, which drops to 0 when rounded to the nearest whole number. Thus, Josie has completely eliminated her van's Footprint.



BREAKING MISSILE-TARGET LOCK

To lock onto a target and fire a missile at it, an attacking vehicle must first detect the target vehicle with a sensor-based Perception Test. Therefore, a target that manages to break contact with an attacker's sensors can cause missile attacks against it to miss.

To break a target lock, the character controlling the targeted vehicle must spend a Complex Action and make a Hiding maneuver (see p. 144, *SR3*) before the missile strikes at the end of the Combat Turn in which it is fired. If the Driving Test for the action generates a number of successes greater than or equal to the missile's Intelligence, the character breaks the target lock, and the missile misses.

If the Hiding maneuver generates a number of successes lower than the missile's Intelligence rating, the character doesn't shake off the missile. The character may make another attempt (assuming he has another Complex Action left before the end of the Combat Turn), but increase by 2 the number of successes required to break the target lock for each additional attempt.

ADVANCED REMOTE-CONTROL RULES

The basic remote-control rules in *SR3* and the *Drones* section of this book (p. 41) provide a comprehensive yet simple system for running drones. Players who want more complex drone rules can spice up their rigging repertoires with the following rules.

PRE-PROGRAMMED DRONE COMMANDS

Phrasing comprehensible commands for drones can consume valuable Combat Actions, and drones may misunderstand or misinterpret commands. Entering pre-programmed commands into a system's remote-control deck can solve both of these problems.

If a rigger pre-programs the various commands required for a particular maneuver, he can then utter a single, short command and his RC deck will send out the pre-programmed commands and automatically direct the drones to perform the action. For example, a rigger might give the command "Home," and the rigger's car, connected via the remote-control network, would automatically drive to the rigger's position by following pre-programmed commands from the deck. Alternately, a rigger could say "Pearl Harbor north," and five aerial attack drones would fly in a V-formation due north, attacking any people or vehicles they see.

Prerequisites and Restrictions

To use pre-programmed commands, the remote-control deck must be equipped with storage memory as an accessory. Pre-programmed maneuvers can be as simple or as difficult as the rigger desires, but the following restrictions apply:

1. A pre-programmed command can cover only a single, specific task. For example, if a rigger wants to have a group of drones fly in a formation in a certain direction, then change course, she must pre-program two separate commands, one for each leg of the journey. Further, commands must state the specific details of the drone's task, leaving nothing vague or open-ended. For example, if a rigger pre-programs drones to

fly in formation, she must specify the type of formation (including the distance between drones) the direction of travel, the distance to be traveled and the speed.

2. The complexity of the command, as determined by the gamemaster using the Skill Success Table on p. 92, *SR3*, cannot be greater than the remote-control deck rating.

Entering Pre-Programmed Commands

To enter a pre-programmed command into a remote-control deck, a rigger must make a Computer (Programming) Test during her preparation time before the run. The gamemaster sets the test target number, based on the command's complexity and the target numbers listed in the Skill Success Table, p. 92, *SR3*. The gamemaster should tell the player the target number before the player makes the test and give the player the option of reducing the command's complexity to lower the target number. Keep track of the number of successes achieved.

Every pre-programmed command takes up memory in the deck's storage. Calculate a command's size with the following formula:

$$([\text{Command's Complexity Target Number}]^2 \times 100) \div \text{successes} = \text{Memory requirement in Mp}$$

Calculate the time required to program the command with the following formula:

$$\text{Target Number} \div \text{successes} = \text{hours needed to program}$$

During a run, a rigger can activate a pre-programmed command simply by using a Free Action. The remote-control deck then automatically directs the drones to act in accordance with the pre-programmed commands.

BACK-UP CHANNELS

Because the data-processing capability of a remote-control deck is divided over three separate radio channels—the command channel, system channel and simsense channel—a rigger can reserve one of those channels as a "back-up" in case one of the other two channels goes down due to electronic warfare. If a channel has suffered degradation from MIJI, the rigger can choose to close down that channel and transfer the functions of the channel onto another one.

If a channel is serving as a back-up for a second channel, all actions performed on both channels suffer a +2 modifier. And because the volume of transmissions on the channels is higher, an intruder receives a -1 modifier when attempting to locate that channel (see *Remote Network Infiltration*, p. 36).

A rigger cannot move all three channels onto one frequency.

Otto Matick is using a remote-control network to perform some scouting and fire support, when a jammer locates his command channel and starts jamming it. Otto decides to transfer the functions of the command channel to the system channel.



As long as Otto uses the system channel as a back-up channel for the command channel, he receives a +2 target modifier when using issuing commands to drones (normally transmitted via the command channel) and directing indirect fire (normally transmitted via the system channel). Furthermore, if the jammer tries to infiltrate Otto's system channel, he receives a -1 modifier to his target number.

THE SERVER SYSTEM FOR CRD

Normally, a cranial remote deck (see p. 23, *M&M*) has very low transmitting power, which forces a rigger to haul around power amplifiers, either on a bulky backpack or as part of a cyberlimb (taking up precious space that could be used for cyberguns, spurs and so on). Alternatively, a rigger may choose to configure his CRD as a super-subscriber to a conventional remote-control deck.

In this option, the CRD reduces the number of drones the normal deck can control by 1 (the CRD counts as one of the deck subscribers) and gives control of the remote-control network to the CRD. The normal deck then becomes a "server" that provides auxiliary support to the CRD. The effective rating for the network is the rating of the CRD or the rating of the standard deck, whichever is lower. Options and accessories (such as ECCM, protocol-emulation modules, BattleTac systems and the like) that are incorporated in either deck are available. (Players should place the majority of remote-control accessories on their server deck and as few as necessary on their CRDs, to save on Essence and monetary costs.)

The range of a remote-control server system is based on the Flux of the server deck. However, remember that the center of effect is the server, not the CRD. If the rigger wanders outside of the server's range, the CRD loses contact with the remote-control network, and the rigger is dumped out of the system.

ADVANCED ELECTRONIC WARFARE RULES

These advanced rules for electronic warfare are used for MIJI attempts against remote-control networks (see *MIJI*, p. 37).

RANGE AND PARTIAL MIJI ATTACKS

Normally, a remote-control network is susceptible to MIJI only when its remote-control deck is within the range of the intruder's electronic device. However, even if the targeted remote-control deck is outside the intruding device's range, the intruder can still make a MIJI attack against any of the network's drones that are inside the intruding device's range.

In such cases, resolve electronic warfare per standard rules. However, only those drones inside the intruding device's range are affected. If a drone leaves the intruding device's range, it is free from the effects of MIJI.

If a rigger has jumped into a drone within the range of the intruding device, the rigger is vulnerable to the effects of dump shock if the intruder dumps the rigger through a successful jamming or interference attempt.

MIJI ON MULTIPLE CHANNELS

If an intruder has successfully infiltrated two or all three channels of a remote-control system, he can try to make a simul-

taneous MIJI blitz on all infiltrated channels. When making a multiple-channel MIJI attack, the intruder makes a MIJI Test; apply a +3 target modifier for each additional channel the intruder is trying to blitz. In other words, an intruder receives a +3 target modifier to the MIJI Test if attempting to use MIJI on two channels simultaneously, and a +6 modifier to the MIJI Test if attempting to use MIJI on all three channels of a remote-control network.

An intruder can make only one type of MIJI attack when making a multiple MIJI attempt.

BARRAGE JAMMING

Barrage jamming is a jamming technique that jams all radio frequency bands. When using barrage jamming, a jammer does not need to make any tests to intercept or infiltrate channels and jams all frequencies and channels (including normal radio) at the same time. On the other hand, because the jammer is spreading his electromagnetic power across a wide range of frequencies, he has a sharply reduced range and, more important, his own device/vehicle becomes more vulnerable to detection by enemy sensor systems and smart weapons.

When employing barrage jamming, the jammer automatically jams all radio and radio-telephone communications and inflicts signal degradation on *all* of his opponent's Signal Monitors. For every 3 points of Flux used in barrage jamming, 1 box of signal degradation on all of the opponent's Signal Monitors are filled in. Devices that use wireless Matrix connections (cellular and radio), receive a -1 modifier to all Matrix-based tests and the user's Matrix Reaction is reduced by 1.

To determine the effective range of barrage jamming, divide all standard ranges by 20. Additionally, barrage jamming reduces the Signature of the jammer. For every 2 points of Flux used in barrage jamming, reduce the jammer's Signature by 1. A jammer's Signature cannot fall below 2, but any excess Signature reductions offset any modifiers that increase the Signature or Signature-based target numbers.

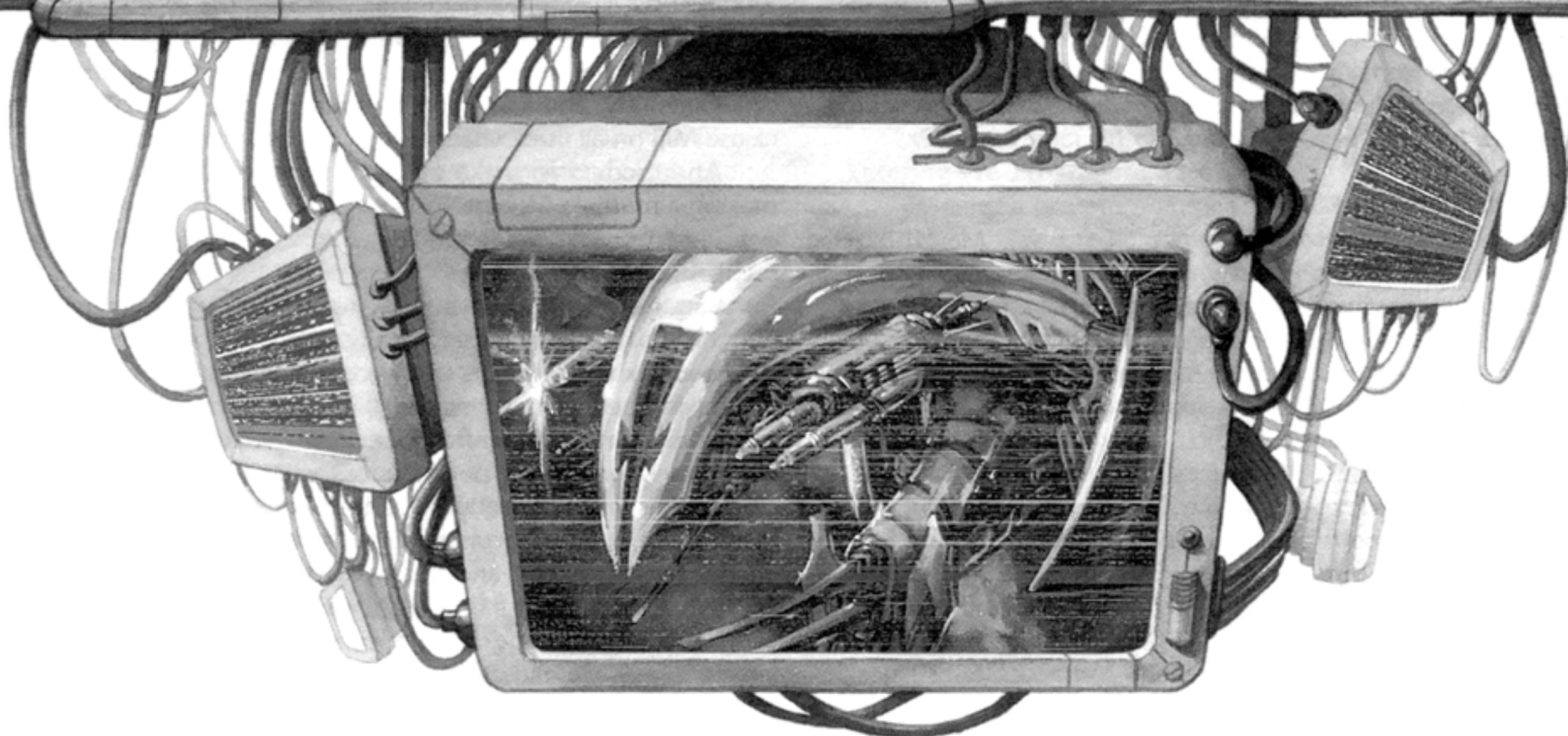
The tactic of barrage jamming does not work with meaconing, intrusion or interference.

HOT MIKE JAMMING

"Hot mike" is military slang for the practice of using a radio transmitter to override all other signals on a frequency, preventing other individuals from talking on that frequency and effectively jamming it. Unintentional hot-mike jamming usually results from a faulty microphone or loose connection, but a similar effect occurs when a speaker intentionally interrupts, or "steps on" another person's transmission.

In *Shadowrun*, hot-mike jamming is an improvised method of jamming that uses standard transmission equipment, such as radios or remote-control decks, in lieu of ECM. Hot-mike jamming works on standard radio communications, radio-based wireless Matrix links and remote-control deck transmissions. However, when using hot-mike jamming against remote-control decks or wireless Matrix links, the jammer receives a +2 target modifier on his MIJI Tests, because the set-up of those networks provides partial protection against accidental transmissions.

NEW TOYS



This section describes new weapons, drones and other accessories guaranteed to make the most jaded rigger character drool. Specific uses for many of these toys have been described in earlier chapters of this book. Rules for designing and modifying vehicles using this equipment appear in the *Vehicle Design* (p. 102) and *Vehicle Customization* (p. 122) sections.

The toys in this section are organized into the following groups: weapons, cyberware, remote-control accessories, and drones and robots. Each item entry includes a short description of the toy and its use in the world of *Shadowrun*, followed by specific game information and rules for game use. The ranges for all weapons listed appear in the Weapons Range Table, p. 95.

Some military-grade vehicle weapons, munitions and gear are so tightly controlled that they are beyond the reach of run-of-the-mill shadowrunners. These weapons are available only through the highest-level military contacts or extremely rare and unusual black-market opportunities. No Availability or Street Index ratings are provided for such weapons; individual gamemasters decide if, when and how such powerful weapons and gear fall into hands of their players.

VEHICLE WEAPONS

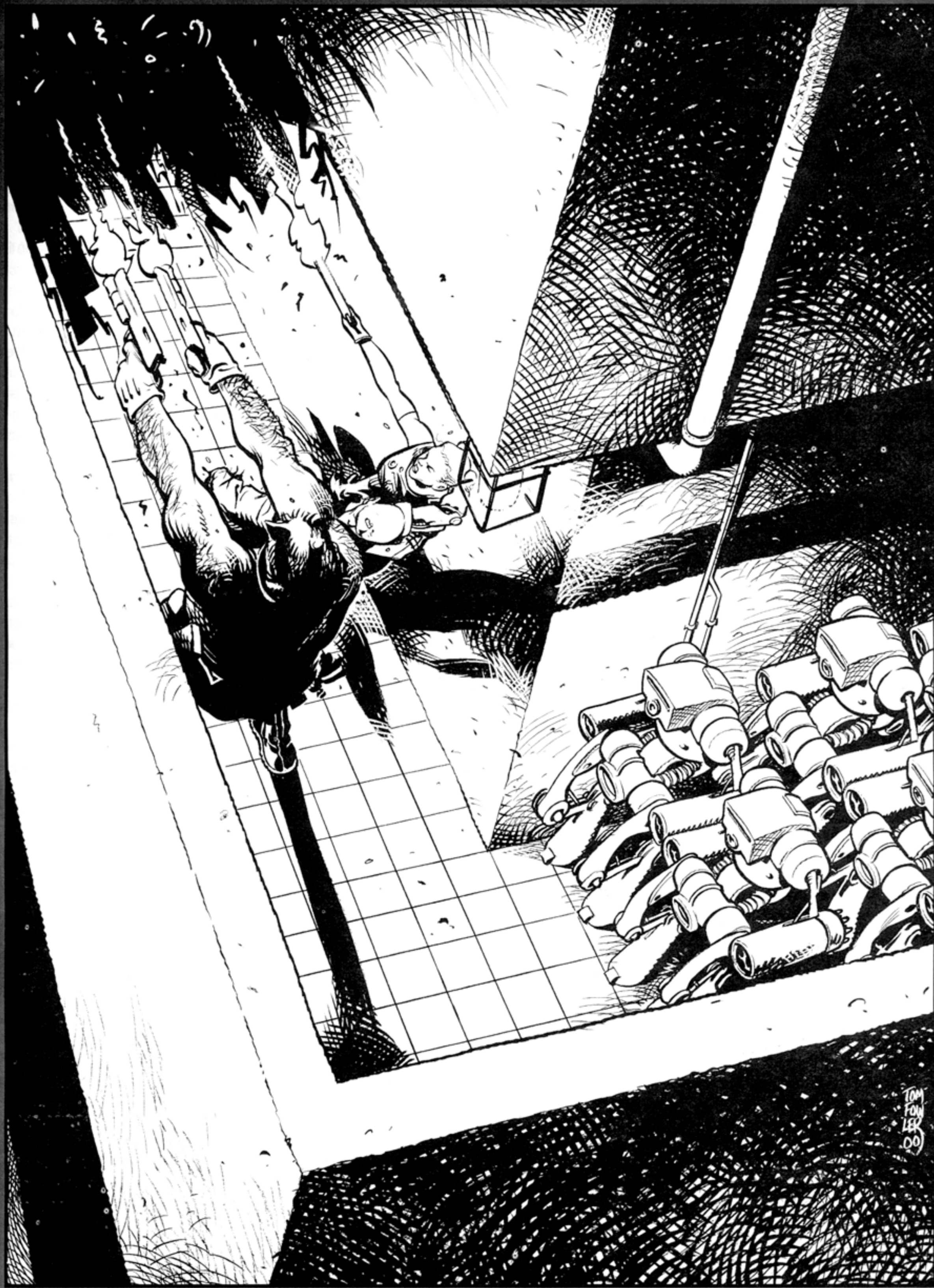
Unless otherwise noted, a character firing a vehicle weapon uses Gunnery skill (see p. 86, *SR3*). All standard vehicle gunnery rules (p. 151, *SR3*) apply.

AN/EDQ-12 AIR-DEFENSE NAVAL

DIRECTED-ENERGY WEAPONS SYSTEM (ANDREWS)

The AN/EDQ-12 Air-Defense Naval Directed-Energy Weapons System (*ANDREWS* for short) is an energy weapon designed to protect a warship against incoming missiles. *ANDREWS* uses a particle beam to discharge megavolts of electron charges at the incoming missile. If *ANDREWS* scores a hit, the discharge either fries the missile's control circuits, causing the missile to fall off target or to detonate in mid-flight. Either way, the ship is safe.

ANDREWS may also be used to attack aircraft and surface ships. Due to its massive power requirements, it may be installed only on ships powered by nuclear power plants.





Game Effects

The ANDREWS system operates in a similar manner to laser weapons such as the Ares Firelance vehicle laser. Reduce its Power by 2 at Medium range, 4 at Long range and 6 at Extreme range. ANDREWS is considered an anti-vehicle weapon, so vehicles do not automatically stage down the Damage Level and use only half their Armor ratings, rounded down, to reduce the weapon's Power.

The Ammo rating for ANDREWS lists the number of shots it can fire before recharging. It takes 10 minutes to recharge the weapon fully. However, if the weapon is inactive between uses, it can recharge shots in the interim, at a rate of 1 shot per 4 Combat Turns. The weapon must remain inactive for 4 consecutive, full turns to recharge. If fired before four turns have elapsed, the recharging time is lost.

If a rigger is jacked into or directly controlling a vehicle or missile when it is struck by an ANDREWS particle beam, she takes physical damage from the ASIST backlash surge (see p. 27). The Power of the attack is 4 plus the rating of the rigger's VCR implant, and the Damage Level is D.

The ANDREWS particle beam may also be used to attack surface ships as well as aircraft and missiles.

The system must be installed in a medium or higher level remote turret. Only vehicles with nuclear power plants may carry ANDREWS.

ARES FIRELANCE VEHICLE LASER

The first viable laser system developed for vehicles, the Firelance was designed for use against low-flying aircraft and lightly armored vehicles. However, it has proved an exceptionally effective weapon against personnel as well.

Game Effects

The Firelance's Power decreases over distance in the same manner as the Power of portable lasers decreases (see p. 30, CC). Reduce the laser's Power by 2 for each range bracket beyond Short (hence 13S at Medium, 11S at Long and 9S at Extreme range). Ballistic armor has no effect against the Firelance; Impact armor reduces the Power by only half its value (round down). The Firelance is not an anti-vehicle weapon, and so is subject to the damage reduction rule for vehicles (p. 149, SR3). Laser weapons do not generate recoil.

Smoke and fog reduce the Firelance's effectiveness. Reduce the weapon's Power by 1 for every 4 meters of smoke or fog the beam passes through.

The Firelance features a built-in battery that provides enough juice for 40 shots. This battery may be recharged at a rate of 1 shot every three hours. A Firelance may not draw power from a vehicle battery.

HARPOON GUN

The ship-mounted version of a spear gun, the harpoon gun fires long bolts mounted with sharpened blades or explosive heads. Ropes, cords or cables connected to harpoons limits their range.

Game Effects

If a character is struck by a harpoon, use his Impact armor to reduce the weapon's Power. Harpoon guns are not anti-vehicle weapons, and so are subject to the damage reduction rule for vehicles (p. 149, SR3).

A harpoon can fly a range equal to or less than the length of its tether. If the target is farther than the tether length, the harpoon automatically misses.

Connecting or disconnecting a tether from a harpoon is a Complex Action.

NAVAL GUNS

Though anti-ship missiles dominate most naval battles, ordinary naval guns and cannons still see extensive service in the 2060s. Usually they are used as backup weapons against targets too small or too insignificant to engage with anti-ship missiles. Naval guns and cannons can be against ships as well, but their short ranges preclude their use against enemies armed with anti-ship missiles.

Thanks to advances in automation and electronic-control technology, modern naval guns are remotely operated and possess autoloaders. This has eliminated the need for manned crews and allowed the design of smaller and lighter gun turrets. Light naval guns are also capable of limited semi-automatic fire.

Naval guns currently exist in two sizes: small and medium. Small naval guns are normally mounted on frigates, corvettes and some of the heavier coastal patrol craft. Medium naval guns are usually mounted on destroyers, cruisers and other line warships.

Game Effects

Light naval guns take up seven weapon slots. Medium naval guns take up ten weapon slots. Each CF of ammunition storage holds either 25 light naval gun shells or 5 medium naval gun shells. At least 2 CF of ammunition storage must be dedicated to either system.

Naval guns fire high-explosive shells that cause naval damage.

FN PIRANHA MINI-TORPEDO LAUNCHER

With the increased publicity of underwater aquacologies such as the Proteus Arkoblocks and Yamatetsu's Saotome Aquadomes, demand has risen for inexpensive close-range underwater weapons, ostensibly to protect against hostile Awakened sea creatures. (That they also happen to be effective against diving shadowrunners and scuba-pirates is just a coincidence.)

Fabrique-Nationale developed its Piranha torpedo system in response to this demand. Ordinary torpedoes are relatively slow, have long arming ranges, and, at over 300,000¥ a pop, are not cost-effective against small targets. FN's torpedo design incorporates the technology of its FN-AAL gyrojet weapons system and uses the same water-combustive alkaline fuel as propellant. This makes the Piranha significantly faster than standard torpedoes, and its enlarged warhead is effective against even the largest Awakened sea creatures. While the range reduction

limits its usefulness in naval combat, it is still adequate enough for point defense against smaller organic targets.

The Piranha has three available warheads: armor piercing (AP), high explosive (HE) and ink-dispensing. Piranha torpedoes may be guided or unguided.

Game Effects

The Piranha follows the standard rules for missile launchers (p. 120, *SR3*) and missile combat (p. 101, *CC*). It can be used only against underwater targets. Damage codes for the high explosive and armor-piercing warheads are subject to the effects of hydrostatic shock (see *Explosions*, p. 112, *CC*). The ink-dispensing warhead creates a 25-meter radius ink cloud that adds a +4 visibility modifier (in addition to normal underwater vision modifiers).

Piranha missiles and rockets are not anti-vehicle weapons, so they are subject to the damage reduction rule for vehicles (p. 149, *SR3*). The Piranha is a specialized launcher and cannot fire generic missiles, rockets or torpedoes.

AZTECHNOLOGY

RELÁMPAGO MEDIUM RAILGUN

The Relámpago ("Lightning") is a brutally powerful vehicle weapon manufactured by Aztechnology and used by several European military outfits. This medium railgun uses high-capacity capacitors and multiple electromagnets to accelerate a ferrous slug to extreme velocities. This slug inflicts terrific damage through sheer kinetic energy. The sound of a railgun firing is quite distinctive, causing a deafening whip crack as the hypervelocity slug exits the barrel.

Game Effects

The Relámpago's capacitors take a full Combat Turn to recharge, so the weapon can be fired only once every other Combat Turn at most.

The Relámpago's capacitors are good for 20 shots and can be recharged from an alternator at a rate of 1 shot per hour. Railguns may not draw power from a vehicle's battery.

Each CF of ammunition storage holds 40 Relámpago slugs.

ARES VAPORIZER HEAVY RAILGUN

The Vaporizer is easily the most powerful railgun in production and is commonly found only on tanks or warships.

Game Effects

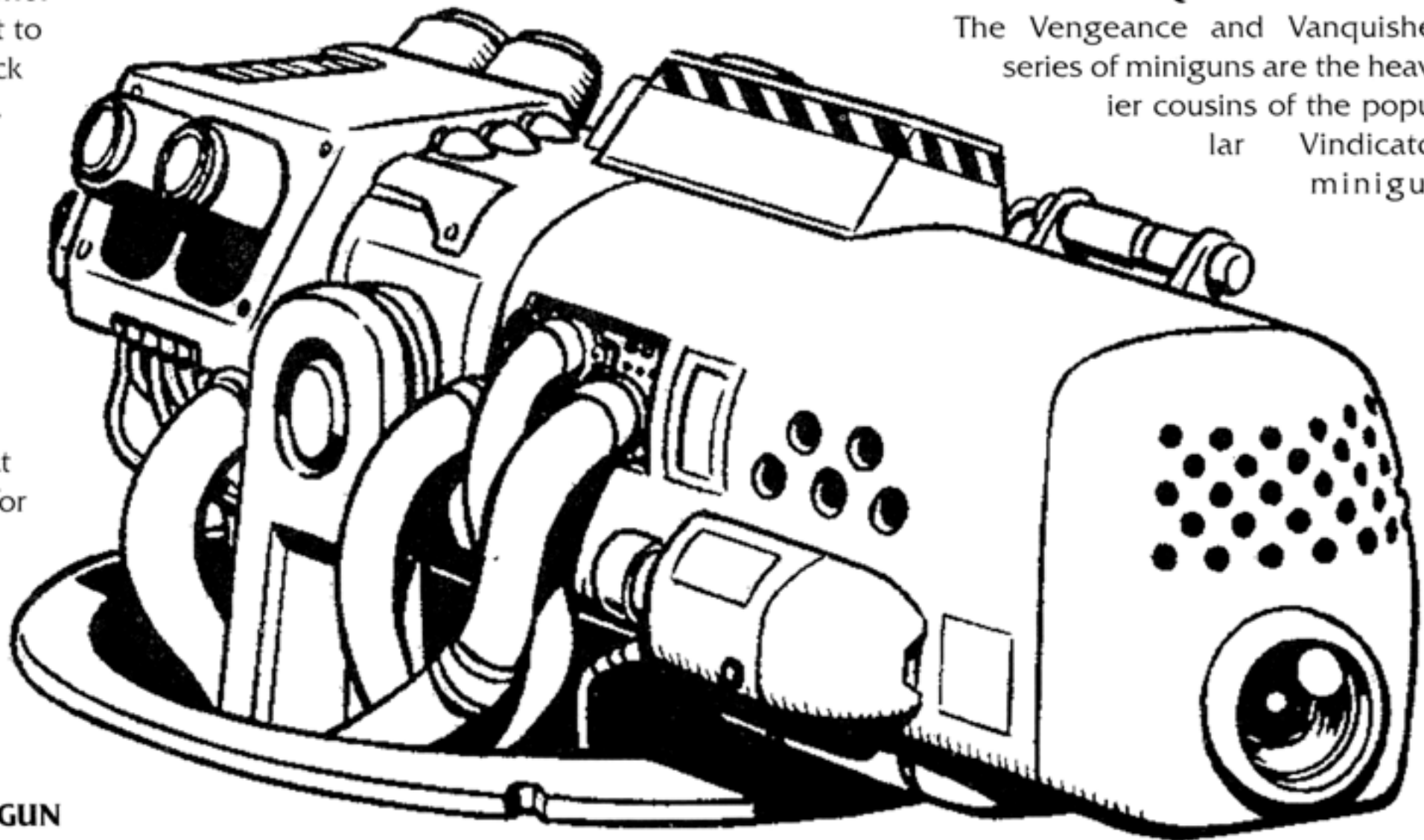
The Vaporizer's capacitors take 1 full Combat Turn to recharge, so the Vaporizer can be fired only once every other Combat Turn at most.

Like other railguns, the Vaporizer's capacitors are good for 20 shots and can be recharged at a rate of 1 shot per 2 hours. Railguns may not draw power from a vehicle's battery, as they use different voltage levels.

Each CF of ammunition storage hold 20 Vaporizer slugs.

ARES VENGEANCE & VANQUISHER MINIGUNS

The Vengeance and Vanquisher series of miniguns are the heavier cousins of the popular Vindicator minigun



(see p. 26, *CC*) and use the Vindicator's rotating-barrel design. The CAS army recently chose to equip its Avenger VII motorized air-defense vehicle with Vanquishers.

Game Effects

Like the Vindicator, both the Vengeance and Vanquisher require 3 seconds (1 Combat Turn) of start-up time to get the barrels rotating at firing speed. The Vengeance and Vanquisher have a fixed rate of fire of 15 rounds per Complex Action. The Vengeance and Vanquisher follow the double-unmodified recoil rules for heavy weapons (p. 110, *SR3*), but mounting the miniguns on a vehicle hardpoint (see *Fixed Mounts*, p. 136) cancels out the special recoil modifier.

Vengeance and Vanquisher miniguns can make use of gyroscopic stabilization, but they *cannot* accept gas-vent recoil compensation. Likewise, they can accept top-mounted weapon accessories but they cannot carry barrel or under-barrel weapon accessories. Vengeance and Vanquisher miniguns can be mounted on vehicle weapon mounts (see *Vehicle Weapon Mounts*, p. 135), but they cannot be mounted on ordinary bipods or tripods.



VEHICLE WEAPONS

Weapon	Ammo	Mode	Damage	Weight	Avail.	Cost	Street Index	Legal.
ANDREWS	50	SA/BF	9LN	1,200	—	600,000¥	—	1-K
Firelance Laser	40	SA	15S	48	—	300,000¥	—	1-K
Harpoon Gun	1	SS	As harpoon	20	3/24 hrs	6,500¥	2	2P-D
Light Naval Gun	500	SA	8LN	250	—	225,000¥	—	1-K
Medium Naval Gun	500	SS	11MN	600	—	475,000¥	—	1-K
Piranha Launcher	8	SS	As rocket/missile	120	16/21 days	15,000¥	3	1-K
Relámpago	Belt	SS	8MN	770	—	620,000	—	1-K
Vaporizer	Belt	SS	15MN	1,540	—	1,000,000¥	—	1-K
Vengeance MMG	Belt	FA	9S	30	18/28 days	50,000¥	3.5	1-K
Vanquisher HMG	Belt	FA	10S	45	18/28 days	75,000¥	3.5	1-K
Vigilant Cannon	Belt	SS/FA	18D	90	20/45 days	90,000¥	5	1-K
Victory Cannon	Belt	SS/FA	20D	105	20/45 days	125,000¥	5	1-K
Xicohtencatl	Belt	SS	6LN	135	—	135,000¥	—	1-K

Rockets	Intel.	Damage	Blast	Scatter	Weight	Avail.	Cost	Street Index	Legal.
Piranha									
Armor-Piercing	—	16D	-8/m	2D6	4	12/21 days	3,000¥	2.5	1-K
High Explosive	—	12D	-1/m	2D6	2.5	12/21 days	2,500¥	2.5	1-K
Ink-Dispensing	—	Special	25m	2D6	2.5	12/21 days	4,000¥	2.5	1-K

Missiles

Piranha									
Armor-Piercing	4	16D	-8/m	2D6	4.25	16/21 days	7,500¥	3.5	1-K
High Explosive	4	12D	-1/m	2D6	2.75	16/21 days	5,000¥	3.5	1-K
Ink-Dispensing	4	Special	25m	2D6	2.75	16/21 days	4,000¥	3.5	1-K

Ammo (per 10)	Damage	Weight	Avail.	Cost	Street Index	Legal.
Normal Harpoon	12D	20	1/6 hrs	250¥	1	As weapon
Explosive Head						
Harpoon	16D	20	3/12 hrs	2,000¥	2	As weapon
Light Naval Shells	As weapon	250	—	800¥	—	As weapon
Medium Naval Shells	As weapon	750	—	1,500¥	—	As weapon
Xicohtencatl						
Light Railgun	As weapon	20	10/7 days	150¥	—	As weapon
Relámpago						
Med. Railgun	As weapon	100	12/14 days	800¥	—	As weapon
Vaporizer						
Heavy Railgun	As weapon	300	14/21 days	2,500¥	—	As weapon



Because of their heavy mass and punishing recoil, Vengeance and Vanquisher miniguns are not man-portable. The Vengeance and Vanquisher are not anti-vehicle weapons, so they are subject to the damage reduction rule for vehicles (p. 149, SR3).

The Vengeance is considered an MMG for range and ammo purposes, the Vanquisher an HMG.

ARES VIGILANT & VICTORY AUTOCANNONS

The Vigilant and Victory autocannons are vehicle-mounted, autofire versions of the standard single-shot assault cannons. These extremely popular heavy-suppression weapons commonly are mounted on all but the lightest armored personnel carriers (APCs) and infantry fighting vehicles (IFVs).

Game Effects

Both the Vigilant and Victory are capable of firing in single-shot (SS) and fully automatic (FA) modes. When firing in full-automatic mode, both cannons fire a minimum burst of 6 rounds and have a maximum rate of fire of 12 rounds per phase.

The Vigilant and Victory autocannons can be mounted only on fixed hardpoints or turrets. Because they are heavy weapons, they both negate the half-recoil modifier for hardpoints (see *Fixed Mounts*, p. 136). Vigilant and Victory autocannons can accept vehicle weapons accessories but no other weapon accessories.

The Vigilant and Victory are not man-portable weapons. If the Vigilant and Victory are loaded with standard assault cannon ammunition, they are not anti-vehicle weapons and are subject to the damage reduction rule for vehicles (p. 149, SR3). If loaded with AV assault cannon rounds (p. 39, CC), they are considered anti-vehicle.

AZTECHNOLOGY XICOHTENCATL LIGHT RAILGUN

The *Xicohtencatl* ("angered bumblebee") is Aztlan's primary light railgun, mounted on border patrol vehicles to provide a powerful punch against interlopers. The main drawback to this railgun is its energy consumption.

Game Effects

The Xicohtencatl's capacitors require a full Combat Turn to recharge, so the Xicohtencatl can only be fired once every other Combat Turn at most.

Like other railguns, the Xicohtencatl features a built-in capacitor. The capacitor is good for 20 shots and may be recharged from an alternator at a rate of 2 shots per hour. Railguns may not draw power from a vehicle's battery.

Each CF of ammunition storage holds 50 slugs.

VEHICLE-MOUNTED ROCKETS, MISSILES AND TORPEDOES

The munitions described here are mounted on vehicles and launched from a vehicle's medium launch control system (see p. 136). These munitions follow the standard rules for rockets and missiles (p. 120, SR3), as well as the rules for missile combat (p. 101, CC).

SAAB-SAAKER AIM-11R AIR-TO-AIR MISSILE

The latest in Saab-Saaker's AIM-11 series of air-to-air missiles, the AIM-11R is a short-range air interceptor weapon designed to be used with air-superiority fighters such as the Federated Boeing Eagle or the dozens of Eurofighter variants in existence around the world.

Game Effects

The Saab-Saaker AIM-11R may be mounted only on aircraft. When fired against ground targets, the attacker receives a +4 modifier to his Gunnery Test and the missile only inflicts 8D damage.

UIM-199 KINGFISHER UNDERWATER-TO-AIR MISSILE (UAM)

Aircraft equipped with dipping sonar present a significant threat to submarines. To counter this threat, the Kingfisher allows an underwater sub to destroy any airborne threat without the danger of surfacing. Capable of being fired from either a standard torpedo tube or a vertical launch system tube, the missile rises to the surface and then launches into the air.

Game Effects

To launch a UAM, a submarine must be submerged at a depth of 50 meters or less. Range for the Kingfisher is measured from the point where the Kingfisher surfaces.

A Kingfisher stored in an internal missile mount (p. 137) or torpedo tube (p. 139) takes up less space than a standard anti-ship missile. Two Kingfisher missiles may be stored in a single vertical launch system tube.

MITSUBISHI-GM OUTLAW MISSILE

The Outlaw vehicle missile system represents a radical restructuring of the original (now discontinued) Bandit AGM system. The Outlaw features multi-platform capability and can be fired from air, ground and nautical vehicles.

The most significant design change to the Outlaw is the ordnance itself, which comes in three block versions: Block I, Block II and Block III.

Block I: The Outlaw Block I missile uses improved conventional munitions that disperse micro-bombs when the missile is flying directly over its designated target or impact point. The compound detonations of the bombs do significant damage to all targets within the missile's area of effect.

Block II: The Outlaw Block II improves on the Block I munitions, using shaped-charge explosives instead of spherical micro-bombs. These charges are oriented downward by a trailing cloth streamer. The shaped-charged munitions give the bombs more penetrating power, making them effective against soft-skinned vehicles and light armor.

Block III: The Outlaw Block III anti-armor missile is designed to attack medium and heavy armor. On acquiring its target, the Block III Outlaw fires its warhead into the vehicle from above to strike where vehicle armor is generally weakest. The Block III is also capable of direct fire when a target is concealed by overhead cover.



Game Effects

Block I: The Block I is a special high-explosive missile. Instead of inflicting blast damage that diminishes in Power farther from the center of the explosion, it inflicts the same damage code on all targets within a fixed radius from the target point. The target and all characters, vehicles and other objects within a 10-meter radius must resist 14D explosive damage. This damage affects only objects within a 10-meter radius around the target. This is not an anti-vehicle attack, so vehicles automatically stage the damage down by one step to Serious, per the vehicle-damage reduction rules (see p. 149, SR3).

Block II: Block II missiles have the same effects as Block I, except that their shaped-charged munitions negate vehicle-damage reduction. Vehicles must resist against 14D vehicle damage, but the vehicle gets the full benefit of its Armor rating (this is an exception to the anti-vehicle munitions rule, p. 149, SR3).

Block III: The Block III missile behaves as a standard anti-vehicle missile and does 20D damage to the target alone. It is an armor-piercing, anti-vehicle weapon, so vehicle armor is only half as effective and the vehicle does not reduce the Damage Code by one level.

TEXTRON ROCKET-ASSISTED SELF-CONTAINED MINE SYSTEM (RASCAM)

Textron's rocket-assisted self-contained mine system (RASCAM) is a rocket-assisted shell used to deploy mines. Textron initially developed the system for use with its Trapdoor smart mine (see p. 42, CC), but popular demand prompted Textron to extend the system to include other mine systems as well.

Game Effects

A RASCAM rocket holds eight mines. When placing mines, make an Indirect Fire Test (p. 99, CC). The location determined by the test (after accounting for scatter direction and distance) is the center of effect. The mines deploy in an octagonal pattern for 50 meters around the center of effect.

LORAL-VOUGHT SILENCER ADVANCED ANTI-RADIATION MUNITIONS (AARM)

Loral-Vought's Silencer series of munitions are an advanced version of the high-speed anti-radiation missiles (HARMs) of the

previous century. Officially designated as advanced anti-radiation munitions (AARMs), Silencers lock onto the emissions of sensor systems as well as anti-sensor ECM.

Game Effects

AARMs behave according to the standard missile-combat rules with one exception. Rather than using the opposing vehicle's Signature as a target number, calculate the AARM's target number as follows: Target Number = $12 \div$ highest active Flux rating from the target vehicle's sensors or ECM (round down result). The target number cannot drop below 2.

ANTI-SHIP MISSILES, ROCKETS AND TORPEDOES

The munitions described here must be mounted on vehicles and launched from a vehicle's heavy launch control system (see p. 137). These munitions follow the standard rules for rockets and missiles (p. 120, SR3), as well as the rules for missile combat (p. 101, CC).

Because anti-ship weapons follow the extended-range rules (see p. 56), their ratings are presented differently from normal missiles. In addition to the normal ratings of Damage, Weight, Intelligence and Cost, anti-ship missiles also have the following vehicle ratings: Handling, Speed (which is fixed), Body and Signature. Additionally, another rating, called Range, is used. Range indicates the maximum traveling distance the missile covers in its flight.

RUR-15D ANTI-SUBMARINE ROCKET (ASROC)

The ASROC is a surface anti-submarine weapon, consisting of a MADCAP strapped onto a rocket motor. The rocket launches the torpedo through the air anywhere between 4 to 16 kilometers. Once the weapon is within the vicinity of its target's location, the torpedo separates from the rocket body, dives into the water and homes in on its target.

Game Effects

The aerial component of the ASROC is an unguided rocket; so while the missile is in flight, its Intelligence rating does not apply. Similarly, ASROCs cannot be controlled or ridden by a rigger after being launched from a ship.

Missile	Intel.	Damage	Blast	Scatter	Weight	Avail.	Cost	Street Index	Legal.
Saab-Saaker									
AAM	6	14D	-2/m	2D6	90	—	25,000¥	—	1-K
Kingfisher	4	14D	-2/m	2D6	25	—	15,000¥	—	1-K
M-GM Outlaw									
Block I	5	14D	See text	2D6	200	—	15,000¥	—	1-K
Block II	5	14D	See text	2D6	200	—	25,000¥	—	1-K
Block III	6	20D (AV)	-8/m	2D6	200	—	35,000¥	—	1-K
Silencer AARM	5	16D	-1/m	2D6	250	—	25,000¥	—	1-K
Rockets									
RASCAM	—	—	See text	2D6	160	—	100,000¥	—	1-K



JAVELOT AERIAL DEFENSE MISSILE

The French-produced Javelot is a common ship missile used for long-range air defense against aircraft, anti-ship missiles and cruise missiles.

Game Effects

The Javelot follows all standard anti-ship missile rules.

MK 197 MULTI-ROLE ADVANCED-CAPABILITY (MADCAP) TORPEDO

The Mark 197 Multi-role Advanced-Capability (MADCAP) torpedo is currently the most widely used torpedo in the world in 2061. Capable of traveling at speeds up to 75 knots, standard models contain an active sonar seeker warhead. However, the MADCAP can also accommodate passive sonar or thermal homing heads.

In addition to the standard submarine and surface ship launch methods, MADCAPs can also be dropped like bombs from anti-submarine helicopters, t-birds or other aircraft.

Game Effects

The torpedo activates from the point it splashes in the water, so its range to the target is measured from the splash point. MADCAPs have a Sonar rating of 1 for calculating the range of active sonar effects.

MADCAPs are wire-guided weapons, so a rigger on a submarine can control them as long as the cable is not severed. Once the cable is severed, the MADCAP's Intelligence rating kicks in automatically. Note that MADCAPs dropped from anti-submarine aircraft have no wire connections, so they cannot be "ridden" by a rigger.

UGM-188 SEA SABER MISSILE

The UGM-188 Sea Saber is the North American counterpart of the Sirocco. Produced originally for the UCAS Navy, it is also commonly used by the Confederate Navy and the British Royal Navy. Although the Sea Saber has a shorter range than the Sirocco, it compensates with speed, smarts, and a bigger punch.

Game Effects

The Sea Saber follows all standard anti-ship missile rules.

SS-N-49 SIROCCO MISSILE

The Russian SS-N-49 Sirocco is an anti-ship missile sold widely throughout the world. Though the design is well over 15 years old, it follows in the footsteps of its effective and fearsome Soviet/Russian predecessors.

Game Effects

The Sirocco follows all standard anti-ship missile rules.

TORPEDO DECOY

A torpedo decoy consists of a torpedo body containing a sophisticated sound system instead of an explosive warhead. When launched from a torpedo tube, the decoy generates noise imitating a submarine in motion, misleading enemy torpedoes into striking it.

Game Effects

Whenever a decoy is deployed, any torpedo targeted toward the sub must make an Intelligence (6) Test. If the test succeeds, the torpedo is not fooled by the decoy and still pursues the sub. If the test fails, the torpedo is fooled and targets the decoy instead of the sub. The torpedo decoy has a maximum depth of 750 meters.

TORPEDO PROBE

The torpedo probe uses the same body as the MADCAP, but it carries a sophisticated sonar array in place of the MADCAP's explosive warhead. If the probe detects other subs, it transmits information back to the main vessel via an optical cable link. The submarine can then use that information to set up a firing solution against the other vessels.

Game Effects

The torpedo probe trails an optical cable that allows it to travel a maximum journey of 3 kilometers (for a total recon time of 20 Combat Turns, or about 1 minute). The probe can also be controlled remotely by a rigger, extending its range to the full 15 kilometers. The torpedo probe has a maximum depth of 750 meters.

The torpedo probe has a Sonar rating of 4.

CYBERWARE

SNAKE-EYES REMOTE INTERFACE PACKAGE

With the right combination of cyberware, a cybernetically enhanced user can be integrated into a rigger remote-control network, transmitting real-time sensory data to the network and even receiving simsense from other drones or "snake-eyes" remotes.

To achieve this network connectivity, the system requires a minimum of four cybernetic devices is required: a simrig, a simlink, a commlink and a rigger protocol-emulation module. While some users may prefer to have these installed separately, the snake-eyes remote interface package offers all of these implants as a package deal. Not only is this package deal more economical, its integrated nature also has less of an impact on the user's body.

Game Effects

The snake-eyes remote interface package includes the following four implants: a simrig (p. 301, *SR3*), a simlink (p. 301, *SR3*), a commlink (p. 297, *SR3*) and a rigger protocol-emulation module (p. 25, *M&M*). The package comes in ratings ranging from 2 to 10. A package's rating denotes the ratings of its commlink, simlink and protocol-emulation implants. The snake-eyes package normally includes a baseline simrig only; a full-X simrig can be purchased at additional cost.

The snake-eyes interface allows the enhanced user to be included as part of a remote-control network. In effect, the snake-eyes user is treated as a drone—he must be subscribed to the network and counts as a drone against the remote-control deck (thus reducing the number of drones the deck can actively control). However, the snake-eyes user is not under the



rigger's control—he merely acts as an extra set of eyes and ears.

If the rigger “jumps into” the snake-eyes user, he can see, hear and otherwise sense everything that the snake-eyes user senses. Because the rigger is receiving the simsense recordings of the character's senses, he also gets the results of any cybernetically enhanced senses (as well as senses augmented through bioware and magic—but not assensing).

The rigger and snake-eyes user can also communicate via the interface. Likewise, the rigger can also transmit sensory data from another drone (or even another snake-eyes remote) to the user. In this case, the snake-eyes user senses everything the drone does through the simrig part of the package. When this occurs, the simrig's built-in RAS override inhibits the user's natural sensory input and muscle control. Apply a +8 modifier to any Perception Tests or actions involving the real world during this time. The snake-eyes user can terminate sensory feeds received through the network at any time, but he cannot connect to another drone without petitioning the rigger first.

Note that the snake-eyes interface does not enable the user to directly control drones or issue commands to them; that is the rigger's prerogative. The rigger running the network must grant permission for the character to perceive through a drone, and the rigger has the authority to change or terminate a connection.

If the remote network is encrypted, then the snake-eyes user also requires a remote-control encryption-module implant (p. 24, *M&M*) to become part of the network.

The snake-eyes system interfaces with the remote-control network through the simsense and system channels.

Characters who do not have a snake-eyes package but do separately possess each of the four component implants can integrate themselves into rigger networks and otherwise act as a snake-eyes user as described above. To do so, however, each of the four implants must be cybernetically linked via a datajack port or router (see *Interconnectivity*, p. 46, *M&M*).

SNAKE EYES FDDM MODULE

The Snake Eyes Fire-Direction Data Manager (FDDM) module is an additional accessory for the remote interface link. With the FDDM module, the connected snake-eyes user can transmit target data to other drones and call for attacks on targets using indirect fire.

Game Effects

To successfully use FDDM, the rigger's remote deck must be equipped with a master FDDM unit (see p. 96) and the drones firing indirectly must also be equipped with FDDM. For details on indirect fire, see p. 99, *CC*.

CYBERDECK ACCESSORIES

SYSTEM-CONTROL RIG EMULATOR (SCRE)

Ares Security International developed the system-control rig emulator (SCRE) in 2055 as a backup for the CCSS rigged security system. When installed in a cyberdeck, the SCRE allows the deck to communicate with a rigged system, albeit with very poor performance. It is available either as an internal system card or an external plug-in accessory.

Game Effects

The SCRE allows a cyberdeck to access a rigged security system as if the decker were a rigger. See *Decking a Rigged System*, p. 50. This option applies to CCSS systems only and does not work with rigged vehicles or remote-control networks.

Installing an internal SCRE in a cyberdeck requires a Computer B/R Test against a Target Number 5. The base time is 24 hours. An external SCRE can be attached to an open FUP.

Missiles	Hand.	Speed	Range	Body	Sig	Intel.	Damage	Blast
ASROC	4	750/115	16 km/15 km	4	5/5	2	14DN	–1/m
Javelot	3	1,100	120 km	3	5	4	8MN	–1/m
MADCAP Torpedo	4	115	15 km	4	5/5	2	14DN	–1/m
Sea Saber	3	1,000	250 km	4	5	4	24DN	–1/m
Sirocco	4	800	350 km	3	5	3	20SN	–1/m
Torpedo Decoy	4	150	15 km	4	5/3	2	None	—
Torpedo Probe	4	150	15 km	4	5/3	2	None	—

Missiles (cont'd)	Scatter	Weight	Avail.	Cost	Street Index	Legal.
ASROC	2D6	2,250	—	450,000¥	—	1–K
Javelot	2D6	495	—	425,000¥	—	1–K
MADCAP Torpedo	2D6	750	—	350,000¥	—	1–K
Sea Saber	2D6	900	—	750,000¥	—	1–K
Sirocco	2D6	750	—	600,000¥	—	1–K
Torpedo Decoy	—	950	—	150,000¥	—	1–K
Torpedo Probe	—	950	—	150,000¥	—	1–K



REMOTE-CONTROL ACCESSORIES

In addition to remote control ECCM (see p. 308, *SR3*), a rigger can also utilize the following remote-control deck accessories.

Ports: Each remote-control deck contains enough plug-in ports to accommodate a number of accessories equal to its rat-

ing. Additional ports can be added to a remote-control deck with an electronics kit and a successful Electronics B/R (4) Test with a base time of 1 hour.

At the gamemaster's discretion, many of the miscellaneous components that can be added to cyberterminals (see p. 61, *Matrix*) may also be plugged into a remote-control deck port.

WEAPON RANGES TABLE

Vehicle Weapons	Range/Target Number			
	Short/TN 4	Medium/TN 5	Long/TN 6	Extreme/TN 9
ANDREWS	20-100*	101-500	501-3,000	3,001-5,000
Firelance Laser	0-200	201-350	351-750	751-12,000
Harpoon Gun	0-100	101-250	251-500	501-750
Light Naval Gun	100-2,500*	2,501-6,000	6,001-12,000	12,001-18,000
Medium Naval Gun	100-4,000*	4,001-12,000	12,001-18,000	18,001-25,000
Relámpago Medium Railgun	0-1,200	1,201-3,000	3,001-5,000	5,001-16,000
Vaporizer Heavy Railgun	0-2,000	2,001-5,000	5,001-8,000	8,001-24,000
Vigilant Autocannon	0-100	101-500	501-2,500	2,501-5,000
Victory Autocannon	0-100	101-500	501-2,500	2,501-5,000
Xicohtencatl Light Railgun	0-500	501-2,000	2,001-4,000	4,001-9,000
Vehicle-Mounted				
Launcher	Short/TN 4	Medium/TN 5	Long/TN 8	Extreme/TN 9
Piranha Launcher	20-100*	101-500	501-3,000	3,001-5,000
Vehicle-Mounted Missiles				
Saab-Saaker AAM	150-2,500*	2,501-6,000	6,001-10,000	10,001-15,000
Kingfisher	20-100*	101-220	221-600	601-2,200
M-GM Outlaw (all Blocks)	50-500*	501-2,500	2,501-6,000	6,001-10,000
Silencer AARM	50-500*	501-3,000	3,001-8,000	8,001-12,000
Vehicle-Mounted Rockets				
RASCAM	50-2,500*	2,501-6,000	6,001-10,000	10,001-15,000
Anti-Ship Missiles				
Javelot	500-5,000*	5,001-30,000	30,001-80,000	80,001-120,000
Sea Saber	500-5,000*	5,001-50,000	50,001-150,000	150,001-250,000
Sirocco	500-5,000*	5,001-50,000	50,001-150,000	150,001-350,000
Anti-Ship Rockets				
ASROC	150-2,500*	2,501-6,000	6,001-10,000	10,001-16,000
Anti-Ship Torpedoes				
MADCAP	150-2,500*	2,501-6,000	6,001-10,000	10,001-15,000

*See Minimum Range, p. 118, *SR3*. Note: All ranges are in meters.

Riggerware	Essence	Cost	Availability	Street Index	Legality
Snake-Eyes Remote Interface Package	2.5	275,000 + (Rating x 15,000)¥	(Rating +2)/(Rating) days	2	Legal
Full-X Modification	—	+150,000¥	—	+1	Legal
Snake-Eyes FDDM Module	.1	70,000¥	10/21 days	3	6P-R



AUDIO/VISUAL SCREEN DISPLAY

With the shift to full cybernetic controls, screen displays are necessary for displaying real-time footage to other people. The audio/visual screen displays use the latest in miniaturized multimedia technology to convey video feeds as well as real-time sound recordings of events being observed by drones.

Game Effects

These 11-inch LCD screen attachments display the rigger's point of view from the remote-control network. A rigger can also connect multiple screens to a remote-control deck so that each screen simultaneously displays a different drone's point of view. The screens also enable a rigger to communicate with viewers, either by voice or by typing text. Viewers, however, cannot talk back, unless the remote-control deck is equipped with an intercom.

BATTLETAC™ FDDM

The BattleTac FDDM (Fire-Direction Data Manager) is the second spin-off from the BattleTac information system. The FDDM system enables one drone to act as a spotter, relaying targeting data to other drones via the remote-control network. This allows drones that cannot "see" the target to fire on it.

Game Effects

The BattleTac FDDM system allows one drone to take advantage of indirect fire and fire its weapons at a target detected by another. For more information, see *Indirect Fire*, page 99, CC.

To use BattleTac FDDM, the remote-control deck must carry the master unit as an accessory and both the spotting drone and the firing drone must be equipped with the BattleTac FDDM receiver module (see p. 142).

BATTLETAC™ IVIS

BattleTac IVIS (Inter-Vehicle Information System) enhances the data-sharing capabilities between a remote-control deck and drones. By improving information sharing, these systems enable drones to execute more complex and sophisticated tactics to accomplish their assigned tasks.

Game Effects

BattleTac IVIS provides two potential bonus effects: it either provides extra dice for a drone's Comprehension Test or it creates a dice pool, known as the IVIS Pool, that can be used for tests made by drones. For complete details on IVIS effects, see *The BattleTac IVIS System*, page 43.

To use BattleTac IVIS, the remote-control deck must carry the master unit as an accessory and the drone must be equipped with the BattleTac IVIS receiver module (see p. 142).

HITCHER JACKS

Similar to cyberterminal hitcher jacks, these accessories enable a second individual to plug into a rigger's remote-control deck, providing a second set of eyes to watch the operation and increase awareness of the remote-control operation.

Game Effects

Hitcher jacks for remote-control decks work the same way as they do for cyberterminals. They allow other characters to perceive everything the rigger does. If the rigger is in captain's chair mode, so is the observer; if the rigger is directly controlling a drone, the observer perceives only the signals from that drone. Hitcher jacks also allow an observer to communicate with the rigger. However, hitcher jacks do not provide the observer with any control over the network or drones.

INTERCOM SYSTEM

An often overlooked accessory to any remote-control network is a two-way intercom. This minor yet important device facilitates communication between the rigger and onlookers. Additionally, the speaker has a port that enables any voice radio to be connected to the intercom.

Game Effects

The intercom system allows two-way communication between the rigger and people within close proximity to the remote-control deck. Without an intercom speaker, a rigger has to focus attention on her meat body to speak with her own vocal cords. (Doing so requires a Complex Action and imposes a +8 modifier to all actions taken while the rigger is speaking.)

REMOTE-CONTROL BIOFEEDBACK FILTER

Based on the same technology as the ICCM biofeedback filter for cyberterminals (see p. 21, *Matrix*), the remote-control biofeedback filter is an internal remote-control deck accessory that protects the rigger from harmful simsense peak level surges.

Game Effects

When installed within a remote-control deck, this accessory reduces the Power from rigger damage (p. 145, *SR3*) or ASIST backlash (p. 27). The reduction equals the device's rating multiplied by 2. (Note that the Power can never be reduced below 2).

Biofeedback filters must be installed within a remote-control deck to function (they do not take up a port). To install them requires an electronics kit and a successful Electronics (Cybertechnology) B/R (4) Test. The base time is (biofeedback filter rating x 2) hours.

Cyberdeck Accessories	Availability	Cost	Street Index	Legality
System Control Rig Emulator				
External	6/72 hrs	25,000¥	2	4P-S
Internal	8/72 hrs	20,000¥	2	4P-S





Remote-control biofeedback filters have a maximum rating of 3. They do not protect against the effects of rigger dump shock.

REMOTE-CONTROL ENCRYPTION MODULE (RCEM)

Though remote-control decks hop from frequency to frequency to maintain signal security, signals are still occasionally intercepted. To guard against this, the remote-control encryption module provides an added layer of communications security by encoding and decoding the digital signals in a secure routine. The remote-control encryption module (RCEM) encodes and decodes remote-control signal transmissions, making them indecipherable to intruders who intercept a remote-control channel.

Game Effects

A remote-control network channel that is encrypted with an RCEM must be decrypted before it can be intercepted, infiltrated or accessed. Only rigger decryption modules can break the encryption of RCEMs. Standard broadcast decryption breakers (p. 289, *SR3*) are ineffective against RCEM encryptions, because the RCEM uses entirely different encryption routines. The encryption of CCSS systems is compatible with the encryption provided by an RCEM.

Because of the special nature of MSST protocol, normal broadcast encryption routines (p. 289, *SR3*) are incompatible with remote-control decks.

Remote-control encryption modules are available in ratings of 1 through 10. For more details on the use of the RCEM, see *Remote-Control Network Infiltration* (p. 36).

If a remote-control network is encrypted with an RCEM, all drones within the network must also carry RCEM modules.

RIGGER DECRYPTION MODULE

A diagnostic tool used by security riggers, the rigger decryption module's firmware cryptographic routines can be used to decrypt remote-control network signals encoded by an RCEM as well as encrypted CCSS security systems.

Game Effects

The rigger decryption module decodes encryption routines used by RCEM (p. 97) or CCSS security systems. It is avail-

able in Ratings 1 through 10. For more information on using rigger decryption modules, see *Remote-Control Network Infiltration* (p. 36) and *Accessing a Security System* (p. 149).

RIGGER PROTOCOL-EMULATION MODULE

The rigger protocol-emulation module allows a rigger to emulate many of the various protocols used on contemporary rigged security systems and remote-control networks. This module is required for infiltrating remote-control networks or accessing CCSS security systems and is also used for electronic warfare attacks.

Game Effects

Protocol emulation modules are available in ratings 1 through 10. For details on using them, see *Remote-Control Network Infiltration* (p. 36), *Accessing a Security System* (p. 149) and *MJJI* (p. 37).

SIGNAL AMPLIFIERS

Remote-control decks have fixed power supplies, which in turn gives them limited ranges and limited resistance to electronic warfare. Signal amplifiers are useful accessories that boost the electromagnetic power available for transmission, increasing a remote-control deck's effective range and making it less vulnerable.

Game Effects

Signal amplifiers increase a remote-control deck's Flux rating by the amplifier's rating. This increases the effective range of a remote-control deck as well as its resistance to electronic warfare. For more information, see *Sensor and Remote Deck Ranges*, (p. 137, *SR3*) and *MJJI* (p. 37).

Signal amplifiers are available in ratings of 1 through 10.

STORAGE MEMORY

Storage memory is just as important for remote-control decks as it is for cyberdecks. Storage memory allows a rigger to record the images, simsense and other data transmitted by drones and vehicles under her control. Storage memory also allows a rigger to store pre-programmed drone commands or falsified sensory input for intrusion electronic warfare attacks.

Accessory	Weight	Availability	Cost	Street Index	Legality
Audio/Visual Screen Display	0.5	2/24 hrs	100¥	1	Legal
BattleTac FDDM Master Unit	1	10/21 days	125,000¥	3	4P-W
BattleTac IVIS Master Unit	1	8/14 days	75,000¥	3	4P-W
Hitcher Jacks	—	2/48 hrs	250¥	1	Legal
Intercom System	—	2/24 hrs	25¥	1	Legal
Remote-Control Biofeedback Filter	0.5	(Rating x 2)/7 days	Rating x 10,000¥	1	Legal
Remote-Control Encryption Module	0.5	(Rating)/(Rating) days	Rating x 5,000¥	3	4P-W
Rigger Decryption Module	0.5	(Rating + 2)/(Rating) days	Rating x 7,500¥	3	4P-W
Rigger Protocol-Emulation Module	0.5	(Rating + 2)/(Rating) days	Rating x 5,000¥	2	4P-W
Signal Amplifier	Rating	(Rating)/(Rating x 12) hrs	Rating x 250¥	1.5	Legal
Storage Memory	1	2/24 hrs	Mp x 6¥	1	Legal



Game Effects

Remote-control deck storage memory functions just like storage memory for other computers. It can be used to store both pre-programmed drone commands (see p. 184) or falsified data for intrusion attacks (see p. 38).

AUTOSOFTS

Autosoftware are software skill-emulation systems, similar to activesoftware (see p. 44 for a full description of activesoftware). A drone equipped with an autosoftware interpretation system can be loaded with an autosoftware program, allowing it to take advantage of the skill or ability provided by the autosoftware

Each of the following autosoftware programs are typically acquired on a chip. The autosoftware must be chipped and loaded into a drone's interpretation system either directly or via the rigger's remote-control deck.

CLEAR SIGHT

Multiplier: 6

The clear sight autosoftware is a data-processing suite designed to perform advanced filtering of a drone's sensor information in real time. This enhances the drone's ability to "perceive" its surroundings.

Game Effects

The clear sight autosoftware adds its rating to the drone's Pilot rating for Perception and Sensor Tests made by the drone. A rigger controlling the drone can add the clear sight rating to his Intelligence for passive Sensor Tests (the added bonus may not exceed the Intelligence rating).

Clear sight may not be used for combat-related Success Tests.

DATALINK

Multiplier: 6

The datalink autosoftware combines signal analysis and error-correction utilities with transmission filters and noise-reduction routines. This enables a drone to reconstruct partially blocked transmissions and cut down retransmission efforts.

Game Effects

The datalink autosoftware allows a drone to partially ignore the effects of MIJI signal degradation on its remote-control network. The drone can ignore a number of boxes of signal degradation equal to the datalink autosoftware's rating. If the channel suffers a full 10 boxes of signal degradation, the datalink ceases to provide any benefit.

ELECTRONIC WARFARE

Multiplier: 4

The electronic-warfare autosoftware provides an in-depth knowledge of radio communications and the use of electronic warfare against them.

Game Effects

The electronic-warfare autosoftware enables a drone equipped with a scanner (p. 289, SR3) to intercept radio communication signals. If the drone is equipped with broadcast decryption, it can also attempt to decrypt the signals (see *Broadcast Encryption*, p. 289, SR3). For all of these tests, the drone may use its Electronic Warfare autosoftware rating in place of the Electronics (Electronic Warfare) skill.

If the drone is equipped with a remote-control deck, it may also attempt to infiltrate rigger remote-control networks (see *Remote Network Infiltration*, p. 36). Likewise, if it carries a rigger decryption module, it may attempt to decrypt encrypted remote-network signals (p. 36). A drone equipped with its own remote-control deck may also conduct MIJI and other electronic warfare attacks against a remote network (see p. 35).

PERFORMANCE PROFILE (VEHICLE TYPE)

Multiplier: 4

The performance profile autosoftware provides a comprehensive database on a particular vehicle type's known capabilities and stress points. This information allows a drone to maneuver the vehicle to the limits of its capabilities and achieve optimal performance.

Game Effects

Each performance profile autosoftware is specialized for a distinct vehicle type, such as Ford Americar, MCT-Nissan Rotodrone, GMC Banshee and so on. At the gamemaster's discretion, the chip may be useless for drones that have been too heavily modified or customized. Typically, these activesoftware are available only for name-brand models and so will not be available for custom-made drones.

For each point of a performance profile autosoftware's rating, the drone receives a -1 target number modifier on Stress Tests (see p. 62).

SHARPSHOOTER

Multiplier: 8

The sharpshooter autosoftware is designed to assist a drone's targeting software with target acquisition, fire control and ballistics modeling.

Autosoftware Chips

Clear sight, Datalink or

Performance-Profile Chip

Electronic Warfare or Sharpshooter Chip

Availability

6/14 days

6/14 days

Cost

Mp size x 250¥

Mp size x 250¥

Street Index

2

2

Legality

Legal

6P-S



Game Effects

The sharpshooter autosoft adds its rating to the drone's Pilot rating for Gunnery Tests made by the drone. The sharpshooter autosoft has no effect when a rigger is directly controlling the drone.

OTHER TOYS

MORPHING LICENSE PLATE

A morphing license plate is composed of smart materials that bend and deform according to set patterns when charged with electricity. This allows the plate to be programmed to depict certain embossed letters or numbers. The plate is also colored with photovoltaic paint, so that its color scheme may also change according to the electric charge, allowing the plate to mimic license plates from any state or country.

Game Effects

When installed, a morphing plate must be linked to the vehicle's onboard computer. This requires an electronics kit and a successful Electronics B/R (4) Test with a base time of 2 hours. Once installed, the plate can be reprogrammed through the vehicle's computer. Changing the plate's color and embossed characters takes a Complex Action.

A morphing plate can also be linked to a transponder library, so that the plate automatically changes color and shape to mimic the transponder code currently being transmitted.

From within 5 meters, morphing plates can be distinguished from a regular plate with a successful Perception (8) Test.

OIL-SLICK SPRAYER

Though clichéd, this device is still effective. An oil-slick sprayer consists of an electric hydraulic cylinder, an oil reservoir tank and a multi-nozzle sprayer. Usually mounted under the rear bumper, this device sprays a sheet of Teflon-powdered oil onto the street, a tactic designed to induce the crashes of pursuing ground vehicles.

Game Effects

Each "shot" of an oil-slick sprayer creates a patch approximately 5 x 10 meters across. Any ground vehicle that moves across this patch must make an immediate Crash Test with a +2 target number modifier.

Even if the vehicle doesn't crash, the oil still sticks to its tires for the next 3 Combat Turns and applies a +1 target number modifier to any maneuvers performed. Crossing additional oil slicks will add cumulative modifiers, up to a maximum +4.

Activating an oil-slick sprayer is a Simple Action. Treat the sprayer as a Single Shot weapon. The tanks of an oil-slick sprayer hold 10 "charges."

TRANSPONDER LIBRARY CHIP

A transponder library is an application program that generates new transponder codes. When chipped into a vehicle transponder, the library swaps out the transponder code with a new one every few seconds.

Game Effects

Transponders and transponder libraries are described on pp. 15 and 17. The library creates a new transponder code on an irregular, semi-random basis, between once a Combat Turn and once a minute. This prevents a vehicle from being traced by its transponder codes alone.

Someone smart enough to check transponder code logs of sequential transponder receivers on a GridGuide host may be able to determine a transponder library was used—doing so requires a Locate File interrogation operation with a number of successes equal to the library's rating + 4. Once it has been established that a transponder library was used, the vehicle can be tracked with a Locate Slave operation that generates successes equal to the library's rating + 4.

Installing a transponder library requires an electronics kit and an Electronics B/R (4) Test with a base time of 2 hours.

Transponder library programs have a multiplier of 3.

VEHICLE SMOKE PROJECTOR

Smoke-projection canisters are designed to be externally mounted on a vehicle. When triggered, smoke projectors spew massive amounts of smoke, providing fast cover and protection from lasers. Infrared smoke may also be used to obscure thermographic vision and sensors.



Game Effects

Each charge of a smoke projector creates a smoke cloud with a 10-meter radius or 10 x 5 x 4 meter ribbon, both of which last for 4 minutes. This smoke obscures standard vision, applying visibility modifiers to relevant tests. If IR smoke is used, the smoke also applies modifiers to thermographic vision.

SPIKE STRIP

Spike strips are long, thin strips embedded with a multitude of sharp, penetrating spikes. When unrolled and stretched across a roadway, the spikes of the strip are designed to penetrate rubber tires and deflate them as a vehicle passes over the strip. Spike strips are commonly used by law enforcement personnel to end vehicle chases or to close off a street from vehicle access.

Game Effects

Spike strips are long enough to stretch across four lanes of traffic, approximately 15 meters. Deploying a spike strip requires 3 Complex Actions.

Any wheeled vehicle that passes over a spike strip automatically takes Moderate damage as its tires are flattened. The vehicle must also make a Crash Test. If the vehicle was equipped with runflat tires (p. 155), it suffers only Light damage (but it still must make a Crash Test). If a hovercraft passes over a spike stripe, it suffers Light damage as the spikes tear at its skirt, but it need not make a Crash Test.

VEHICLE TERMINATION CHIP

Vehicle termination chips are built into the onboard computers of most commercially sold ground vehicles. When activated by a termination code received via an onboard cell-phone or autonav, the termination chip automatically takes control of the vehicle, locks the occupants inside and brings the vehicle to a halt.

The termination chip was designed as a tool for law-enforcement authorities, though it has also been used by creative criminals. Termination chips are often deactivated by those who don't want the police (or others) disabling their vehicles. Likewise, some shadowrunners have been known to secretly install termination chips inside the vehicles of targets whom they plan to intercept.

Game Effects

The use of vehicle termination chips by law-enforcement personnel is described on p. 18.

ZAPPER STRIP

Zapper strips are flat strips that are designed to stretch across a road. A number of "feelers" extend upward from the strip, high enough to brush against the chassis of any vehicle that passes overhead. When activated, a zapper strip generates a damaging electromagnetic pulse that is transmitted through the feelers to the chassis of vehicles passing over the strip. This charge is designed to fry the vehicle's electronics, shock the controlling rigger and disable the vehicle.

Game Effects

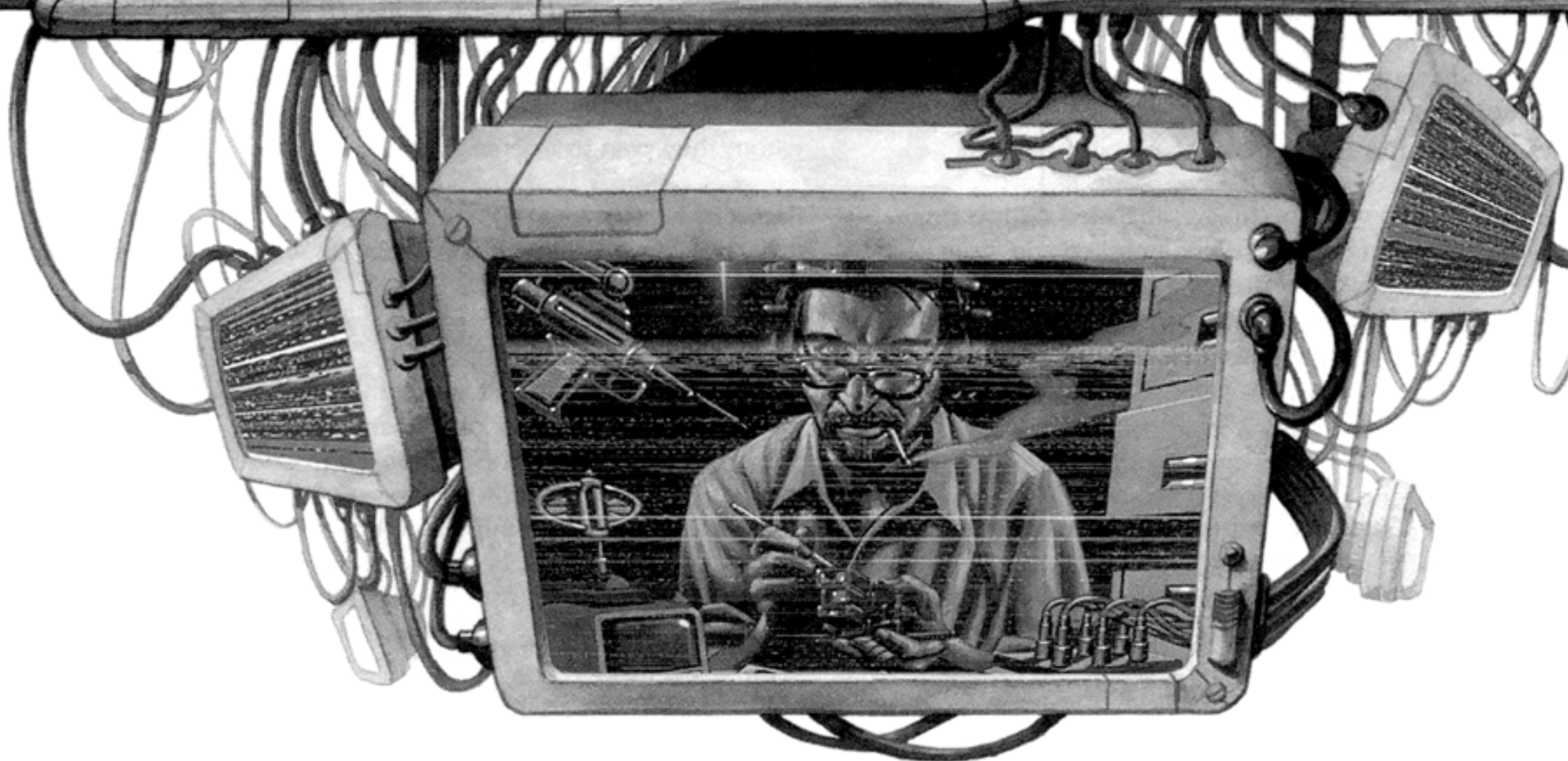
Zapper strips are long enough to stretch across two lanes of traffic, approximately 8 meters. Deploying a zapper strip constitutes 2 Complex Actions. Once activated, a zapper strip has enough juice to remain active for 2 full Combat Turns. Zapper strips take a full 24 hours to recharge.

Any ground vehicle (with the exception of hovercraft) that passes over an activated zapper strip comes into contact with the charged feelers and suffers a damaging electromagnetic surge. Zapper strips inflict 12D damage to such vehicles; this damage is considered anti-vehicular.

If the vehicle is controlled by a rigger, the rigger suffers from ASIST backlash (see p. 27).

Item	Weight	Availability	Cost	Street Index	Legality
Morphing License Plate	1	8/14 days	5,000¥	2	4-U
Oil-Slick Sprayer	5	5/14 days	600¥	2	6-U
Oil tank refills	2	5/14 days	50¥	2	8-U
Smoke Projector					
Small (6 canisters)	2.5	5/14 days	700¥	1	5-J
Large (12 canisters)	5	6/21 days	1,000¥	1	4-J
Infrared Smoke	—	+1/+7 days	x 120%	2	5-J
Spike Strip	5	8/7 days	500¥	2	4-U
Transponder Library Chip	—	5/48 hrs	Mp x 20¥	2	6-S
Vehicle Termination Chip	—	5/7 days	500¥	2	8P-S
Zapper Strip	3	10/28 days	5,000¥	3	5-V

VEHICLE DESIGN



It's one thing to own a vehicle and add a few secret touches here and there. It's an entirely different thing to actually create a vehicle from scratch. The vehicle design process outline below allows players and gamemasters to do exactly that.

This chapter provides rules for designing "stock" vehicles in *Shadowrun* (vehicles mass-produced by the giant industrial corps). For rules on how individual shadowrunners can modify, upgrade, or customize their own vehicles, see *Vehicle Customization* (p. 122).

All vehicles that have appeared in previous *Shadowrun* publications (as well as some new ones) have been re-constructed according to the vehicle design system in this chapter, and their ratings recalculated accordingly. These revised ratings appear in the *Vehicle List* (p. 156).

Note that modifications listed in *Vehicle Customization* may also be used during the design process.

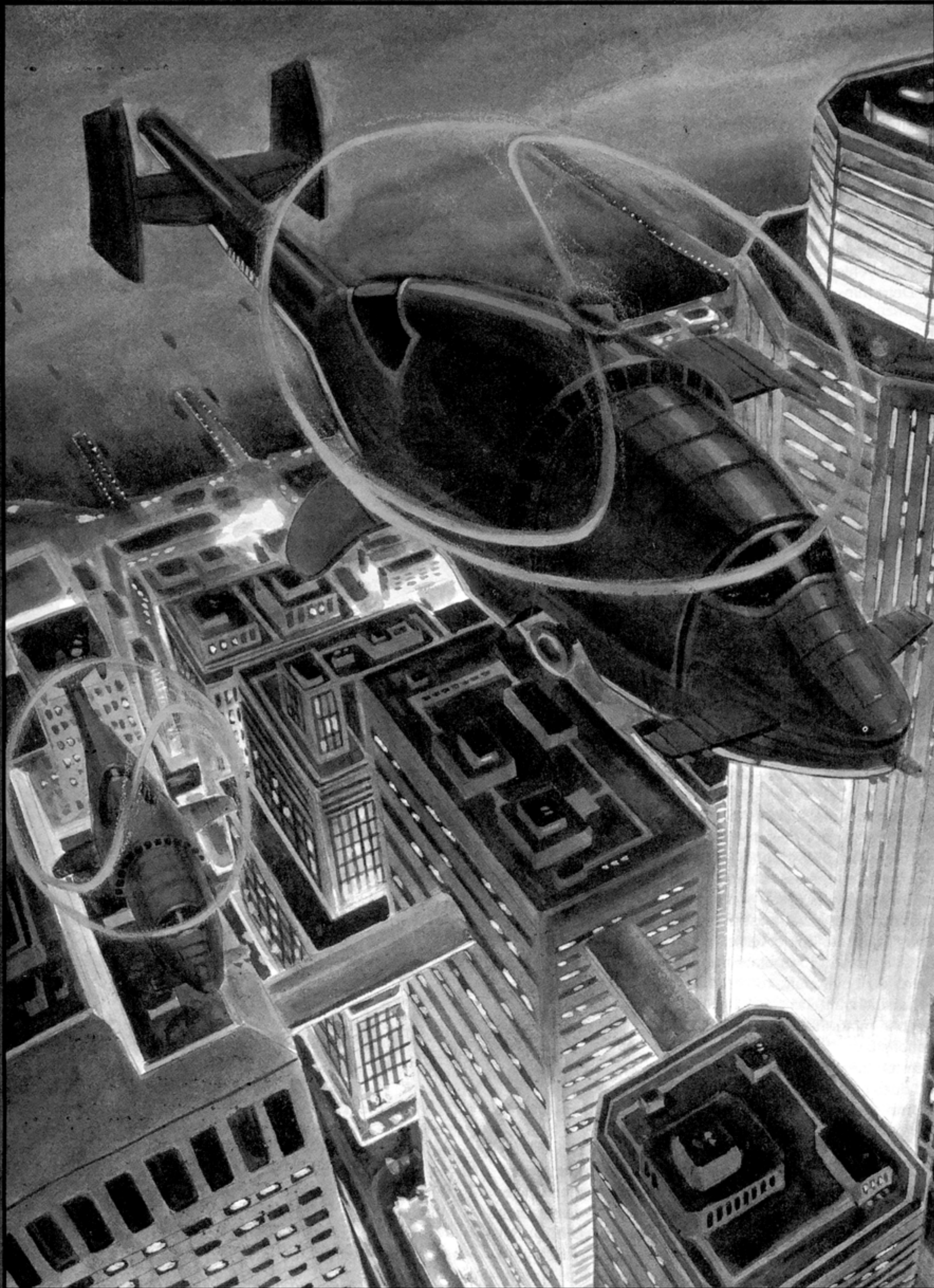
THE DESIGN PROCESS

Like a well-designed character, a well-designed vehicle demands some thought and creativity on the part of the player designing the machine.

The intent of these design rules is to assign attributes and ratings to mass-produced vehicles, both large and small. Produced in mass quantities by large automotive, aerospace, and other heavy industrial companies, these kinds of vehicles are by far the most common encountered worldwide. They are NOT intended to be used as guidelines for allowing individual characters (either player characters or NPCs) to design or build vehicles from scratch. Therefore, all of the vehicles created here need, at a minimum, an automotive factory for actual creation.

These design rules do NOT cover custom-modified vehicles created from existing stock models available on the market. Those fall under the jurisdiction of the vehicle-customization rules.

The design process begins with the selection of a vehicle chassis and power plant, which together form the base for the vehicle's Design Point Value. The Design Point Value is the total sum of all the Design Points added to the vehicle. As additional improvements, enhancements, modifications and accessories are selected, more





Design Points are added to the vehicle's Design Point Value. At the end of the process, the gamemaster multiplies the Design Point Value by the Chassis Mark-Up Factor to determine the final price of the vehicle and sets the vehicle's Availability and Street Index ratings.

The design process can be divided into five steps:

1. Select a chassis
2. Select a power plant
3. Add design options
4. Add vehicle modifications
5. Determine final vehicle cost

SELECT A CHASSIS

The chassis is a template that determines what type of vehicle is being constructed (bike, car, airplane, boat, etc.), as well as the vehicle's specific subtype (subcompact or sedan, ultralight or airliner, for example).

The chassis also determines the starting values for certain vehicle ratings—Handling, Body, Armor, Autonav or Pilot, Sensor and Cargo Factor (CF)—as well as the starting seating arrangement, the arrangement of entry points, the set-up and breakdown time for drones, the landing and takeoff profiles for aircraft, and any other accessories and options that are already available for the chassis. The Vehicle Chassis Table (p. 202) lists the different types of chassis available and the starting vehicle ratings for each.

The Body rating of a chassis is fixed; it cannot be improved nor reduced. Other vehicle ratings may be improved by adding design options and vehicle modifications that enhance those ratings. Doing so increases the Design Point Value of the vehicle and subsequently increases the final price.

Ratings may also be decreased if the designer desires. For example, a designer may wish to decrease the Armor or CF rating of a vehicle below the starting value to create the fastest possible racing car. A designer may also remove standard chassis components such as doors or seats. However, such "downgrades" do not decrease the Design Point Value or final price of the vehicle. (With one exception: removing seats from a vehicle frees up the associated CF and Load taken up by that particular type of seat. Keep in mind, however, that all manned vehicles must possess at least one seat for the driver.)

Chassis fall into one of ten categories, based largely on the Vehicle skill needed to operate them: bikes, boats, cars, fixed-wing aircraft, hovercraft, rotor craft, ships, submarines, vectored-thrust aircraft and special vehicles.

Keep in mind that the chassis listed below are only general descriptions based on size, shape, and function and should not be taken too literally. If the vehicle a player or gamemaster has in mind does not exactly match the associated type of chassis, it may fit into another with a little bit of creative interpretation.

Bike

Bikes include two, three, and certain four-wheeled open-topped vehicles that a driver operates by straddling the vehicle. Bikes cannot have Autonav ratings greater than 1 unless they are also modified with special gyroscopic gear (see p. 129). All bike chassis come with a two-person seat, or can be fitted with an optional one-person seat.

The bike category includes the following chassis:

All-Terrain Vehicles: All-terrain vehicles (ATVs) are three- or four-wheeled versions of the off-road bike. ATVs are easier to handle off-road, but they sacrifice on-road Handling rating as well as speed.

Choppers: Choppers are heavy motorcycles designed primarily for long-distance cruising.

Off-Road Bikes: Off-road motorcycles are designed for traversing rough terrain and have better-than-standard off-road Handling ratings (usually at the expense of on-road Handling).

Racing Bikes: Racing bikes are designed to achieve and sustain high speeds.

Scooters: Scooters are short-range city commuter vehicles. They do not offer spectacular performance, but they are fairly cheap.

Boats

Boats consist of surface watercraft weighing less than 100 metric tons and with an overall length less than 50 meters. Larger and heavier vessels fall under the *Ship* category (see p. 106).

Skiffs: A skiff is a small boat under 6 meters long.

Speedboats: Speedboats are high-speed boats, such as the cigarette racing boat. Some not-so-powerful versions also exist for day tripping. Speedboats generally measure between 7 and 10 meters long.

Sport Cruisers: Sport cruisers are medium-sized boats, generally used as pleasure boats by the wealthy. Sport cruisers generally measure between 10 and 20 meters long.

Water Scooters: Water scooters, sometimes called jet skis, are waterborne versions of motorcycles. They are exclusively motor-powered for design purposes.

Yachts: Yachts are large boats with an overall length greater than 20 meters, but less than 40 meters. Most of them are the toys of the very well-to-do. All yachts come with basic living amenities.

Cars

Cars include all manner of ground vehicles, including wheeled and tracked vehicles. Cars contain the following chassis:

Armored Personnel Carriers (APCs): APCs are armored ground vehicles designed for carrying troops into combat. They weight between 15 and 30 metric tons. Though often mistaken for tanks, APCs are vulnerable to anti-vehicle missiles and can carry the smallest of heavy weapons only. APCs may use either tracks or wheels for propulsion.

Caterpillars: The term "caterpillar" refers to heavy tracked vehicles used in civilian applications. The most notable of these is in the construction field, where this type of chassis serves as the foundations for various vehicles, from bulldozers to cranes.

Crawlers (Drone): Crawlers are unmanned drones designed for use with remote-control decks. Crawlers may move via tracks or wheels; few differences exist between the two types. All crawlers (and all drone chassis) come with a remote-control interface and rigger adaptation as standard options.

Crawler chassis come in four sizes: micro (Body 0), small (Body 1), medium (Body 2) and large (Body 3+). Micro-sized



crawlers range in size anywhere from 10 to 25 centimeters long and are light enough to be carried in the palm of a person's hand. Small crawlers may be as small as a toaster or as large as a large dog. Medium crawlers are roughly comparable in size to a motorcycle or a human lying prone on the ground. To create crawlers larger than medium-scale, use one of the "standard" car chassis.

Industrial Movers: Industrial movers represent a wide variety of heavy-lifting vehicles used indoors, including forklifts, cherry-pickers, and street and ice cleaners. Typically, they run on electric or methane engines to eliminate emissions of hazardous fumes. These vehicles possess tremendous lifting capability, though often at the cost of speed and operational duration.

Limousines: Limousines are extended-length luxury cars, designed to carry extra passengers, amenities and accessories.

RVs: All-terrain recreational vehicles (RVs) weigh in between 1.25 and 2.5 metric tons and are designed for long-range travel. RVs come equipped with living and sleeping amenities as a standard option.

Sand Buggies: Sand buggies are light, open-air four-wheeled vehicles designed for off-road use. Although similar to ATVs in structure and design, sand buggies can carry more passengers (up to four) and more cargo. Most sand buggies use open tube-frame chassis, but they often carry attachable canvas or plastic overhead and side panels for protection against the elements.

Sedans: Sedans are medium-sized, four-seat cars. This subtype includes everything from family to luxury models.

Sports Cars: These two-seat cars are designed for moving at extremely high speeds.

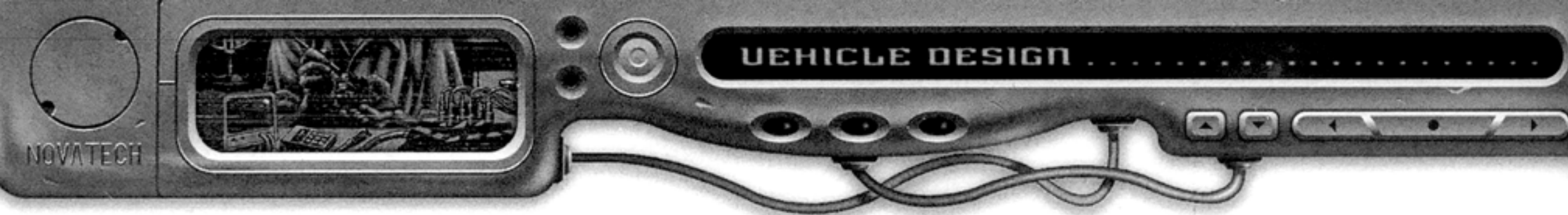
Sport Utility Vehicles: Sport Utility Vehicles (SUVs) include light trucks that weigh less than 1.25 metric tons, such as pickups, 4WDs, jeeps and Hummers.

Subcompacts: Subcompacts are small, inexpensive cars designed primarily for commuting within a city. Most are one- or two-seaters and have very little cargo space.

Tractors: Tractors usually weigh as much as heavy transports but have no internal cargo capacity. Tractors are designed to pull one or more trailers and can haul as much as 18 metric tons of cargo.

Transports: Medium transports are freight-haulers that weigh between 2.5 and 5 metric tons. Heavy transports are heavy-duty freight trucks that weigh in at 5 to 10 metric tons.

Vans: Vans are trucks that weigh between 1.25 and 2.5 metric tons.



Fixed-Wing Aircraft

Fixed-wing aircraft are airborne vehicles that use aerodynamic lift (as opposed to directed air pressure or vectored thrust) to stay aloft. This category does not include helicopters, tilt-wing or jump-jet aircraft.

All chassis in this category have a Standard Landing/Takeoff Profile as default.

Airliners: An airliner is a heavy-duty aircraft, such as those operated by major air carriers. Airliners are capable of transcontinental or even intercontinental flight and rely on two, three, four or occasionally five heavy propeller or turbofan engines.

Fixed-Wing Unmanned Aerial Vehicles (UAVs)(Drone): UAVs are drone aircraft. Fixed-wing UAVs come in three sizes: small (Body 1), medium (Body 2) and large (Body 3). Small fixed-wing UAVs are approximately the size of toy model aircraft. Medium-sized UAVs have fuselages comparable in size to a dwarf or a small human. Large UAVs have fuselages as big as trolls, and some of the larger ones can actually carry metahumans. To create larger drones than these airframes allow, use either the ultralight or single-engine aircraft chassis.

HSCT: High-speed commercial transports (HSCTs) are hypersonic aircraft capable of crossing the Atlantic or Pacific Ocean in a matter of hours. Because of the devastating sonic boom caused by hypersonic travel, HSCT flight is normally confined to airspace over the oceans or largely unpopulated areas. The Concorde is an early predecessor of the HSCT.

An HSCT chassis has a Standard Landing/Takeoff Profile and cannot take the Improved Takeoff/Landing Profile design option.

Jet Fighters: Jet fighters are supersonic combat aircraft controlled by one or two pilots. Jet fighters have a lifting capability of several tons, most of which is used for carrying heavy bombs and long-range missiles. Jet fighters never carry more than the lightest armor, to preserve their maneuverability and ordnance-carrying capacities.

Single-Engine Aircraft: A single-engine aircraft chassis is a small, multi-passenger aircraft that possesses only one propulsion engine (either propeller or turbine).

Twin-Engine Aircraft: A twin-engine aircraft chassis is a middleweight air frame that normally requires two propulsion engines, either propeller or turbine. (This does *not* imply that a twin-engine plane takes two power plants.) Examples include regional or commuter aircraft that fly between small airports and larger ones serving major airline companies.

Ultralights: An ultralight is a very small, single-pilot aircraft. Although the term originally referred to open-air hang gliders powered by internal-combustion engines, any single-passenger aircraft, regardless of structure, is considered an ultralight for design purposes.

Hovercraft

Hovercraft float centimeters above the ground or water on cushions of pressurized air. Commonly known as ACVs (air-cushion vehicles), hovercraft are maneuverable on both land and sea and make excellent amphibious vehicles. However, ACVs are not seaworthy without modification and sink if powered down over water. ACVs are divided into the following groups.

Light Hovercraft: Light hovercraft are roughly comparable in size to pickups or sport utility vehicles and are used primarily as recreation or pleasure craft.

Medium Hovercraft: Medium hovercraft are approximately as large as vans or lightweight medium transports. Medium hovercraft are used as amphibious recreation vehicles, light cargo and passenger carriers, and even security vehicles.

Heavy Hovercraft: Heavy hovercraft are comparable in size to medium or heavy transports and can haul large numbers of passengers or large freight loads. The Confederate States marine corps uses armored heavy hovercraft as rapid-assault and screening vehicles during amphibious combat operations.

Skimmers (Drone): Skimmers are drone hovercraft. They come in two sizes, small (Body 1) and medium (Body 2), which are comparable in size to small and medium crawlers.

Rotor Craft

Rotor craft generate vertical lift by propelling air downward, creating a localized updraft that lifts the aircraft. This category includes helicopters and tilt-wing aircraft. Rotor craft are divided into the following subtypes.

Attack Helicopters: Attack helicopters are one- or two-passenger high-performance combat helicopters. Most militaries use attack helicopters as missile carriers for close-air support or longer-range deep-strike missions. Consequently, they tend to be lightly armored. Because they are so specialized, attack helicopters are rarely used for any other role.

Autogyros: Autogyros are single-passenger ultra-light helicopters. Though they lack significant Body and Armor Ratings and engine performance, they are very versatile.

Cargo Helicopters: Cargo helicopters are large helicopters designed for carrying heavy loads.

Rotary Wing UAVs (Drone): Rotary wing UAVs are generally (but not always) drone helicopters. They come in three sizes: micro, small, and medium. Micro-scale (Body 0) rotary UAVs measure between 20 and 40 centimeters long (many can even be held in the palm of one's hand). Small (Body 1) and medium (Body 2) versions are equal in size to fixed-wing UAVs. To create drones larger than medium scale, use the autogyro template.

The rotary wing UAV chassis also include several handheld models that generate lift by flapping their wings, in much the same way that birds do. These types of "hummingbird drones" are limited only to micro-scale chassis, as the power requirements are too inefficient for Body 1 or larger drones.

Tilt-Wing Airplanes: Tilt-wing airplanes are fixed-wing propeller aircraft that can alter the incidence of their wings and perform vertical take-offs and landings. These craft have traveling ranges comparable to fixed-wing aircraft, yet they can hover and make vertical landings like helicopters. Almost all tilt-wing airplanes are propeller-driven.

Tilt-Wing UAVs (Drone): Tilt-wing UAVs are drone tilt-wing aircraft. They come in two sizes, small and medium, which correspond in size to small and medium fixed-wing UAVs.

Utility Helicopters: Utility helicopters are medium-sized multipurpose helicopters.

Ships

Ships are heavy surface watercraft longer than 50 meters and heavier than 100 metric tons.

Aircraft Carrier: Aircraft carriers transport and launch aircraft (fixed-wing, rotary-wing, or vectored-thrust) from their decks. Aircraft carriers are available in three sizes: light, medium, and heavy. Light carriers, which have a tonnage between 10 and 25 metric thousand tons, are typically designed to carry helicopters or other specialty aircraft and perform specialized missions (such as amphibious operations, convoy air escort, or ASW). Medium carriers, usually weighing between 40–50 thousand metric tons, are flexible enough to handle several different roles and are generally employed by most nations (including Great Britain, France, Russia, and the Canton Confederation). Heavy carriers, which range in weight from 75 to 100 metric thousand tons, carry many more aircraft. Currently only Imperial Japan and the UCAS employ heavy carriers, as no other nation possesses the money and vested interest required to maintain such behemoths.

Corvette: Corvettes are the heavier cousins of patrol vessels and are designed specifically for naval combat. Although their small size makes them very vulnerable to anti-ship weapons, their speed and shallow drafts gives them a slight advantage over line warships in constricted waters.

Corvettes can carry some of the lighter anti-ship weapons. They are the mainstays of brown-water navies (navies structured for defending a local region of water), such as the Aztlan and CAS navies.

Cruiser: A cruiser is a medium-weight warship designed for general naval combat. Since World War II, cruisers have been gradually replacing heavier capital warships such as dreadnoughts and battleships. Currently, no active battleships remain on duty, most having been melted down for scrap or sold as museum pieces.

Destroyer: A destroyer is a light warship, though slightly heavier than frigates, and is designed as a surface combatant specializing in one aspect of naval combat (either air defense, surface warfare, or ASW).

Freighter: Freighters are giant trans-oceanic cargo ships and include specialized designs such as bulk freighters, container ships, roll-on/roll-off (RO/RO) ships, lighter aboard ship (LASH) freighters, and most oil tankers.

Frigate: A frigate is defined as a light warship designed primarily for escort duty or anti-submarine warfare (ASW).

Harbor Tug: A harbor tug is a heavy duty utility boat. They are generally used for pushing or pulling large barges in and out of a harbor.

Merchantman: Merchantmen are middleweight general commercial hulls, up to 125 meters long and carrying up to



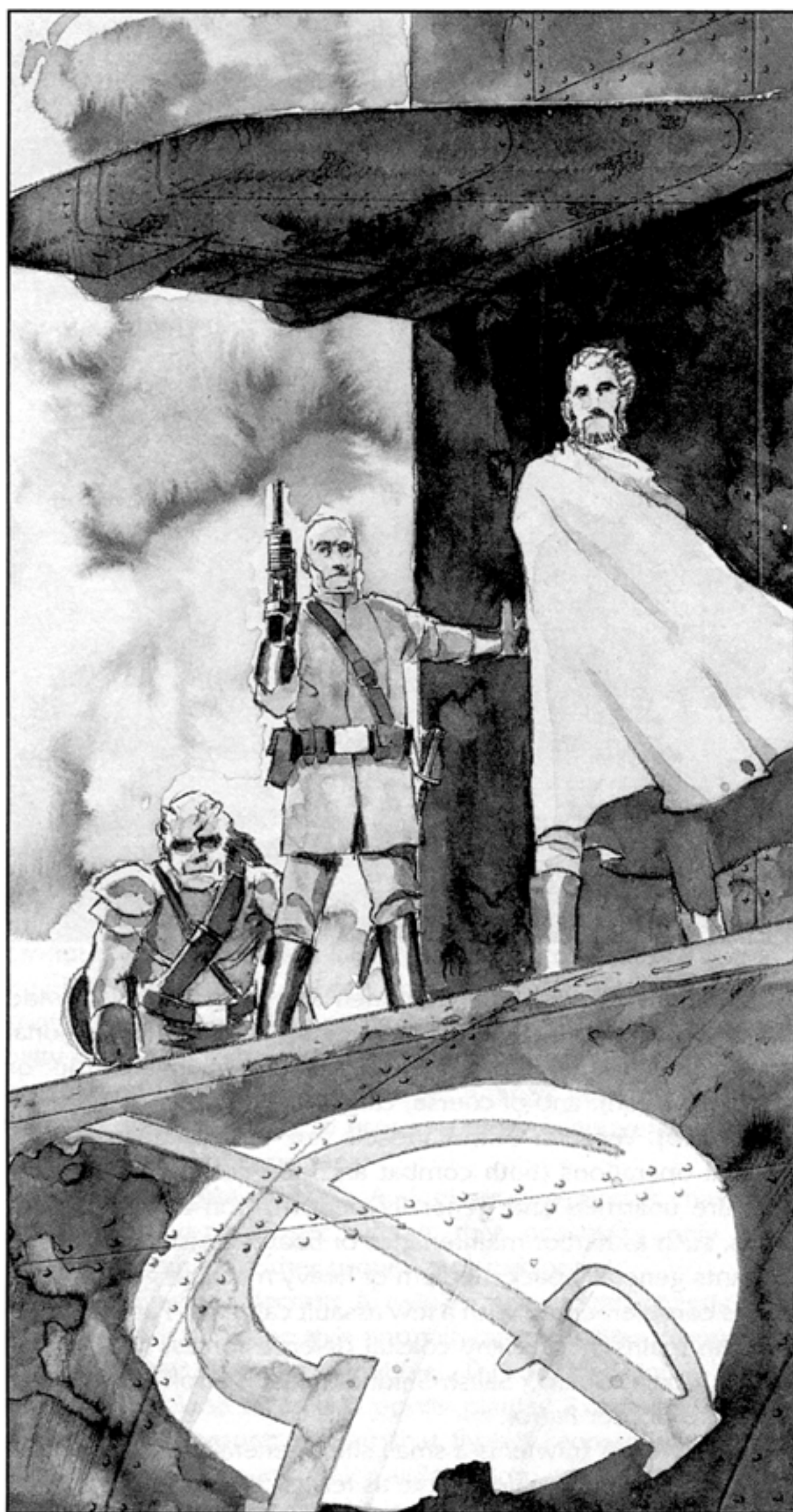
100,000 metric tons. Merchantmen are used to carry a wide variety of items, including passengers, vehicles (for regional transportation across large seas such as the Baltic or Mediterranean), and of course, cargo.

Patrol Vessels: Patrol vessels are vessels designed for coastal operations (both combat and non-combat). Most cutters are unarmed and generally perform non-combat operations, such as harbor maintenance or boater assistance. Armed variants generally pack medium or heavy machine guns, sometimes complemented with a few assault cannons. Patrol vessels are the mainstay of many coastal defense forces, such as the UCAS Coast Guard, Salish-Shidhe Coast Patrol and the Tir Tairngire Border Patrol.

Trawler: A trawler is a small ship, generally used as a fishing vessel. Some trawlers serve as ferries for cities built around a large bay (like Hong Kong or Vladivostok). It is also rumored that certain national and corporate intelligence services use trawlers for electronic surveillance.

Submarine

The submarine chassis category encompasses all sub-surface watercraft. With the recent development of underwater research and commercial stations, as well as underwater arcologies (also known as aquacologies), the use of submarines has grown tremendously. Many commercial submarines often employ "recycled" hulls of decommissioned naval attack and ballistic missile submarines from the past century (such as American *Ohio*-class or Soviet *Typhoon*-class ballistic missile submarines).



All subs in this category automatically come with the EnviroSeal system with water and engine-seal options. This system may not be removed.

Attack Submarine: Attack submarines are middleweight war subs and are designed for use against sub-surface, surface, and (occasionally) aerial targets.

Bathyscaph: A bathyscaph is a deep-sea research and exploration submarine designed for deep dives into the darkest reaches of the ocean.

Boomer: Boomers are the largest type of underwater warships. Their heavy size makes them relatively slow, so they depend on stealth rather than speed or armor for survivability.

The most common submarines of this type (designated as SSBN) are used to carry strategic ballistic missiles for the nuclear powers. Another common class (designated as SSGN) carries lighter anti-ship and land-attack missiles.

Commercial Sub: Commercial subs are designed for transporting passengers and cargo. They come in three sizes: light (Hull 3), medium (Hull 5), and heavy (Hull 7).

Minisub: A minisub is a submarine with a displacement of less than 100 metric tons (and so is treated as a regular vehicle, not a ship-sized vessel). Minisubs come in three sizes: light (Body 4), medium (Body 6), and heavy (Body 9). Light minisubs are barely large enough for one or two passengers and are primarily used for pleasure or espionage purposes. Medium minisubs can accommodate about a half dozen people and are usually used on underwater construction jobs. Heavy minisubs serve primarily as short-range underwater subs from the surface to underwater subs or aquacologies.

Patrol Submarine: A patrol sub is a small submarine designed to patrol a sub-oceanic region of water (such as a major sea). Because of their small size, patrol subs are not nuclear powered.

Sea Sled (Drone): A sea sled is an unmanned submarine, used primarily for undersea surveying and exploration. This chassis can also be used as an underwater "scooter," allowing divers to piggyback on the sled, thus extending their diving ranges. Sea sleds come in three sizes: small (Body 1), medium (Body 2), and large (Body 3).

Vectored-Thrust Craft

Vectored-thrust craft use directed jets of turbojet and turbofan exhaust to generate force and overcome the pull of gravity. Vehicles that fall into this category include low-altitude vehicles (known commonly as "thunderbirds" or "LAVs") and jump-jet fighters. Vectored-thrust craft are divided into the following subtypes.

Jump-Jet Fighters: Jump-jet fighters are similar to standard fixed-wing jet fighters but have additional vertical vents for vertical landings and takeoffs and hovering.

Thunderbirds: Thunderbirds have stubby auxiliary wings and rely almost entirely on jet propulsion to provide lift and thrust. Without adequate power, t-birds become flying (or more precisely, *falling*) bricks. Consequently, thunderbirds generally have short ranges and tremendous fuel requirements.

In most militaries, thunderbirds are used for short-range close air support, as well as armor support in terrain not suited to tank maneuvers. In these applications, t-birds are heavily armored and fitted with machine guns and assault cannons in place of rockets and missiles.

Vectored-Thrust UAVs (Drone): Vectored-thrust UAVs are drone versions of t-birds and jump-jet aircraft. They come in three sizes: small (Body 1), medium (Body 2) and large (Body 3). These sizes correspond to the sizes of fixed-wing UAVs. Vectored-thrust UAVs start with the VTOL takeoff profile, but they may be downgraded to VSTOL, which reduces the chassis cost by half. Vectored-thrust UAVs with a VSTOL profile have a stall speed equal to (30 x Body) meters per turn and follow the special rules for LAVs (see p. 69).



Special Vehicles

Special vehicles are vehicles that do not fit into existing vehicle categories. Controlling special vehicles normally requires a Special Skill, but in most cases a character can default to a relevant Vehicle Skill as if it were part of the skill grouping (see *Defaulting*, p. 84, SR3). Characters with a VCR operating a rigged vehicle can reduce this modifier by half. Special vehicles are divided into the following subtypes.

Anthroforms (Drone): Anthroforms are specialized walker drones with metahuman-shaped bodies. They can perform nearly any physical task a metahuman can, and they can do so with greater strength, speed and agility than even a cybered metahuman. However, anthroforms lack the intelligence, breadth of experience and talent for creative adaptation that metahumanity possesses, which is why anthroforms have not replaced metahuman workers except in high-risk hazard areas, such as nuclear power plants and ultra-heavy industrial work areas. Anthroforms are available in two sizes, medium (Body 2) and large (Body 3).

Barge: A barge is the waterborne version of a trailer, but on a larger scale.

Locomotive: A locomotive is a vehicle that travels on a fixed path and includes both standard railroads and monorails. Locomotives come in five types: streetcars, switchers, express, bullet, and bulk. Streetcars are trains used for city transportation (such as a subway), either singly or in a train. Switchers are (relatively) small locomotives used for attaching and detaching cars in a rail yard, as well as (to a limited degree) local transportation. Express locomotives are moderately fast engines used primarily for coach travel. Bullet locomotives are high-speed engines and include such notables as the French TGV, German InterCity Express and TransRapid Maglev, and Japanese bullet trains. Bulk locomotives are slow but possess extraordinary pulling power; typically these are used to pull freight trains.

Mini-Blimps (Drone): Mini-blimps are miniature zeppelins. Their capability for hovering indefinitely makes them especially well-suited for reconnaissance and wide-area surveillance.

Rail Car: Rail cars are non-powered rail vehicles pulled by locomotives. They are available in three basic types: short passenger cars, long passenger cars, and freight cars.

Semiballistic: A semiballistic is a rocket-like vehicle that travels in a parabolic arc. It takes off from an airport like a normal aircraft, but once it gets a safe distance away, it launches itself vertically and actually leaves the atmosphere temporarily. At its peak, it has expended all its fuel, and gravity brings it in the rest of the way. The best way to picture a semiballistic is to think of it as an ICBM that carries passengers instead of nuclear warheads.

Semiballistics have a Standard Takeoff Profile, but they require a special type of runway to land. Semiballistics must take the Chemical Rocket power plant.

Inspired by some of the adventures of Allied forces in Operation Desert Storm, Steffi wants to re-create the tactical beach buggy used by some of the U.S. light infantry and special forces in that campaign. Steffi decides to call this armed dune buggy the Lockheed-Chenoweth Light Strike

Vehicle, a product created in joint partnership between the defense giant Lockheed and the British corporation Chenoweth.

Scanning through the Chassis Table (p. 169), Steffi finds the perfect chassis: the "sand buggy." The sand buggy has the following stats: Handling 4/4, Body 2, Armor 0, Cargo 4 (with a maximum of 35), Autonav 0, and Sensor 0. It starts with a bench (enough for two people, and is an open-entry vehicle. This chassis is worth 40 Design Points.

Rich, on the other hand, is a racing fan and wants to supply his character with a Formula One-style open wheel race car. Looking through the chassis list, the closest thing Rich can find to a Formula One car is the "sports car" chassis. Rich looks up sports car in the Chassis Table and finds that the vehicle has the following stats: Handling 4/8, Body 3, Armor 0, Cargo 3 (with a Maximum of 18), Autonav 0 and Sensor 0. In addition to its two bucket seats and two doors, it also allows top entry. Because Formula One racing cars have only one seat and no doors (he only wants the top entry), Rich decides to remove the doors and the extra seat, which increases the vehicle's starting CF by 6 and its starting Load by 100 kg. However, Rich still must pay the Sports Car's full 125 Design Point cost.

Suborbital: A suborbital is a rocket-boosted fixed-wing aircraft. The main difference between suborbitals and full orbital launchers is that suborbitals lack the fuel capacity to make an unassisted launch into space. The Space Shuttle is a predecessor of 2060-era suborbitals.

Suborbitals have a Standard Landing/Takeoff Profile. They may not take the Improved Takeoff/Landing Profile design option. Suborbitals must take the Chemical Rocket power plant.

Trailer: A trailer is a vehicle that is incapable of self-motion. Trailers are commonly wheeled, though some may be tracked. There are also a few drone models that are mounted on tripods and perform area surveillance or security. Trailers do not take a power plant.

Walkers (Drone): Walkers are drones that use robotic legs for propulsion. (Legs can provide a distinct advantage over wheels or tracks when crossing difficult terrain.) Walkers come in five sizes—micro (Body 0), small (Body 1), medium (Body 2), and large (Body 3) and extra-large (Body 4)—which correspond to crawler sizes. (The extra-large size is roughly equivalent to a sedan-sized car.)

Zeppelins: More commonly known as "blimps," zeppelins are rigid-structure, lighter-than-air (LTA) dirigibles that use helium to provide lift. Zeppelins are huge but fairly easy to bring down. Jet propeller engines propel most zeppelins, though some have been outfitted with turbojets.

SELECT A POWER PLANT

A vehicle's power plant provides primary power to move the vehicle and operate its accessories and modifications. The type of power plant selected determines the starting and maximum values of the vehicle's Speed, Acceleration, Load and Economy ratings, as well as the vehicle's initial Signature rating and fuel tank size.



Note that a power plant does not refer to an actual, physical unit. The term Power Plant merely refers to a method of propulsion and only provides general description of the method of generating power and moving the vehicle. For example, a gasoline engine could have two, four, six or eight cylinders, in either an in-line or V-configuration, but it is still a gasoline engine regardless.

The Power Plant Table (p. 194) lists the different power plants available, the chassis that may use each type of power plant, and the starting and maximum values conferred by each power plant. If a chassis type is not listed under a particular power plant, the vehicle may not use that power plant.

All templates begin with the vehicle's Speed and Load at the base minimum ratings. Either rating may be increased with the addition of extra Design Points to the vehicle's Design Point Value (see *Add Design Options*, p. 111). Designers may also reduce ratings below their starting values if desired, but doing so will not decrease the Design Point Value of the vehicle.

Electric Battery

Direct-current, battery-powered electrical motors have high Signature ratings because they generate little heat compared to other types of engines. However, their low power outputs produce low Speed and Load ratings. The fuel consumption of electric battery motors is expressed as a Power Factor (PF), a unit of electrical energy roughly equivalent to 180 kilojoules (approximately 50 watt-hours).

Electric Fuel Cell

An electric fuel cell generates electrical AC power through the mechanic of proton exchange. In the engine configuration, hydrogen ions are guided through a capillary coil before hydrolyzing with oxygen, generating an electric current through electromagnetic induction. Electric fuel cells have better power performance than electric batteries, but they also have their drawbacks. Electric fuel cells provide only half nor-

mal Flux boosts to electronic equipment. The fuel consumption of electric fuel cell motors is expressed as a Power Factor (PF).

Methane

A methane power plant is a combustion engine that uses methane gas instead of gasoline as its fuel. Methane burns cleaner than gasoline, which makes it a highly touted alternative in the NAN and other environmentally friendly countries. Methane engines provide lower overall performance and lower Signature ratings than gasoline engines, but they also have far greater fuel capacities. The fuel consumption of methane engines is expressed in bars of atmospheric pressure.

Gasoline

A gasoline power plant refers to any type of four-cycle internal combustion engine. Even with the development of alternate fuel sources, petroleum-derived gasoline remains the primary fuel for most ground and water vehicles and some aircraft. Some countries (such as the NAN) and several metroplexes, however, may impose legal limits on the use of such vehicles within their respective jurisdictions for environmental reasons. The fuel consumption of gasoline engines is expressed in liters.

Diesel

A diesel engine is a two-cycle internal combustion engine. Diesel fuel has a lower flashpoint than gasoline, which makes diesel power plants suitable for heavy vehicles (otherwise the excess heat would melt the engine block). The fuel consumption of diesel engines is expressed in liters.

Jet Propeller

Jet propeller aircraft use propellers to blow air over their wings, creating aerodynamic lift with forward thrust on the side. Propeller aircraft are slower than jets (props can't break the sound barrier, for instance), but they generally have higher Signatures, better fuel economy and lower price tags than planes powered by jet turbine engines. Propeller engines consume jet fuel, which is measured in liters. Tilt-wing aircraft also use jet propeller power plants.

Jet Turbine

Jet turbine power plants include turbojets, turbofans, ramjets—just about anything short of a space rocket engine. Though more powerful than jet propeller engines, jet turbine engines have lower Signatures, consume more fuel and are expensive to build and maintain.

All rotor craft and vectored-thrust aircraft—except for tilt-wing designs—use jet turbine engines. Some ships and heavy ground vehicles (such as tanks) also use jet turbine engines. These types of engines are commonly called gas turbine engines when installed in ground or naval vehicles.

Nuclear

Nuclear power plants are fission or fusion engines used in larger ships, submarines, and space stations. In 2060 most



nuclear-powered vessels use fusion energy, although there are some older models that still rely on fission. The nuclear power plant designation covers both designs, though for obvious reasons the fuel types are not interchangeable. (Fusion reactors use a mixture of deuterium and tritium, both isotopes of hydrogen, while fission reactors use uranium or plutonium pellets.)

Chemical Rocket

Chemical rockets use chemical reactions (normally liquid hydrogen and liquid oxygen) in mass quantities to generate rocket thrust for semiballistics, suborbitals, and certain types of spacecraft (usually those designed for intra-orbital travel and satellite launch). This power plant is available for the suborbital and semiballistic chassis only.

Sail

Sails harness the power of the wind and may be used with certain types of watercraft. Sailing is a tricky skill to master, however, so sail craft generally underperform in comparison to their powered counterparts. However, sail-powered vessels have the highest Signature ratings, as well as unlimited "fuel mileage"—as long as the wind is blowing, of course.

Steffi, deciding to keep things simple, determines that the Light Strike Vehicle will have a gasoline engine. Looking through the Power Plant Table, Steffi finds the following entry for the sand buggy chassis under the Gasoline heading: Speed 90 (maximum 120), Acceleration 6, (maximum 9), Load 40 kg (maximum 400 kg), Signature 3, Economy 8 km/liter (maximum 12 km/liter) and Fuel 40 liters.

A gasoline engine for a sand buggy is worth 20 Design Points, which increases the Design Point cost for the new vehicle to 60 points.

Rich's choice is easy. Sports cars come only with gasoline engines. Under the Sports Car entry, Rich finds Speed 160 (maximum 270), Acceleration 10 (maximum 18), Load 40 (Maximum 260), Signature 2, Economy 6 km/liter (maximum 10 km/liter) and Fuel 40 liters. The Design Point cost for a sports-car gasoline engine is 70, which raises the car's Design Point cost to 195.

ADD DESIGN OPTIONS

Design options are improvements, enhancements and accessories added to the vehicle by the manufacturer during the engineering and manufacturing processes. Design options are not available to shadow mechanics on the street.

As a general rule, any feature or improvement that involves internal restructuring of the vehicle is considered a design option. Additionally, the gamemaster may re-designate any vehicle modification (see *Add Vehicle Modifications*, p. 112) as a design option if he wants to restrict his players' access to the modification.

Some design options consume cargo space or add weight to the vehicle. These factors are listed under CF Consumed and Load Reduction in each entry in *Vehicle Design Options*, p. 114. If a vehicle incorporates an option that takes up CF or Load, reduce the appropriate rating by the

amount of CF or Load consumed. No vehicle can carry more design options than its CF or Load rating allows.

Steffi decides that her new Light Strike Vehicle should have a better off-road Handling Rating, so she decides to make a straight Handling improvement to the vehicle's off-road Handling Rating, reducing it from 4 to 3.

A straight Handling Improvement costs 25 points for every point subtracted from the vehicle's on-road or off-road Handling rating. Therefore, the Handling reduction increases the Light Strike Vehicle's Design Point cost by 25 points, from 60 to 85.

Steffi also decides to increase the vehicle's Acceleration rating from 6 to 8. Improving the Acceleration costs 25 Design Points per point of increase, so this 2-point increase adds 50 more Design Points to the strike vehicle's Design Point cost, raising it to 135 points.

Anticipating some of the modifications she's planning to incorporate into the vehicle, Steffi decides to increase the vehicle's Cargo and Load ratings. She decides to add 2 CF to the Cargo rating and 30 kg to the Load rating for final ratings of Cargo 6 and Load 70. The associated Design Point costs for each option are 10 Design Points for the Cargo increase and 3 points for the Load increase. This increases the total Design Point cost of the Light Strike Vehicle by 13 points, from 135 to 148.

Meanwhile, all Rich thinks about is speed, speed and more speed. First, Rich is going to break the bank and get himself a vehicle made with smart materials. This costs him 100 Design Points but allows him to increase the vehicle's maximum Speed and Acceleration ratings by 15 percent (it also allows for an increase in Load, but Rich doesn't care about that).

The smart materials increase the racing car's maximum speed to 311 and bump up the maximum Acceleration to 21. For the record, the maximum Load rating rises to 299. This raises the vehicle's Design Point cost up to 295 points. The gamemaster also notes that the Street Index automatically is modified by +1.

Rich decides it's time to increase the Acceleration and the Speed. The Acceleration costs 25 Design Points per point of increase. Rich is going to max them both out, so he increases Acceleration by 11 points (from the standard Sports Car maximum of 10 to the new maximum of 21). That increase alone costs 275 (25 x 11) Design Points.

The Speed rating increase goes from the standard maximum Speed of 160 to the new maximum Speed of 311, a total increase of 151 points. This upgrade costs Rich 302 (151 x 2) Design Points. The total Design Points for both rating increases is 577, which brings the vehicle's total Design Point cost up to 872.

Rich has some specific toys he wants to add to the vehicle and contemplates increasing its Load rating. The new vehicle has a base Load rating of 40 kg, plus the additional 100 kg from removing the rest of the seats from the vehicle. That give its a base Load of 140 kg. In the end, Rich decides that should be sufficient.



Finally, Rich realizes that speed without good handling means he'll be driving a death trap. Rich wants to improve the vehicle's on-road Handling (if he has to take this thing off-road, he's already lost the race). He improves the Handling, now 3 due to smart materials, to its maximum of 2. That improvement costs 25 points. Adding this to the Design Point cost, Rich gets a new total of 897.

ADD VEHICLE MODIFICATIONS

Unlike design options, vehicle modifications are enhancements and accessories that can be installed in a new vehicle by the manufacturer or added to an existing vehicle by a rigger or shadow mechanic as vehicle customizations. Vehicle modifications are listed in *Vehicle Customization*, p. 122. Generally, vehicle modifications installed during the design process have fewer restrictions than those added during vehicle customization, but they also cost more.

When installing a vehicle modification during vehicle design, remember to use its Vehicle Design Point cost, p. 114, only when calculating the final cost of the vehicle. Do not use the modification's nuyen cost unless the description specifically directs it.

Some modifications consume cargo space or add weight to the vehicle. These factors are listed under CF Consumed and Load Reduction in each entry in *Design Options* and also under *Design Specifications* for each entry in *Vehicle Customization*, p. 122. If a vehicle incorporates an option that takes up CF or Load, reduce the appropriate rating by the amount of CF or Load consumed. No vehicle can carry more modifications than its CF or Load rating allows.

Now it's time to add all the neat toys and flashy features to the Light Strike Vehicle. First, Steffi decides that the

buggy needs to have reinforced roll bars, because soldiers tend to be rough on their equipment. Second, it will need a radio to keep in touch with headquarters, and installing a radio requires that the vehicle have an electronics port. Last, the vehicle needs weapon mounts (it is a strike vehicle, after all). Steffi decides that a ring mount and a passenger-side pintle mount will do nicely.

Thumbing through *Vehicle Customization*, Steffi looks up the modifications she wants and jots down the associated costs. Roll Bars: 0 Design Points, 0 CF, 0 kg Load. Electronics Port: 10 Design Points plus the radio's cost (we'll ignore the radio for now, although it will have CF and Load), 0 CF, 0 kg. Ring

mount: 10 Design Points, 1 CF, 25 kg Load. Pintle mount: 1 Design Point, 0 CF, 0 kg Load. Total costs for all modifications: 21 Design Points, 1 CF and 25 kg Load.

The CF and Load costs are subtracted from the vehicle's Cargo and Load Ratings respectively, so the Light Strike Vehicle now has a Cargo Rating of 5 and a Load Rating of 45 kg. The 21 Design Points are added to the vehicle's Design Point cost, bringing the total up to 169 points.

Now let's see what Rich comes up with for modifications to his race car. He decides not to take the engine customization—it carries far too great a risk of engine failure for the benefits it provides and the amount it will cost. He does, however, choose nitrous-oxide injectors for that quick burst of getaway speed. He also includes a datajack, rigger adaptation, basic sensors, a crash cage and some high-performance tires. Here are the Design Points, Cargo Factor and Load costs for the modifications he's selected:

Rating 6 Nitrous Oxide Injectors: 330 Design Points (55 Design Points per rating point), 1.5 CF and 15 kg Load
Datajack Port: 25 Design Points

Rigger Adaptation: 35 Design Points

Sensors, Level 2: 75 Design Points, 1 CF, 20 kg Load

Crash Cage: 40 Design Points, 10 kg Load

Rich adds up all his customizations. Total Design Points = 505, Total CF = 2.5 (his vehicle's maximum is 3), and Total Load = 45 (leaving 95 kg for future customization).

The final Design Point cost of Rich's Formula One car is 1,427. After finding that total, Rich calculates the cost of the high-performance tires. This cost, expressed in nuyen rather than Design Points, is 75¥ x Body each ([75 x 3] x 4 wheels),



STREET INDEX TABLE

Vehicle Class	Street Index
Standard Vehicles	1
Luxury Vehicle	2
Security Grade Vehicle	2
Military Grade Vehicle	3+

Specialty Classifications	Street Index Modifiers
Ambulance or Medical Treatment Vehicle	+0.5
Specialty Non-Combat Vehicle (e.g. fire truck)	+1

for a total of 900 nuyen. He's going to be paying a bundle for this vehicle.

DETERMINE FINAL VEHICLE COST

After the gamemaster and/or player have finished designing the vehicle, the gamemaster multiplies the tabulated Design Point Value by the appropriate Chassis Mark-Up Factor listed in the Chassis Table (p. 202). Gamemasters may add additional modifiers to the Mark-Up Factors for unusual, prototype, or experimental designs or one-off specialty cars. The range of these modifiers should be from 1 to 3.

To determine the final base cost multiply the Design Point Value by 100 to translate the cost from points into nuyen.

Street Index

Like other gear, all vehicles in *Shadowrun* have a Street Index. The Street Index multiplier includes everything from taxes, licensing fees and insurance, as well as other "after-purchase costs."

While standard cars have an Availability of 1, others will be higher and cost more due to what they have on or in them. Specialty, luxury, security and military vehicles simply aren't that common, and so cost more due to their relative scarcity. This factor is reflected in the Street Index.

The Street Index Table provides base Street Index ranges for both standard and non-standard vehicles.

A **Luxury Vehicle** is any vehicle that uses high-quality raw materials and is given extra care and detail during production. A luxury vehicle may also be one that is built-to-order or otherwise customized for the owner.

A **Security-Grade Vehicle** is any vehicle that features components with a Legality rating other than Legal. Many security

vehicles are simply standard vehicles customized with weaponry or armor for security or police work. Usually security vehicles are constructed according to a set of specifications submitted by the agency ordering them, and are not available to public purchase. Security vehicles that do not display proper identifying codes or that seem to be operated by non-security personnel are likely to be stopped by the authorities.

Military-Grade Vehicles are highly restricted and usually only available for sale from military contractors. Government or corporate authorization is required for the purchase, design and manufacture of most military vehicles. They cannot be purchased legally by the general public.

Calculating Availability

Determine a vehicle's Availability as follows: Availability = Vehicle Cost ÷ 20,000 (round up result). The same figure is the base time (in days) required to manufacture or acquire the vehicle. The minimum Availability and base time are 2/24, no matter the cost. The gamemaster may change the base time if the vehicle is actually on the show room floor, but rarely does that happen.

The gamemaster may allow some vehicles to have no Availability, which means the vehicle is simply not within the players' reach (most military, large ships and aircraft carriers and suborbitals would fall into this category).

Satisfied with her vehicle's design, Steffi shows it to the gamemaster, Diane, who checks it over. Everything looks fine to her, so Diane computes the final vehicle cost.

The Light Strike Vehicle's sand buggy chassis has a Mark-Up Factor of .40. Multiplying the Design Point cost (169) by the Mark-Up Factor (.4) nets a result of 67.6. That result is multiplied by 100 to calculate the nuyen cost—6,760¥.

Diane decides that the weapon mounts Steffi has added make the vehicle either security-grade or military-grade. Because the vehicle is unarmored and has relatively light weapons, Diane decides to call it a security-grade vehicle and gives the vehicle a Street Index of 2. Therefore, it will cost Steffi 13,520¥ (6,760 x 2) to get this vehicle on the street.

The final stats for the Light Strike Vehicle appear on p. 113.

LIGHT STRIKE VEHICLE

Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
3/4	90	8	2	0	3	0	—	0	5	45

Seating	Entry	Fuel	Econ	S/B	L/T	Chassis	SI	Avail	Cost
1b	NA	G (40 l)	8 km/l	NA	NA	Sand buggy	2	2/2 days	13,520¥



FERRARI OPEN WHEEL RACER (BRICKYARD BEAUTY)

Hand 2/7	Speed 311	Accel 21	Body 3	Armor 0	Sig 2	Auto 0	Pilot —	Sensor 2	Cargo 6.5	Load 95
Seating 1	Entry —	Fuel G (40 l)	Econ 6 km/l	S/B —	L/T —	Chassis Sports car	SI 3	Avail 11/11 days	Cost 210,300¥	

Other Features: Electronics Port (not including radio), Pintle Mount, Ring Mount, Roll Bars

Now let's move on to Rich. Rich is pretty darn happy with his racing car, which he's christened the Brickyard Beauty (part of the Ferrari Open Wheel Racer design). He thought about adding a fixed mount, but who need guns if you can outrun the bullets!

The Beauty's sports car chassis has a Mark-Up Factor of 1.0. The vehicle is a bit unique so Diane adds 0.5 to the Mark-Up Factor.

Multiplying the Design Point cost (1,402) by the Mark-Up Factor (1.5) nets a result of 2,103. That yields a nuyen cost of 210,300¥ (2,103 x 100). With the 900¥ in custom tires that gives the vehicle a price tag of 214,950¥!

Diane decides the racer is most accurately classified as a luxury vehicle, made only on demand, so she gives the vehicle a base Street Index of 2. Rich's use of smart materials in the vehicle design provides an increase of 1 to the base Street Index, so the final Street Index is 3. That puts the final price at a whopping 644,850¥. The final stats for the Brickyard Beauty are listed above.

Other Features: Crash Cage, Datajack Port, High Performance Tires, Nitrous Oxide Injectors (Rating 6), Rigger Adaptation

VEHICLE DESIGN OPTIONS

The design options in this section can be selected during vehicle design only. They are *not* available for vehicle customization. For ease of organization, design options are arranged in the following groups:

Functional Improvements are options that directly affect the various ratings and statistics (such as Speed, Load, Entry Points, etc.) of a vehicle.

Design Enhancements, p. 116, are special features and designs that allow a vehicle to perform functions it normally can't.

Facilities are tools, equipment, and elbow room that allow characters to do things inside the vehicle while moving. Facilities begin on p. 119.

Robot Options are special features available to robots (see *Robots*, p. 44) and begin on p. 121.

Game Information

The description of each option explains the option's game effects and uses the following specifications:

Design Cost: The option's design cost is expressed in Design Points. Some design options have a flat Design Point cost, while others vary according to the selected level of improvement.

Hull Factor: Unless otherwise noted, any improvement for a vehicle with a Hull rating uses the formula $(100 \times \text{Hull}^2)$. This is called Hull Factor and appears throughout the Vehicle Design and Vehicle Customization sections.

Maximum Rating or Improvement: This specification lists the maximum rating or amount of improvement a vehicle can take in the design option. Unless otherwise noted, maximums for Cargo Factor and Depth are listed with the chassis on the Chassis Table (p. 202) and maximums for Load, Speed, Acceleration, and Economy are listed with the specific power plants on the Power Plant Table (p. 194).

CF Consumed: This number is the Cargo Factor that the design option takes up. Players and gamemasters should keep track of the total Cargo rating of the vehicle during design to ensure that it does not exceed the maximum allowed for the chassis chosen. If the vehicle does not have enough CF in its Cargo rating to accommodate the design option, it cannot accept the option. Note that installing options decreases the available cargo space for storing goodies from personal gear to secret caches of ammo and weapons.

If no CF Consumed is listed in a design option's description, that design option does not require Cargo space.

Load Reduction: This listing is the number of kilograms from the vehicle's Load rating that the design option takes up. Players and gamemasters should keep track of the total Load rating of the vehicle during design, to ensure that it does not exceed the maximum allowed for the power plant chosen. If the vehicle does not have enough kilograms in its Load rating to accommodate the design option, it cannot accept the option. Note that installing options decreases the available Load rating for hauling anything else.

If no Load Reduction is listed in a design option's description, that design option does not reduce the vehicle's Load rating.



FUEL TANK CAPACITY TABLE

Engine Type	Capacity Increase	Design Point Cost	CF Consumed	Load Reduction
Electric Battery/Fuel Cell	5 PF	2	None	1 kg
Body 0 vehicles only	1 PF	20	0	0.2 kg
Methane	5 bars	2	0.5 CF	None
Gas/Diesel	1 liter	2	1 CF/50 liters	None
Jet	10 liters	1	1 CF/50 liters	None

Fuel Tank/Capacity Enlargement

The Design Point, CF, and Load costs of enlarging a vehicle's fuel tank vary according to the type of engine used in the vehicle. These costs are listed in the Fuel Tank Capacity Table. Increasing the size of the fuel tank does not reduce the vehicle's Load rating.

Increased fuel tank capacity does make the vehicle heavier when the tanks are full, however. Increase the take-off and landing distances of non-electric aircraft by 10 percent when they are equipped with enlarged fuel tanks.

FUNCTIONAL IMPROVEMENTS

Functional improvements are straightforward improvements with no strings attached. In most cases, the limits for each option are dictated by the statistics set when determining the vehicle's chassis and power plant.

Acceleration Increase

This option improves a vehicle's Acceleration rating. Acceleration may not be increased beyond the listed maximum Acceleration.

Design Cost: 25 points per +1 increase to Acceleration.

Maximum Improvement: As listed in power plant description

Depth Enhancement

Depth enhancement reinforces the structure of a submarine, allowing it to descend to lower reaches underwater. The Depth rating of the submarine may be increased to the maximum depth allowed by the chassis.

Non-sub vehicles modified to operate underwater have starting Depth ratings equal to their (Body x 10) + 100 meters. Unmanned vehicles (such as drones) triple that calculation for their starting Depth ratings. The maximum Depth rating of a non-sub vehicle is calculated as follows: Maximum Depth = starting Depth rating x 2.

Design Cost: 2 points per 10 meters of additional Depth rating

Maximum Improvement: As listed in chassis description

Load Reduction: Hull Factor x (Body or Hull rating) x 2 kg per 10 meters of additional Depth rating

Extra Entry Points

This option adds, subtracts, or changes the type of entry points installed on the vehicle. Although there is no limit to the number, type and configuration of entry points on a vehicle, gamemasters should exercise common sense when reviewing requests for extra entry points. If the arrangement is unusual for that type of vehicle, gamemasters should add additional points to the Chassis Multiplier as if the vehicle were a unique prototype (see p. 113). Similarly, if the design is physically impossible or unfeasible, gamemasters should disallow it.

Design Cost: 0

Maximum Improvement: The number of additional entry points cannot exceed the vehicle's Body ÷ 2 (round up). For vehicles with hulls, additional entry points cannot exceed the Hull rating x 2.

Handling Improvement

Vehicle Handling ratings can be reduced at a cost of 25 Design Points per 1-point reduction. A vehicle's Handling rating cannot be reduced to less than half of the chassis' original Handling rating (rounded up) listed on the Chassis Table (p. 202). For ground vehicles, Handling reductions must be applied separately to the on-road or off-road Handling rating.

Design Cost: 25 points per -1 to Handling rating

Maximum Improvement: 1/2 of chassis' original Handling (rounded up)

Improved Economy

The Economy of a vehicle may be improved at a cost of 5 Design Points for each 5-percent improvement (multiply the initial Economy rating by 0.05 to determine the amount gained in each increment).

Design Cost: 5 points per 5-percent increase

Maximum Improvement: As listed in power plant description

Increased Cargo Space

The cargo capacity of a vehicle may be increased at a cost of 1 Design Point for every 0.2 CF increase.

To ensure that a vehicle does not exceed its allowed Cargo rating during vehicle design, players and gamemasters are advised to keep a tally of the vehicle's total Cargo rating. Add the CF consumption of all design options and vehicle modifications selected, and subtract the total CF Consumed from the vehicle's Cargo rating to determine the final Cargo rating for the vehicle.

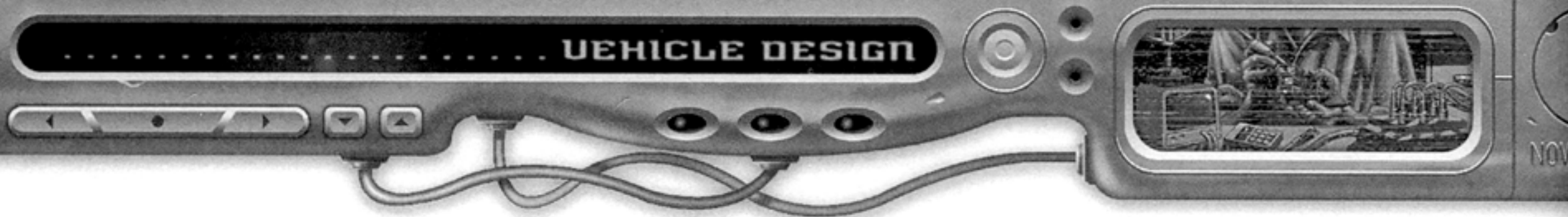
Design Cost: 1 point per +0.2 CF

Maximum Improvement: As listed in chassis description

Load Increase

A vehicle's Load may be increased at a cost of 1 Design Point for every 10 kilograms of additional Load for vehicles with a Body of 1 or greater. Vehicles with a Body of 0 increase their Load at a rate of 1 Design Point per 1 kg.

To ensure that a vehicle does not exceed its maximum Load rating during vehicle design, players and gamemasters



are advised to keep a tally of the vehicle's total Load rating. Add the Load Reductions of all design options and vehicle modifications selected, and subtract the total Load Reduction from the vehicle's Load rating to determine the final Load rating for the vehicle.

Design Cost:

Body 0 Vehicles: 1 point per +1 kilogram to Load rating

Body 1 and Larger Vehicles: 1 point per +10 kilograms to Load rating

Maximum Improvement: As listed in power plant description

Signature Improvement

A vehicle's Signature may be improved by using alternative non-metallic materials in the vehicle's chassis or hull or by re-designing the vehicle's structural profile to reduce its radar cross-section and exhaust emissions.

The gamemaster may set limits for Signature improvement.

Design Cost: (Levels of improvement)⁴ x 200 points

Maximum Improvement: Gamemaster's discretion

Speed Increase

A vehicle's Speed rating may be increased at the cost of 2 Design Points per 1-point rating increase.

The stall speeds of fixed-wing aircraft cannot be changed with this design option.

Design Cost: 2 points per +1 increase to Speed rating

Maximum Improvement: As listed in power plant description

DESIGN ENHANCEMENTS

Design enhancements are design options that augment a vehicle's normal performance parameters.

Airlock

An airlock is a special type of entry point that enables personnel to enter or leave a submarine safely. An airlock consists of a sealed chamber with one doorway leading to the sub and another to the outside. The chamber can be filled with water or air to facilitate entering or leaving the sub.

Airlocks are available to submarines and any vehicle that possesses the EnviroSeal™ system.

Design Cost: 500 points

CF Consumed: 40 CF per lock, plus 40 CF per the number of persons using the lock at one time

Load Reduction: 1,000 kg

Auxiliary Engine

An auxiliary engine is a secondary power plant that operates in place of (but not concurrently with) the main engine. Auxiliary engines commonly serve as emergency backup in the event of main engine failure. However, auxiliary engines can be put to other uses as well; for example, some "stealthy" vehicles carry auxiliary electrical batteries as a "silent drive" system, thus reducing their noise and thermal footprint to avoid detection.

Auxiliary engines typically use electric battery, electric fuel cell, methane, gasoline or diesel power plants. An auxiliary engine has separate Speed, Acceleration, Signature, Economy, and Fuel ratings. The starting and maximum Speed and

Acceleration ratings for auxiliary engines are half the normal listed for the power plant type used. For the starting and maximum Load values for the vehicle, use the lowest Load values listed for the main or auxiliary power plant.

During game play, only one engine (main or auxiliary) may be operating at any one time. Switching between engines requires a Complex Action, and the new engine becomes operational at the start of the next Combat Turn.

In most cases, only one auxiliary engine will be necessary. Vehicles can have more than one auxiliary engine, but additional engines must be approved by the gamemaster.

Vehicles with a Body of 0 cannot carry auxiliary engines.

Design Cost: Power plant cost of secondary power plant type

CF Consumed: (Body + 1) x 2 or (Hull + Hull Factor) x 2

Load Reduction: 10% of maximum Load value for vehicle

Ballast Tanks

Ballast tanks allow a chassis other than a submarine (for example, a walker drone) to change its depth underwater. Note that the vehicle also needs the EnviroSeal engine seal modification to function underwater as well. (See *EnviroSeal*, p. 132.) This design option is not available to boat and ship chassis.

A vehicle equipped with a ballast tank ascends and descends at a rate of 1 meter per Combat Turn. Ballast tanks do not provide any horizontal propulsion; that comes from the vehicle's drive train. (See *Amphibious Operation Packages*, p. 149.)

Design Cost: (Body)² x 10 points

CF Consumed: (Body)² x 2

Load Reduction: (Body)² x 25 kg

Ducted Waterjet Drive

A ducted waterjet drive is similar to a turbojet engine, except it compresses and expels water rather than air. This method generates far less cavitation than a conventional screw drive, while maintaining a moderate amount of thrust.

This option is available to submarines only. A submarine equipped with a ducted waterjet drive increases its Sonar Signature by +2 when the drive is engaged. While the drive is engaged, the submarine's Speed rating drops to 20 meters per turn. Submarines moving on a ducted impeller produce cavitation only when their speed exceeds the Speed rating, and cavitation in this mode negates only the +2 modifier provided from the ducted impeller drive.

Design Cost: (5,000 x Hull Factor) points

CF Consumed: (4 x Hull Factor) CF

Load Reduction: (3 x Hull Factor) kg

Electromagnetic Ducted Waterjet (EMD) Drive

The electromagnetic ducted waterjet (EMD) drive takes the ducted waterjet drive one step further. When water rushes in through the intake, an electrolytic generator charges it with negative ions. A solenoid coil then accelerates the ionized water down the length of the tube, assisted also by turbine compressors inside the tube. The result generates a terrific amount of thrust with the least amount of cavitation noise. There are several disadvantages, however. First, submarines running on an EMD drive are more vulnerable to detection by



magnetic-anomaly detectors (see *Magnetic Anomaly Detector*, p. 146). Second, a nuclear reactor is required to produce the enormous power required by the EMD drive. This disadvantage also goes hand in hand with the EMD drive's second disadvantage: its price tag.

When a submarine engages an EMD drive, its Sonar Signature increases by +2. Additionally, its Speed rating does not drop, and the submarine does not cavitate. However, the submarine is more vulnerable to detection by magnetic-anomaly detectors (MADs). Reduce the vehicle's normal Signature rating by 3 for Sensor-related tests using MADs.

Only submarines equipped with nuclear power plants may install an EMD drive.

Design Cost: (50,000 x Hull Factor) points

CF Consumed: (6 x Hull Factor) CF

Load Reduction: (4 x Hull Factor) kg

Fin Drive

A fin drive is a special type of propulsion system available only to boats and submarines with a Body of 4 or less. Instead of using a conventional screw or waterjet, a fin drive uses fins made of smart materials (see *Smart Materials*, p. 118) that bend and ripple from side to side like the fins of fish, sea turtles or other marine animals. This method of propulsion is far more efficient than either screws or waterjets, and it consequently allows a boat or sub to move faster while consuming the same amount of power.

This design option increases the starting and maximum values of a vehicle's Speed and Acceleration ratings by 25%. Vehicles built with this option take the "Smart Materials used" markup increase, as well as a +4 increase to the Availability target number. A vehicle with this option cannot take the smart materials design option, as the fin drive already uses smart materials.

Design Cost: (Body)² x 100 points

CF Consumed: (Body -1) CF

Load Reduction: Half the Starting Load value for the power plant

Hybrid Engine

A hybrid engine is a combination of an electrical-battery engine with an internal combustion engine (methane, gas, or diesel). Hybrid engines are available for ground vehicles and small watercraft. During operation, the vehicle draws power from the combustion engine, which simultaneously recharges the batteries. When the operator wants the vehicle to run more quietly, or when it runs out of fuel, the battery engine engages.

To create a vehicle with a hybrid engine, begin with a methane, gasoline, or diesel power plant and this design option. The base Signature of the power plant increases by +1, while the base and maximum Economy ratings double. Reduce by 2 the starting and maximum Acceleration ratings for the power plant. These changes take place before any other design options.

This design option is available only to the bike, boat, car, and special vehicle chassis that can use methane, gasoline or diesel power plants.

Design Cost: 25 percent of power plant cost

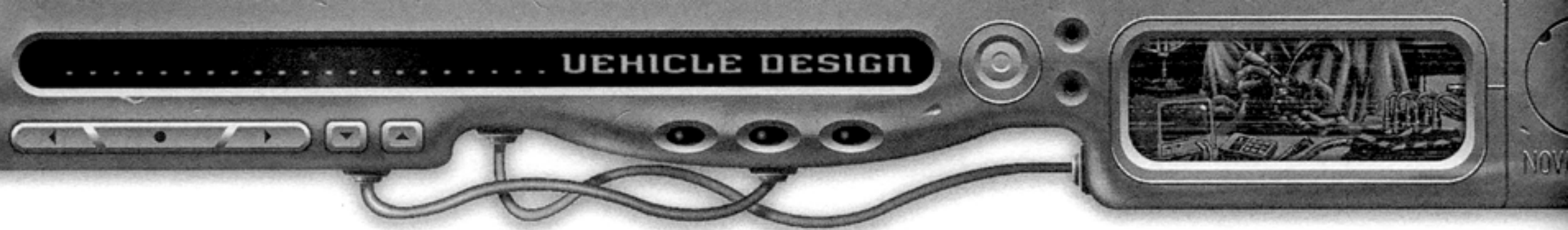
CF Consumed: 6

Load Reduction: Half the starting Load value

Hydrofoil Capability

Hydrofoil capability may be added to all boats (except for skiffs). When engaging hydrofoil capability, the boat elevates on three large "skis" that eliminate drag on the water, thus improving the craft's Speed, Acceleration and Signature.

When a boat's hydrofoil is engaged, the vehicle's Speed and Acceleration ratings increase by 25 percent (rounded down) and the Handling rating increases by 2. On the downside the, the boat's Signature increases by 1.



Design Cost: 50 points
CF Consumed: 8

Improved Takeoff/Landing Profile

All fixed-wing aircraft chassis begin with a standard take-off and landing profile (see the Runway Distances Table, p. 68). However, players may add STOL or VSTOL capabilities to their fixed-wing aircraft. Changing an aircraft's takeoff/landing profile does not consume CF or reduce Load.

Design Cost: 250 for STOL, 400 for VSTOL

Removed Manual Controls

A vehicle with this design option lacks any of the controls normally used for manual piloting: pedals, steering wheels, shifting levers, joysticks and so on. In their stead, the vehicle must feature either a datajack port (p. 128) or rigger adaptation (p. 130). To pilot the vehicle, a character must control it through the virtual dashboard, control it remotely or rig it.

A vehicle with removed manual controls increases its Load by 10 kg and its available CF by 2.

Design Cost: 50

Setup/Breakdown Time

This design option allows a vehicle to be broken down into a more compact form for easy transport. A broken-down vehicle takes up only one-third the storage space the vehicle normally requires (see *Drone Storage Requirements*, p. 62). This option is available only to drones with a Body of 3 or less and other vehicles with a Body of 2 or less.

The initial cost of this option allows a vehicle to be broken down. The base setup/breakdown time is equal to (Body x 2) + 1 minutes. Each additional (5 x Body) Design Points spent reduces this time by 1 minute, down to a minimum of half the base (rounded down).

Taking this design option reduces the maximum CF for the chassis to half its standard value.

Design Cost: Body x 5 points

Setup/Breakdown Time Reduction: (Body x 5) points per 1 minute reduction

Maximum Improvement: Half the base Setup/Breakdown Time (rounded down)

CF Consumed: See text

Load Reduction: 0 kg

Smart Materials

Smart materials are a revolutionary new state-of-the-art enhancement available only as a manufacturer's design option. Smart materials consist of layered piezo-electric compounds that bend and warp when a certain electrical voltage is applied.

If a vehicle is equipped with smart materials, reduce its Handling by 1 and add a +1 modifier whenever the vehicle makes a Stress Test (see *Stress*, p. 62).

Smart materials also reduce a vehicle's weight and increase the vehicle's maximum Speed, Acceleration and Load ratings by 15 percent.

Note that smart materials do not automatically increase a vehicle's Speed, Acceleration and Load ratings—instead, they

raise the limits on those ratings. A player must pay for the Speed Increase, Acceleration Increase and Load Increase design options to actually increase the ratings.

Helicopters equipped with smart materials also increase their Signatures by 1, because a smart-material drive shaft eliminates the rotor's mechanical actuators that cause the audible "eggbeater" noise and increase the radar cross section.

Smart materials increase the Street Index by 1.

Design Cost: 100 points

Special Machinery

Special machinery is a catch-all category that covers unique, unusual, or highly specialized equipment that is not likely to be found on any other model of vehicle. The CF of special equipment cannot exceed the vehicle's Body multiplied by 2; special machinery Load reduction is 25 kilograms per CF. The exact CF and Load requirements of special machinery are set by the gamemaster.

Vehicles that carry special machinery must take an additional mark-up modifier (see p. 113).

Design Cost: 0

Maximum Rating: Gamemaster's discretion (if applicable)

CF Consumed: Gamemaster's discretion (recommended Body x 2 CF)

Load Reduction: Gamemaster's discretion (recommended 25 kg per CF consumed)

Special Storage Area

Special storage areas represent any cargo volume that requires special storage considerations. Examples include refrigeration units, bulk liquid tanks, high- or low-pressurized chambers, and so on. Special storage areas may be accessible from either inside the vehicle, outside the vehicle, or both. (The choice doesn't affect the cost or requirements, but once made it cannot be changed.)

The vehicle designer must designate how much CF is dedicated to special storage. This dictates the Design Point cost, as well as any additional CF or Load taken up to accommodate support machinery.

Design Cost: 1–9 CF = 3 points, 10–99 CF = 6 points, 100–999 CF = 9 points, 1,000+ CF = 12 points

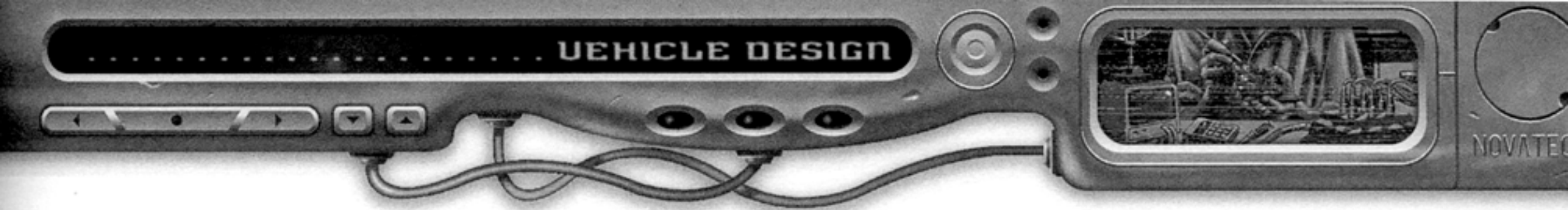
Maximum Rating: CF available in vehicle

CF Consumed: 10 percent of designated CF (rounded up)

Load Reduction: 1 kg per 10 CF of special storage

Structural Agility

This option is available only for vehicles that incorporate the drive-by-wire modification (see *Drive-by-Wire Systems*, p. 129). The digital-control software of a drive-by-wire system can make minute adjustments many times per microsecond; this allows designers to create dynamically unstable vehicles that would otherwise be uncontrollable. Each level of Structural Agility provides a +1 bonus to the character's Reaction attribute when driving the vehicle. This Reaction bonus also applies to a rigger's Control Pool, so it effectively raises the Control Pool by 1 when the character is rigging the vehicle.



The vehicle's Drive-by-Wire level equals the vehicle's maximum Structural Agility level.

A vehicle must be fitted with a drive-by-wire system during vehicle design to accommodate Structural Agility. This option cannot be added if the vehicle is fitted with a drive-by-wire system during vehicle customization. Additionally, increases to a vehicle's drive-by-wire system during vehicle customization do not increase the levels of Structural Agility it may accept.

Design Cost: Body x 150 points per level (plus the drive-by-wire modification)

Maximum Rating: Number of levels purchased in the drive-by-wire modification

Tailhook System

The tailhook system allows an aircraft to take advantage of catapults and arrestor hooks when taking off or landing from vehicles. It consists of three things: a tailhook for catching the arrestor wires, a redesign of the landing gear to allow it to mate with a catapult, and reinforcement of the landing struts to cushion against the greater stress of carrier takeoffs and landings.

Design Cost: 10% of chassis cost

CF Consumed: 1 CF per 2 points of Body

Load Reduction: Body x 125 kg

FACILITIES

Facilities are design options that let people do things inside a vehicle. These options include everything from living amenities to working facilities.

The design options in this category include the term "People Space" in their CF and Load Reduction specifications. The People Space requirement lists the number of CF or Load that needs to be set aside for people to work in while the vehicle is moving. Consequently, CF or Load designated as People Space will not be available for design options or modifications.

People Space requirements assume that the occupants are roughly human-sized and the design options accommodate humans, elves, orks, and dwarves. Increase People Space requirements by 50 percent if the option must accommodate trolls. Likewise, dwarf-only facilities can reduce People Space requirements by 50 percent.

Note that People Space is not always a mandatory requirement; if a vehicle lacks the CF or Load to meet People Space requirements (or characters want to use that space for other purposes), the design option can still be used. However, to use those facilities, the vehicle must be parked and motionless. (In this case, some or all of the People Space requirement is being taken care of by the outdoor space around the vehicle.)

People Space not occupied by people may be used to store cargo. However, the cargo must be removed to access the facility.

Flight Deck

A flight deck is a flat surface that allows aircraft to take off and land on the vehicle. This option normally appears on ships, though some vehicles possess this option for launching and recovering aerial drones.

Flight decks are rated by length. The length of a flight deck dictates the type of landing/takeoff profile an aircraft must use when taking off or landing on the deck (see *Takeoff and Landing*, p. 68). A vehicle can launch or land only aircraft that have Body ratings less than half its Body rating. (For ships, use the Hull rating multiplied by 10 in place of Body.) Flight decks can launch or land only one aircraft at a time, and taking off or landing on a flight deck requires a Vehicle Test. (Failure means that the vehicle has missed the landing deck and must make a Crash Test.)

Listed below are two additional options available for flight decks. Neither option assists in VTOL takeoffs or landing.

Catapult/Arrestor Wire: The catapult/arrestor wire option assists aircraft in landing, effectively reducing the runway length required by the aircraft. If an aircraft has a tailhook system, divide the required runway distance (see the Runway Distances Table on p. 68) by 3. Additionally, the pilot receives a -2 modifier to the Vehicle Test when taking off or landing.

Angled Deck: An angled deck (typically at a slope between 10 and 15 degrees from horizontal) assists aircraft landing by providing a natural gravitational brake. Aircraft landing on an angled flight deck receive a -1 modifier on their Vehicle Tests (see *Taking Off/Landing on Unusual Surfaces*, p. 68).

Design Cost: (Deck Length in meters) x (Body or Hull Factor)

Catapult/Arrestor Wire: (Body x 2) or (Hull Factor x 2)

Angled Deck: +10% of deck cost

CF Consumed: 0 CF

Catapult/Arrestor Wire: (Body x 2) or (Hull Factor x 2) CF

Load Reduction: 0 kg

Catapult/Arrestor Wire: (Body x 10) kg or (Hull Factor x 10) kg

Angled Deck: (Deck Length) x 20 kg or 20 x (Deck Length + Hull Factor) kg

Living Amenities

Living amenities consist of folding bunks, portable toilets, mini-refrigerators and other features that enable one or more persons to live temporarily in the vehicle in relative comfort. Three levels of living amenities are available: basic, improved and high.

Basic living amenities include most of the living features of someone living in a coffin hotel (Low lifestyle). Improved living amenities are more expensive and include living features normally found at Middle lifestyle. High living amenities are the most expensive and are comparable to those provided by a High or Luxury lifestyle.

Note that living amenities provide only the facilities needed to sustain the comparable lifestyle. They do not include the cost of expendable supplies, which must be paid for separately and replenished on a periodic basis. (For simplicity assume that supplies comprise ten percent of a lifestyle's monthly cost.)

These amenities may be mixed (to reflect divisions such as first class, business class, and coach, for example), but accommodations count separately for each type. (Passengers supported by basic amenities do not count against improved, and so on.)



PEOPLE SPACE REQUIREMENTS

Type of Work	CF	Load
Computer/Electronics	108 CF per technician	200 kg per person
Weapons	512 CF per weaponsmith	250 kg per person
Enchanting Magic	500 CF + 64 CF per magician	250 kg per person
Medical	162 CF per patient	200 kg per patient + 150 kg per medical attendant
Miscellaneous	800 CF minimum	200 kg per person + weight of object being worked
Ritual Conjuring/Sorcery	500 CF + 64 CF per magician	100 kg per person
Vehicles		
Body 0 Vehicles	162 CF per mechanic	200 kg per person
Ground/Water Vehicles	(45 x Body ³) per vehicle	See Body Table (use maximum value)
Fixed Wing Aircraft	(125 x Body ³) per vehicle	See Body Table (use maximum value)
Other Aircraft	(64 x Body ³) per vehicle	see Body Table (use maximum value)

One additional option available to all living amenities is partial amenities. Partial amenities include small utilities that wouldn't call for an entire lifestyle but still carry some living support (for example, portable toilets or wet bars). Partial amenities cost half the normal rate of the comparable lifestyle for one person. Partial amenities are not subject to the specification increase for large numbers of people, but if a vehicle is intended to carry a large number of people, one additional set of partial amenities is required for each group of 50. (For example, an airliner designed to carry 200 people would require 4 portable toilets.) Partial amenities have no People Space requirements.

Design Cost:

Basic: 40 points per person

Improved: 50 points base cost, plus 40 points per person

High: 100 points base cost, plus 40 points per person

Partial: Half the cost of the comparable lifestyle for one person

CF Consumed: 12 CF per person

People Space: 150 CF + 6 CF per person

Load Reduction: 100 kg per person

People Space: 150 kg per person

Work Shops and Facilities

This design option provides a work space within a vehicle to use shop and facility-sized tools (see *Tools*, p. 288, SR3). (Kits are small enough to be treated as cargo, and so are not normally available as a design option.) People Space requirements depend on the type of equipment being worked on (see the People Space Requirements Table).

Design Cost:

Shop: Nuyen cost of shop

Facility: 250 points, plus nuyen cost of facility

CF Consumed:

Shop: 52 CF

Facility: 500 CF (vehicle facility)/200 CF (computer or electronics facility)/300 CF (all others)

Load Reduction:

Shop: 250 kilograms

Facility: 1,000 kilograms

ROBOT OPTIONS

The design options in this category are available to those semi-autonomous drones known as robots (see p. 44). All robots must purchase the robotic-pilot advanced programming option.

Fuzzy Logic Augmentation

Fuzzy logic is a type of computing algorithm that is optimized to handle probabilities. Fuzzy logic allows computers to think not just in terms of "true" and "false" but also in terms of "maybe," "very likely" or "probably not."

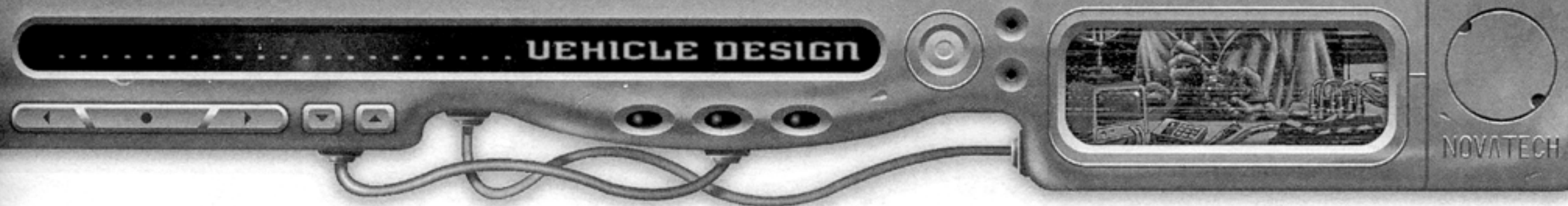
A robot with fuzzy logic augmentation has more sophisticated fuzzy logic algorithms than normal. Each level in this design option adds two dice to the robot's Pilot rating when it makes Comprehension Tests (p. 157, SR3).

Design Cost: Adaptation Pool x 100 points per level

Maximum Rating: Robot's Pilot rating

Improved Neural Network Algorithms

The neural network model more closely imitates the function of biological neurons. Though computationally inefficient at an individual level, the net synchronicity of hundreds of thousands of neurons working together in parallel makes a neural network vastly superior at pattern-recognition applications and decision-tree navigation than ordinary serial logic.



A robot with improved neural networks is even more adept at adapting to surrounding conditions. Each level in this option provides one extra die to the robot's Adaptation Pool.

Design Cost: Pilot rating² x 25 points per level

Maximum Rating: Robot's Pilot rating

Multi-Object Manipulation

Multi-object manipulation uses advanced symbolic manipulation techniques to forecast the interaction of multiple objects within a scenario. Within a robot's programming, multi-object manipulation allows a robot to apply its adaptive programming to a network of drones.

A robot must possess the BattleTac IVIS Receiver Module (see p. 142) to take advantage of this design option. Each level possessed in this option adds one die to any IVIS Pool created (see *IVIS Pool*, p. 25). At least one die from the IVIS Pool must result from successes on the IVIS Test.

Design Cost: Adaptation Pool x 100 points per level

Maximum Rating: Robot's Adaptation Pool

Robotic-Pilot Advanced Programming

Robotic-pilot programming is the advanced version of drone-pilot programming (see p. 84). The advanced neural network structure and adaptive decision-making abilities of robotic pilots distinguish robots from ordinary drones. Robotic-pilot programming is not compatible with drone-pilot programming—a drone can have one or the other but not both.

Like drone pilots, robot pilots are available in Pilot ratings from 1 through 5. While a Rating 1 robot pilot is comparatively "dumb" and unskilled, it still possesses interpretive abilities far beyond those of a basic drone. Rating 5 robot pilots are cunning expert systems that exhibit comprehension levels beyond those of some metahumans.

Robotic pilot programming also provides the robot with an Adaptation Pool (see p. 44) equal to its Pilot rating. This Adaptation Pool represents the robot's ability to learn from its environment and adapt its methods to pursue its prime directive. Robots use Adaptation Pool dice like any other dice pool.

Design Cost: Pilot Rating³ x 50 points

Maximum Rating: Pilot 5

Robotic Reflexes

By increasing processing power, boosting interpretive logic and streamlining command interfaces, a robot's ability to move and respond quickly can be improved. This allows a robot that

is acting under its own control (it is not directly controlled by a rigger) to act more quickly and decisively. In effect, this design option is a robotic version of cybernetic wired reflexes.

Each level of robotic reflexes provides the robot with an extra Initiative die when it is operating under its own control (see *Robots*, p. 44).

Design Cost: 100 points per level

Maximum Rating: 3

GAMEMASTER APPROVAL OF VEHICLES

The vehicle design rules were designed to provide players with as much flexibility as possible when creating vehicles. This flexibility gives players enormous freedom to exercise their imaginations, but it also enables them to misuse the system. To prevent such misuse, the gamemaster has the right to approve, modify or disallow any new vehicle.

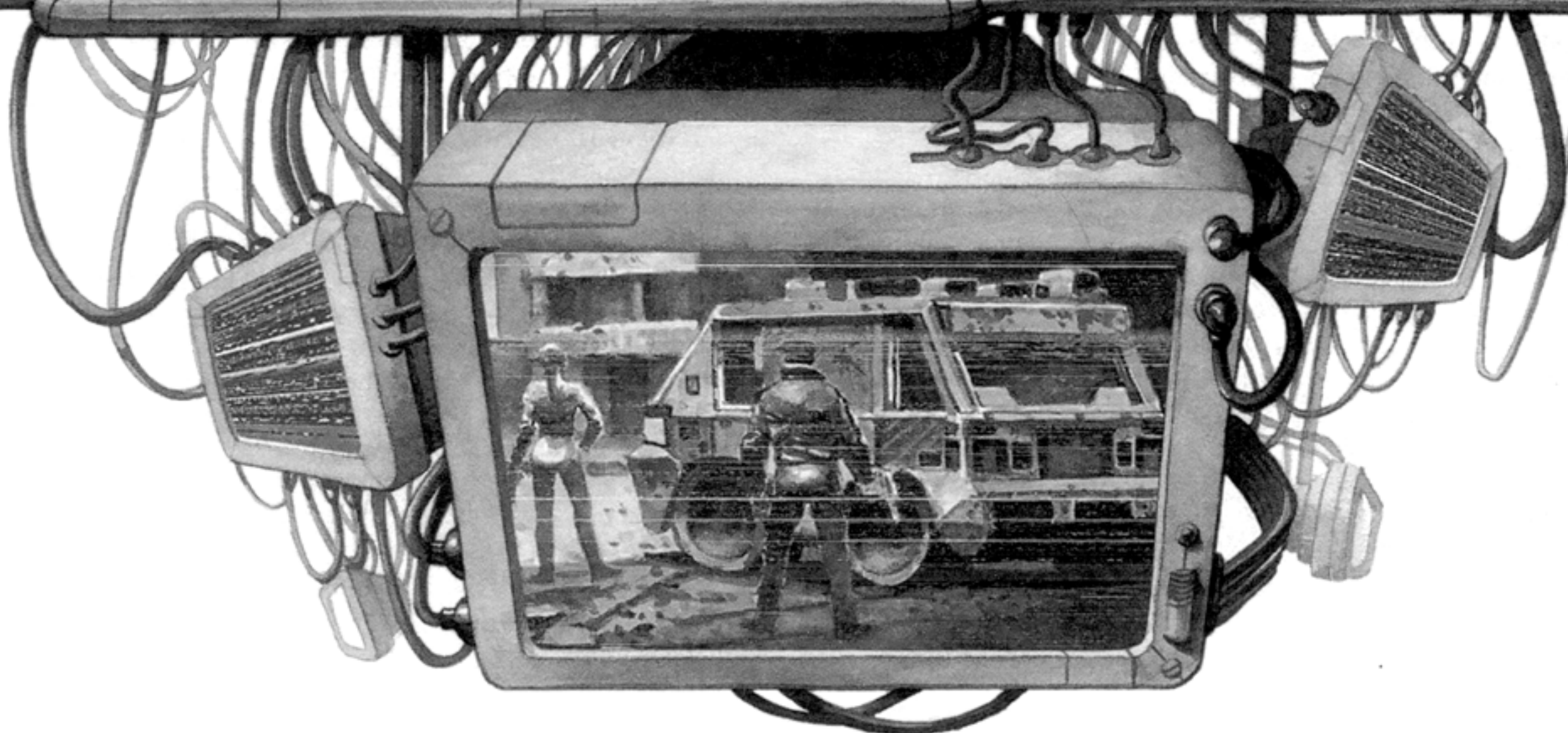
Ideally, vehicle design should be a cooperative process between the player and the gamemaster, with a little give-and-take on both sides. If a player has a really creative, solid and well-thought-out idea, the gamemaster should respect the player's efforts and let him run with it. At the same time, the gamemaster also has the responsibility to keep the game balanced, entertaining and challenging—and players should respect that.

If a player creates a vehicle that threatens the balance of the game or gives an unfair advantage (either to the player character or the NPCs), the gamemaster has several options. For example, the gamemaster has the final say over the final vehicle cost, so by sufficiently raising the cost he can limit the vehicle's use in the game. Alternatively, the gamemaster can change any of the vehicle's ratings, features, design options and modifications, or even veto proposed design options and vehicle modifications. And as a last resort, the gamemaster can simply prohibit the player from introducing the vehicle into the game.

The final price of a vehicle is determined by its Street Index and Availability. Gamemasters are free to raise or lower either statistic, in the interest of adding variety to their games and preventing their campaigns from degenerating into vehicle "power gaming."

Also remember that vehicles are not created in a vacuum. Corporations are always on the prowl for prototypes, new tech breakthroughs and other specialized custom or design options. If a character creates a car that seems to work very well, don't be surprised when Nissan, Honda, Ford or Ares comes out with a very similar vehicle shortly thereafter.

VEHICLE CUSTOMIZATION



Like a magician's spells, a rigger's vehicles and drones give the rigger power in the third millennium. And in the same way a custom spell can make a name for a magician, a unique vehicle can set a rigger apart from all other joystick jockeys. This section covers the modification, upgrade and customization of existing production models.

Vehicle customization may be performed after a vehicle has been designed and manufactured. Unlike design, customization requires a skilled mechanic and parts. During vehicle customization, the following types of modifications may be performed: engine, control systems and protective-systems modifications; Signature enhancement; weapon-mount modifications; electronic-systems modifications and miscellaneous modifications/accessories.

Note that the vehicle modifications described here may also be incorporated during the vehicle design process (see *Vehicle Design*, p. 102).

THE CUSTOMIZATION PROCESS

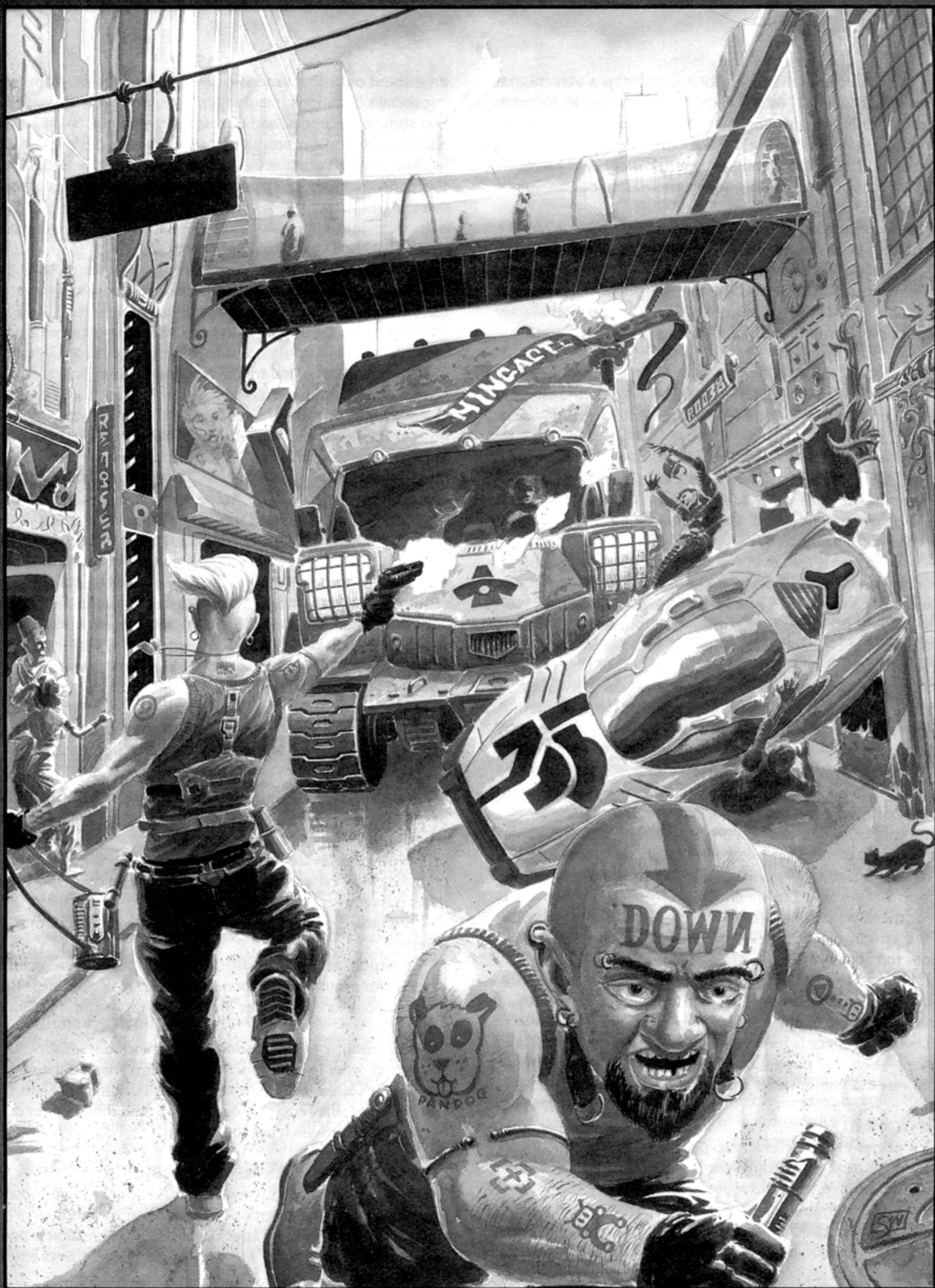
To customize a vehicle, the character first has to procure the parts. The character can do this however he likes—through a fixer, contacts, favors and so on. Use the rules for obtaining equipment, including Availability and Street Index, published in *SR3* (pp. 272–73).

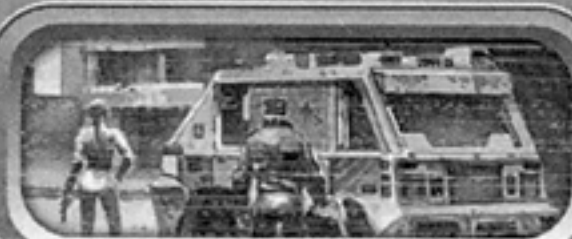
After obtaining the required parts, the character (or his mechanic) must install the modification by making an Installation Test with an appropriate Build/Repair skill (or skills). The required skill, Installation Test target number and required base time for each modification are listed in the modification's description. To find the actual time it takes to perform the modification, divide the listed base time by the number of successes generated on the Installation Test.

PARTS

Parts are the generic term for all types of components needed to make repairs, customizations or modifications. They included the actual item that will be installed as well as the kits to install them (screws, instructions, electronics and so on).

If a character is just repairing a vehicle, use the rules in *Repairing Vehicles* (pp. 149–50, *SR3*) to determine the cost of parts.





If the character is modifying or customizing a vehicle, the cost for modifications is listed on the *Parts Cost* line included in each modification description (see *Modifications*).

Parts are obtained using the standard rules for purchasing gear (see p. 272, *SR3*) through fixers, shadow mechanics or any other appropriate contact the gamemaster deems might have access to the parts.

Unless otherwise noted in *Modifications*, parts have the same Street Index and Availability as the vehicle they are being used to repair or modify.

The cost for parts reflects only the components; it does not include the cost for installation. To install parts, a character must spend the time himself or hire some one to do it.

THE MECHANIC CONTACT

Besides being the supplier of parts to a rigger, the shadow mechanic installs them—for a fee, of course. Using a mechanic means an outlay of hard earned nuyen to get the job done right, fast and secretly.

The going rate for shadow mechanics is 100 nuyen per work hour. Mechanics will work eight hours a day, five days a week. Any overtime beyond that is charged at time and a half (150¥ per hour) or more.

The base rate is for Level 1 contacts and friends of a friend, to whom the character must also pay the initial contact fee, as well as labor charges. (See p. 254, *SR3*, for information on contact levels and pp. 59–62, *SRComp*, for information on friends of a friend.) Level 1 contacts or friends of a friend rarely take rush jobs.

A Level 2 mechanic contact will charge less (between 50¥ and 75¥ an hour) and may waive any overtime if it is needed. A rush job may mean that the mechanic will charge up to the 100¥ per hour fee but will work straight through to get the job done.

A Level 3 mechanic will not only waive overtime, he'll also charge his buddy a discounted rate (25¥ to 50¥ an hour). He may not even raise the rate for a rush job or overtime.

The opposite of a rush job is a "spare time" job." If a character chooses this option he or she sacrifices speed for cost. The character parks his vehicle with the mechanic whenever he's not using it and the mechanic will get to it when biz is slow or there is nothing else going on. A spare time job doubles the length of time the repair or installation will take but reduces the cost by half.

It is up to the gamemaster to decide the vehicle's condition if the character wants to use the vehicle before the repair or installation time is up.

Level 2 or 3 contacts may also accept alternate means of payment—favors, paydata, gear, or other barter/trade goods—at the gamemaster's discretion.

DO-IT-YOURSELF

If a player character elects to perform a modification himself, he must deal with a different set of restrictions—namely, the amount of time he can devote to the work.

As a rule of thumb, a character can spend up to six hours a day working on a vehicle and still have time available to meet with contacts, pursue legwork, pay bills and so on. Any more

time spent on customization prevents the character from meeting social obligations (resulting in irate landlords, angry friends and significant others, and uncooperative contacts). In fact, if a character spends more than twelve hours performing customization, he cuts into his bodily sustenance time and faces the consequences of sleep deprivation, malnutrition, lack of exercise and so on.

WEIGHT AND SPACE RESTRICTIONS

Certain modifications consume Cargo space or Load. This limits the modifications a vehicle can carry, because no vehicle can exceed its Cargo or Load ratings.

If desired, riggers and their mechanics can scrape up some extra CF by using up the vehicle's "passenger room." A rigger can scrape up an extra 1.5 CF (rounded down) for every passenger seat the vehicle has.

However, scraping up extra CF in this manner means that equipment is shoved into areas normally reserved for elbow, leg or head room. This makes the vehicle less comfortable and imposes an additional +1 to the power of any damage that a character might have to resist as a result of a crash or collision.

INCORPORATING MODIFICATIONS DURING VEHICLE DESIGN

Any of the listed modifications may be installed during the vehicle design process. In this case, no Installation Tests are required. The character simply pays the required Design Cost and reduces the vehicle's CF and Load by the amounts listed in the modification descriptions.

MODIFICATIONS

The following modifications may be installed as customizations or during the vehicle-design process.

Engine modifications affect the engine or motor of a vehicle.

Control-systems modifications affect the control, driving or piloting of a vehicle. These modifications include rigger adaptation, autonavs and drone pilots.

Protective-systems modifications affect the Armor rating of a vehicle or otherwise enhance the protection of the vehicle or its passengers.

Signature modifications improve the Signature rating of a vehicle.

Weapon-mount modifications improve the vehicle's capacity for mounting weapons and weapon accessories. These modifications do not cover vehicle weapons, ammunition or ordnance.

Electronic-systems modifications include sensors, ECM, ECCM and other internal electronic systems that aid the vehicle.

Accessories include items such as bucket seats, anti-theft systems and other creature comforts for the metahuman driver of the mid-twenty-first century.

CUSTOMIZATION AND DESIGN SPECIFICATIONS

Each modification description includes *Customization Specifications* and *Design Specifications*. A modification's customization specifications apply when the modification is added as a customization after the vehicle has been manufactured.



Design specifications apply when the modification is incorporated during vehicle design.

Design Specifications

Design Cost lists the modification's design cost as expressed in Design Points.

Maximum Rating or Improvement (Max Rating/Improvement) lists the maximum rating or amount of improvement a vehicle can take in the modification during design. If this listing is not included, there is no maximum improvement (other than the maximum imposed by available Load, CF or other factors).

CF Consumed lists the CF that the modification takes up. If no CF is listed in the modification/feature description, the modification/feature does not require cargo space.

Load Reduction lists the number of kilograms from the vehicle's Load rating that the modification takes up. If no load reduction is listed in the modification/feature description, the modification/feature does not affect the vehicle's Load rating.

Customization Specifications

Parts Cost lists the nuyen cost of the parts required for the modification. If the cost is based on the vehicle's list cost, do not factor in the vehicle's Street Index multipliers.

Parts Availability (SI) lists the Availability rating for the parts or equipment required for the modification. The Street Index (SI) for the parts or equipment required for the modification is included in parentheses.

Equipment Required (Equipment Req'd) specifies the type of tools and working gear needed to perform the installation or repair: kit, shop or facility (see p. 288, *SR3*, for more information on working gear). Unless otherwise specified, the type of tools required are those for the skill listed under **Skill Test**.

Base Time/Skill Test lists the base time and skill test required for the modification. The amount before the slash is the base time, in hours, required to install the modification (see *The Customization Process*, p. 122). After the slash is listed the relevant skill test and target number needed to install and repair the modification. Some modifications may require more than one skill for successful installation or repair. If this is the case, the character must make successful tests with each of the listed skills to perform a successful installation or repair. A separate **Target Number** listing is provided for tests that require variable target numbers.

Maximum Rating or Improvement (Max Rating/Improvement) lists the maximum rating or amount of improvement a vehicle can take in the modification during design. If the vehicle being customized received the modification during the design process, its existing modification levels count against the maximum. If this listing is not included, there is no maximum improvement (other than the maximum imposed by available Load, CF or other factors).

CF Consumed: See *Design Specifications*, above.

Load Reduction: See *Design Specifications*, above.

ENGINE MODIFICATIONS

Engine modifications affect a vehicle's power-producing systems. Some modifications improve the performance of the

engine and enhance Speed, Acceleration or Load. Others provide secondary means of generating power to propel the vehicle.

Engine Customization

Engine customization involves a radical redesign of the existing engine to perform at levels well beyond normal. Engine customization enables a vehicle to exceed the standard maximum Acceleration, Speed or Load ratings for that particular type of vehicle, but at the cost of bypassing numerous performance safeguards and thereby greatly increasing the risk of engine failure during operation.

Engine customization is usually a vehicle modification, but gamemasters may also use it as a design option to reflect prototype models that have not yet been fully tested. During the vehicle design process, engine customization may increase a vehicle's Speed rating above the normal maximum specified on the Power Plant Table (p. 194).

Engine customization is measured in levels. Each level increases either the Speed rating by 30, Acceleration by 2, or Load by (Body x 50) kilograms. Each rating must be raised separately—in other words, three separate customizations are needed to increase a vehicle's Speed, Acceleration and Load all by one increment (+30, +2 and + [Body x 50]).

To determine the risk of a customized engine failing during operation, the gamemaster makes a secret Build/Repair Test. The target number equals the Installation Test target number multiplied by 2. If the engine customization is performed during the vehicle design process, the gamemaster rolls 6 dice against a Target Number 6. If the test succeeds, the engine will not fail. If the secret test fails, roll 1D6 and divide the result by 2, rounding up. The result is the number of *permanent* Stress Points added to the vehicle. These Stress Points cannot be reduced unless the customized engine is replaced by a factory-standard engine.

Design Specifications

Design Cost: 25 percent of the power plant's design-point cost for the first level of customization; 50 percent of power-plant cost per level for second and subsequent levels.

Max Rating/Improvement: The maximum improvement is equal to the power plant's maximum Speed, Acceleration, or Load, multiplied by 1.75 and rounded up. (One full level is possible in each category.)

Customization Specifications

Parts Cost: 5 percent of vehicle's list cost per level

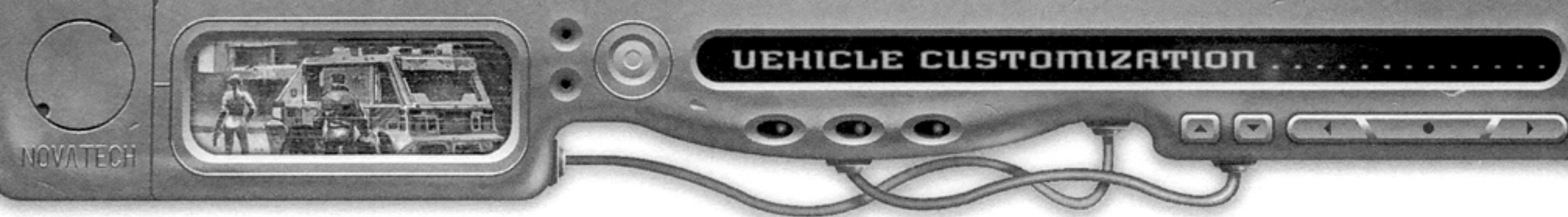
Parts Availability (SI): 8/14 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 40 hrs per level/Appropriate Vehicle B/R

Target Number: For ground vehicles and watercraft, the target number equals the number of customization levels plus 3. For drones and hovercraft, the target number equals the number of customization levels plus 4. For aircraft, the target number equals the number of customization levels plus 5.

Max Rating/Improvement: Multiply the vehicle's Speed, Acceleration, or Load by 1.5 to determine the new maximum. (One full level is possible in each category.)



GridLink™ Power

The GridLink system provides power to electrical ground vehicles through magnetic induction coils buried a few inches under the pavement in cities. Low-friction runners along the vehicle's underbelly induce an electrical current from the magnetic field produced by the roadbed coils. This modification is available only to ground vehicles. For more information on GridLink, see p. 16.

Design Specifications

Design Cost: 2 points

Customization Specifications

Parts Cost: 600¥

Parts Availability (SI): 3/96 hrs (1)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 16 hrs/Appropriate Vehicle B/R (4)

CF Consumed: 1

Nitrous Oxide Injectors

Nitrous oxide injectors inject nitrous oxide into the air compressors of gasoline and diesel engines, providing a short boost to power output. During vehicle combat, a driver may attempt to use this device to assist in performing the Accelerating/Braking action. When making an Accelerating/Braking Success Test, the player rolls an additional number of dice equal to the level of the injector.

Additionally, the player may use the device to increase his vehicle's Speed to its standard Speed rating multiplied by 2.5. However, the vehicle will decelerate by its Acceleration rating each subsequent turn afterward, until the vehicle's speed falls below its standard Speed rating.

Charges are stored in a pressurized gas cylinder, which can hold up to 20 charges.

This modification is available to vehicles that use diesel or gasoline power plants only.

Design Specifications

Design Cost: 55 points per level

Max Rating/Improvement: 6

CF Consumed: 1.5

Load Reduction: 15 kg

Customization Specifications

Parts Cost: 3,500¥ per level (Levels 1–3), 7,000¥ per level (Levels 4–5)

Parts Availability (SI): 4/48 hrs (1)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: (Level + 47) hrs/Appropriate Vehicle B/R (4)

Max Rating/Improvement: 5

CF Consumed: 2

Load Reduction: 15 kg

SunCell Power

The SunCell system consists of externally mounted solar cells that provide electrical power to the vehicle. Under clear

skies, the SunCell produces (vehicle's Body x 25) PF per hour. The system's power output is reduced by half in cloudy weather and reduced to zero at night or in heavily overcast weather. Tractors using this modification must mount their SunCell panels on all trailers they are towing.

SunCell systems are compatible with electric-engine driven vehicles. The accessory is not available for motorcycles.

Design Specifications

Design Cost: 5 points

Customization Specifications

Parts Cost: 500¥

Parts Availability (SI): 3/72 hrs (1)

Equipment Req'd: Vehicle shop

Base Time/Skill Test: 8 hrs/Appropriate Vehicle B/R (4)

CF Consumed: 1

Turbocharging/Superconductive Drive

Turbocharging improves the speed and acceleration of a methane, gasoline or diesel engine by using a turbine to compress the air that enters the engine's carburetor. A similar modification, called a "superconductive drive," provides electric engines with the same performance boosts. For convenience, both modifications follow the same rules and are collectively referred to as "turbocharging."

Each level of turbocharging increases a vehicle's Speed by 15 and its Acceleration by 1, while reducing its Signature by 1. The Economy of the vehicle also decreases by 5 percent per level. If turbocharging is added during vehicle design, apply the multiplier to the vehicle's Economy rating after Economy effects of all other design options have been applied.

Aircraft (except for electrically powered aircraft) cannot be turbocharged, as their engines already incorporate turbocharging as part of their designs.

Design Specifications

Design Cost: 75 percent of power plant cost (multiply power plant's design-point cost by 0.75) per level

Max Rating/Improvement: To determine the new maximum, multiply the vehicle's original maximum Speed by 1.25. (Note that a vehicle's maximum Speed can always be improved by 1 full level.)

Customization Specifications

Parts Cost: 10 percent of the vehicle's list cost per level.

Parts Availability (SI): 6/12 days (1.5)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 8 hrs per level/Appropriate Vehicle B/R

Target Number: For ground vehicles and watercraft, the target number equals the number of customization levels plus 2. For drones and hovercraft, the target number equals the number of customization levels plus 3. For electrically powered aircraft, the target number equals the number of customization levels plus 4.

Max Rating/Improvement: Multiply the vehicle's Speed by 1.5 to calculate the new maximum Speed (Note that a vehicle's maximum Speed can always be improved by 1 full level.)



CONTROL-SYSTEM MODIFICATIONS

Control-system modifications affect the operation or handling of the vehicle in one way or another. Some modifications enhance ease of control and thus reduce the vehicle's Handling rating. Others, such as rigger adaptation or autonavigation systems, provide alternate or supplementary methods of controlling a vehicle.

Adjusted Controls

Standard manual vehicle controls (steering wheels, foot pedals, dashboards and so on) are arranged to accommodate humans, elves and orks.

Dwarfs and trolls, because of their unusual sizes, have difficulty using such controls. Dwarf legs are too short to reach foot pedals and most dashboard controls will be out of a dwarf's reach. Likewise, trolls experience difficulty when attempting to manipulate standard-sized controls with their huge hands and feet. Adjusted controls are modified to fit the ergonomic needs of dwarfs and trolls and solve these problems.

If a dwarf or troll attempts to drive a vehicle with standard controls, he receives +3 target modifiers on all driving-related Success Tests. Likewise, if humans, elves or orks attempt to drive vehicles with adjusted controls, they receive +3 target modifiers on all driving-related Success Tests. Furthermore, dwarfs cannot drive vehicles with controls adjusted for trolls, and vice versa. Note that size does not matter when driving a rigged vehicle or driving via the virtual dashboard.

Adjusted controls are also available for any metahumans with disabilities that prevent them from using standard controls.

Note that vehicles with adjusted controls may be harder to come by, more expensive or simply unavailable in areas unfriendly to metahumans.

Design Specifications

Design Cost: 25 (Dwarf), 35 (Troll), 30 (Other)

Customization Specifications

Parts Cost: 2,500¥ (Dwarf), 3,500¥ (Troll), 3,000¥ (Other)

Parts Availability (SI): 3/72 hrs (1)

Base Time/Skill Test: 40 hrs/Appropriate Vehicle B/R (4)

Equipment Req'd: Vehicle facility

Advanced Drone Pilot

The advanced drone pilot option is required if the character desires a Pilot rating greater than 1. Note that vehicles equipped with remote control interfaces (see p. 130) have a base Pilot rating of 1.

A **Rating 1 pilot** is a simple system that does exactly what it's told and is easily confused.

A **Rating 2 pilot** is an enhanced system with limited autonomy and the ability to interpret commands with slight latitude. Level 2 pilot programming is the highest-level pilot system available on the public retail market.

A **Rating 3 pilot** is an advanced expert system and possesses roughly the same intelligence and comprehension level as an average metahuman. Level 3 pilots are the lowest level traded in the business-to-business market.

Rating 4 pilot systems employ sophisticated expert systems that give a drone the equivalent vehicular proficiency of a well-trained driver.

Rating 5 pilots are the most advanced pilot programs outside of Research & Development. Possessing the latest advances in expert systems and symbolic manipulation, Level 5 pilots are the piloting equal of pilots who've logged more than a thousand hours of flight duty. Level 5 is also the highest known pilot level in mass production.

Design Specifications

Design Cost:

Pilot 1: 0 pts (default rating)

Pilot 2: 50 pts

Pilot 3: 250 pts

Pilot 4: 1,250 pts

Pilot 5: 5,000 pts

Max Rating/Improvement: Pilot 5

Customization Specifications

Parts Cost:

Rating 1: 0¥ (default)

Rating 2: 5,000¥

Rating 3: 25,000¥

Rating 4: 500,000¥

Rating 5: 2,500,000¥

Parts Availability (SI):

Rating 2-3: 6/14 days (2)

Rating 4: 10/35 days (4)

Rating 5: 14/70 days (—)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 64 hrs/Computer B/R

Target Number: 8 – Handling Rating (Use on-road Handling for ground vehicles)

Max Rating/Improvement: Pilot 5

Autonavigation Systems

Autonavigation systems are available for most vehicles. The effects of each basic type of system—Ratings 1-4—are described in the following entries.

The Autonav rating also represents extra dice the rigger can add to standard Driving Tests. In combat, however, the autonav system works against the character because its safety-conscious programming runs counter to vehicle combat. In this case, the system's rating is *added* to test target numbers. See *The Driving Test* (p. 134, SR3) and the *Vehicle Combat* section (p. 138, SR3) for more information on these effects.

Rating 2, Rating 3 and Rating 4 autonav systems are also capable of controlling a vehicle without input from the driver. In these cases, assume that the vehicle has the appropriate Vehicle skill at a rating equal to its Autonav rating. This self-driving function is not available for motorcycles unless the motorcycle is equipped with gyroscopic stabilization (see p. 129).

Rating 1 Autonav: Rating 1 autonav consists of rudimentary collision detection/avoidance systems. It comes with Level 0 sensors, which consist primarily of ultrasound and basic radar systems that detect the presence of other objects. However, the Rating 1 autonav system cannot control a vehicle by itself.



Rating 2 Autonav: Rating 2 autonav is capable of self-navigation and is equipped with radio transponders that can communicate with a traffic-control grid system, such as GridGuide (see p. 15). After receiving traffic data from such systems, the autonav can suggest alternate routes to a destination. Using a standard map chip (available for all major urban areas, 25 nuyen each), a Rating 2 autonav system can also follow any route mapped out along terrain not classified as rough. Rough terrain (where off-road penalties apply) rapidly overwhelms the system's collision-avoidance software and all relevant target numbers are doubled.

Rating 3 Autonav: Rating 3 autonav can navigate rough terrain without difficulty, following a pre-programmed route. Geological-survey map chips may be used in conjunction with this system; these chips cost 50 nuyen each and cover an area between 100,000 and 200,000 square kilometers in size (roughly the size of an average UCAS or CAS state).

Rating 4 Autonav: Rating 4 autonav systems are the most sophisticated autonav systems available to private individuals. These systems can operate a vehicle in urban and off-road terrain, as long as the appropriate map chips are provided (see *Rating 3 Autonav*). A Rating 4 system can plan its own route if given destination instructions and modify its programmed route to the next most appropriate route if local conditions make a course modification desirable.

Design Specifications

Design Cost:

- Rating 1:** 5 points
- Rating 2:** 10 points
- Rating 3:** 50 points
- Rating 4:** 150 points

Customization Specifications

Parts Cost:

- Rating 1:** 500¥
- Rating 2:** 1,000¥
- Rating 3:** 5,000¥
- Rating 4:** 15,000¥

Parts Availability (SI):

- Rating 1:** 2/96 hrs (1)
- Rating 2:** 3/6 days (1)
- Rating 3:** 4/8 days (1.5)
- Rating 4:** 6/14 days (2)

Base Time/Skill Test:

- Rating 1:** 16 hrs/Appropriate Vehicle B/R
- Rating 2:** 32 hrs/Appropriate Vehicle B/R
- Rating 3:** 40 hrs/Appropriate Vehicle B/R
- Rating 4:** 48 hrs/Appropriate Vehicle B/R

Target Number: 8 – Handling Rating (use on-road Handling for ground vehicles)

Equipment Req'd: Vehicle facility

Contingency Maneuver Controls (CMCs)

Contingency maneuver controls (CMCs) consist of redundant wiring, secondary circuit breakers and backup systems. CMCs allow a vehicle to ignore, to a limited extent, the effects

of vehicle damage on driving and control of the vehicle.

CMCs allow the vehicle to ignore the effects of a number of boxes of vehicle damage equal to the rating of the CMC system. For example, a vehicle with Rating 3 CMCs does not suffer any damage modifiers when taking Light or Moderate vehicle damage. Once the damage passes the Moderate level, however, all damage and Initiative modifiers apply per standard rules.

Note that even if a vehicle has Rating 9 CMCs, it will be destroyed when it suffers damage at the Deadly level. CMCs keep the vehicle running at peak performance instead of slowly degrading performance as damage accumulates, up until the point of destruction.

CMCs do not compensate for damage modifiers applied to riggers suffering from Physical or Mental damage.

Design Specifications

Design Cost: 35 points per rating (Rating 1–3), 75 points per rating (Rating 4–6); 150 points per rating (Rating 7–9)

Max Rating/Improvement: 9

Load Reduction: 25 kg

Customization Specifications

Parts Cost: 2,500¥ per rating (Rating 1–3); 5,000¥ per rating (Rating 4–6); 10,000¥ per rating (Rating 7–9)

Parts Availability (SI): 6/14 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 80 hrs/Appropriate Vehicle B/R

Target Number: 10 – Handling Rating (use on-road Handling for ground vehicles)

Max Rating/Improvement: 9

CF Consumed: 2

Load Reduction: 30 kg

Datajack Port

A datajack port provides a rigger with direct control of a vehicle and also enables any individual equipped with a datajack to plug into the vehicle and control it through the virtual dashboard (see p. 11) with rudimentary cybernetic commands. However, increase a character's Reaction rating by 1 when he controls the vehicle without rigger adaptation or vehicle-control rig cyberware.

Vehicle-control rig cyberware cannot properly interface with a simple datajack link. A full vehicle-control rig is required to receive the full Reaction and Initiative bonuses of the cyberware.

Note that this option is unnecessary if the vehicle already has the rigger adaptation option (see p. 130), because that option includes a datajack port.

Design Specifications

Design Cost: 25 points

Customization Specifications

Parts Cost: 2,500¥ (5,000¥ for motorcycles)

Parts Availability: 3/72 hrs (1.5)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 56 hrs (112 hrs for motorcycles)/Appropriate Vehicle B/R (4)



CF Consumed: 1

Load Reduction: 15 kg

Drive-by-Wire Systems

Drive-by-wire systems substitute advanced computer-controlled maneuvering systems for standard mechanical or basic electronic steering controls.

Drive-by-wire systems are available at levels 1, 2 and 3. Each level of drive-by-wire reduces a vehicle's Handling by 1. Additionally, the system reduces a vehicle's overall weight and provides a one-time increase to the vehicle's Acceleration, Speed and Load ratings. (During vehicle design, this increase takes place after applying all design options.)

To calculate the one-time increase, multiply the desired rating by 10 percent. If desired, the bonus can be split among two or three ratings. For example, the player may increase the Acceleration, Speed and Load ratings by the following amounts: Acceleration rating x 3 percent, Speed rating x 3 percent and Load rating x 4 percent. Or the player may increase the Acceleration rating by 6 percent, and the Speed rating by 4 percent.

The multiplier increase is *not* cumulative per level of drive-by-wire. A vehicle with a Rating 3 drive-by-wire system receives the same .10 multiplier as a vehicle with a Rating 1 drive-by-wire system.

To install a drive-by-wire system as a vehicle customization, the rigger or mechanic must make three separate successful tests (see below). Successes from all three tests may be used to reduce the base time for the modification.

Design Specifications

Design Cost: Chassis' Design Point cost x 1.75 per level added

Max Rating/Improvement: -3 to Handling Rating

Customization Specifications

Parts Cost: Vehicle's original cost x 1.25 per level added

Parts Availability (SI): 8/16 days (2.5)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: Body x 160 hrs/Appropriate Vehicle B/R (10 - On-Road Handling), Computer (4), Electronics (4)

Max Rating/Improvement: -3 to Handling Rating

Improved Control Surfaces (Watercraft Only)

Improved control surfaces improve the rudder and other control surfaces of watercraft. Each increment of improvement reduces the boat's Handling by 1. This modification may not be used in conjunction with drive-by-wire systems.

During vehicle design, levels of improved control surfaces are not subject to the limit of the chassis' original Handling rating. However, improved control surfaces may not reduce the boat's Handling by more than 2.

Design Specifications

Design Cost: Chassis' Design Point cost x 1.4 per increment added

Max Rating/Improvement: -2 to Handling Rating

Customization Specifications

Parts Cost: Vehicle's original cost x 1.15 per increment added

Parts Availability (SI): 6/12 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: Level x 40 hrs/Appropriate Vehicle B/R (4)

Max Rating/Improvement: -2 to Handling

Improved Suspension (Ground Vehicles Only)

This modification improves the physical suspension of wheeled ground vehicles. Each level of improvement reduces the vehicle's Handling Rating by 1. Improved suspension improves on-road Handling except the case of motorcycles, where it improves on-road and off-road Handling equally. This modification may not be used in conjunction with drive-by-wire systems.

During vehicle design, levels of improved suspension are not subject to the limit of the original chassis' Handling rating. However, the modification may not reduce the vehicle's Handling by more than 2.

Design Specifications

Design Cost: Chassis' Design Point cost x 1.25 per level added

Max Rating/Improvement: -2 to Handling Rating

Customization Specifications

Parts Cost: Vehicle's original cost x 1.1 per level added

Parts Availability (SI): 6/12 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: Level x 40 hrs/Appropriate Vehicle B/R (4)

Max Rating/Improvement: -2 to Handling Rating

Motorbike Gyro-Stabilization Gear

This package of gyroscopic balancing systems allows a motorbike to balance itself, so that it may be remotely driven or even piloted by an autonav. The gyro-stabilization gear is required for control of motorbikes by an autonav of 2 or higher (see p. 127) and motorbikes equipped with remote-control adaptation (see p. 130).

Design Specifications

Design Cost: Chassis' Design Point cost x 1.25

Load Reduction: 5 kg

Customization Specifications

Parts Cost: Vehicle's original cost x 1.25

Parts Availability (SI): 6/10 days (1.5)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 48 hrs/Bike B/R (5)

Load Reduction: 5 kg

Off-Road Suspension

Off-road suspension improves off-road Handling at the expense of on-road Handling, Speed and fuel consumption. This modification is available only to wheeled ground vehicles and is compatible with drive-by-wire systems.

Each level of off-road suspension reduces the vehicle's off-road Handling rating by 1, while increasing the on-road

Handling rating by 1. The installation of off-road suspension, regardless of how many levels of improvement are made, reduces Speed by 15. It also decreases the vehicle's Economy by a varying amount, depending on the type of vehicle (see Off-Road Suspension Table).

During vehicle design, levels of off-road suspension are not subject to the limit of the chassis' original Handling rating. However, the modification cannot raise or lower the vehicle's ratings by more than 2.

Off-road Handling is compatible with the improved-suspension modification.

Design Specifications

Design Cost: Chassis' Design Point cost x 1.5 per 1-point change to Handling rating

Max Rating/Improvement: +2/-2 to Handling

Customization Specifications

Parts Cost:

Cars (except Medium/Heavy Transports and Tractors): Original vehicle cost x 0.35 for every 1-point change to Handling rating

Bikes: Original vehicle cost x 0.2 for every 1-point change to Handling rating.

Medium/Heavy Transports and Tractors: Original vehicle cost x 1.50 for every 1-point change to Handling rating.

Parts Availability (SI): 6/12 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: Level x 40 hrs/Appropriate Vehicle B/R (4)

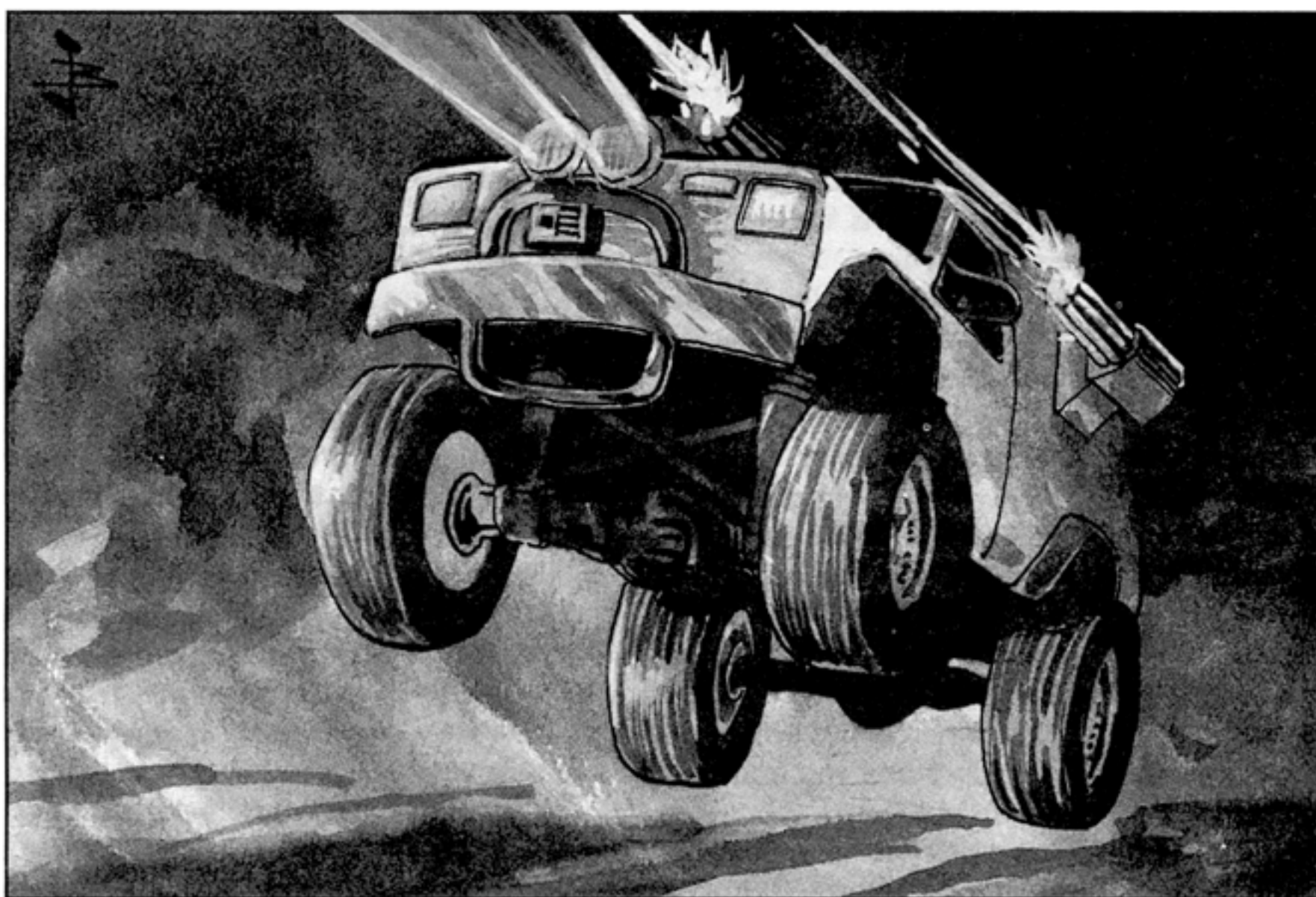
Max Rating/Improvement: +2/-2 Handling

Remote-Control Interfaces

The remote-control interface enables a vehicle to receive and transmit data from and to a remote-control network so that a rigger can control the vehicle via the network. The remote-control interface also gives the vehicle a Pilot rating that reflects the vehicle's level of semi-autonomy. Vehicles adapted for remote control start with an initial Pilot rating 1; this can be increased with the *Advanced Drone Pilot* modification (p. 127).

This modification is not needed for drones (vehicles with a drone chassis that are not built to accommodate pilots or passengers), as they are automatically equipped with remote-control gear.

In addition to the remote-control interfaces, the vehicle must be equipped with sensors rated at 1 or higher (see p. 148), so that the rigger controlling the vehicle can sense through it remotely.



OFF-ROAD SUSPENSION TABLE

Vehicle	Economy Change Multiplier
Cars, Vans, SUVs, Light Trucks	0.85
Motorcycles	0.7
Transports	0.6

Design Specifications

Design Cost: (25 x Body) points

Customization Specifications

Parts Cost: 2,500¥ x Body

Parts Availability (SI): 4/72 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 16 hrs/Appropriate Vehicle B/R (4), Electronics B/R (4)

Rigger Adaptation

The rigger adaptation consists of a "black box" that translates machine code into neurological stimuli and vice versa. The rigger adaptation modification incorporates a datajack port (see p. 128).

A character with vehicle-control rig cyberware has access to a Control Pool and the full Reaction and Initiative increases bestowed by the cyberware when controlling a vehicle via rigger adaptation.

Design Specifications

Design Cost: 35 points



Customization Specifications

Parts Cost: 2,800¥

Parts Availability (SI): 4/7 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 40 hrs/Appropriate Vehicle B/R (4)

CF Consumed: 1

Load Reduction: 10 kg

Secondary Controls

Secondary controls duplicate the basic steering and speed-control functions of the primary controls and are normally slaved to a vehicle's primary controls. The co-pilot controls common on many aircraft are examples of secondary controls.

This modification is not available for motorcycles.

Design Specifications

Design Cost: 5 points

CF Consumed: 1

Customization Specifications

Parts Cost: 400¥

Parts Availability (SI): 3/72 hrs (1)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 40 hrs/Appropriate Vehicle B/R (4)

CF Consumed: 2

PROTECTIVE SYSTEM MODIFICATIONS

Protective-system modifications help protect a vehicle and its passengers. Protective systems include vehicle armor, crash cages, EnviroSeal and life-support systems.

Ablative Armor

Ablative armor consists of dozens or hundreds of small, square, ceramic-metallic plates, roughly 10 centimeters long on each side. When a projectile or explosion strikes a vehicle, some of the ablative plates blow off the vehicle and deflect part of the damaging energy of the attack.

For each level of ablative armor added to a vehicle, increase the vehicle's Armor Rating by a number of points equal to the ablative armor level x 2. The vehicle's Armor rating may be raised to a maximum equal to the vehicle's Body. If struck by a weapon that has a Power greater than 3 times the total modified Armor rating, reduce the ablative armor level by 1. Ablative armor is not hardened and does not stage down the damage code of attacks.

Installing or replacing ablative armor plates takes 6 hours and does not require a Skill Test. Ablative armor is not available as a design option, cannot be installed on aircraft and is not concealable.

Regardless of its level, ablative armor reduces the vehicle's available Load by (Body x 100) kilograms. Ablative armor does not consume CF. A vehicle with ablative armor is automatically considered security- or military-grade.

Advanced Passenger Protection Systems (APPS™)

The APPS system consists of specially secured seat belts, additional impact-activated air bags in all passenger positions,

and special reinforcement of a vehicle's interior body panels.

In a crash, the system reduces the Power of crash damage by half. To exit the vehicle following such a crash, however, requires a Strength (5) Test.

APPS is not available for motorcycles.

Design Specifications

Design Cost: 30 points per seat

Customization Specifications

Parts Cost: 2,500¥ per seat

Parts Availability (SI): 3/6 days (1)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 40 hrs/Appropriate Vehicle B/R (4)

CF Consumed: 1

Armor (Vehicle)

Standard vehicle armor consists of hardened ceramic and metallic panels that protect both vehicle and passengers from attacks. Each level of armor increases the Armor rating of the vehicle by 1 point.

Armor adds weight, reducing the vehicle's Load by an amount dependent on the vehicle's size (see below). Vehicles with a Body of 0 cannot carry any form of vehicle armor.

Armor also increases a vehicle's Handling rating, because maneuvering vehicles becomes more difficult as the vehicle's weight increases. For every 6 points of Armor added, increase the Handling of the vehicle by 1.

Design Specifications

Design Cost: 50 points per Armor Point

Load Reduction: (Body² x 5) kilograms per Armor Point

Customization Specifications

Parts Cost: 1,250¥ per Armor point

Parts Availability (SI): 6/12 days (2.5)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: Armor value x 8 hrs/Appropriate Vehicle B/R

Target Number: Desired Armor rating ÷ 3

Load Reduction: (Body² x 5) kilograms per Armor Point

Armor (Personal)

This includes advanced ceramics and Kevlar body panels to fend off small-arms fire without hindering vehicle performance or adding much weight. It has the same effect on vehicle-scale weaponry as personal body armor. It is ballistic armor, not impact.

Design Specifications

Design Cost: 5 points per point

Max Rating/Improvement: (Body x 2)

Load Reduction: (Body x 2) kilograms per Armor Point

Customization Specifications

Parts Cost: 400¥ per point

Parts Availability (SI): 7/10 days (1.5)



Equipment Req'd: Vehicle facility

Base Time/Skill Test: Armor value x 6 hrs/Appropriate Vehicle B/R

Target Number: Desired Armor rating ÷ 3 (rounded up)

Max Rating/Improvement: (Body x 2)

Load Reduction: (Body x 3) kilograms per Armor Point

Bulwark

Bulwark is armor for ships and other heavy vehicles that have Hull ratings instead of Body ratings. It is not available to normal vehicles that have no Hull rating.

Bulwark functions in the same manner as standard vehicular armor, except on a larger scale. Each point of Bulwark reduces the Power of naval damage codes by 1 and negates the attack if the Power is less than the Bulwark rating. Every additional 6 points of Bulwark increases the vessel's Handling by +1.

Design Specifications

Design Cost: (Hull Factor x 100) points per Bulwark Point

Load Reduction: (Hull Factor x 500) kilograms per Bulwark Point

Customization Specifications

Parts Cost: (Hull Factor x 12,500¥) per Bulwark Point

Parts Availability (SI): 6/24 days (2.5)

Equipment Req'd: Ship facility

Base Time/Skill Test: Bulwark value x 16 days/Appropriate Vehicle B/R

Target Number: Desired Bulwark rating ÷ 3

CF Consumed: 10 CF per Bulwark Point

Load Reduction: (Hull Factor x 500) kilograms per Bulwark Point

Concealed Armor

Even casual observers can easily discern standard armor on a vehicle. Concealed armor is hidden in a vehicle's interior spaces so that anyone attempting to detect it must make a Perception Test. Determine the test target number as follows: Target Number = 9 - (Armor rating ÷ 3 [round down]).

Concealed armor reduces the interior cargo space; if a vehicle's available cargo space cannot accommodate the desired Armor rating, the character must either reduce the Armor rating or use standard vehicle armor.

Concealed armor is not compatible with standard vehicle armor. (After all, what's the point of installing concealed armor, when installing standard armor on top of it blatantly gives away the fact that the vehicle is armored?)

Design Specifications

Design Cost: 50 points per level

CF Consumed: 2 CF per Armor Point

Load Reduction: (Body² x 5) kilograms per Armor Point

Customization Specifications

Parts Cost: 2,000¥ per point

Parts Availability (SI): 8/21 days (3.5)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: Armor value x 8 hrs/Appropriate Vehicle B/R

Target Number: Desired Armor rating ÷ 3 (rounded up)

CF Consumed: 3 CF per Armor Point

Load Reduction: (Body² x 5) kilograms per Armor Point

Crash Cages

A crash cage consists of a padded, hydraulically cushioned passenger cabin and seating that protect passengers in a crash. In the event of a crash, a crash cage provides each vehicle occupant with an extra 6 dice for the necessary Damage Resistance Test.

This accessory is not available for motorcycles.

Design Specifications

Design Cost: 40 points

Load Reduction: 10 kg

Customization Specifications

Parts Cost: 3,500¥

Parts Availability (SI): 4/96 hrs (2)

Equipment Req'd: Vehicle shop

Base Time/Skill Test: 16 hrs/Appropriate Vehicle B/R (4)

CF Consumed: 2

Load Reduction: 25 kg

EnviroSeal™ System

The EnviroSeal™ system provides a vehicle with gas-tight (or watertight) seals. Note that opening windows, doors, or hatches breaks the integrity of the seal for as long as the windows, doors or hatches remain open. Note also that this system does not provide life support for a vehicle's occupants. For submersible operations, a vehicle's engine compartment must be sealed separately. Note that an engine seal only seals the engine from water; internal combustion engines (methane, gas, diesel, and jet) must still have method of drawing in air from the surface. (In most cases, this effectively limits internal combustion engines to operating at a depth just below the water's surface.) Unmanned vehicles, such as drones, only require the engine seal option to operate underwater.

Light damage to a sealed vehicle breaches the seal. Emergency slap-patches that can handle holes made by light damage are available at a modest cost of 5 nuyen each. Of course, some contamination may penetrate even if the hole is sealed relatively quickly. Moderate vehicle damage or worse cannot be sealed without work on the vehicle.

EnviroSeal™ is not available for motorcycles or vehicles with "open" entry points.

Cabin over-pressurization: This additional option is available with all EnviroSeal™ systems. A cabin-over-pressurization system uses air pumps to increase the air pressure inside a vehicle's cabin, so that external contaminants are kept out of the vehicle if a window, door or hatch is opened or a light-damage breach occurs. This option is commonly incorporated in emergency rescue, decontamination and reconnaissance vehicles designed for use in hazardous, toxic or NBC



(nuclear/biological/chemical) contamination areas.

Cabin over-pressurization does not work underwater or if the vehicle sustains Moderate or greater damage.

Design Specifications

Design Cost:

Gas Seal: Body x 3 points

Water Seal: Body x 10 points

Engine Seal: Body x 15 points

Cabin Over-pressurization: Body x 75 points

CF Consumed: 0 (1 CF with cabin over-pressurization)

Load Reduction: 0 kg (10 kg with cabin over-pressurization)

Customization Specifications

Parts Cost

Gas Seal: Body x 250¥

Water Seal: Body x 750¥

Engine Seal: Body x 1,000¥

Cabin Overpressurization: Body x 5,000¥

Parts Availability (SI): 8/14 days (2.5)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 12 hrs/Appropriate Vehicle B/R (3)

CF Consumed: 1 (2 CF with cabin over-pressurization)

Load Reduction: 0 kg (15 kg with cabin over-pressurization)

Life-Support Systems

Life-support systems provide oxygen and basic climate control inside a sealed vehicle cabin or cockpit. Each point of CF dedicated to life-support provides ten man-hours of support (ten hours for one man, five hours for two and so on).

Design Specifications

Design Cost: 5 points + 1 point per man-hour

CF Consumed: 1 CF per 10 man-hrs

Load Reduction: 25 kg per 10 man-hrs

Customization Specifications

Parts Cost: 500¥ + 100¥ per man-hour

Parts Availability (SI): 8/14 days (2.5)

Equipment Req'd: Vehicle shop

Base Time/Skill Test: 8 hrs/Appropriate Vehicle B/R (3)

CF Consumed: 1 CF per 10 man-hrs

Load Reduction: 25 kg per 10 man-hrs

Roll Bars

Roll bars add rigidity to vehicles and mitigate damage from crashes. For rag-top vehicles (vehicles with convertible tops), roll bars negate the double Damage Resistance penalty. For hard-top vehicles, roll bars add 3 dice to any character's Damage Resistance Test following a crash. Roll bars are also required when installing certain vehicle mounts on the roofs of civilian vehicles (see *Vehicle Weapon Mounts*, p. 135).

Design Specifications

Design Cost: 0 points

Customization Specifications

Parts Cost: 2,000¥

Parts Availability (SI): 3/72 hrs (1)

Equipment Req'd: Vehicle shop

Base Time/Skill Test: 24 hrs/Appropriate Vehicle B/R (3)

Smart Armor Systems (SAS)

Smart, or "proactive," armor systems use small hexagonal explosive cells, each approximately 5 centimeters in diameter and 10 centimeters high. Controlling these cells is a proximity sensor system, which can either be active (such as an ultra-short range radar system) or passive (such as a fine electronic fiber mesh suspended around the vehicle) in nature. (Neither system conveys any special bonus; this is a special effect and merely reflects the designer's preference.) Whenever the system detects an incoming projectile, the system computer determines its size and impact location and then detonates a portion of the explosive cells to offset or deflect the projectile's impact.

In game terms, each time a projectile strikes a smart-armor-equipped vehicle, the player controlling the vehicle rolls 2D6 and adds the results together. If the total equals 3 or higher, the smart armor detects the attack and activates. For each hit the vehicle takes (whether or not the smart armor activates or the vehicle takes damage), increase the target number by 1. Note that a burst fire or full autofire attack counts as one "hit" for these purposes.

If the smart armor activates against an attack, reduce the Damage Level of the attack by one level (D to S, S to M and so on). This Damage Level reduction is in addition to the reduction applied toward normal weapon attacks against vehicles (so the damage of standard bullets against a smart armor-equipped vehicle would be reduced by two levels).

Dangerous Dave is a Desert Rat marine based at the Twenty-Nine Palms Combat Center in the Mojave Desert. Dave is driving the Murdilizer, a Ferrari Appaloosa equipped with smart armor, into a running gun battle with some Aztechnology-backed mercs who are attempting to grab some telesma material from the Joshua Tree National Monument.

During the first Combat Turn, the Murdilizer takes a hit from a barrage of heavy machine gun fire (damage 10S, boosted up to 16D to account for full autofire). The Appaloosa hasn't been hit yet, so Dave rolls 2D6, totals the result and compares it against a Target Number 3. The test generates a 5, so the smart armor stages the damage down to 16S. Additionally, the machine gun is not firing anti-vehicle munitions, so the damage is staged down another level to 8M (per standard vehicle-damage rules on p. 149 of SR3). Consequently, Dave makes the Appaloosa's Resistance Test against 8M damage (minus Armor modifiers).

During the next Combat Turn, an Aguilar attack helicopter pops up over a mesa and lobs a Block II Outlaw AVM (Damage 20D) at the Murdilizer. The Appaloosa has already taken one hit, so the smart armor activation target number increases from 3 to 4. Dave rolls 2D6 but gets two



Is—a total of only 2. The smart armor fails to function, and the AVM hits the Appaloosa full on. To compound the bad luck, the Outlaw is an anti-vehicle munition, so its Damage Code is not staged down against vehicles. Dave must therefore make a Damage Resistance Test against 20D damage, with half the Murdilizer's Armor rating applying against the attack's Power. (Now you know why the other jarheads call him "Dangerous Dave.")

After a vehicle's smart armor has taken a hit, the character can replace the expended explosive cells. Doing so returns the target number for activation back to 3 for the next attack against the vehicle. The repair takes an appropriate Vehicle B/R (2) Test with a base time of 8 hours.

To install smart armor as a vehicle customization, the rigger or mechanic must make three successful skill tests, noted below. Smart armor is not available for vehicles with Body ratings lower than 4, and it cannot be concealed.

Only vehicles with an Armor rating of 1 or more may take this modification. If smart armor is incorporated during the vehicle-design process, the vehicle is considered military-grade.

Design Specifications

Design Cost: 250 points

CF Consumed: 2

Load Reduction: Body x 50 kg per Armor Point

Customization Specifications

Parts Cost: 20,000¥ (installment), Body x 500¥ (replacement)

Parts Availability (SI): 10/28 days (—)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: Body rating x 40 hrs/Demolitions B/R (4), Electronics (4), Computer (4)

CF Consumed: 3 CF per Armor Point

Load Reduction: Body x 50 kg per Armor Point

SIGNATURE MODIFICATIONS

Signature modifications reduce or mask a vehicle's thermographic or radar profile. This increases the difficulty of detecting the vehicle with sensor systems.

Active Thermal Masking

Active thermal masking is a high-powered coolant system that temporarily absorbs heat generated by the vehicle's power plant. This modification is available only for standard motorcycle engines and customized gasoline, methane, diesel and jet engines (see *Engine Modifications*, p. 125). Each level of engine customization allows one level of active masking, and each level of active masking increases the vehicle's Signature by 1.

During operation, the vehicle loses 15 meters per turn to its Speed rating for each level of masking activated, and the vehicle cannot exceed its adjusted Speed rating. The system runs for a duration equal to (60 – [masking x 5]) minutes. Running the coolant system longer than the indicated duration produces 1 Stress point per minute and forces the vehicle to make a Stress Test each minute (see *Stress*, p. 62). Characters can switch off the masking system before the end of the specified duration.

At the end of the duration, the masking system must shut down for 10 minutes to vent accumulated heat. During this period the vehicle Signature falls to 2, regardless of any other Signature modifiers in effect.

Design Specifications

Design Cost: For the first level of masking, the cost equals the cost of engine customization multiplied by 2. For each additional level, increase the multiplier by .25.

Max Rating/Improvement: +2 Signature or Engine Customization level (whichever is lower)

CF Consumed: 3

Load Reduction: 100 kg

Customization Specifications

Parts Cost: For the first level of masking, the cost equals the cost of engine customization multiplied by 2. For each additional level, increase the multiplier by .25.

Parts Availability (SI): 8/21 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: (Level of improvement x 8) hrs/Appropriate Vehicle B/R (4)

Max Rating/Improvement: +2 Signature or Engine Customization level (whichever is lower)

CF Consumed: 3

Load Reduction: 100 kg

Noisemaker Dispenser

A noisemaker consists of a perforated canister, approximately one meter tall and a half meter wide, filled with assorted chemicals. When a ship releases one into the water, the chemicals react to create a frothing mass of gas bubbles. This bubble mass confuses sonar and torpedoes, making it harder to target the submarine possessing the noisemaker.

Whenever a ship, sub, or boat releases a noisemaker, it adds a +3 modifier to all target numbers made to detect or target the boat for the duration of that Combat Turn and the next two turns.

Design Specifications

Design Cost: 350 points

CF Consumed: 16 CF + 8 CF/noisemaker

Load Reduction: 150 kg + 25 kg/noisemaker

Customization Specifications

Parts Cost: 350,000¥

Parts Availability (SI): 8/21 days (4.5)

Base Time/Skill Test: 48 hrs/Submarine B/R (4)

Equipment Req'd: Ship facility

CF Consumed: 16 CF + 8 CF/noisemaker

Load Reduction: 150 kg + 25 kg/noisemaker

Radar-Absorbent Materials (RAM)

Radar-absorbent materials consist of special coatings and enamels that absorb radar signals and convert them into heat or small magnetic fields. As a result, the RAM-treated vehicle reflects back very little radar energy, making it harder for sensors to detect and lock on to it. Each level of RAM coating



applied to a vehicle increases its Signature by 1, up to a maximum improvement of +3.

RAM is extremely hard to obtain, even for licensed security agencies. A vehicle with RAM should use the Military grade Street Index (see p. 113).

Design Specifications

Design Cost: (Levels of improvement)³ x 50 points

Max Rating/Improvement: +3 Signature

Customization Specifications

Parts Cost: (Levels of improvement)³ x 25,000¥

Parts Availability (SI): 18/30 days (NA)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 12 hrs/Appropriate Vehicle B/R (4)

Max Rating/Improvement: +3 Signature

Thermal Baffles

Thermal baffles are heat-blocking and absorbing materials added to the chassis of a vehicle to reduce its thermal signature. This increases the difficulty of detecting and locking on to the vehicle with infrared sensors.

Thermal baffles are available only for vehicles with gasoline, methane, diesel and jet engines. Like vehicle armor, thermal baffles are heavy. Each point of thermal baffle weighs (Body x 50) kilograms, which counts against the vehicle's Load rating.

Players also need to keep separate track of the total rating of thermal masking on a vehicle, because that rating serves as a positive modifier on any Perception Tests made against the vehicle that involve non-vehicle thermographic detection techniques.

Design Specifications

Design Cost: 75 points per +1 increase

Max Rating/Improvement: +2 Signature or determined by weight of thermal baffles and vehicle Load rating (whichever is lower)

Load Reduction: Body x 50 kg per +1 increase

Customization Specifications

Parts Cost: For each +1 increase to Signature:

Ground Vehicles: Body x 5,000¥

Motorcycles: Body x 6,000¥

Trucks and Fixed-Wing Aircraft: Body x 7,500¥

Tractors and Helicopters: Body x 10,000¥

Hovercraft: Body x 3,750¥

Watercraft and Zeppelins: Body x 2,500¥

Parts Availability (SI): 6/14 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: (Level of improvement x 8) hrs/Appropriate Vehicle B/R (4)

CF Consumed: 3 CF per +1 increase

Load Reduction: Body x 50 kg per +1 increase

Max Rating/Improvement: +2 Signature or determined by weight of thermal baffles and vehicle Load rating (whichever is lower)

VEHICLE WEAPON MOUNTS

Vehicle weapon mounts use the weight of the vehicle to stabilize the weapon against the vehicle's movement and to provide some recoil resistance as well. Though ostensibly licensed only to law enforcement, private security and military organizations, a number of general-purpose vehicle-weapon mounts are available on the shadow market. Certain weapons require certain special mounts; those requirements are described in the appropriate weapon descriptions.

Hardpoints and Firmpoints: A vehicle's Body rating determines the number of hardpoints and firmpoints it can accommodate. In turn, the vehicle's hardpoints and firmpoints determine the number of weapon mounts the vehicle can accommodate. See *Body Rating and Weapon Mounts*, p. 132, SR3.

Each hardpoint is worth 2 points and each firmpoint counts for 1 point. The total point value of all the hardpoints and firmpoints on a vehicle cannot exceed the vehicle's Body rating. Heavy weapons (MMGs and larger) and vehicle weapons must be mounted on hardpoints. LMGs and small arms (assault rifles and smaller) can be mounted on firmpoints.

Motorcycles with medium or larger sidecars and sufficient Body can accommodate 1 hardpoint. The hardpoint can only take a forward-firing fixed weapon mount and must be in the sidecar (see *Sidecars*, p. 154).

Vehicles that come equipped with vehicle weapon mounts should have a security- or military-grade Street Index (see p. 113).

Ammunition Bins

Fixed mounts and turrets are assumed to hold an ammunition load equal to twice the mounted weapon's Ammo rating. If the character wishes to allot more ammunition, then she will need to install additional ammunition bins.

Ammunition bins are allocated a CF rating (in increments of 0.2 CF) that determines how much ammunition they hold. Each 0.2 CF of allotted storage space holds up to 2,000 rounds of small-arms ammunition (LMGs, rifles or smaller), 200 rounds of machine gun ammo (MMG or HMG), or 20 rounds of grenade launcher or assault cannon ammo. The weight of the ammunition counts against the Load rating as cargo (though this normally won't be a problem). Unless otherwise noted, ammunition bins accept only belted ammunition.

Gamemaster must use a bit of common sense when allocating space for ammunition. Ammo space for turrets will consume the turret's internal CF space (if it has any) first, and then CF from the vehicle itself. On the other hand, a weapon mounted on the hood of a car probably won't have any space for ammo, other than the "default," since it's sitting over the engine block and doesn't have any extra "space" near that area.

Once an ammunition bin's supply is exhausted, it must be manually reloaded. Reloading occurs at a rate of 100 rounds per Combat Turn; characters may double this rate by making a Quickness (4) Test, but failing this test will cause the ammunition bin to jam. Clearing a jam requires a Quickness (2) Test and a Complex Action. Rolling all 1s on either test causes the weapon to backfire and renders it useless for the duration of combat. (Note that on most weapon systems, ammo bins can



be accessed only from the outside, so manually reloading an ammo bin may be physically impossible during vehicle combat.)

Also note that pintles and ring mounts are nothing more than specialized bipods and tripods and cannot take ammunition bins. Ammunition storage is wherever available, and reloading depends on how fast the gunner (or assistant gunner) can reload.

These rules for ammunition storage do not apply to rockets and missiles. See *Missile and Rocket Mounts*, p. 137.

Design Specifications

Design Cost: 0 points

Max Rating/Improvement: Gamemaster's discretion (recommended 2 CF per mount)

CF Consumed: As allocated (see below)

LMGs, Rifles and Smaller: 0.2 CF per 2,000 rounds

MMGs and HMGs: 0.2 CF per 200 rounds

Grenade Launchers and Assault Cannons: 0.2 CF per 20 rounds

Customization Specifications

Parts Cost: 50¥ per 0.2 CF allotted

Parts Availability (SI): As associated weapon mount

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 12 hrs/Appropriate Vehicle B/R (4)

Max Rating/Improvement: Gamemaster's discretion (recommended 2 CF per mount)

CF Consumed: As allocated (see below)

LMGs, Rifles and Smaller: 0.2 CF per 2,000 rounds

MMGs and HMGs: 0.2 CF per 200 rounds

Grenade Launchers and Assault Cannons: 0.2 CF per 20 rounds

Load Reduction: 1 kg per weapon mount

Firearm Conversion Kits

A firearm conversion kit is required for mounting any personal firearm, from pistols to man-portable heavy weapons, onto fixed mounts or turrets. Conversion kits are not required to mount firearms on pintle or ring mounts.

To convert a firearm for mounting on a vehicle, the character must make an appropriate Weapon B/R (4) Test. The base time is 12 hours. Additionally, the character needs a Weapons Kit (see p. 288, *SR3*) to make the conversion.

Any accessories, features or properties that are part of the weapon are also available when it is mounted as a vehicle weapon. However, external weapon accessories that are not part of the weapon cannot be fitted onto the converted weapon, with the exception of the smartgun system, which must be installed internally (p. 281, *SR3*). Converted firearms do not consume CF (though the mounts onto which they are fitted do).

Firearm conversion kits are not needed for weapons specifically designed to be mounted on vehicles, such as the Ares Vermicide autocannon or water cannon from *SR3* or any of the vehicle weapons from this book.

Fixed Mounts

A fixed mount is a hardpoint or firmpoint with a weapon permanently affixed to it. Fixed mounts fire in a fixed arc (no

more than 5 degrees to either side, up or down), so a driver "aims" the fixed-mount weapon by moving his vehicle. Fixed mounts commonly face forward or to the rear; side-facing mounts tend to interfere with a vehicle's handling. (Add the weapon's recoil to the vehicle's normal Handling rating when a side-facing mount is fired. The driver must make a Driving Test against the increased Handling rating or crash. Double the recoil modifiers for hovercraft; triple them for watercraft).

Single fixed-mount weapons must be placed directly along the vehicle's center line. Twin mounts may sit either side-by-side along the center line or may be placed on the left and right fairings of the vehicle. If different weapons are mounted on fixed mounts, both must sit side-by-side along the center line, to limit recoil imbalance (which is really bad for vehicle handling).

Fixed mounts reduce recoil modifiers by half before applying recoil compensation from any accessories. Thus, they cancel the double-recoil modifier for heavy weapons. Fixed mounts may be remotely operated by a gunner or by the rigger jacked into the vehicle.

Fixed mounts may be configured as external or internal mounts. External fixed mounts are easily seen by casual observers and are not protected by a vehicle's armor. Consequently, having any external mounts decreases a vehicle's Signature by 1 but does not reduce the Sonar rating.

Weapons on internal mounts are protected by the vehicle's armor and receive the benefit of Concealability (except when firing), but do not decrease the vehicle's Signature. An observer who makes a successful Perception (4) Test can spot an internal weapon mount but will not immediately deduce what the mount is used for. During vehicle combat, the controlling character must spend a Complex Action to extend or stow a weapon on an internal mount. While a weapon is armed, it is not protected by the vehicle's armor and it reduces the vehicle's Signature by 1, but does not reduce the Sonar rating.

Design Specifications

Design Cost:

External Hardpoint: 25 points

External Firmpoint: 10 points

Internal Hardpoint: 35 points

Internal Firmpoint: 20 points

CF Consumed:

External Hardpoint: 1

External Firmpoint: 0.5

Internal Hardpoint: 4

Internal Firmpoint: 3

Load Reduction: 10 kg, plus weapon's weight (all cases)

Customization Specifications

Parts Cost:

External Hardpoint: 2,000¥

External Firmpoint: 750¥

Internal Hardpoint: 3,000¥

Internal Firmpoint: 1,500¥



Parts Availability (SI): 6/7 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 24 hrs/Appropriate Vehicle B/R (4)

CF Consumed:

External Hardpoint: 2

External Firmpoint: 1

Internal Hardpoint: 7

Internal Firmpoint: 5

Load Reduction: 10 kg, plus weapon's weight (all cases)

Gunnery Recoil Adjusters

The gunnery recoil adjuster is a unique form of recoil compensation available for vehicle weapons. The adjuster consists of high-precision micro-actuators that replace the weapon mount's servo-motors. When the weapon is fired, the actuators lower the weapon in minute increments to compensate for the effects of recoil.

In game terms, recoil adjusters work in the same way as standard recoil compensators do (see *Recoil Compensation*, p. 113, *SR3*). Each level of recoil adjuster negates 1 point of recoil.

Gunnery recoil adjusters are available for fixed mounts and turrets only. Recoil adjusters are not compatible with vehicle gyro-stabilization, because the rotational momentum interferes with the micro-actuators' minute adjustments.

Design Specifications

Design Cost: 10 points per level of recoil adjustment

Max Rating/Improvement:

Fixed Firmpoint or Micro-Turret: 4

Mini-Turret: 6

Small Turret or Fixed Hardpoint: 9

Medium or Larger Turrets: 12

Customization Specifications

Parts Cost: 500¥ per level of recoil adjustment

Parts Availability (SI): 6/48 hrs (1.5)

Equipment Req'd: Vehicle kit

Base Time/Skill Test: 24 hrs/Appropriate Vehicle B/R (4)

Max Rating/Improvement:

Fixed Firmpoint or Micro-Turret: 4

Mini-Turret: 6

Small Turret or Fixed Hardpoint: 9

Medium or Larger Turrets: 12

CF Consumed: 1

Load Reduction: Rating + 24 kg

Launch Control Systems

Launch control systems control the firing of missiles and rockets. During a single Initiative Pass, a vehicle can fire any number of rockets and missiles up to the number of launch control systems it has. For example, a vehicle with two launch systems can launch up to two rockets or missiles per Initiative Pass. Launch control systems come in two sizes, medium and heavy. Medium launch systems launch regular rockets and missiles and take up one firmpoint. Heavy launch systems launch anti-ship rockets and missiles (those with a Damage Code ending in "N") and consume one hardpoint.

Design Specifications

Design Cost: 25 points (Heavy), 10 points (Medium)

CF Consumed: 1 (Heavy), 0.5 (Medium)

Load Reduction: 10 kg (both types)

Customization Specifications

Parts Cost: 2,000¥ (Heavy), 750¥ (Medium)

Parts Availability (SI): 6/7 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 24 hrs/Appropriate Vehicle B/R (4)

CF Consumed: 2 (Heavy), 1 (Medium)

Load Reduction: 10 kg (both types)

Missile and Rocket Mounts

Because of their size, missiles and rockets use different rules for weapon mounts. The number and type of missiles or rockets carried varies depending on the type, size, CF and Load rating of the vehicle.

For ground vehicles, externally mounted missiles and rockets sit on roof-rack mounts. Civilian vehicles armed in this manner must also have roll bars for recoil stability. A vehicle may carry a number of missiles or rockets equal to its Body rating in this manner. Rockets and missiles mounted externally receive no protection from the vehicle's armor and they reduce the Signature of the vehicle by 1, regardless of the number of missiles or rockets mounted.

Aircraft and helicopters generally carry rockets and missiles on pinions under their wings, fairings and fuselages. An aircraft may carry a number of external mounts equal to its Body rating. Every two external mounts installed on an aircraft reduce its Signature by 1. Each aircraft mount may carry up to 300 kilograms of missiles or rockets.

Ships generally mount their missiles externally, on either the deck or superstructure of the vessel. Some ships carry their missiles internally under the deck, in vertically mounted silos.

In all cases, remember that a vehicle cannot carry more missiles or rockets than its Load rating allows. And missiles—particularly anti-vehicle missiles—can be very heavy.

Reinforced Mounts: Some aircraft, such as anti-submarine helicopters or heavy bombers, may carry heavy anti-ship missiles or torpedoes. Because most anti-ship weapons exceed the 300 kilogram weight limit for normal aircraft missile racks, these aircraft must mount reinforced aircraft weapon mounts.

Reinforced weapon mounts are capable of holding up to 1,500 kilograms weight of ordnance, whether it be bombs, missiles, rockets, or torpedoes. Remember, however, that an aircraft cannot carry more ordnance than its Load rating will allow.

Internal Missile and Rocket Mounts: Internal rocket and missile mounts do not decrease a vehicle's Signature and receive the benefit of the vehicle's armor protection.

To fire an internally stored rocket or missile, the driver must open the weapon bay door and arm the rocket or missile. While the missile is armed and ready to fire, the vehicle's Signature decreases by 1, until the munition is fired or is stowed back in its storage place. Arming or stowing a munition requires one Complex Action.



The number of missiles stored internally depends on the amount of space and Load allocated. Normal rockets and missiles require 3 CF of storage each, plus 2 CF for door actuators, as well as Load equal to the weight of the ordnance. Heavy missiles with a naval damage code require 50 CF of storage each, 8 CF for door actuators, and 500 kg plus the weight of the missiles in Load.

Design Specifications

Design Cost: 0 points

Max Rating/Improvement: Body of vehicle (External);
See text (Internal)

CF Consumed:

External Mount (Standard & Reinforced): 0 CF

Internal Mount (Standard): 2 CF + 3 CF per rocket/missile

Internal Mount (Heavy): 8 CF + 50 CF per missile

Load Reduction:

External Mount (Standard & Reinforced): 0 kg
(not including weapons)

Internal Mount (Standard): 0 kg (not including weapons)

Internal Mount (Heavy): 500 kg (plus weapons)

Customization Specifications

Parts Cost:

Standard External Mount: 1,500¥ per mount

Reinforced External Mount: 5,000¥ per mount

Standard Internal Mount: 5,000¥ per CF allocated

Heavy Internal Mount: 50,000¥ per CF allocated

Parts Availability (SI): 10/60 days (5)

Equipment Req'd: Aircraft facility

Base Time/Skill Test: 8 hrs/Appropriate Vehicle B/R (4)

Max Rating/Improvement: Body of vehicle (External);
See text (Internal)

CF Consumed:

External Mount (Standard & Reinforced): 0 CF

Internal Mount (Standard): 2 CF + 3 CF per rocket/missile

Internal Mount (Heavy): 8 CF + 50 CF per missile

Load Reduction:

External Mount (Standard & Reinforced): 0 kg (not
including weapons)

Internal Mount (Standard): 0 kg (not including weapons)

Internal Mount (Heavy): 500 kg (plus weapons)

Naval-Weapons Control Network (NWCN)

The naval-weapons control network is a rigger network that provides central control and coordination of naval weapons fired from a ship or submarine. The rating of a NWCN indicates the number of control systems linked by the network.

By themselves, missiles, rockets and torpedoes do not consume hardpoints (see *Launch Control Systems*, p. 137). However, the control systems for these munitions do. Each munition that a ship is capable of launching independently or controlling simultaneously (through a NWCN control station) consumes one hardpoint. Automated gun systems and turrets consume hardpoints as normally specified.

For more information on the use of a naval-weapons control network, see *Ship Weapon Systems*, p. 55.

Design Specifications

Cost: Rating x 5,000 points

Max Rating/Improvement: Number of available hardpoints

CF Consumed: 100 CF per station

Load Reduction: 500 kg per station

Customization Specifications

Parts Cost: Rating x 500,000¥

Parts Availability (SI): (Rating x 10)/(Rating x 10) days (—)

Equipment Req'd: Ship facility

Base Time/Skill Test: 480 hrs/Electronics (B/R) (8)

Max Rating/Improvement: Number of available hardpoints

CF Consumed: 100 CF per station

Load Reduction: 500 kg per station

Pintle Mounts

Pintle mounts, the simplest mounts available, consist of simple reinforced holes and swivels mounted into the side of a vehicle. Pintle mounts accept any firmpoint-sized weapon. Firing arcs are generally 60 degrees to the left and right and 30 degrees up and down (which allows the vehicle to engage low-flying aircraft at a height of less than half the weapon's long-range value). Pintle mounts count as one firmpoint.

To mount a weapon on or remove a weapon from a pintle mount requires a Complex Action; if the vehicle is moving, it also requires a Quickness (4) Test. Drone pilots and riggers jacked into the vehicle cannot remotely control pintle mounts. Weapons in a pintle mount receive the equivalent of 2 points of recoil compensation.

Design Specifications

Design Cost: 1 point

CF Consumed: 0 (not including passenger space)

Customization Specifications

Parts Cost: 50¥

Parts Availability (SI): 4/96 hrs (1.5)

Equipment Req'd: Vehicle shop

Base Time/Skill Test: 12 hrs/Appropriate Vehicle B/R (2)

CF Consumed: 0 (not including passenger space)

Ring Mounts

Ring mounts are a step up from the basic pintle mount. Ring mounts consist of a freely rotating ring set on the top of a vehicle, with a tripod assembly attached to the ring; the gunner stands in the middle of the ring to fire the weapon. The ring rotates in a full circle, but its vertical traversing remains 30 degrees upwards or downwards. Mounting or dismounting a weapon from a ring mount requires a Complex Action, as well as a Quickness (4) Test if the vehicle is moving.

Ring mounts may be mounted on hardtop vehicles; open-top or convertible vehicles must be equipped with roll bars to use ring mounts. Ring mounts installed on helicopters are actually door guns, which require the gunner to open the door on one side to fire out (and also exposes the pilot, crew and the rest of the helicopter interior to incoming fire).



Ring mounts count as a hardpoint and can mount any man-portable heavy weapon, as well as LMGs. Ring mounts cannot be remotely controlled by a drone pilot or a rigger jacked into the vehicle. Weapons on a ring mount receive the equivalent of 6 points of recoil compensation.

Design Specifications

Design Cost: 10 points

CF Consumed: 1 (16 CF People Space required for door gun configuration)

Load Reduction: 25 kg

Customization Specifications

Parts Cost: 3,000¥

Parts Availability (SI): 8/14 days (2)

Equipment Req'd: Vehicle shop

Base Time/Skill Test: 8 hrs/Appropriate Vehicle B/R (3)

CF Consumed: 1 (16 CF People Space required for door gun configuration)

Load Reduction: 25 kg

Smartlink Integration Kits

The smartlink integration kit is an interface that connects smartgun-equipped weapons mounted in fixed mounts and turrets with gunners who are equipped with smartlink cyberware. Without the integration kit, smartgun-equipped weapons mounted in fixed mounts or turrets do not gain the benefit of the smartlink during Manual Gunnery Tests.

Remember that gunners must have smartlink cyberware to take full advantage of the smartlink system. If the gunner using a vehicle smartgun does not have smartlink cyberware, treat the gunner as if he is wearing smartgoggles (see p. 112, SR3).

The gunner need not be jacked into the vehicle to take advantage of the smartlink system. The smartlink integration kit also contains palm-induction links for weapon controls. Remember that smartlink modifiers do not apply to Sensor-Enhanced Gunnery or Missile Attack Tests.

The smartlink integration kit is not necessary for weapons mounted on pintle or ring mounts.

Design Specifications

Design Cost: 250 (Smartlink Level 1), 350 (Smartlink Level II)

Customization Specifications

Parts Cost: 650¥ (Smartlink Level 1), 900¥ (Smartlink Level II)

Parts Availability (SI):

Smartlink Level I: 4/48 hrs (1)

Smartlink Level II: 6/48 hrs (2)

Equipment Req'd: Vehicle kit

Base Time/Skill Test: 24 hrs/Appropriate Vehicle B/R (4)

CF Consumed: 1

Torpedo Tubes

Torpedo tubes launch torpedoes, underwater munitions designed for use against surface or underwater targets. Only submarines require torpedo tubes; surface ships can launch torpedoes from external or internal missile mounts.

Torpedo tubes consist of the tube itself, support equip-

ment, and racks for storing torpedoes and loading them into the tube. Torpedo tubes are fixed in direction and can fire only to the fore (forwards) or aft (rearwards). The tubes themselves do not consume any hardpoints, but the control systems do, depending on the number of torpedoes the vessel can command simultaneously (see *Launch Control Systems*, p. 137).

As with normal weapons, the number of torpedoes a vessel may carry depends on its allocated storage space. Torpedoes require 32 CF of storage on an ammunition rack. Note also that fore and aft-mounted tubes require separate storage compartments; torpedoes stored for fore-mounted tubes are not available for aft-mounted tubes, and vice versa.

Loading torpedoes from the racks into the tubes takes place by two different methods: manual or automatic. Manual loading requires a crew with a combined Strength of 30 to load one torpedo and takes 30 seconds to prepare it for shooting. Automatic loaders use machinery instead of a crew to load torpedoes and take 15 seconds to prepare one torpedo for firing. While autoloaders work faster and take less space, they are also heavier and add to the price tag as well.

In addition to torpedoes, submarines may also launch certain types of weapons and munitions (such as sea mines and anti-ship missiles) from a torpedo tube.

Design Specifications

Design Cost: 250 points per tube, plus:

Autoloader: 250 points per tube

CF Consumed: 128 per tube, plus:

Storage Racks: 32 per torpedo

Manual Loading: 720

Autoloader: 360

Load Reduction: 500 per tube, plus:

Storage Racks: Weight of torpedoes stored

Autoloader: 50,000 kg

Customization Specifications

Parts Cost: 100,000¥ per tube, plus:

Autoloader: 50,000¥ per tube

Parts Availability (SI): 25/6 months (—)

Equipment Req'd: Ship Facility

Base Time/Skill Test: 300 hrs/Submarine B/R (6)

CF Consumed: 50, plus 150 per tube, plus:

Storage Racks: 32 per torpedo

Manual Loading: 720

Autoloader: 400

Load Reduction: 750 per tube, plus:

Storage Racks: Weight of torpedoes stored

Autoloader: 60,000 kg

Turrets

Turrets are motorized, armored ring mounts. Turrets provide weapons with armor protection but also increase a vehicle's profile. Consequently, a turret reduces a vehicle's Signature by 1. Civilian vehicles must be reinforced with roll bars before they can mount turrets.

Turrets come in six sizes: mini, small, medium, large and extra-large. Mini turrets, which are found on large drones and



WEAPON VALUES TABLE

Turret Type	Weapon Value	Hardpoint Requirement
Mini	2	1 hardpoint
Small	3	2 hardpoints
Medium	6	3 hardpoints
Large	8	4 hardpoints
Extra-Large	10	6 hardpoints

Weapon	Weapon Value
SMG	1
Microwave Designator	1
Rifle	1
Light Machine Gun	1.5
Medium Machine Gun	2
Heavy Machine Gun	2
Missile/Rocket Launcher	2
Harpoon Gun	2
Vindicator Minigun	2
Vanquisher/Vengeance Minigun	2.5
Assault Cannon	3
Autocannon	3
Vehicle Laser	3
Water Cannon	3
Mortar	4
Light Railgun	5
Outlaw Missile System	5
RASCAM	5
Silencer AARM	6
Light Naval Gun	8
Medium Railgun	8
Javelot	9
Karpfen PBRs	9
Sirocco	9
ANDREWS	10
ASROC	10
Medium Naval Gun	10
Heavy Railgun	10
Sea Saber	10

TURRET INTERNAL SPACE TABLE

Size	CF	Seating
Mini	1	None
Small	2	None
Medium	4	2
Large	8	2
Extra-Large	16	3

All turrets generally have a 360-degree firing arc, with -10 degrees depression and 45 degrees elevation. (There are exceptions, but these should be taken on a case-by-case basis.) Some turrets also have additional internal space that can accommodate ammunition bins, smoke launchers, sensor systems, electronics packages and the like. Consult the Turret Internal Space Table to determine the amount of internal space available in a turret.

When firing turret-mounted weapons, reduce recoil modifiers by half before applying recoil compensation from any accessories.

Turrets cancel the double-recoil modifier for heavy weapons. Turrets are manually operated by a turret gunner.

Though submarines may mount turrets, turrets drastically reduce a sub's Sonar Signature. Reduce the sub's Sonar Signature by 1 for every medium or smaller turret mounted. Reduce the Sonar Signature by 3 for every large turret mounted and reduce it by 5 for every extra-large turret mounted.

Anti-Aircraft Turrets: Anti-aircraft turrets can elevate to a maximum angle of 75 degrees, which allows weapons on them to fire at aircraft at a height up to 95 percent of the weapon's long-range value. Multiply the design or parts cost for such turrets by 1.5 and increase the standard CF Consumed by 1 CF. The turret's Load Reduction remains the same.

Pop-Up Turrets: Pop-up turrets remain concealed from plain view until their weapons are used.

While they are concealed, the standard -1 penalty to the vehicle's Signature does not apply. To "pop up" this kind of turret for operation, the gunner must spend a Complex Action. The turret weapon is ready for use on the next available action.

Pop-up turrets have weapon values 1 point lower than standard weapon values. CF consumption for these turrets is double the standard CF consumption. Large or extra-large turrets cannot be constructed with pop-up capability.

Design Specifications

Design Cost:

Mini-turret: 125 points

Small turret: 250 points

pickup-sized trucks, take up one hardpoint and have a Weapon Value of 2. Small turrets, found on most anti-riot vehicles, take up two hardpoints and have a Weapon Value of 3. Medium turrets, installed mostly on heavy security vehicles or armored personnel carriers, take up three hardpoints and have a Weapon Value of 6.

Large turrets are found on light tanks, heavy gunships, and light warships. They take up four hardpoints and have a Weapon Value of 8. Extra-large turrets belong almost exclusively to heavy main battle tanks and warships, take up six hardpoints and have a Weapon Value of 10. However, standard rigger characters do not have access to such turrets and vehicles.

The weapon values of all weapons mounted on a turret may not exceed the turret's weapon value, per the Weapon Values Table.



Medium turret: 500 points
Large Turret: 1,500 points
Extra-large Turret: 3,000 points

CF Consumed:

Mini-turret: 6
Small turret: 7
Medium turret: 16
Large Turret: 32
Extra-large Turret: 64

Load Reduction:

Mini-turret: 25 kg
Small turret: 100 kg
Medium turret: 1,000 kg
Large Turret: 6,000 kg
Extra-large Turret: 30,000 kg

Customization Specifications

Parts Cost:

Mini-turret: 5,000¥
Small turret: 7,500¥
Medium turret: 15,000¥
Large Turret: 300,000¥
Extra-large Turret: 1,000,000¥

Parts Availability: Calculate parts availability for mini and small turrets with the following formula: $\text{Vehicle Cost} \div 25 \div 6 = \text{Availability Target Number}$. $(\text{Vehicle Cost} \div 25) \times 14 = \text{days required to obtain parts}$

Street Index: 2 for a mini, 3 for a small, medium and larger turrets available to military only

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 72 hrs/Appropriate Vehicle B/R (4)

CF Consumed:

Mini-turret: 7
Small turret: 8
Medium turret: 24
Large Turret: 36
Extra-large Turret: 72

Load Reduction:

Mini-turret: 25 kg
Small turret: 100 kg
Medium turret: 1,000 kg
Large Turret: 6,000 kg
Extra-large Turret: 30,000 kg

Remote Turrets

Remote turrets are weapons-only mounts that the operator controls from inside the passenger compartment via remote sensors. A separate gunner or a rigger may operate a remote turret (military vehicles often use two riggers, one controlling the vehicle and the other controlling the turret).

Remote turrets are available in micro, mini, small, medium, large, and extra-large sizes. Micro turrets, normally installed on smaller drones, take up 1 firmpoint and have a Weapon Value of 1. Mini and larger turrets are the same size as their gunner-operated counterparts.

Both anti-aircraft capability and pop-up options are available for remote turrets. Pop-up micro-turrets have a Weapon Value of 1 and take up 1 CF.

Large and extra-large remote turrets exist, but they are used only on large warships, such as destroyers and cruisers, which are out of the price range of most shadowrunners.

Design Specifications

Design Cost:

Micro-turret: 100 points
Mini-turret: 175 points
Small turret: 350 points
Medium turret: 600 points
Large turret: 2,500 points
Extra-large turret: 5,000 points

CF Consumed:

Micro-turret: 0
Mini-turret: 3
Small turret: 4
Medium turret: 4
Large turret: 60
Extra-large turret: 120

Load Reduction:

Micro-turret: 10 kg
Mini-turret: 25 kg
Small turret: 100 kg
Medium turret: 1,000 kg
Large turret: 8,000 kg
Extra-large turret: 75,000 kg

Customization Specifications

Parts Cost:

Micro-turret: 2,500¥
Mini-turret: 6,000¥
Small turret: 9,000¥
Medium turret: 17,500¥
Large turret: 600,000¥
Extra-large turret: 2M ¥

Parts Availability: Calculate parts availability for mini and small turrets with the following formulas:

$[\text{Vehicle Cost} \div 25] \div 6 = \text{Availability Target Number}$.
 $(\text{Vehicle Cost} \div 25) \times 14 = \text{days required to obtain parts}$

Street Index: 2 (Micro and Mini), 3 (Small), — (the rest)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 72 hrs/Appropriate Vehicle B/R (4)

CF Consumed:

Micro-turret: 1
Mini-turret: 4
Small turret: 5
Medium turret: 8
Large turret: 60
Extra-large turret: 120

Load Reduction:

Micro-turret: 10 kg
Mini-turret: 25 kg
Small turret: 100 kg
Medium turret: 1,000 kg



Large turret: 8,000 kg
Extra-large turret: 75,000 kg

Vehicle Gyroscopic Stabilizers

Vehicle gyroscopic stabilizers are available for weapons mounted in fixed mounts and turrets. As with normal weapon gyros, every point of vehicle gyro-stabilization reduces the combined modifiers for recoil and movement (the latter applies only to vehicles moving by means of mechanical legs).

There is, however, a drawback to gyro-stabilization. The rotational momentum generated by a gyroscope tends to interfere with the maneuverability of a vehicle. If the total active gyroscopic stabilization rating is greater than the vehicle's Body, the vehicle receives a +1 modifier to its Handling for every point of gyro-stabilization greater than the vehicle's Body.

Vehicle gyro-stabilization is not compatible with gunnery recoil adjusters.

Design Specifications

Design Cost: 15 points per level of gyro-stabilization

Max Rating/Improvement: Body x 2

CF Consumed: 1

Load Reduction: Rating + 24 kg

Customization Specifications

Parts Cost: 1,000¥ per level of gyro-stabilization

Parts Availability (SI): 8/72 hrs (1.5)

Equipment Req'd: Vehicle kit

Base Time/Skill Test: 24 hrs/Appropriate Vehicle B/R (4)

Max Rating/Improvement: Body x 2

CF Consumed: 1

Load Reduction: Rating + 24 kg

ELECTRONIC SYSTEMS

Electronic systems include the computer and electronic devices that regulate and control vehicles, as well as sensor and electronic warfare systems.

Autosoft Interpretation System

The autosoft interpretation system is essentially a "skill-wire" system for drones. The autosoft system allows a drone to interpret the programming on either an autosoft (see p. 44) or a knowsoft (see p. 295, SR3) and to utilize the ability or skill encoded there. Autosoft systems cannot read or use activesofts.

The autosoft interpretation system comes equipped with a number of chip ports equal to the drone's Pilot rating. Autosofts and knowsofts must either be chipped directly into one of these ports or transmitted through the remote control network and then loaded into the autosoft interpretation system's memory to be used. The system's processing power and memory is equal to its Pilot rating x 2; when the drone is using multiple autosofts and/or knowsofts simultaneously, the combined ratings of the programs may not exceed this figure.

A drone may only use autosofts or knowsofts with ratings equal to or less than its Pilot rating. Autosofts may not use any of the programming options available to skillsofts. Autosofts

do not inhibit a drone's use of IVIS Pool or a robot's use of Adaptation Pool.

Design Specifications

Design Cost: Pilot rating x 50 points

CF Consumed: 1

Customization Specifications

Parts Cost: Pilot rating x 1,000¥

Parts Availability (SI): 8/14 days (2)

Equipment Req'd: Electronics shop

Base Time/Skill Test: 72 hrs/Electronics B/R (4)

CF Consumed: 1

Load Reduction: 2 kg

BattleTac™ FDDM Receiver Module

FDDM (Fire-Direction Data Manager) is a spin-off of the BattleTac information system. The FDDM receiver module allows a vehicle to transmit and receive targeting information among other drones via a remote-control network. This enables drones to fire on targets outside of their lines of sight.

For more information, see *Indirect Fire*, p. 99, CC.

Design Specifications

Design Cost: 350 points

Customization Specifications

Parts Cost: 35,000¥

Parts Availability (SI): 10/21 days (3)

Equipment Req'd: Microtronics shop

Base Time/Skill Test: 64 x Pilot hrs/Computer B/R (4)

BattleTac™ IVIS Receiver Modules

IVIS is another spin-off from the BattleTac information system. BattleTac IVIS enhances data-sharing capabilities between a remote-control deck and the drones in its network. This enables drones to execute even more complex and sophisticated tactics to accomplish their assigned tasks.

The IVIS receiver module allows a remote-controlled vehicle or drone to participate in the IVIS system. BattleTac IVIS can provide extra dice for the Comprehension Test or it can create an IVIS Pool for vehicles or drones to use. Only remotely controlled vehicles or drones that have their pilots modified to interact with BattleTac IVIS receive the benefits of this system.

For more information, see *The BattleTac IVIS System*, p. 43.

Design Specifications

Design Cost: 250 points

Customization Specifications

Parts Cost: 25,000¥

Parts Availability (SI): 8/14 days (3)

Equipment Req'd: Microtronics shop

Base Time/Skill Test: 64 x Pilot hrs/Computer B/R (4)

Closed-Circuit Simsense System Integration (Ships Only)

Closed-circuit simsense systems (CCSS) allow a rigger to monitor a ship the same way she can monitor a building's



security system (see *Closed Circuit Simsense Systems*, p. 45). If a ship is wired with CCSS, a rigger can monitor the system status of the ship and the internal activities of the ship.

Note that CCSS integration is not the same as adapting the ship for rigger control. CCSS is concerned with the internal activities within a ship and has no capabilities for piloting or maneuvering a ship. However, if a ship is wired for both CCSS and rigger control, a rigger can “jump” from directly controlling the ship (as part of the helm functions) to monitoring the ship’s internal status via CCSS.

CCSS can be particularly useful in performing engineering functions, such as damage control, by commanding a group of maintenance drones to repair damage from ship attacks. Each maintenance drone counts as a crew member on a damage-control team. Use the Ship/Build Repair Skill of the controlling rigger, when making the Success Test for the damage-control team.

When commanding internal drones via a ship CCSS network, a rigger can command a maximum number of drones equal to her Intelligence attribute.

Design Specifications

Cost: Technical rating x 5,000 points

Max Rating/Improvement: 10

Customization Specifications

Parts Cost: Technical rating x 400,000¥

Parts Availability (SI): 6/21 days (4)

Equipment Req’d: Ship Facility

Base Time/Skill Test: 120 hrs/Computer B/R (6),

Electronics B/R (6)

Max Rating/Improvement: 10

Dipping Sonar

Dipping sonar is a vehicle modification available for helicopters and other aircraft capable of hovering in place. Dipping sonar consists of a sonar array, with both active and passive elements, suspended from a long cable attached to the underbelly of the aircraft.

As the aircraft flies or hovers over water, it periodically lowers or “dips” the sonar array into the water. The sonar scans for underwater contacts (such as submarines) and transmits its data to the aircraft via the cable.

To use dipping sonar, the helicopter must be flying at an altitude no higher than 30 meters and a speed no faster than 7 meters per turn. If a helicopter flies higher than 30 meters, then the sonar array will not be deep enough to be useful. Likewise, if the helicopter is flying too fast, the sound of water rushing past the array will drown out any other noises, rendering dipping sonar useless.

One method of getting around this developed by navy pilots is to make short sprints in the air and then slow to a hover and drop to the surface for a minute, periodically “dipping” the sonar array in the water. This, consequently, is how dipping sonar got its name.

Design Specifications

Cost: Sonar rating x 250 points

Max Rating/Improvement: 6

CF Consumed: 12 CF

Load Reduction: 50 kg

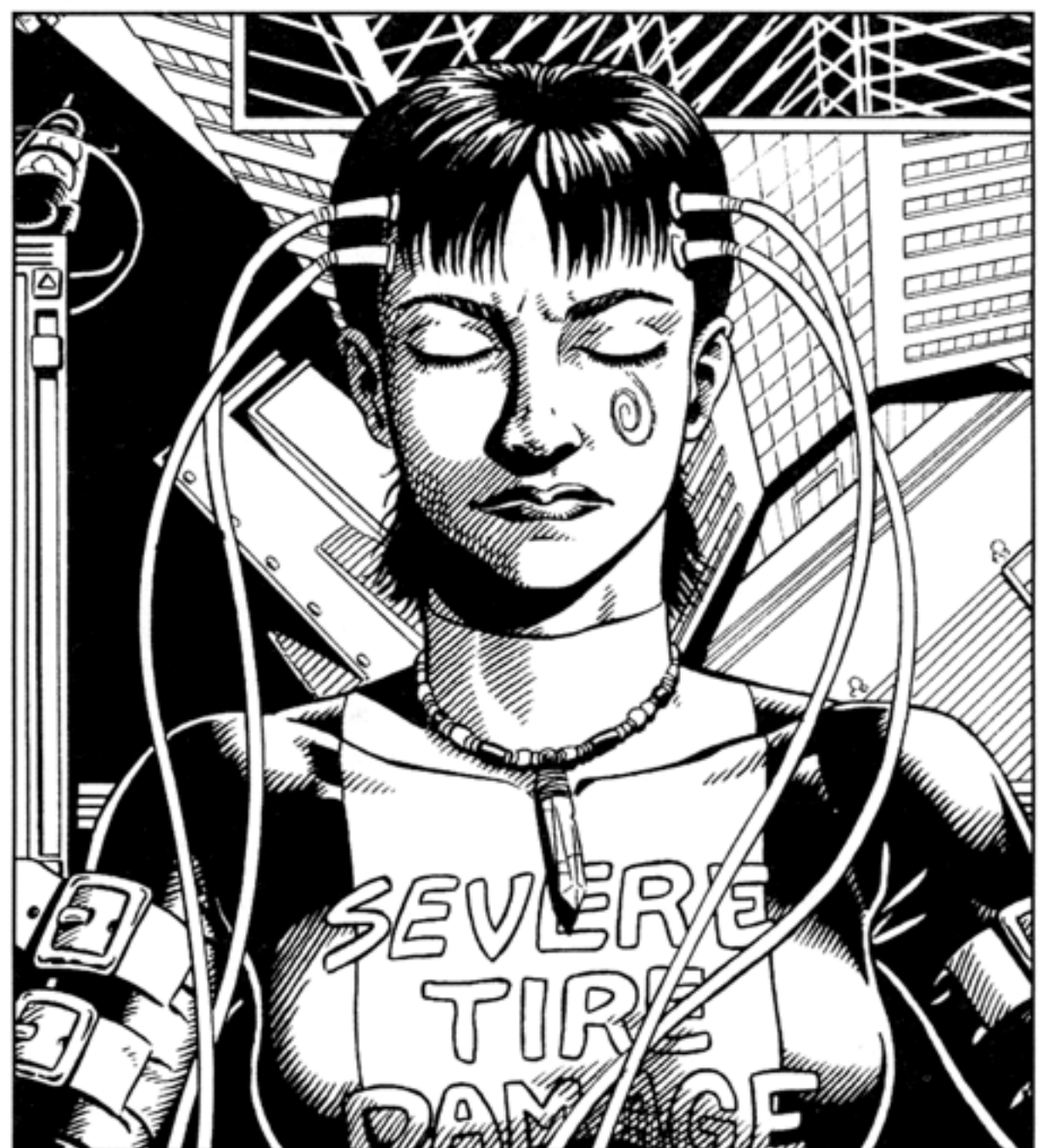
Customization Specifications

Parts Cost: Sonar rating x 15,000¥

Parts Availability (SI): 8/21 days (4.5)

Equipment Req’d: Vehicle Facility

Base Time/Skill Test: 16 hrs/Appropriate Vehicle B/R (4)



Max Rating/Improvement: 6

CF Consumed: 16 CF

Load Reduction: 50 kg

Electronic Countermeasures (ECM)

Electronic countermeasures include active devices such as barrage radio jammers, infrared jammers, chaff and flare dispensers, and wave harmonic disrupters that confound sensor systems and jam the communications of opposing remote-control operations. (See *ECM*, p. 138, *SR3*, for more information on electronic countermeasures.)

Though normally restricted to security and military agencies, several low-level ECM systems are available on the public market. These are sold primarily to celebrities and VIPs as a defense against prying eyes armed with intrusive drones and sensors.

Most design and customization specifications are included on the ECM Systems Table (p. 144).



ECM SYSTEMS TABLE

ECM Level	CF Consumed*	Design Points	Customization Cost	Weight (kg)	Availability	Street Index
1	0/1	100	10,000¥	5	5/7 days	2.5
2	1/2	200	20,000¥	10	6/10 days	3
3	2/3	300	30,000¥	15	7/14 days	3.5
4	2/3	500	50,000¥	20	8/21 days	4
5	3/6	750	75,000¥	25	10/30 days	—
6	4/8	1,000	100,000¥	50	12/45 days	—
7	6/9	2,000	200,000¥	75	14/60 days	—
8	10/12	3,000	300,000¥	100	16/3 months	—
9	12/16	5,000	500,000¥	150	18/6 months	—
10	16/20	10,000	1,000,000¥	250	20/1 year	—

* The first number is the CF consumed if the ECM is installed during vehicle design. The second value is the CF consumed if the ECM is installed as a vehicle customization.

ECCM SYSTEMS

ECCM Level	CF Consumed*	Design Points	Customization Cost	Weight (kg)	Availability	Street Index
1	0/1	100	10,000¥	3	4/7 days	2
2	1/2	200	20,000¥	5	4/10 days	2.5
3	2/3	300	30,000¥	8	5/14 days	3
4	2/3	400	40,000¥	12	6/21 days	3.5
5	3/6	500	50,000¥	18	8/30 days	—
6	4/8	750	75,000¥	25	10/45 days	—
7	6/9	1,000	100,000¥	50	12/60 days	—
8	10/12	2,500	250,000¥	75	14/3 months	—
9	12/16	3,000	300,000¥	100	16/6 months	—
10	16/20	5,000	500,000¥	150	18/1 year	—

*The first number is the CF consumed if the ECCM is installed during vehicle design. The second value is the CF consumed if the ECCM is installed as a vehicle customization.

ED SYSTEMS

ED Level	CF Consumed*	Design Points	Customization Cost	Weight (kg)	Availability	Street Index
1	1/2	150	15,000¥	10	8/30 days	3
2	2/3	300	30,000¥	20	8/45 days	3.5
3	4/5	500	50,000¥	30	8/60 days	4
4	5/6	750	75,000¥	45	10/3 months	4.5
5	6/7	1,000	100,000¥	50	12/6 months	5
6	8/9	2,500	250,000¥	75	16/1 year	—

*The first number is the CF consumed if ED is installed during vehicle design. The second number is the CF consumed if ED is installed as a vehicle customization.



ECD SYSTEMS TABLE

ECD Level	CF Consumed*	Design Points	Customization Cost	Weight (kg)	Availability	Street Index
1	1/2	100	10,000¥	25	8/30 days	3
2	2/3	300	30,000¥	30	8/45 days	3.5
3	3/4	500	50,000¥	35	8/60 days	4
4	4/5	750	75,000¥	45	10/3 months	4.5
5	6	1,500	150,000¥	60	12/6 months	5
6	8	3,000	300,000¥	75	16/1 year	—

*The first number is the CF consumed if ECD is installed during vehicle design. The second number is the CF consumed if ECD is installed as a vehicle customization.

Design Specifications

See ECM Systems Table.

Customization Specifications

See ECM Systems Table.

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 16 hrs per level/Electronics B/R (4)

Electronic Counter-Countermeasures (ECCM)

Electronic counter-countermeasures include signal amplifiers and noise filters that nullify the effects of ECM. See *Electronic Countermeasures* (p. 138, SR3) for information on the use of ECCM.

ECCM systems are generally more readily available than ECM, because ECCM helps to counter the interference caused by the increasing congestion of the radio spectrum in most metropolitan areas. Higher-level ECCM systems are available only through licensed security firms or military organizations.

Most design and customization specifications are included on the ECCM Systems Table (p. 144).

Design Specifications

See ECCM Systems Table.

Customization Specifications

See ECCM Systems Table.

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 16 hrs per level/Electronics B/R (4)

Electronic Deception (ED)

Electronic deception measures are devices that feed sensors false information about the target's range, position, direction of travel and so on. Electronic deception is more subtle and insidious than ECM; a sensor won't know it's being deceived until the metahuman controller physically sees the target with his own eyes or video feeds. For more information on the use of electronic deception, see *Electronic Deception* (p. 32).

ED systems are generally restricted to security and military agencies and are almost impossible to come by on the streets.

Most design and customization specifications are included on the ED Systems Table (p. 144).

Design Specifications

See ED Systems Table.

Customization Specifications

See ED Systems Table.

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 16 hrs per level/Electronics B/R (4)

Electronic Counter-Deception (ECD)

Electronic counter-deception measures use reality-checking electronic components, such as inertial navigation and flux density monitors, to negate the effects of ED. See *Electronic Deception* (p. 32) for more information on the use of ECD.

Electronic counter-deception systems are generally restricted to security and military agencies and are almost impossible to acquire on the streets.

Most design and customization specifications are included on the ECD Systems Table.

Design Specifications

See ECD Systems Table.

Customization Specifications

See ECD Systems Table.

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 16 hrs per level/Electronics B/R (4)

Electronics Ports

Electronics ports are required for those electronic items unrelated to vehicle operations, such as radios, video cameras, surveillance measures and remote control decks. An electronics port allows these items to draw electrical power from the vehicle's power plant. Where applicable, electronic devices attached to such ports may increase their Flux ratings by half the vehicle's Body, rounded up.

All electronics ports are automatically linked to the vehicle's computer. The computer also acts as a router, allowing all connected devices and systems (autonav, sensors, pilot and so on) to communicate and share information.

While the electronics port itself takes up no cargo space and does not reduce Load, the equipment attached to it might (see the CF Requirements For Common Electronic Equipment table).



CF REQUIREMENTS FOR COMMON ELECTRONIC EQUIPMENT

Item	CF Required
Video/Trideo Display	0.15 per 20 cm of screen size
Simsense Player	0.1
Cellular Phone	0.05
Table Top Personal Computer (not including monitor)	0.5
Computer Printer	0.25
Radio	0.3 x Flux rating
Audio/video/trideo recorder	0.25
Cyberdeck	0.15
Remote Control Deck	0.25
BattleTac Master Component	0.6
Tactical Communications Gear	
Master Unit	2
Personal Comm Unit	0.3 x Flux rating
Microwave/Laser Link	1
Satellite Dish	
Standard Portable	2
Large Portable	6
Fixed Base	20

Note that the following design and customization specifications reflect the costs of electronic ports only; electronic items and other components have separate nuyen costs.

Design Specifications

Design Cost: 10 points

Customization Specifications

Parts Cost: 1,000¥

Parts Availability (SI): 3/6 days (1)

Equipment Req'd: Vehicle shop

Base Time/Skill Test: 8 hrs/Electronics B/R (3)

Magnetic-Anomaly Detector

Magnetic-anomaly detectors (MADs) available as vehicle modifications are used to detect underwater submarines by monitoring the effects such large boats have on the earth's natural magnetic field. Despite advances in materials engineering and metallurgy, submarines continue to use large quantities of iron-based steel, because steel is relatively inexpensive (at least compared to the alternatives). MADs are the only method, other than sonar, for detecting submerged submarines. Only aircraft can be fitted with MADs (ships have too much iron in them to use MADs).

MADs augment the sensor system of an aircraft. To detect an underwater submarine using MADs, make a Sensor Perception Test (p. 135, SR3), rolling a number of dice equal to the aircraft's Sensor rating against a target number equal to the sub's *normal* (not Sonar) Signature rating.

Design Specifications

Cost: Sensor rating x 250 points

CF Consumed: 12 CF

Load Reduction: 50 kg

Customization Specifications

Parts Cost: Sensor rating x 20,000¥

Parts Availability (SI): 8/21 days (4.5)

Equipment Req'd: Vehicle Facility

Base Time/Skill Test: 16 hrs/Electronics (B/R) (8)

CF Consumed: 16 CF

Load Reduction: 50 kg

Over-the-Horizon Sensors (OTHS)

Normal ship surface-scanning sensors are limited in their range to an absolute maximum range of 35 kilometers, due to the curvature of the earth. Over-the-horizon sensors (OTHS) overcome this limitation, however, by using reflective and refractive optical techniques to extend the range of ship surface sensors.

A ship with OTHS ignores the 35-kilometer limitation for detecting surface contacts using onboard ship sensors. However, the ship also receives a +3 modifier when making Detection Tests against surface targets beyond the 35 kilometer range, because the ray-bending technology of OTHS tends to degrade image quality and reliability.

Design Specifications

Cost: Sensor rating x 1,000 points

CF Consumed: 216 CF

Load Reduction: 2,500 kg

Customization Specifications

Parts Cost: Sensor rating x 100,000¥

Parts Availability (SI): 10/60 days (5)

Equipment Req'd: Ship facility

Base Time/Skill Test: 40 hrs/Electronics B/R (6)

CF Consumed: 216 CF

Load Reduction: 2,500 kg

Power Amplifiers

Power amplifiers increase the Flux ratings of sensors, ECM, ECCM, hardwired remote control decks and other electronic transmission devices. An increased Flux rating increases the effective range of a remote-control deck and makes it more resistant to electronic warfare. For more information, see *Electronic Warfare*, p. 35.

Design Specifications

Cost: 5 points per rating

Max Rating/Improvement: 10

CF Consumed: 0.25 CF per rating (round down)

Load Reduction: 1 kg per rating

Customization Specifications

Parts Cost: 250¥ per rating

Parts Availability (SI): Rating ÷ (rating x 12) hrs (1.5)



SENSOR SYSTEMS TABLE

Sensor Level	CF Consumed*	Design Points	Customization Cost	Weight (kg)	Availability	Street Index
1	0/1	50	5,000¥	12	4/7 days	2
2	1/2	75	7,500¥	20	4/10 days	2.5
3	2/3	100	10,000¥	25	5/14 days	3
4	2/3	125	12,500¥	35	6/21 days	3.5
5	3/6	150	15,000¥	50	8/30 days	—
6	4/8	200	20,000¥	75	10/45 days	—
7	6/9	300	30,000¥	110	12/60 days	—
8	10/12	500	50,000¥	150	14/3 months	—
9	12/16	1,000	100,000¥	200	16/6 months	—
10	16/20	5,000	500,000¥	250	18/1 year	—

* The first number is the CF consumed if the sensor is installed during vehicle design. The second value is the CF consumed if the sensor is installed during vehicle customization.

Equipment Req'd: Vehicle shop

Base Time/Skill Test: 8 hrs/Electronics B/R (4)

Max Rating/Improvement: 10

CF Consumed: 0.5 CF per rating (round up)

Load Reduction: 1 kg per rating

Remote-Control Encryption Module

This device works just like the encryption module for remote-control decks (see p. 97), allowing remotely controlled drones to decrypt encrypted signals from the rigger and scramble their own transmissions to protect against signal interception. If a vehicle or drone is part of a remote-control network using an encryption module to scramble its signals, then the vehicle/drone must have a module to communicate with the network.

A remote-control network always operates with an encryption rating equal to the rating of the lowest encryption module in the network.

Design Specifications

Design Cost: Rating x 50 points

Customization Specifications

Parts Cost: Rating x 5,000¥

Parts Availability (SI): Rating/rating days (3)

Equipment Req'd: Electronics kit

Base Time/Skill Test: 1 hour/Electronics B/R (4)

Retransmission Units

A retransmission unit (known as "retrans" for short) is a receiver-transmitter unit that intercepts signals from a remote-control deck and relays them to other drones on a separate frequency. When used properly, a retrans unit can do two things: increase the effective range of a remote-control deck and provide extra defense against electronic warfare.

A retrans unit has its own Flux rating. Any drone inside the transmitting range of a retrans unit can receive commands from the main remote-control deck, even if it is outside the deck's range. Additionally, a retrans unit can use its Flux as complementary dice to any MIJI Tests made against the remote-control deck. This applies to drones that are within range of both the remote-control deck and the retrans unit only.

A retrans unit may be targeted for electronic warfare, but any MIJI results apply only to those drones in range of the retrans unit. Drones within range of the remote-control deck are unaffected.

A retrans unit has a base Flux of 0. Additional Flux can be purchased by adding on power amplifiers.

Design Specifications

Design Cost: 250 points

CF Consumed: 1 CF

Load Reduction: 5 kg

Customization Specifications

Parts Cost: 25,000¥

Parts Availability (SI): 8/14 days (3)

Equipment Req'd: Microtronics shop

Base Time/Skill Test: 64 hrs/Electronics B/R (4)

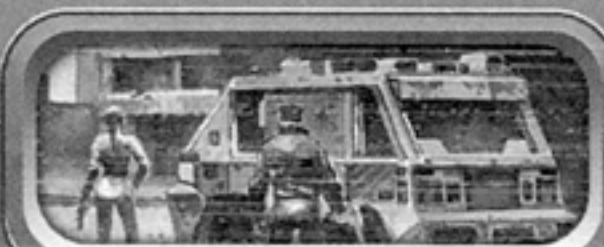
CF consumed: 1.5 CF

Load Reduction: 5 kg

Sensors

Sensor systems include standard and enhanced audio/video sensors, thermal and radar sensors and ultrasound sensors, as well as identification, recognition and tracking software. See *Sensor-Enhanced Gunnery* (p. 152, SR3) and *Sensors* (p. 135, SR3) for information on using sensors.

Note that certain higher-level sensors are restricted security- and military-grade equipment and not available on the street (except from very well-connected fixers).



SONAR SYSTEMS TABLE

Sensor Level	CF Consumed*	Design Points	Customization Cost	Weight (kg)	Availability	Street Index
1	4/6	50	5,000¥	120	4/7 days	2
2	6/8	500	25,000¥	250	4/10 days	2.5
3	10/14	2,500	125,000¥	350	5/14 days	3
4	16/25	5,000	625,000¥	500	6/21 days	3.5
5	50/75	2,500	2,000,000¥	750	8/30 days	—
6	75/100	3,000	5,000,000¥	1,000	10/45 days	—
7	100/150	10,000	15,000,000¥	1,250	12/60 days	—
8	200/300	15,000	20,000,000¥	1,500	14/3 months	—
9	300/500	25,000	30,000,000¥	2,000	16/6 months	—
10	500/750	50,000	50,000,000¥	2,500	18/1 year	—

* The first number is the CF consumed if the sensor is installed during vehicle design. The second value is the CF consumed if the sensor is installed during vehicle customization.

Most design and customization specifications are included on the Sensor Systems Table (p. 147).

Design Specifications

See Sensor Systems Table.

Customization Specifications

See Sensor Systems Table.

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 16 hrs per level/Electronics B/R (4)

Sonar Systems

Sonar systems are the primary means for submarines to navigate underwater. Surface ships also carry sonar, to detect underwater hazards, both natural (reefs and sandbars) and manmade (mines and submarines).

Most design and customization specifications are included on the Sonar Systems Table.

Design Specifications

See Sonar Systems Table.

Customization Specifications

See Sonar Systems Table.

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 40 hrs per level/Electronics B/R (6)

Towed-Array Sonar

Towed-array sonar consists of a long cable with sophisticated microphones positioned at strategic lengths along the cable. Towed-array sonar allows a ship to overcome its "blind spot" in the stern, caused by baffles from the propeller's turbulence.

Additionally, towed-array sonar has an additional benefit of improving detection of passive sonar contacts at medium and long ranges. When a ship has its passive sonar deployed, it gains an additional die when making Passive Sonar Detection Tests against contacts more than 15 kilometers distant from the ship.

Towed-array sonar is vulnerable to cable breaks during ship combat maneuvers. To determine if a cable is cut during sudden maneuvers, roll 2D6 each time a maneuver is made (gamemaster's discretion). On a result of two 1s, the cable has been cut during maneuvers.

Design Specifications

Cost: Sonar rating x 1,000 points

Max Rating/Improvement: 6

CF Consumed: 125 CF

Load Reduction: 1,500 kg

Customization Specifications

Parts Cost: Sonar rating x 100,000¥

Parts Availability (SI): 10/45 days (4.5)

Equipment Req'd: Ship facility

Base Time/Skill Test: 16 hrs/Ship or Submarine B/R (6)

Max Rating/Improvement: 6

CF Consumed: 175 CF

Load Reduction: 1,500 kg

ACCESSORIES

What's a rigger vehicle without custom, hand-picked accessories? The following descriptions present a wide assortment of items designed to custom-tailor any vehicle to a rigger's satisfaction.

Aircraft Drop Tanks

Drop tanks may be attached under an aircraft's wings or fuselage in lieu of rocket/missile mounts. For every two external mounts sacrificed, a pair of drop tanks may be added. (Drop tanks are installed in pairs to maintain aerodynamic balance.)

Each drop tank can hold 1,000 liters of fuel, so a pair of drop tanks increases an aircraft's fuel supply by 2,000 liters. Installing drop tanks on an aircraft decreases its Signature by 1. Each additional pair of drop tanks decreases the aircraft's Speed by 15, and every two pairs of drop tanks increases the



vehicle's Handling by 1. Mounting drop tanks on an aircraft takes ten minutes.

The pilot may jettison drop tanks if he spends a Complex Action for that purpose. The aircraft's flight characteristics immediately return to their standard values. The cost of a pair of drop tanks is 8,000¥. Drop tanks have a Body of 1 and 3 Armor Points.

Amphibious Operation Packages

Amphibious-operation packages are used to modify ground vehicles for amphibious operations. If the vehicle has watertight seals and life support, it can be used for underwater operations. Three levels of amphibious-operation packages are available.

To perform submarine operations, a vehicle must have a sealed power plant (see EnviroSeal™, p. 132). However, vehicles with unsealed engines may perform surface operations.

The speeds listed for each package apply only when a ground vehicle is afloat and treading water. If a vehicle is touching ground, it should travel at its Off-Road speed.

Level 1 Package: This package uses the vehicle's wheels as the source of motive power and enables a vehicle to travel through water at a speed of 15 meters per turn. While operating in this manner, the vehicle receives a +2 Handling modifier.

Level 2 Package: This package consists of a propeller or drive system linked to the vehicle's drive system. This system gives the vehicle Speed rating 30 in the water, with no Handling modifier.

Level 3 Package: The Level 3 package consists of water-jet units and impellers that are linked to the vehicle's drive system. This package gives the vehicle Speed rating 45 on the water, with no modifier to Handling.

Design Specifications

Design Cost: 25 (Level 1), 80 (Level 2), 200 (Level 3)

Max Rating/Improvement: 3

CF Consumed: 0 CF (Levels 1 and 2), 2 CF (Level 3)

Customization Specifications

Parts Cost: 2,500¥ (Level 1), 7,500¥ (Level 2), 15,000¥ (Level 3)

Parts Availability (SI):

Level 1: 3/6 days (1)

Level 2: 5/10 days (1.25)

Level 3: 6/12 days (1.5)

Equipment Req'd: Vehicle facility

Base Time/Skill Test:

Level 1: 32 hrs/Appropriate Vehicle B/R (4)

Level 2: 40 hrs/Appropriate Vehicle B/R (5)

Level 3: 80 hrs/Appropriate Vehicle B/R (6)

Max Rating/Improvement: 3

CF Consumed: 0 (Level 1), 2 (Level 2), 4 (Level 3)

Anti-Theft Systems

Every vehicle comes equipped with maglocks on its entry points and on its control systems. Default vehicle maglocks have a rating of 2, and are equipped with either a keypad, cardreader or fingerprint scanner (purchaser's choice). These maglocks can be defeated (as described on p. 235, SR3), allowing access to and control over the vehicle. The system can be programmed with a variety of responses to a triggered alarm. It may be set to emit a loud, attention-grabbing alarm, automatically call a pre-programmed number (usually either the owner, the police or a security service) via the onboard cell-phone, or alert a controlling rigger.

More secure anti-theft systems can be purchased, improving the quality of the maglocks and adding additional security features.



Improved Security: Anti-theft systems can be improved to a rating between 3 and 10 with this modification. The improved rating is used as the rating for all of the vehicle's maglocks and other features

Electric Shock: An electrical current ripples through the outer shell of the vehicle, giving a nasty shock to the would-be thief. The voltage level does the same damage as a Defiance Super Shock taser (10S Stun).

Explosion: Characters who really hate vehicle thieves can set up their anti-theft systems to blow up the vehicle with plastic explosives (either Compound IV or Compound XII). As a general rule, vehicles must be packed with enough plastic explosives to deliver a Power equal to the square of their Body ratings (see p. 283, *SR3*, for computing Power for plastic explosives). The explosion destroys the vehicle and inflicts explosive damage on the would-be intruder—as well as on passengers, cargo and anyone passing by.

For damage to the vehicle's passengers, cargo, and bystanders in the immediate vicinity, reduce the damage Power Level by the Vehicle's Body or Armor rating, whichever is higher. For a more powerful effect, the player installing the system can make a Demolitions (4) Test during installation. If the test succeeds, reduce by half the Body or Armor rating for this calculation. In any case, the damage Power Level drops by 1 for each meter of distance from the vehicle.

If the vehicle is packed with less than the minimum charge required to destroy it, the explosion merely damages the vehicle. If more than half but less than the full minimum is used, the blast causes Serious damage. If less than half is used, the blast causes Moderate damage. In either case, the explosion causes damage to passengers, cargo and bystanders.

Proximity Alert: A vehicle with this system uses its sensors to scan any people who approach within a prescribed distance. If the approaching person is not carrying a proper identifier (usually either a minor radio beacon, magnetized passcard or similar gadget), the vehicle audibly warns the interloper to back off. If the person continues to approach the vehicle, it issues an alarm and/or triggers a linked system (such as the electric shock system above). Only vehicles with sensors can take this modification.

Design Specifications

Design Cost:

Ratings 3–6: 4 points per rating
Ratings 7–9: 10 points per rating
Ratings 10+: 50 points per rating
Electric System: +20 points
Proximity Alert: +2 points

Max Rating/Improvement: 10

Customization Specifications

Parts Cost:

Ratings 3–6: 400¥ per rating
Ratings 7–9: 1,000¥ per rating
Ratings 10+: 5,000¥ per rating
Electric Shock System: +2,000¥
Proximity Alert: +250¥

Parts Availability (SI):

Ratings 3–6: 4/7 days (1.25)

Ratings 7–9: 5/10 days (1.5)

Ratings 10+: 6/14 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 40 hrs/Appropriate Vehicle B/R (4)

Max Rating/Improvement: 10

Ejection Bucket Seats

The ejection bucket seat is a standard or armored bucket seat (see *Seats*, p. 153) fitted with a small solid-fuel rocket and rudimentary stabilization systems. Ejection-activation controls may be included on or near the seat (or elsewhere) at the time of installation. The seat includes a parasail that deploys on ejection and brings the chair and occupant safely to the ground, assuming the occupant is securely strapped in. The cost of the seat and the CF Consumed include the necessary jettison-capable panels that allow the seat to be fired clear.

Reinforced ejection bucket seats are also available for large orks, trolls and other large metahumans. Double the appropriate costs for reinforced ejection seats.

Design Specifications

Design Cost: 35 (Standard), 70 (Reinforced)

CF Consumed: 6 CF

Load Reduction: 100 kg (Standard), 250 kg (Reinforced)

Customization Specifications

Parts Cost: 3,000¥ (Standard), 6,000¥ (Reinforced)

Parts Availability (SI): 5/10 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 16 hrs/Appropriate Vehicle B/R (4)

CF Consumed: 7

Load Reduction: 110 kg (Standard), 250 kg (Reinforced)

Convertible Tops

"Rag-top" conversions are available for vehicles that normally come with hard tops and do not have gull-wing or canopy access. The conversion replaces the hard-top roof with a folding canopy that can be extended or retracted on command. If a roll bar is not installed, double the target number for any passenger Damage Resistance Test following a crash. Rag-tops do not provide vehicle protection to passengers from side, rear or top attacks.

Design Specifications

Design Cost: 0 points

Customization Specifications

Parts Cost: Multiply the vehicle cost by .1 and then add 2,500 nuyen

Parts Availability (SI): 4/72 hrs (1)

Base Time/Skill Test: 24 hrs/Appropriate Vehicle B/R (4)

Equipment Req'd: Vehicle shop



Cranes

A crane is a hydraulic-powered mechanical boom capable of lifting heavy loads. To use a crane, the vehicle must be stationary and immobilized with the supplied chocks. Cranes are not available for vehicles with Body ratings of 0.

A crane has its own Load rating, which denotes how many kilograms of weight it can lift. The maximum Load rating for a crane is based on the vehicle's Body, as shown on the Crane Capacity Table. If desired, players can install cranes with Load ratings lower than the maximum allowed for the vehicle.

If a vehicle uses its crane to pull or tow an object while moving (for example, a tow truck towing an automobile), the towing maximum is determined by the vehicle's or crane's Load rating, whichever is lower.

For more information on lifting and towing, see *Lifting and Pulling Objects*, p. 64.

Design Specifications

Design Cost: (Crane's Load rating ÷ 50) points

Max Rating/Improvement: See Crane Capacity Table

CF Consumed: 15

Load Reduction: Body x 80 kg

Customization Specifications

Parts Cost: Crane's Load rating x 2¥

Parts Availability (SI): 6/14 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: Body x 16 hrs/Appropriate Vehicle B/R (4)

Max Rating/Improvement: See Crane Capacity Table

CF Consumed: 35

Load Reduction: Body x 80 kg

Drone Racks

Drone racks are used to launch airborne drones from moving vehicles. The rack is a hardware cradle that holds the drone, moves it into launch position and then releases it. Drone racks can also be used to recover launched drones while a vehicle is moving.

Launching a drone from a drone rack requires two separate actions, the first to activate the drone rack and the second to launch the drone. The drone is then considered to be moving at either the current speed of the vehicle or the drone's stall speed, whichever is greater. Rotorcraft drones launched from stationary vehicles launch in hover mode.

Recovering a launched drone requires a successful Handling Test by the driver of the recovering vehicle and a Free Action. At the same time, the drone's controller must make a Handling Test. If either test fails, the drone has not been recovered. If both tests fail, the drone crashes into the vehicle.

The drone rack also serves as an enclosed mini-hangar that protects drones stored inside it. A drone rack has the same Armor rating as the vehicle on which it is mounted, but only one-half the vehicle's Body (round down.)

Design Specifications

Design Cost: Body x 12 points

CF Consumed: Amount needed to store drones (see p. 62)

Load Reduction: 45 kg

CRANE CAPACITY TABLE

Vehicle Body Rating	Maximum Crane Load Rating/Lifting Capacity
1	25 kg
2	200 kg
3	750 kg
4	2,000 kg
5	5,000 kg
6	20,000 kg
7	30,000 kg
8	45,000 kg
9	60,000 kg
10+	Body x Body x 750 kg

Customization Specifications

Parts Cost: Multiply the vehicle cost by .1 and then add 2,500¥

Parts Availability (SI): 4/96 hrs (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 8 hrs per Body point/Appropriate Vehicle B/R (4)

CF Consumed: Amount needed to store drones + 2 CF

Load Reduction: 45 kg

External Cargo Mounts

External cargo mounts include accessories such as roof racks and externally mounted side cargo-boxes on motorcycles. External cargo mounts require no CF allocation, but when the cargo mount is loaded the vehicle's Handling rating increases by 1. The maximum cargo capacity of a vehicle's external mounts is equal to the vehicle's original internal cargo capacity.

This modification may not be added during the design process.

Customization Specifications

Parts Cost: 250¥ per CF that the mount will hold

Parts Availability (SI): 3/24 hrs (1)

Equipment Req'd: Vehicle shop

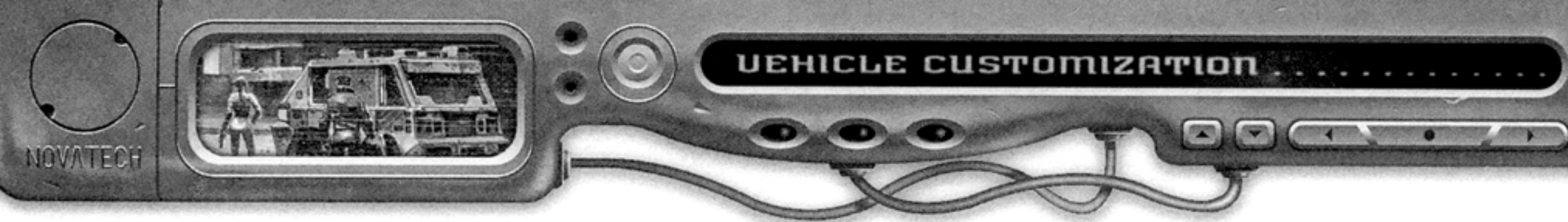
Base Time/Skill Test: 8 hrs/Appropriate Vehicle B/R (3)

Max Rating/Improvement: Original internal cargo space

Flotation Packages (Aircraft)

Any aircraft or helicopter may be fitted with floats for amphibious operations. Adding floats to an aircraft increases the aircraft's Economy (multiply the initial Economy by 1.2). Additionally, the floats reduce the aircraft's Speed by half. And of course, an aircraft fitted with floats cannot touch down on land.

Floats also reduce the Speed ratings of helicopters. To determine the reduced Speed of a float-equipped helicopter, multiply the helicopter's initial Speed rating by .9 and round down. The product is the helicopter's new Speed rating. Float-equipped helicopters can still touch down on land, however.



Design Specifications

Design Cost: Chassis point value x 1.2

Customization Specifications

Parts Cost: (Vehicle cost x .1) + 2,500¥

Parts Availability (SI): 4/7 days (2)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 32 hrs/Appropriate Vehicle B/R (3)

Load Reduction: 100 kg

Generator

The generator design option is available for trailers, barges and rail cars only. This option provides power for design options or modifications that require power. The gamemaster should exercise common sense in determining which modifications require power and which do not.

Design Specifications

Design Cost: Chassis cost ÷ 4

CF Consumed: Starting CF rating ÷ 3

Load Reduction: Starting Load rating ÷ 2

Customization Specifications

Parts Cost: Chassis cost ÷ 4

Parts Availability (SI): 5/7 days (1)

Equipment Req'd: Vehicle shop

Base Time/Skill Test: 16 hrs/Appropriate Vehicle B/R (4)

CF Consumed: Starting CF rating ÷ 3

Load Reduction: Starting Load rating ÷ 2

Hovercraft Water Seals

Normally, a hovercraft that loses power while on a body of water will sink within 30 minutes. However, a hovercraft water seal makes a hovercraft's chassis watertight and enables the craft to float, a useful capability if the engine fails, is deliberately turned off or destroyed while the vehicle is moving over water.

Design Specifications

Design Cost: Body x 5 points

Customization Specifications

Parts Cost: Body x 500¥

Parts Availability (SI): 4/96 hrs (1)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 32 hrs/Appropriate Vehicle B/R (3)

Mechanical Arms

Articulated mechanical arms are not as strong as cranes, but they possess superior dexterity. In fact, a mechanical arm can do the same things a metahuman arm can and then some.

Every mechanical arm has a Strength rating, which is equal to the vehicle's Body rating². A mechanical arm can lift a number of kilograms equal to its Strength rating multiplied by 20.

An arm's Strength rating may be increased by purchasing additional Strength enhancement. Note that increasing the Strength of an arm also increases its Load reduction, which lim-

its the amount of Strength enhancement a mechanical arm can take. The Strength rating of a limb can *never* increase beyond ten times the Body rating of the vehicle to which it is attached.

Mechanical arms can sport any accessory or feature available on cyberarms except for the Strength or Quickness enhancements described on pp. 33-34, *M&M*. A limb accessory for a mechanical arm costs half as much as the standard cyberarm version of the accessory but has the same Availability and Street Index ratings as the standard version.

The gamemaster has final say over the type and number of modifications that can be made to a mechanical arm.

Design Specifications

Design Cost: Body x 100 points

Strength Enhancement (1-3 pts): (60 x Body) Design Points per point of enhancement

Strength Enhancement (4+ pts): (75 x Body) Design Points per point of enhancement

CF Consumed: 2

Load Reduction: Strength x 10 kg

Customization Specifications

Parts Cost: Body x 10,000¥

Strength Enhancement (1-3 pts): (5,000 x Body)¥ per point

Strength Enhancement (4+ pts): (6,000 x Body)¥ per point

Parts Availability (SI): 4/4 days (1)

Equipment Req'd: Vehicle facility

Base Time/Skill Test: 40 hrs/Cybertechnology B/R (6)

CF Consumed: 4

Load Reduction: Strength x 10 kg

Medical Clinic

A mobile medical clinic is a complete assortment of medical gear including emergency diagnostic electronics and biomonitors, pressurized oxygen tanks and breathing masks, a stabilization unit (p. 305, *SR3*), and an assortment of controlled drugs and compounds. A vehicle medical clinic is the equivalent of a medical shop (see p. 138, *SR3*).

Vehicle medical clinics are primarily used by ambulances and other emergency medical vehicles. The number of patients a mobile medical clinic can hold is dictated by the amount of People Space in the vehicle (see p. 120).

Design Specifications

Design Cost: (Rating + 4)³ x 3 points

Maximum Rating: 6

CF Consumed: Rating x 2

Load Reduction: Rating x 75 kg

Customization Specifications

Part Cost: (Rating + 4)³ x 800¥

Parts Availability (SI): (Rating + 3)/(Rating x 2) days (3)

Equipment needed: Vehicle shop, electronics shop

Base Time/Skill Test: (Rating) days/Appropriate Vehicle B/R Skill, Electronics B/R

Target Number: Rating

Maximum Rating: 6

CF Consumed: Rating x 3

Load Reduction: Rating x 100 kg

Photovoltaic Chameleon Paint

Photovoltaic chameleon paint allows the pigmentation and pattern of a vehicle's paint to be altered. Unmarked security and police vehicles use chameleon paint to switch between a mundane appearance and official security/police markings. Likewise, shadowrunners use chameleon paint to lose tails and prevent their vehicles from being identified at crime scenes. Chameleon paint is also popular among members of certain social classes who like to show off their vehicles with specialized schemes or display certain messages to passersby.

Chameleon paint requires more than a simple paint job, however. First, a monofilament mesh must be secured to the vehicle's surface with insulating resin. This mesh is then wired to the vehicle's onboard computer. The photovoltaic paint is then applied over the mesh. The paint scheme is controlled via a program loaded onto the onboard computer, allowing the user to select a particular color and pattern for each segment of the mesh grid.

Changing a vehicle's color takes a minimum of one Complex Action and may take significantly longer for detailed patterns or color combinations.

Note that chameleon paint does not allow a vehicle to blend into the surrounding environment, as do ruthenium polymers. In fact, chameleon paint is incompatible with ruthenium, as well as smart armor systems, ablative armor and radar-absorbing materials.

Design Specifications

Design Cost: 50 points

Customization Specifications

Parts Cost: 5,000¥

Parts Availability (SI): 6/14 days (1.5)

Equipment Req'd: Vehicle shop

Base Time/Skill Test: 72 hrs/Electronics (6)

Seats

Seats come in two types: bench and bucket. Both types of seats have additional options available: armoring and reinforcement.

Bench Seats: Bench seats are popular in compact vehicles or other vehicles in which space is at a premium. A single bench seat can accommodate two human-sized passengers (three if you cram), or 200 kilograms. Bench seats are not available for motorcycles.

Removing a bench seat frees up 6 CF and increases the available Load rating by 200 kilograms (the Load increase reflects the fact that the vehicle now carries fewer passengers and thus has more power free for hauling cargo).

Folding Bench Seats: Folding bench seats are common in vehicles such as limousines, to provide extra seating for lack-



eys and the like when needed, or in station wagons. Four CF are freed up for cargo (weighing up to 150 kilograms) when a folding bench seat is folded.

Bucket Seats: A bucket seat holds a single person in greater comfort than a standard bench seat. Removing a bucket seat frees up 6 CF and increases a vehicle's available Load rating by 100 kg (the Load increase reflects the fact that the vehicle now carries one less 100-kilogram passenger).

Armored Seats: Both bench and bucket seats may be armored to protect against incoming fire that penetrates the vehicle. (Armoring on bench seats protects against attacks from the rear only.) Up to 2 points of Armor may be installed on a bench seat.

Reinforced Seats: Reinforced seats are designed to support the weight of larger orks, trolls and other large metahumans. A reinforced bench seat can hold up to 300 kilograms, while a reinforced bucket seat can hold up to 250 kilograms. Sturdier seats are also available for either type, but they cost an additional 100 nuyen for every additional 25 kilograms of support capacity.

When replacing a standard seat with a reinforced one, the vehicle's current Load rating must be able to accommodate the additional weight of the reinforced seat.

If an oversized metahuman attempts to sit in a standard seat, he will crush the seat and mangle its padding. Additionally, he suffers a +2 modifier when making Resistance Tests against collision or crash damage (see p. 147, SR3). This effect also applies to any character (oversized or not) that is not sitting in a seat (for example, riding in the trunk).

Metahuman Adjustment Package Deal: All of the vehicles listed in the *Vehicle List* (beginning on p. 156) are also available in metahuman-adjusted variants, which replace all standard seats with reinforced seating. To calculate the cost of a reinforced-seat model, count the number of bench and bucket seats in the vehicle. Multiply the number of seats by 1,200¥



and add this amount to the cost of the vehicle. (Yes, this gives a higher cost than simply replacing the regular seats with the reinforced seats. But remember that the manufacturer is also adjusting the performance of the vehicle to compensate for the heavier-than-normal driver and passengers.)

This package deal also includes size adjustment of manual controls, if necessary. Metahuman-adjusted vehicles may be harder to obtain, more expensive or simply unavailable in areas unfriendly to metahumans.

Design Specifications

Design Cost:

Standard Bench/Bucket Seat: 0 points

Folding Bench Seat: 0 points

Reinforced Bench/Bucket Seat: 5 points

Armoring: 12 points per Armor point

CF Consumed:

Standard Bench/Bucket Seat: 6

Folding Bench Seat: 6

Reinforced Bench/Bucket Seat: 8

Load Reduction:

Standard Bench/Bucket Seat: 150 kg

Reinforced Bench Seat: 300 kg

Reinforced Bucket Seat: 250+ kg

Customization Specifications

Parts Cost:

Standard Bench Seat: 750¥

Folding Bench Seat: 750¥

Reinforced Bench Seat: 1,500¥

Standard Bucket Seat: 700¥

Reinforced Bucket Seat: 1,500¥, plus an additional 100¥ for every 25 kilograms of support capacity above 250

Armoring: 1,250¥ per Armor point

Parts Availability (SI): 3/48 hrs (1)

Equipment Req'd: Vehicle shop

Base Time/Skill Test: 4 hrs/Appropriate Vehicle B/R (4)

CF Consumed:

Standard Bench/Bucket Seat: 6

Folding Bench Seat: 6

Reinforced Bucket Seat: 8

Load Reduction

Standard Bench/Bucket Seat: 100 kg

Reinforced Bench Seat: 300 kg

Reinforced Bucket Seat: 250+ kg

Sidecars

Motorcycle sidecars come in three sizes: small, medium and large. The Sidecar Table shows the costs of adding a sidecar to a vehicle.

The cargo capacity for each sidecar does not include seating, which must be taken out of the sidecar's CF capacity (for example, a small sidecar can accommodate one bucket seat, but it takes up all of the sidecar's CF). A motorcycle's Load rating does not change with the installation of a sidecar, so characters will have to be careful not to overload the sidecar with excessive weight.

A sidecar reduces the cycle's Speed by 15, increases its Handling rating by the appropriate modifier and decreases its Economy by 10 percent. (To calculate the new Economy, simply multiply the initial Economy rating by .9.) A sidecar has the same Body rating as the vehicle on which it is mounted. Sidecar armor may be increased in accordance with the standard vehicle-modification rules (p. 131).

Installing or removing a sidecar requires 15 minutes.

Spotlights

A spotlight projects a concentrated beam of light. It has an effective range of 600 meters, with a beam diameter of 0.5 meters at the point of origin and 5 meters at maximum range. The beam diameter increases in proportion to the range, so the diameter of the spotlight at 300 meters would be $300/600 \times (0.5 + 5)$, or 2.75 meters.

In addition to standard white-light spotlights, spotlights are also available in medium-range infrared, which is invisible to the unaugmented human eye but illuminates areas for low-light and thermographic imaging systems. Spotlights may be controlled manually or remotely operated from inside a vehicle.

Design Specifications

Design Cost: 6 points

Customization Specifications

Parts Cost: 600¥

Parts Availability (SI): 4/96 hrs (1.5)

Equipment Req'd: Vehicle shop

Base Time/Skill Test: 24 hrs/Appropriate Vehicle B/R (4)

Tires

A number of different tire types are available. All require a standard tool kit to install. Spare tires take up a number of CF equal to one-half the Body of the vehicle, rounded down.

All vehicles are fitted with appropriate tires at the time of manufacture for no extra cost. Characters need only pay tire costs only if they request special tires during vehicle design or replace or add tires as vehicle customizations.

Standard tires are regular, run-of-the-mill tires. For vehicles using these tires, reduce by half (round down) the effects of any suspension or Handling modifications. Cost = Body $\times$ 50¥ each.

SIDECAR TABLE

Size	Cargo	Handling Modifier	Design Cost	Customization Cost
Small	6 CF	+1	10 points	1,000¥
Medium	8 CF	+1	20 points	2,000¥
Large	12 CF	+2	35 points	3,500¥

Performance tires are required for use with improved suspension and drive-by-wire systems. They also negate the effects of off-road or active suspensions in off-road mode. Cost = Body x 75¥ each.

Off-road tires are required for use with off-road suspensions or active suspensions in off-road mode. With all other types of suspensions, they behave as standard tires (i.e., they negate the benefits of improved suspension and drive-by-wire improvements during on-road operation). Cost = Body x 125¥ each.

Dual-purpose tires are designed for use with active suspensions, allowing vehicles to operate both off-road and on-road without penalty. These tires act like standard tires with regard to improved and high-speed suspensions. Assume that any vehicle with improved suspension or a drive-by-wire system is also equipped with dual-purpose tires. Cost = Body x 250¥ each.

Runflat versions of all the aforementioned tire types are available. A runflat tire has the equivalent protection of an armored vest (5/3). Cost = tire cost + 200¥ each.

Valkyrie Module

A Valkyrie module is essentially a one-patient medical shop robotic drone designed for tele-surgery. For a full explanation of the Valkyrie system, see p. 139, *M&M*.

The Valkyrie module includes rigger adaptation, remote-control interfaces, a satellite uplink, a datajack port, robotic Pilot 5 (with Adaptation Pool 5), and space for one patient.

Design Specifications

Design Cost: 3,000 points

CF Consumed: 10

Load Reduction: 400 kg

Customization Specifications

Part Cost: 1,000,000¥

Parts Availability (SI): 10/2 wks (3)

Equipment needed: Vehicle shop, Electronics shop

Base Time/Skill Test: 5 days/Appropriate Vehicle B/R Skill (5), Electronics B/R (5)

CF Consumed: 15

Load Reduction: 500 kg

Winches

Winches are attached to the bumpers of ground vehicles and can pull and tow heavy loads.

A winch has its own Load rating/weight capacity, which determines how much weight the winch can pull, tow or lift. The maximum Load rating for a winch is based on the vehicle's

WINCH CAPACITY TABLE

Vehicle Body Rating	Maximum Winch Load Rating/Lifting Capacity
0	5 kg
1	25 kg
2	200 kg
3	750 kg
4	2,000 kg
5	5,000 kg
6	20,000 kg
7	30,000 kg
8	45,000 kg
9	60,000 kg
10+	Body x Body x 750 kg

Body, as shown on the Winch Capacity Table. If desired, players can select winches with Load ratings lower than the maximum for their vehicle's Body ratings.

If a vehicle uses its winch to pull or tow an object while moving (for example, a tow truck towing an automobile), the towing maximum is determined by the vehicle's or winch's Load rating, whichever is lower.

A vehicle can also use a winch to pull itself across normally impassable terrain, such as up a vertical cliff face. The vehicle must not be loaded over its Load rating when doing so, however. The winch pulls the vehicle at a speed of 1 meter per turn. The vehicle cannot perform any other actions while the winch is working.

For more information on lifting and towing, see *Lifting and Pulling Objects* (p. 64).

Design Specifications

Design Cost: (Winch's Load rating ÷ 100) points

Max Rating/Improvement: See table

Load Reduction: Body x 2.5 kg

Customization Specifications

Parts Cost: (Winch's Load rating ÷ 2)¥

Parts Availability (SI): 6/14 days (2)

Equipment Req'd: Vehicle facility

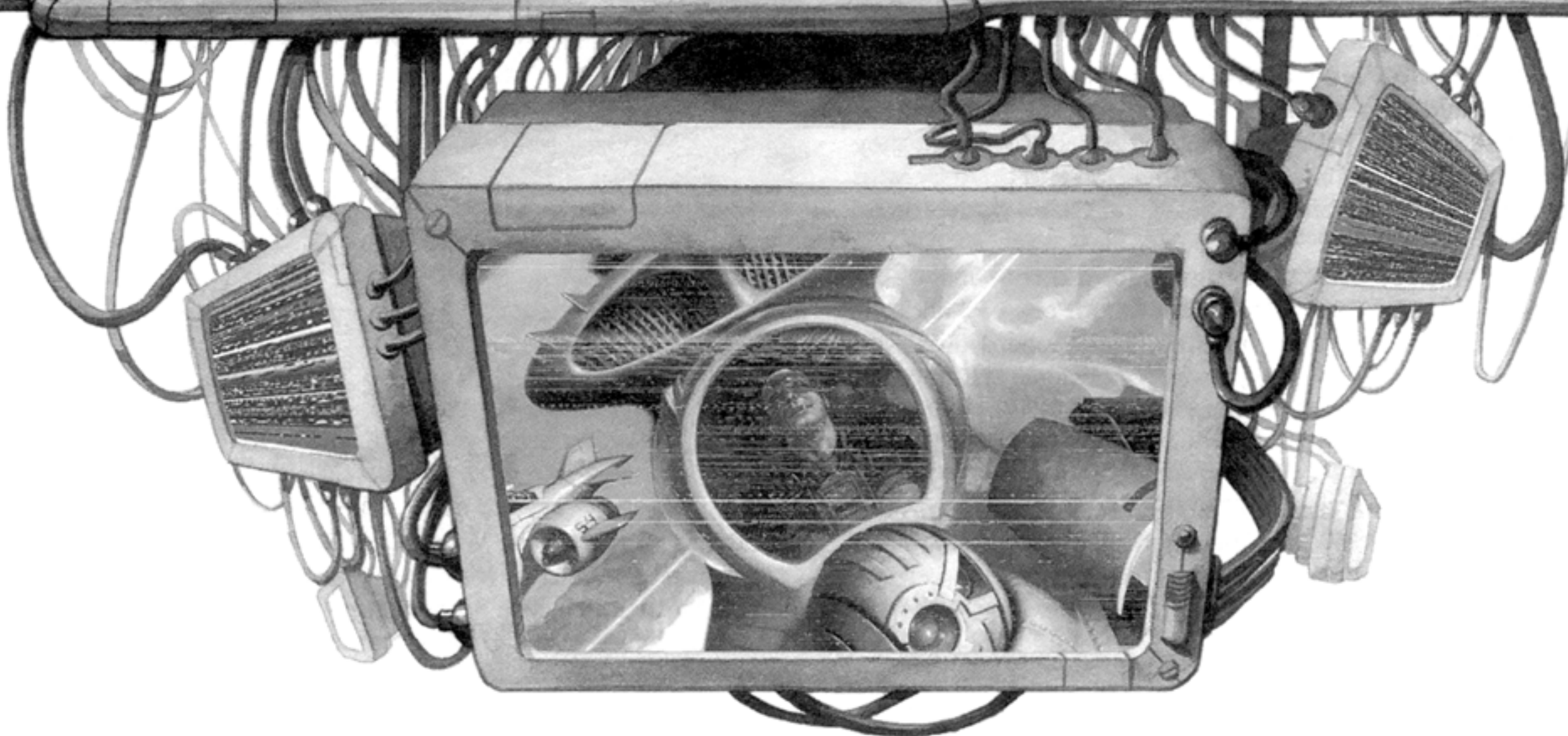
Base Time/Skill Test: Body x 16 hrs/Appropriate Vehicle B/R (4)

Max Rating/Improvement: See table

CF Consumed: 1

Load Reduction: Body x 2.5 kg

VEHICLE LIST



Below are all the vehicles previously presented in *Shadowrun* products throughout the years. The list also includes some new vehicles, as well as the ones created as examples in *Vehicle Design*.

FINDING A VEHICLE

The rules for determining Availability (p. 113) will sometimes send vehicle Availability ratings off the scale. When working with unique or niche vehicles, Availability ratings of 25 or greater may easily occur. Those vehicles are rare, to say the least. Very few are produced at any given time, so that there really isn't much of a "black market" where runners or contacts can gather these vehicles in numbers.

There are three options open to the character for finding the rare vehicle of her choice: the legal way, using contacts and "borrowing."

THE LEGAL WAY

Purchasing expensive and rare vehicles through the normal, everyday channels will require legal papers (credit history, SIN, bank records, reason for purchase, and so on). It may also require a background check in order to verify that the character's base lifestyle can live up to the costs. The cost for creating such a background can be determined by using the rules for forging an ID (p. 239, *SR3*). Since many of these vehicles are created on demand, the dealer may request a down payment of anywhere from 10 to 25 percent just to place the order.

The delivery date would be the Street Index multiplied by the Availability in days. Payment is expected in full on delivery. Design enhancements and modifications added to the base model use the rules presented in *Vehicle Design*, p. 102, or *Vehicle Customization*, p. 122, to calculate additional cost and time.

As normal, the Street Index is not used when purchasing a vehicle through legal means.

Remember that vehicles with exceptionally high Availability ratings are top-of-the-line models. If a corp discovers they were conned by a shadowrunner, they will cooperate fully with both local law enforcement and internal security forces, providing all pertinent records. Due to the limited number of that vehicle manufactured, the corpo-



ration can easily provide sales records, factory logs and other documents that will make the character's life difficult. If the character manages to legally purchase a vehicle, however, she'll be on the mailing list for notices of new models, sales and special features as they become available.

USING CONTACTS

The character can choose to wait it out and see if her contact can find one of the types she's looking for on the black market. Because this is typically a dicey and long-term project, the character can decide to turn those long odds a bit more in her favor by tossing nuyen at the problem. The character can reduce the Availability per the rules for purchasing gear (p. 272-3, SR3), except that for vehicles, the Street Index is increased by only .10 per point of Availability reduction.

"BORROWING A VEHICLE"

There are many times when a character needs a vehicle—one that doesn't belong to her. *Security Systems* (p. 12) discusses the ways one "borrows" such a vehicle, but sometimes the right vehicle is not around or handy, especially if he is looking for something rare or unusual.

If the character is looking for a specific vehicle, especially one that has an Availability of 24 or higher, a good rule of thumb is to let the character see it every few (Availability x Street Index) days. This will allow the gamemaster to create a subplot as the character stalks his prey. Once the character finds out who owns it and where it sits at night, the real test begins.

NON-COMMERICAL VEHICLES

Vehicles with no Street Index are the sole domain of corps or governments and their militaries. The only way characters should ever end up with one (and that's only if a gamemaster allows it) is through theft, a turn of events that usually makes all kinds of enemies for the characters.

THE VEHICLE ENTRY

Each vehicle entry in the list follows this format:

Vehicle Name

A brief description of the vehicle.

Maximum Depth: This lists the maximum depth that a vehicle can reach underwater. It is shown only for submarines.

Similar Models: This lists similar versions of this vehicle made by competitors. The gamemaster can allow subtle changes in features or enhancements for different models.

Other Features: This includes a list of vehicle features not included in its basic statistics.

VEHICLE ATTRIBUTES AND RATINGS

Hand	Handling Rating (p. 131, SR3)
Speed	Speed Rating (p. 132, SR3)
Accel	Acceleration Rating (p. 132, SR3)
Body	Body Rating (p. 132, SR3)
Armor	Armor Rating (p. 132, SR3)
Sig	Signature Rating (p. 133, SR3)
Auto	Autonav Rating (p. 133, SR3)
Pilot	Pilot Rating (p. 133, SR3)
Sensor	Sensor Rating (p. 133, SR3)
Cargo	Cargo Factor (p. 133, SR3)
Load	Load Factor (p. 133, SR3)
Seating	Seating Code (p. 133, SR3)
Entry	Entry Code (p. 133, SR3)
Fuel	Fuel Code (p. 62)
Econ	Economy Rating (p. 62)
S/B	Set Up/Breakdown Time (p. 62)
L/T	Landing Takeoff Profile (p. 62)
Chass	Chassis type (p. 104)
SI	Street Index (p. 113)
Avail	Availability Rating (p. 113)
Cost	Cost of the vehicle
Hull	Hull Rating (p. 52)
Bulwark	Bulwark Rating (p. 52)

TABLE LEGEND

Entry and Fuel Codes

Open-air vehicles have no entry codes

c	canopy
d	standard vehicle door, hinged
s	double-sized sliding door
g	double-sized gate-style entry
h	rooftop hatch
f	standard-sized rear-facing door
x	double-sized rear-facing door
r	rear ramp
D	diesel
M	methane
E	electric battery
EC	electric fuel cell
G	gasoline
R	rocket fuel
Jet	jet fuel

Cargo/Load Codes

t	trunk	PS	People Space (p. 119)
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Seating Codes

Bucket seats are considered standard and have no special notation.

b	bench seat	e	ejection seat
m	motorcycle seat (p. 104)		



ALL-TERRAIN VEHICLES

Thundercloud Pinto

The Pinto is manufactured in Pueblo, and their attention to detail and focus in creating a design that could flourish across the untamed wilds of their nation has paid off. Technically a trike, the vehicle's tri-wheel base and balloon tires enable the Pinto to handle almost any terrain it finds.

Similar Models: Jeep Rover, EUC Veldt and the Nissan Tornado

Other Features: None

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
Thundercloud Pinto	4/2	85	4	2	0	2	0	—	0	8	40

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
Thundercloud Pinto	3m	—	G (50 l)	10 km/l	—	—	ATV	1	2/48 hrs	35,000¥

Bikes

CHOPPERS

BMW Blitzen 2050

The Blitzen is a high-performance combat bike. Continuing the tradition of state-of-the-art performance bikes from the creators of the motorcycle, the Blitzen is used in combat bike competitions around the globe. Seen as the ultimate in design, speed and handling, it is the bike of the corporate elite—and those who want to pretend they are.

Similar Models: Yamaha Sprint, Honda Banshee and the Harley-Davidson Diablo

Other Features: Turbocharging 3 (factored in)

Harley-Davidson Electroglide

The Electroglide is the vehicle of choice for Lone Star bike patrols in cities across the UCAS. In keeping with its reputation for being able to take overwhelming punishment and keep going, it comes standard with runflat tires and off-road suspension, allowing security forces to take the chase to the perpetrators no matter where they run.

Similar Models: Dodge Guardian, Honda Cerebus and the Nissan Stealth

Other Features: Electronics Port w/Radio (Rating 3, 0.9 CF), External Fixed Firmpoint (1 CF Ammo Bin), Turbocharging 3 (factored in)

Harley-Davidson Scorpion

The Scorpion is the classic road hog. The folks at Harley-Davidson have taken years of experience in what bikers dream about and distilled it into the Scorpion design. A heavy chassis and powerful engine, combined with the Harley-Davidson reputation for quality, make this bike the most popular model on the road today.

Similar Models: Triumph RK30, Nissan Khan, and the Honda Duke

Other Features: None

Honda Viking

The other major candidate for road hog of the century, the Viking supports optional reinforced seating for troll-sized riders, giving even the largest rider the freedom of the road. Honda has taken advantage of the strengths inherent in the chopper chassis to create the most meta-friendly vehicle to hit the market since the Awakening.

Similar Models: Mitsuhamma Reckoning, Yamatetsu Predator and the Harley-Davidson Gideon

Other Features: Turbocharging 1 (factored in), Engine Customization 3 (factored in), Adjusted Controls (troll)

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
BMW Blitzen	3/4	220	13	2	2	1	2	—	0	2	40
H-D Electroglide	3/4	225	13	2	2	1	1	—	0	2	140
H-D Scorpion	4/5	120	6	2	1	2	2	—	0	4	60
Honda Viking	3/5	120	5	2	1	1	2	—	0	4	40

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
BMW Blitzen	2m	—	G (35 l)	8.5 km/l	—	—	Chopper	1	2/48 hrs	26,300¥
H-D Electroglide	1m	—	G (45 l)	8.5 km/l	—	—	Chopper	1	4/4 days	70,000¥
H-D Scorpion	2m	—	G (20 l)	10 km/l	—	—	Chopper	1	2/24 hrs	13,000¥
Honda Viking	2m	—	G (35 l)	9.5 km/l	—	—	Chopper	1	2/24 hrs	20,000¥

OFF-ROAD BIKES

Gaz-Niki White Eagle

The White Eagle is an off-road cycle, designed for durability and easy maintenance. Given the amount of punishment an off-road bike takes, the creators of the White Eagle designed a bike that could not only function in the outdoors but also be easy to service and repair. In addition, it can also mount a weapon, making for an excellent rural or urban security vehicle.

Similar Models: Harley-Davidson Wolverine, BMW Starfire and the Hyundai Marauder

Other Features: External fixed hardpoint

Hyundai Offroader

This all-terrain cycle is one of the best in the off-road market. Voted Best for Off-Road Terrain by *Easy Rider* magazine, the Offroader has made huge inroads into the competition. It is surprisingly quiet for a vehicle of this type and has earned a reputation for reliable off-road performance, earning military contracts in many North American countries.

Similar Models: Opel Nacht, Dodge Gauntlet and the Yamaha Growler

Other Features: None

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
G-N White Eagle	3/3	100	4	2	0	1	0	—	0	2	30
Hyundai Offroader	2/4	90	4	2	0	4	1	—	0	1	20

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
G-N White Eagle	2m	+	G (35 l)	10 km/l	—	—	Off-Road	1	2/24 hrs	13,000¥
Hyundai Offroader	2m	—	M (200 b)	1.25 km/bar	—	—	Off-Road	1	2/24 hrs	13,000¥

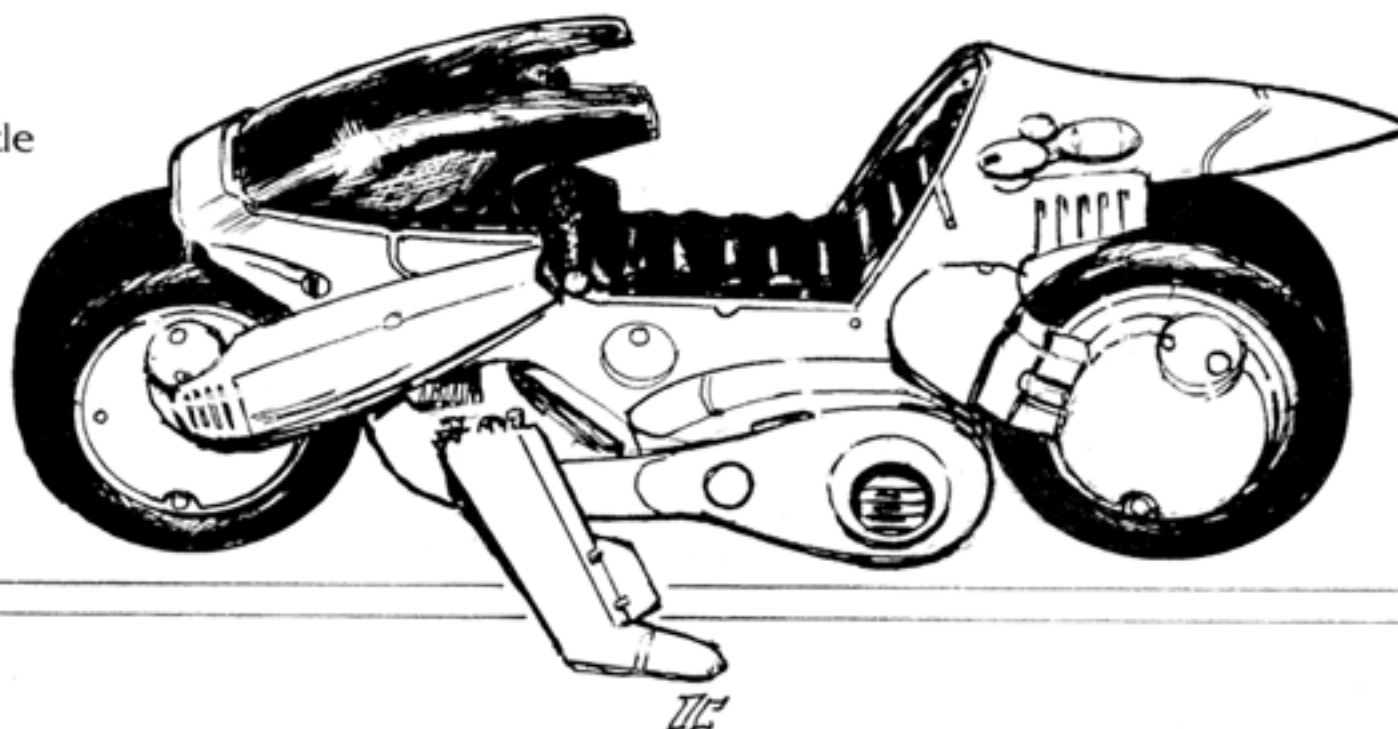
RACING BIKES

Suzuki Aurora

When Suzuki designed the Aurora, they wanted a vehicle that would cement their hold on the top-end racing market. The Aurora does all that and more. It's the definitive speed machine, with superior handling and maneuverability for challenging roads. Add that to the high level of performance the Aurora provides, and it's little wonder that the Aurora is the preferred model of the racing circuit.

Similar Models: Yamaha Katana, BMW Victory and the Mitsuhamma Blaze

Other Features: None



Yamaha Rapier

Yamaha created the Rapier to give racing performance in a real-world environment. Taking a different tack from its competitors, it decided to build a bike with premium performance, acceleration and handling for the street instead of the racecourse. While this does give it a slightly lower maximum speed, its lightweight design makes it a pleasure to ride.

Similar Models: Suzuki Mirage, Honda Zephyr and the Dodge G6000

Other Features: None

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
Suzuki Aurora	2/4	210	11	2	0	2	1	—	0	1	40
Yamaha Rapier	3/6	195	10	2	0	2	1	—	0	1	40

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
Suzuki Aurora	1m	—	G (15 l)	8 km/l	—	—	Racing	1	2/24 hrs	16,600¥
Yamaha Rapier	1m	—	G (15 l)	8 km/l	—	—	Racing	1	2/24 hrs	12,700¥

SCOOTERS

Dodge Scoot

The Scoot is an electrically powered scooter. Designed for urban commuting, the Scoot is an inexpensive option to public transportation that is affordable and ecologically friendly. Among young upwardly mobile urban professionals, it is the best selling bike on the market.

Similar Models: Yamaha Star, Messerschmidt-Kawasaki Chi and the Honda Sprite

Other Features: Gridlink



Entertainment Systems Papoose

The Papoose is an unusual vehicle: an electric racing cycle. While it can't compete with a combustion engine for speed or acceleration, the Papoose can achieve up to 30 kpm more than other vehicles of its class. Designed for crowded city streets, its surprising power and performance make it a good compromise for those who have an ecological conscience but still desire some speed.

Similar Models: Mitsuhamma Kestrel, Hyundai Clarion and the Suzuki Metro

Other Features: None

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
Dodge Scoot	3/4	60	3	2	0	5	0	—	0	1	10
E. S. Papoose	3/6	90	3	2	0	5	0	—	0	1	35

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
Dodge Scoot	2m	—	E (75 PF)	0.5 km/PF	—	—	Scooter	0.5	2/24 hrs	4,000¥
E. S. Papoose	1m	—	E (75 PF)	0.5 km/PF	—	—	Scooter	0.5	2/24 hrs	4,550¥

Boats

SKIFFS

Aztechnology Nightrunner

The aptly named Nightrunner is a small, efficient skiff that can keep up with watercraft twice its size. The model is also available in an electric model for the ultimate in a quiet, peaceful ride.

Similar Models: Kawasaki Interloper, GMC Heron and the Suzuki Skimmer

Other Features: Available in electric or methane models

Sendako Marlin

Whether you're a weekend sailor or weekday smuggler, the Marlin is a silent, affordable and inconspicuous alternative to a traditionally powered vessel. While many of Sendako's competitors have gone to sleeker, more modern designs, the Marlin retains a traditional, classic look. Last year, dilettante Mortimer Profacas won the Chicago Mackinac race in a humble Marlin, increasing its popularity among boat enthusiasts.

Similar Models: Surfstar Liberty, Celebrian Seagull and the JY Splash

Other Features: None

Surfstar Marine Seacop

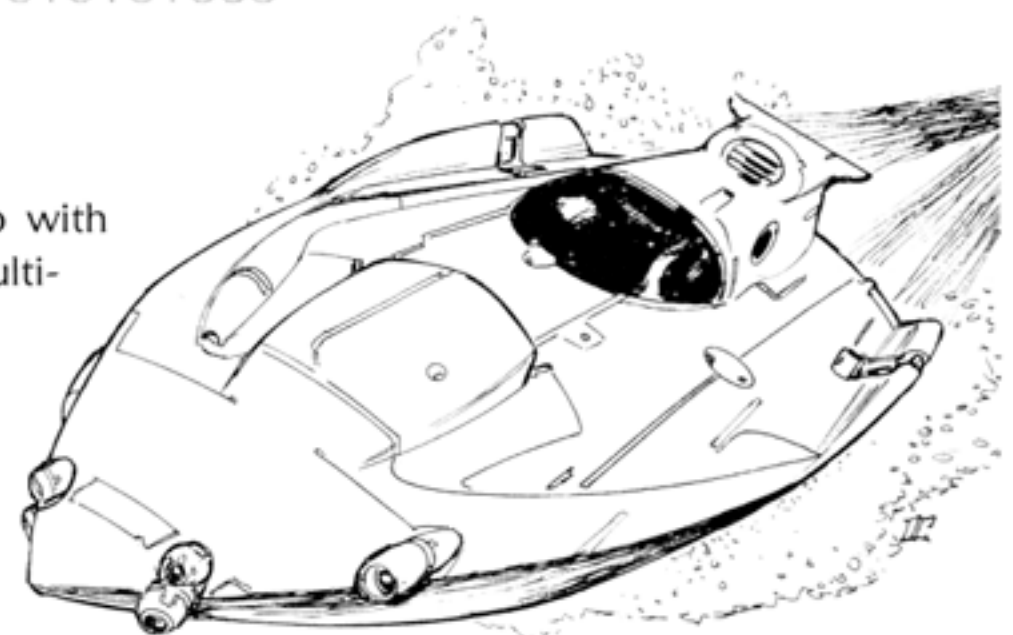
Coastal Lone Star branches use the Seacop as their standard patrol boat. While generally utilized for routine search-and-seizure duty, its speed comes into play when criminals think they can outrun the smaller craft. While there are models available to the general public, Surfstar seems content to fine-tune the Seacop for law-enforcement use and thereby ensure their contract with Lone Star.

Similar Models: GMC Merrow, Suzuki Sea Lion and the Renraku CK7250

Other Features: Electronics Port w/Radio (Rating 4, 1.2 CF), External Fixed Firmpoint (1 CF Ammo Bin), Spotlight

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
A. Nightrunner (M)	3	75	8	3	0	4/4	3	—	0/0	14	250
A. Nightrunner (E)	3	45	5	3	0	4/4	3	—	0/0	14	250
Sendako Marlin	3	30	3	3	0	6/6	0	—	0/0	12	150
S. M. Seacop	3	90	7	3	1	3/3	2	—	0/0	10	45

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
A. Nightrunner (M)	2	—	M (250 b)	1 km/bar	—	—	Skiff	1	2/48 hrs	30,000¥
A. Nightrunner (E)	2	—	E (150 PF)	0.5 km/PF	—	—	Skiff	1	2/48 hrs	30,000¥
Sendako Marlin	2 + 1b	—	Sail	—	—	—	Skiff	1	2/24 hrs	18,750¥
S. M. Seacop	1 + 2b	—	G (100 l)	7 km/l	—	—	Skiff	1	9/9 days	170,000¥





SPEEDBOATS

Colorado Craft Cigarette Hydrofoil

Colorado Craft has surpassed itself, coming back from a dry design spell to breeze past its competitors with the Cigarette Hydrofoil, so named because of its distinctive slim design. The boat itself is fast becoming a fixture on the racing circuit, and with the improvements that have been made to the latest model it is sure to keep Colorado Craft afloat for years to come.

Similar Models: Suzuki Tsunami, Yamatetsu Jet Stream

Other Features: Hydrofoil Capability (stats in parentheses apply when hydrofoil is engaged)

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
C. C. Cigarette	4 (5)	75 (105)	10 (15)	3	0	3 (1)	2	—	0	8	240

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
C. C. Cigarette	2	—	G (100 l)	3 km/l	—	—	Speedboat	1	2/48 hrs	35,000¥

SPORT CRUISERS

Aztechnology Tiburón Patrol Boat

The impressive performance and success of the Aztech Tiburón has resulted in the production of several different models. Ideally a stealth cruiser, the Tiburón seems to enjoy a strong presence in all markets: military, corps, private owners and especially overseas. Proud owners often quote the cruiser's reliability and plethora of options as their reasons for purchasing the boat, features that help increase Aztech's market share across the board.

Similar Models: GMC Avenger, Criscraft Patroller and the Zemlya-Poltava Militant

Other Features: 2 Mini-turrets (1 CF Ammo Bin each) on the standard model; 3 Micro-turrets (1 CF Ammo Bin each), Mini-turret (1 CF Ammo Bin) on the combat model; Improved Signature 3 (factored in) on combat model; Improved Signature 1 (factored in) on standard model

Biohm & Voss River Commander

The River Commander is one of the largest boats in its class, having comparably devoted much of its space to cargo. Surprisingly, the expected sacrifice in speed and power is not as significant as one would expect. The spacious design of the Biohm & Voss craft is unique and obviously inspired the derivative Aztechnology Serpiente.

Similar Models: GMC Harbormaster, Aztechnology Serpiente and the Celebrian Striker

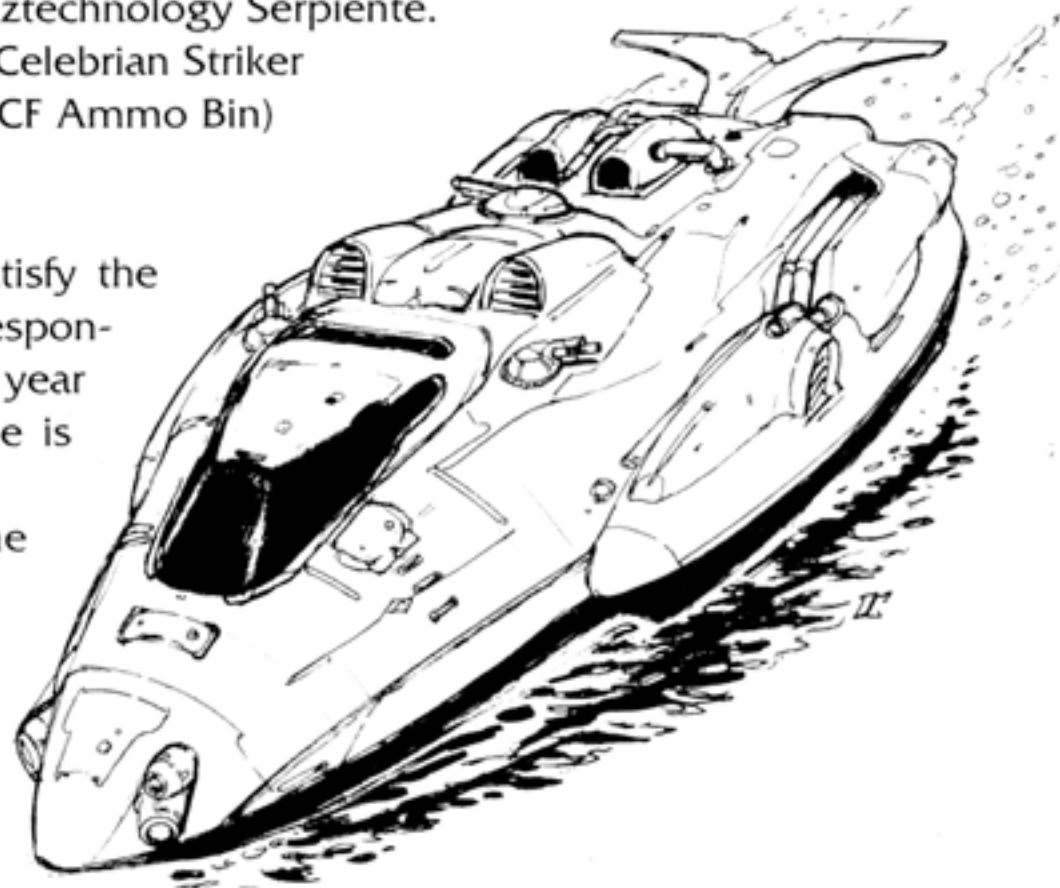
Other Features: 3 Micro-turrets (1 CF Ammo Bin each), Mini-turret (1 CF Ammo Bin)

GMC Riverine

This popular patrol boat has warranted three model variations to satisfy the demand for this large, fast, and potentially well-armed craft. GMC is very responsive to customer recommendations, altering the Riverine significantly each year of its production. Because of the wide range of features, the '42 Riverine is almost unrecognizable next to the dynamic '62 model.

Similar Models: Criscraft Tidal, Kawasaki Gendarmerie and the Mitsuhamma Tigershark

Other Features: Partial Basic Living Amenities, Folding Bench Seats on all models; Ring Mount on the standard model; External Fixed Hardpoint (1 CF Ammo Bin), Ring Mount on the police model; Micro-turret (1 CF Ammo Bin), Mini-turret (1 CF Ammo Bin) on the security model



Samuvani-Criscraft Otter

This widely copied utility vessel is used largely for river and inshore operations. The Otter features an open-hull fiberglass body, making it both light and affordable. While fishermen and sportsmen purchase the majority of these boats, it's not uncommon to see security officers, port authority or even smugglers using a heavily modified but still unassuming Otter.

Similar Models: Suzuki Hannibal, Yamatetsu Shadowcat and the GMC Imperator

Other Features: None

Zemlya-Poltava Swordsman

The modestly priced pleasure craft is the way to go if you're looking for the most boat for the nuyen. The Swordsman comfortably seats eight, with two bunks located in the bow. It is commonly outfitted with either a more powerful Euronav "Poseidon" motor or an Acced Marine electric drive for a smooth boating experience.

Similar Models: Surfstar Marine Mer-Warrior, Yamatetsu Valkyrie and the Biohm & Voss Seneschal

Other Features: Folding Bench Seats



Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
A. Tiburón	3	90	5	5	4	3/3	3	—	7/0	20	505
A. Tiburón (Cbt.)	3	90	5	5	4	3/3	3	—	7/0	18	475
B&V Riv. Comm.	4	75	4	5	9	1/1	3	—	1/0	55	800
GMC Riverine	3	90	5	5	6	2/2	2	—	1/0	16	175
GMC Riverine (Sec.)	3	90	5	5	6	1/1	2	—	1/0	51	1,355
GMC Riverine (Pol.)	3	90	5	5	6	2/2	2	—	1/0	55	1,345
S-C Otter	4	45	6	5	0	3/3	2	—	1/0	48	650
Z-P Swordsman	4	75	5	5	0	3/3	2	—	1/0	30	300
Z-P Swords (AME)	4	30	3	5	0	4/4	2	—	1/0	30	300
Z-P Swords (P.O.)	4	90	6	5	0	3/3	2	—	1/0	30	300

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
A. Tiburón	2 + 1b	—	D (500 l)	2 km/l	—	—	Cruiser	1	32/1 mo	650,000¥
A. Tiburón (Cbt.)	2 + 1b	—	D (500 l)	2 km/l	—	—	Cruiser	3	—	2,670,000¥
B&V Riv. Comm.	2 + 1b	—	D (500 l)	2 km/l	—	—	Cruiser	2	13/13 days	260,000¥
GMC Riverine	2 + 5b	2d	D (200 l)	2 km/l	—	—	Cruiser	2	5/5 days	100,000¥
GMC Riv. (Sec)	2 + 2b	2d	D (200 l)	2 km/l	—	—	Cruiser	3	8/8 days	150,000¥
GMC Riv. (Pol.)	2 + 2b	2d	D (200 l)	2 km/l	—	—	Cruiser	2	7/7 days	125,000¥
S-C Otter	2	—	G (200 l)	7 km/l	—	—	Cruiser	1	2/48 hrs	32,500¥
Z-P Swordsman	2 + 3b	—	G (200 l)	4 km/l	—	—	Cruiser	1	2/48 hrs	29,000¥
Z-P Swords (AME)	2 + 3b	—	E (200 PF)	1 km/PF	—	—	Cruiser	1	2/48 hrs	27,000¥
Z-P Swords (P.O.)	2 + 3b	—	G (200 l)	4 km/l	—	—	Cruiser	1	2/48 hrs	37,000¥

WATER SCOOTERS

Suzuki Watersport

The Watersport offers all the maneuverability and speed of a Suzuki motorcycle on the wide-open sea. Suzuki has definitely aimed the Watersport at the recreational crowd, offering several dynamic paint schemes and minor body modification options to personalize each one. There is also an electric model, which sacrifices power and acceleration for environmental peace of mind.

Similar Models: SeaDoo Arrow, Kawasaki Aqualisk and the Aztechnology Maya

Other Features: Available in both gasoline and electric models

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
S. Watersport (G)	2	45	7	2	0	3/3	0	—	1	4	38
S. Watersport (E)	2	30	4	2	0	5/5	0	—	1	1	53

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
S. Watersport (G)	1	—	G (20 l)	7 km/l	—	—	Scooter	1	2/24 hrs	10,000¥
S. Watersport (E)	1	—	E (100 PF)	0.5 km/PF	—	—	Scooter	1	2/24 hrs	9,250¥

YACHTS

Harland & Wolff Classique

There's no luxury that isn't part of this floating mansion; cabin space for 12 passengers with three bathrooms, a cabin unit for a crew of 6 and a three-room owner's unit with private bath, large living space and galley. The standard features on this yacht are considered opulent, making this boat the premier choice among those who wish to sail in style.

Similar Models: Yamatetsu Genève, Marine Technologies Sea Nymph and the Celebrian Galahad

Other Features: 10 High Living Amenities, 10-man Life Raft

Marine Technologies Dolphin II

Common to marine rental companies and the executive on the rise, the Dolphin II is 10 meters of seaworthy style and class. Below decks are the galley, lounge, cabins and toilet facilities, while above decks are a partially covered bridge, seating for five and a flying deck above. Tell the world you're somebody by owning a seaworthy work of art.

Similar Models: Greater Victoria Patrician, Yamatetsu Princessa and the Celebrian Mallornica

Other Features: 6 Improved Living Amenities, 10-man Life Raft

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
H&W Classique	5	45	4	8	0	2/2	2	—	1/0	120 [210 PS]	2,500
M. T. Dolphin II	3	45	4	8	0	2/2	4	—	1/0	9 [210 PS]	1,200



Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
H&W Classique	2	2	D (500 l)	2 km/l	—	—	Yacht	2	11/11 days	207,500¥
M. T. Dolphin II	1	2	D (200 l)	3 km/l	—	—	Yacht	2	7/7 days	125,000¥

Cars

ARMORED PERSONNEL CARRIERS (APCS)

Ferrari Appaloosa Light Scout

The Appaloosa goes to prove that Ferrari can turn its hand to anything it wishes and come out with a superior product. Commissioned by Italy during the Euro Wars, the Appaloosa is a light, fast vehicle that can carry six along with their gear through moderate to heavy fire. While not as tough as some APCs, it is well worth its purchase price for the armies lucky enough to have it.

Similar Models: Dodge APC750, Lockheed-Chenoweth Protector

Other Features: ECM 5, ECCM 5, Medium Turret (12 CF Ammo Bin), Folding Bench Seat, Improved Signature 2 (factored in), Radar-absorbent Materials 2 (factored in), Thermal Baffles 2 (factored in)

LAV-93 Devil Rat

The Devil Rat is a vehicle that knows its job and does it well, making it popular across the globe. Designed to be one of the premier armored personnel carriers in military service today, its affordable price combined with its superior performance ensure its presence in the modern military.

Similar Models: Salish-Sidhe Warrior

Other Features: Amphibious Operation 1, Electronics Port w/Radio (Rating 2, 0.6 CF), Gas Enviroseal, Small Remote Turret (2 CF Ammo Bin), Improved Signature 1 (factored in), Thermal Baffles 1 (factored in), 2 Folding Bench Seats

LAV-103 Striker Light Tank

The Striker is LAV's interpretation of the need for light tanks in today's infantry. It's a favorite with megacorporations because of its affordable firepower. While there are only a few manufacturers of light tanks today, the competition is fierce for military contracts. It remains to be seen if LAV's traditional yet reliable designs can keep up with the innovative engineers at Lockheed-Chenoweth.

Similar Models: Lockheed-Chenoweth Defender, UCAS A1098

Other Features: Amphibious Operation 1, Electronics Port w/Radio (Rating 2, 0.6 CF), Gas Enviroseal, Medium Remote Turret (10 CF Ammo Bin), Improved Signature 1 (factored in), Thermal Baffles 1 (factored in)

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
Ferrari Light Scout	2/3	125	10	6	9	5	2	—	6	5	625
LAV-93 Devil Rat	5/4	75	5	7	12	3	2	—	0	12	2,800
LAV-103 Striker	5/4	75	5	7	15	3	2	—	0	12	1,865

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
Ferrari Light Scout	3 + 1b	1h + 1d + 1x	Jet (250 l)	1 km/l	—	—	APC (Wheel)	2	38/1 mo	775,300¥
LAV-93 Devil Rat	2 + 2b	3h + 1r	D (200 l)	2 km/l	—	—	APC (Track)	2	13/13 days	260,100¥
LAV-103 Striker	3	3h + 1r	D (200 l)	2 km/l	—	—	APC (Track)	2	16/16 days	305,100¥

INDUSTRIAL MOVERS

Mesametric Kodiak Roadway Clearance System

The Kodiak is the latest in a long line of top-of-the-line construction and industrial vehicles from Mesametric. Designed specifically for the back-breaking job of removing old concrete and asphalt road surfaces, it goes to show that Mesametric has no intention of relinquishing its hold on the industrial vehicle market any time soon.

Similar Models: CAT Heavyweight

Other Features: Remote-Control Interface, Rigger Adaptation, Off-Road Suspension 2 (factored in), Improved Suspension 2 (factored in) Crane (Scoop, 1,000 kg) Special Equipment (Dozer Blade)

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
M. Kodiak	5/4	20	2	4	12	3	—	2	3	0	1,025



Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
M. Kodiak	None	—	D (125 l)	2.8 km/l	—	—	Med. Ind. Mov.	1	4/4 days	75,500¥

LIMOUSINES

Mitsubishi Nightsky

The Nightsky is the favored limo among both corporate ladder-climbers and celebrities. Its plush interior made from all-natural materials along with a cornucopia of communication and entertainment gadgets make getting there more fun. Customization is par for the course, and a stock Nightsky screams "rental."

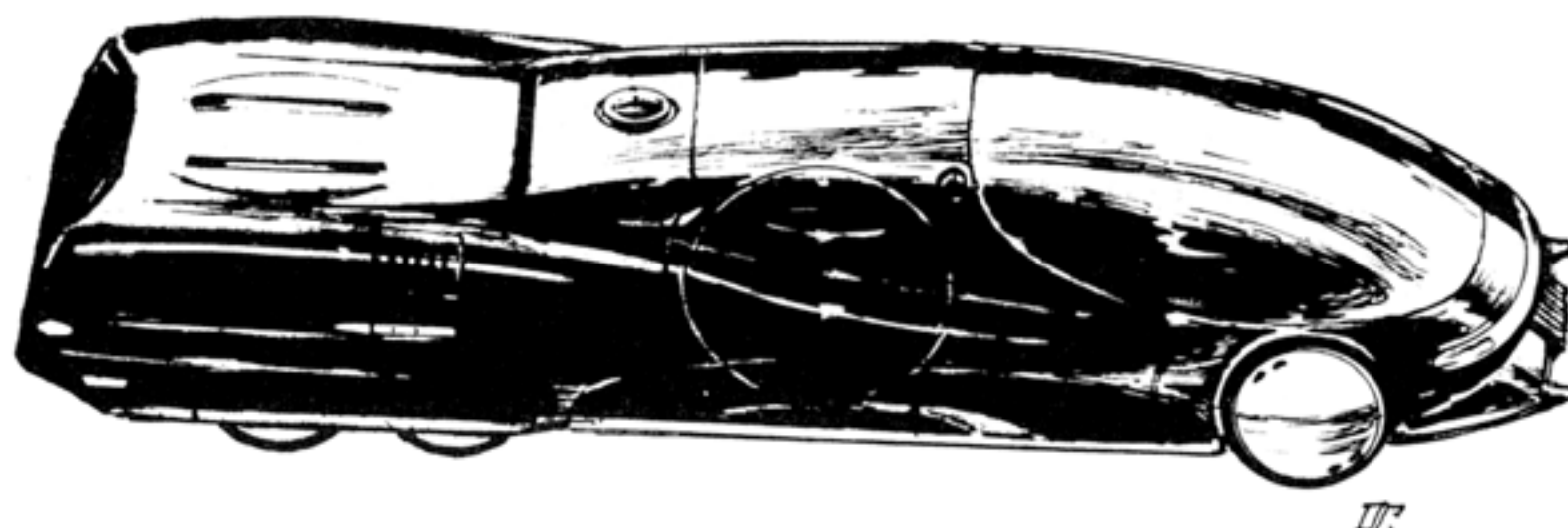
Similar Models: Lincoln Mark V, Buick Broadway and the Renraku Honor

Other Features: APPS, Concealed Armor, Roll Bars, Gas Enviroseal, Electronics Port w/Sat Uplink

Rolls-Royce Phaeton

The Rolls limo is the most spectacularly decadent, secure and high-tech vehicle on the road today. Its Satellite uplink, multi-electronic data ports, wet bar and tridscreen are standard features, just to name a few. While popular with the top corp executives and government officials, most people can't afford to rent one.

Similar Models: Bentley Verde, BMW Exeter 960 and the Daimler-Benz Ambassador



Other Features: APPS, Concealed Armor, Roll Bars, Gas Enviroseal, Electronics Port w/Sat Uplink, 3 Folding Bucket Seats

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
M. Nightsky	4/8	120	8	4	2	2	4	—	1	10	60
R-R Phaeton	4/4	140	8	4	4	2	4	—	1	6	30

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
M. Nightsky	8	2d + 2s + 1t	G (200 l)	8 km/l	—	—	Limousine	2	9/9 days	171,200¥
R-R Phaeton	8 + 1b	4d + 1h + 1g	D (250 l)	6 km/l	—	—	Limousine	2	11/11 days	218,800¥

RVs

Ford-Canada Bison

The Bison is a favorite for those who enjoy experiencing the power of a vehicle first hand. It's large and powerful enough to haul just about anything or anyone. The Bison's excellent off-road suspension and balloon tires make it a go-anywhere vehicle, and its powerful engine is ripe for rigger modification. Size and power, thy name is Bison.

Similar Models: Dodge Wanderer, Winnebago Sojourner and the Renraku Typhoon

Other Features: Concealed Armor, Folding Bench Seat, 2 Basic Living Amenities

Rolls-Royce Prairie Cat

A 4x4 with an amphibious propulsion system has very few terrain limits. This unusual vehicle combines luxurious amenities with the toughness and capabilities of a sturdy four-wheel-drive off-roader. Though the Prairie Cat has a heavy price tag, this RV is equipped with every entertainment, communications and safety feature you can jam into a vehicle.

Similar Models: Itasca Limitless, Dodge California, and the Celebrian Celestine

Other Features: APPS, Amphibious Operation 1, Concealed Armor, Electronics Port (Standard Portable Satellite Uplink, 2 CF), Roll Bars, 2 Improved Living Amenities

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
F-C Bison	4/3	135	6	4	4	2	3	—	1	67	1,918
R-R Prairie Cat	3/2	120	4	4	4	2	3	—	1	36	1,008

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
F-C Bison	2 + 5b	2d + 1s + 1x	D (250 l)	6 km/l	—	—	RV	1	8/8 days	145,000¥
R-R Prairie Cat	2 + 4b	4d + 1h + 1x	D (100 l)	8 km/l	—	—	RV	2	6/6 days	113,400¥



SAND BUGGIES

Lockheed-Chenoweth Light Strike Vehicle

The Lockheed-Chenoweth LSV is a four-person dune buggy commonly used by mercenaries, security agencies and special forces operating on long-range reconnaissance missions. Lockheed uses its knowledge of lightweight aircraft materials to make a quick and dependable buggy. Titanium alloy tubing allows for solid support with only half the weight.

Similar Models: VW Sandstorm, Suzuki Dune and the Yamaha Sahara

Other Features: Electronics Port w/Radio (Rating 2, 0.6 CF), Roll Bars, Ring Mount

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
L-C LSV	4/3	90	8	2	—	3	—	—	—	4	45

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
L-C LSV	4	—	G (40 l)	8 km/l	—	—	Sand Buggy	1	2/24 hrs	12,300¥

SEDANS

Chrysler-Nissan Patrol-1

The P-1 is the most common urban patrol car in use today. It is based on the Chrysler-Nissan Skyline GTR, one of the quickest sedans on the road. The P-1 package keeps the GTR's powerful engine and adds both armor and plenty of space for locking up criminals, options which keep law-enforcement agencies coming back.

Similar Models: Ford Marshal, Kia Justice and the Mazda XZ250

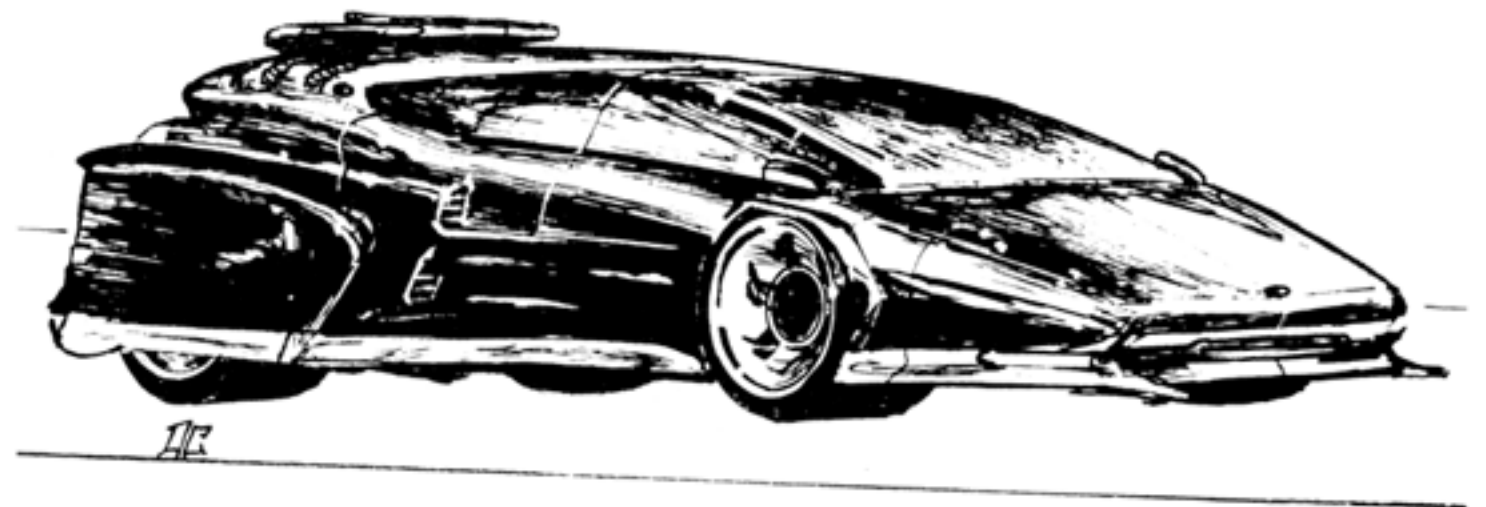
Other Features: Gas Enviroseal, Turbocharging 2 (factored in), Electronics Port w/Radio (Rating 4, 1.2 CF), 2 Pintle Mounts; Available in a civilian model

Ford Americar

Though it has gone through many changes and modifications over the years, the Americar remains Ford's best-selling car. The alterations have eliminated most of the problems and bugs, making it Ford's most reliable car. Its price has stayed competitive for years and continues to be the benchmark for low-priced sedans on the road today.

Similar Models: Chrysler-Nissan Sentra XI, Mercury Comet and the Honda Accord

Other Features: None



General Products COP

The City Operations Patroller (COP) is a common alternative to a full-size patrol car. Though not as big and armored as most other patrol cars, it is a cheaper option for rural precincts to consider. Civilian versions without armor or weapons are commonly used by delivery services across the UCAS.

Similar Models: Ford Mule, Mitsuhamma Chariot and the Renraku Sai

Other Features: Gridlink, Superconductive Drive 1

Lone Star-Modified Ford Americar

The Lone Star-modified Ford Americar makes an excellent patrol vehicle. The modification adds armor to the base Americar frame but does not hinder the car's speed or handling, though it does sacrifice some load capacity. Ford and Lone Star have a long and amicable relationship as a result of this contract.

Similar Models: Knight Errant Nissan Sentra XI, Sioux Mercury Grand Prix V and the PCC Honda Kia Argent

Other Features: None

Toyota Elite

The Elite is a full-size luxury car with a relatively average price for a power sedan. You get a lot of bang for your buck with this vehicle. Surprisingly nimble for a car of its size, the Elite's vast amount of head room and comfortable interior make it a favorite among trolls and orcs.

Similar Models: Buick Park Avenue, Saab 10-6 and the Citroen Xhen

Other Features: APPS, Gas Enviroseal



Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
C-N Patrol 1	4/8	180	12	3	2	1	3	—	0	11	40
Ford Americar	4/8	105	8	3	0	2	2	—	1	12	110
G. P. COP	4/8	90	6	3	1	4	1	—	0	18	185
L. S. Americar	4/8	105	8	3	3	2	2	—	1	10	65
Toyota Elite	4/8	120	12	3	0	2	4	—	1	11	100

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
C-N Patrol-1	2 + 1b	4d + 1t	G (60 l)	7.2 km/l	—	—	Sedan	2	3/72 hrs	43,700¥
Ford Americar	2 + 1b	2d + 1t	G (60 l)	12.4 km/l	—	—	Sedan	1	2/24 hrs	20,000¥
G. P. COP	2	1c + 1t	E (200 PF)	1 km/PF	—	—	Sedan	2	2/48 hrs	28,800¥
L. S. Americar	4	2d + 1t	G (60 l)	12.4 km/l	—	—	Sedan	2	2/48 hrs	38,500¥
Toyota Elite	4	4d + 1t	G (80 l)	12 km/l	—	—	Sedan	2	4/96 hrs	66,400¥

SPORT UTILITY VEHICLES

Gaz-Willys Nomad

The Gaz is a favorite among professional riggers. Its versatility and numerous options make it one of the most widely used vehicles on the road. Whether you use it for hauling soy beans or blasting through a go-ganger roadblock, it is equally capable. And, with plenty of cargo space, there is plenty of room for either groceries or heavy ordnance, take your pick.

Similar Models: Ford Survivor, Citroën Jumpy and the Mitsuhamma Tanto

Other Features: Roll Bars

GMC MPUV

The versatile GMC multi-purpose utility vehicle (MPUV) is a very popular light-combat SUV. As opposed to the Gaz-Willys, this truck has nothing to hide. Heavy armor and weapon mounts come as standard equipment. Its low price for a vehicle of its class makes it a common sight around the world.

Similar Models: Ford Workhorse, Volkswagen Wildnis and the Renraku Bear

Other Features: Electronics Port w/Radio (Rating 3, 0.9 CF), Pintle Mount, Spotlight

Land Rover Model 2046

This legendary 4-wheel drive SUV is the latest descendant in Land Rover's long line of off-road vehicles. From the deserts of north Africa to the streets of Seattle, the 2046 is as sturdy and dependable as any vehicle on the road. The 2046 is available as a van or pickup.

Similar Models: Saab Auslander, Suzuki Sporty and the Celebrian Terrain

Other Features: 3 Folding Bench Seats in the van version, 2 Folding Bench Seats in the pickup version

Nissan-Holden Brumby

The Brumby is a smaller 4-wheel drive SUV. If you don't need all that space, but still want a diesel engine and all-terrain suspension, it can pull you out off some very difficult situations. The Brumby receives excellent reviews from automotive magazines and other consumer reports as an affordable performance SUV.

Similar Models: Land Rover Model 2067, BMW Off-Roader and the Honda Safari

Other Features: Folding Bench Seat

Toyota Gopher

The Gopher is a classic pickup truck with great off-road suspension, superior handling and a loyal customer base. It comes with a built-in gun safe and an impressive warranty, but the Gopher's low price and huge cargo space are its best features.

Similar Models: Ford Texan, Nissan Rebel and the GMC B150

Other Features: Roll Bars

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
G-W Nomad	3/3	100	9	4	0	2	2	—	0	18	850
GMC MPUV	4/3	120	8	4	6	2	0	—	0	11	750
L. R. 2046 Van	3/5	100	7	4	0	2	2	—	0	11	750
L. R. 2046 Pickup	3/3	100	7	4	0	2	1	—	0	18	700
N-H Brumby	4/3	100	7	4	0	2	2	—	0	12	850
Toyota Gopher	4/4	105	7	4	0	2	2	—	0	38	500



Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
G-W Nomad	2 + 1b	2d	D (90 l)	7.8 km/l	—	—	SUV	1	2/48 hrs	34,500¥
GMC MPUV	2 + 1b	4d	D (100 l)	6 km/l	—	—	SUV	1	3/72 hrs	70,000¥
L. R. 2046 Van	2 + 3b	2d + 1h + 1x	D (120 l)	6 km/l	—	—	SUV	1	2/48 hrs	32,000¥
L. R. 2046 Pickup	2 + 2b	2d + 1h + 1x	D (90 l)	6 km/l	—	—	SUV	1	2/48 hrs	29,000¥
N-H Brumby	2 + 1b	2d	D (80 l)	6 km/l	—	—	SUV	1	2/48 hrs	19,000¥
Toyota Gopher	2	2d	G (80 l)	6 km/l	—	—	SUV	1	2/48 hrs	29,500¥

SPORTS CARS

Eurocar Westwind 2000

The Westwind 2K is the product of some of the most talented designers in Europe, with a body that says Porsche and an engine that screams Ferrari. Arguably the most beautiful sports car on the road today, it's a classic blend of form and function. The twin turbo model offers the same quality with the extra speed that some customers require.

Similar Models: Ferrari 770 Spider, BMW 3420LS and the Citron 1030

Other Features: APPS on both models; Turbocharging 2 on the turbo model

Ferrari Open-Wheel Racer

This car was designed with a specific audience in mind, and it was never meant for the street. The Ferrari racer was a concept car, created for collectors and auto eccentrics. Many owners won't drive this open-wheeled one-seater on the open road for legal reasons if nothing else, choosing to keep the vehicle on display or garaged. Those who do dare travel the road in this masterpiece leave everything else in the dust.

Similar Models: Peugeot AP75, Daimler-Benz MP6-17 and the Mazda Star 303

Other Features: Smart Materials, Nitrous Oxide Injectors 6, Datajack Port, Rigger Adaptation, Crash Cage

Honda-GM 3220

Honda-GM has cornered the market on the low-price sports cars and the 3220 has remained popular throughout all its model changes. With all the after market products that are made for the 3220s, it's no wonder that there are so many different kinds on the streets. The Thirty-Two Hundreds, a popular owners club with chapters across the UCAS, even has a convention every year in Milwaukee to celebrate the car they have come to love.

Similar Models: Ford Mustang, Toyota 660 Arachnid and the Chrysler Menace

Other Features: None standard, Turbocharging 2 (factored in) for the turbo model

Lone Star Modified Honda 3220 Turbo

Law enforcement needs to stay competitive in every field in order to remain effective. Vehicles are no exception. The Lone Star 3220 has all the edges it needs over the average auto; more speed, quicker acceleration, and an armored body. It's a rare crook that can outrun or out-gun the LS3220.

Similar Models: Knight Errant-modified Ford Mustang, PCC-modified Nissan Celer and the Ares-modified Mitsuhamma Reflex 6

Other Features: Turbocharging 2 (factored in)

Saab Dynamit 778 TI

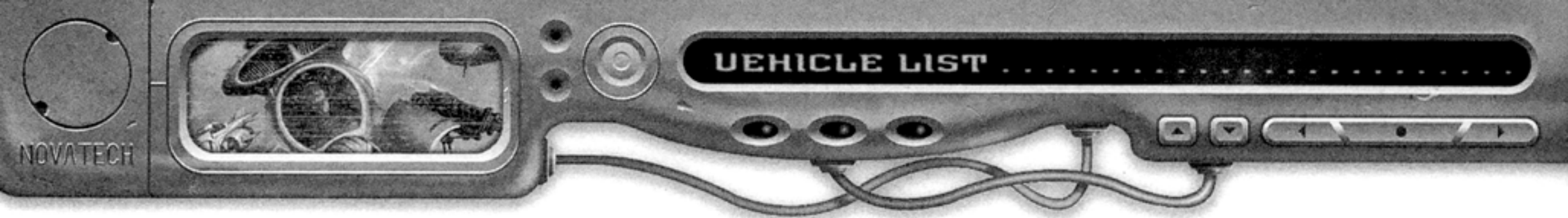
With its amazing new Mitsuhamma sensory active traction accelerator (SATA), the 778 TI is one of the fastest things on the road today. It takes quick reflexes and a lot of money to pilot this land rocket. Roll bars and a 6-point seat harness are standard, as Saab does its best to help you feel safer at speeds over 300 kph.

Similar Models: Porsche Winter, Mitsubishi Shadow and the Peugeot RM780

Other Features: APPS, Roll Bars, Turbocharging 2 (factored in)

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
E. W-wind 2000	3/8	210	10	3	0	2	3	—	1	5	45
E. W-wind Turbo	3/8	240	14	3	0	1	3	—	1	5	45
Ferrari Racer	2/8	311	21	3	0	2	0	—	2	7	115
Honda 3220	4/8	160	10	3	0	2	1	—	0	3	40
Honda 3220 Turbo	4/8	190	14	3	0	1	2	—	0	3	40
L. S. Honda 3220	4/8	190	14	3	1	1	2	—	0	3	15
Saab Dynamit	4/8	250	15	3	0	1	3	—	1	3	45

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
E. W-wind 2000	2 + 1b	2d + 1t	G (60 l)	6 km/l	—	—	Sports Car	2	3/72 hrs	57,000¥



Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
E. W-wind Turbo	2 + 1b	2d + 1t	G (80 l)	5.4 km/l	—	—	Sports Car	2	4/96 hrs	77,000¥
Ferrari Racer	1	—	G (60 l)	6 km/l	—	—	Sports Car	3	11/11 days	210,000¥
Honda 3220	4	2d + 1t	G (60 l)	6 km/l	—	—	Sports Car	1	2/48 hrs	28,000¥
Honda 3220 Turbo	4	2d + 1t	G (60 l)	5.4 km/l	—	—	Sports Car	1	3/72 hrs	44,000¥
L. S. Honda 3220	4	2d + 1t	G (60 l)	5.4 km/l	—	—	Sports Car	2	3/72 hrs	49,000¥
Saab Dynamit	2 + 1b	2d + 1t	G (150 l)	5.4 km/l	—	—	Sports Car	2	5/5 days	92,000¥

SUBCOMPACTS

Chrysler-Nissan Jackrabbit

The option for either methane or electric engines in the Jackrabbit is one of the most popular choices on the market, and the Jackrabbit's ease of repair and readily available after-market parts make it one of the most common cars among the masses. There are a number of vehicles on the market which share similar parts, making repair times remarkably short. This availability has unfortunately also led to the Jackrabbit being one of the most frequently stolen cars on the streets, flooding the black market with cheap stolen parts.

Similar Models: Citroën Ztana, Ford Swift and the Dodge Glow

Other Features: Folding Bench Seat, available in either electric or methane models

Leyland-Zil Tsarina

This car has an unusual seating arrangement, with the driver's seat slightly above and to the rear of the passenger. This car also comes with cargo space and a luggage rack, both rarities in the subcompact class. While Leyland-Zil has a reputation for putting economy above quality, the Tsarina has held its ground in the market nonetheless.

Similar Models: Opel Rana, Kia Zephyr and the Volkswagen Messenger

Other Features: Available in either electric- or methane-powered models

Mitsubishi Runabout

This three-wheeler is designed primarily for commuting and short distances. The Runabout is one of the smallest cars on the market, so it's always easy to park, though it's short on cargo space.

Similar Models: Honda Spirit, Mazda Watcher and the Renraku Konichiwa

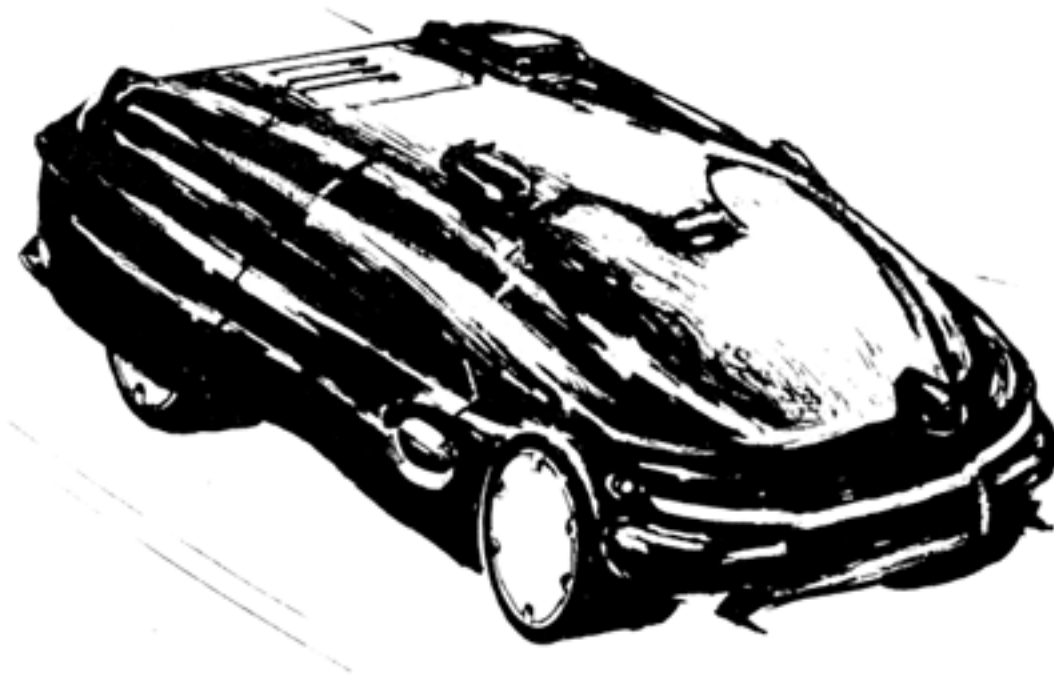
Other Features: None

Volkswagen Elektro

The Elektro is an inexpensive and exciting way to get around in style. This low-slung 3-wheeler is a sleek and stylish commuter car, with its high tech one-seat interior giving the impression of being in a jet cockpit. It is not designed for transporting cargo, but it's ideal for the corporate figure on the go.

Similar Models: Toyota Cirian, Aztechnology Sol and the Peugeot 401

Other Features: None



Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
C-N Jackrabbit (E)	3/8	60	4	3	0	5	1	—	0	1	50
C-N Jackrabbit (M)	3/8	90	6	3	0	4	1	—	0	1	100
L-Z Tsarina (E)	4/8	75	4	3	0	5	1	—	0	2	50
L-Z Tsarina (M)	4/8	100	6	3	0	4	1	—	0	3	100
M. Runabout	4/8	75	5	3	0	5	1	—	0	1	50
VW Elektro	4/8	75	4	3	0	5	0	—	0	1	45

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
C-N Jackrabbit (E)	2 + 1b	2d + 1t	E (200 PF)	0.5 km/PF	—	—	Subcompact	1	2/24 hrs	15,500¥
C-N Jackrabbit (M)	2 + 1b	2d + 1t	M (450 b)	1.25 km/bar	—	—	Subcompact	1	2/24 hrs	16,500¥
L-Z Tsarina (E)	2	2d	E (200 PF)	0.5 km/PF	—	—	Subcompact	1	2/24 hrs	12,000¥
L-Z Tsarina (M)	2	2d	M (450 b)	1.25 km/bar	—	—	Subcompact	1	2/24 hrs	12,500¥
M. Runabout	1	1c	E (200 PF)	0.5 km/PF	—	—	Subcompact	1	2/24 hrs	10,000¥
VW Elektro	1	1c	E (225 PF)	0.5 km/PF	—	—	Subcompact	1	2/24 hrs	8,000¥



TRACTORS

Conestoga Trailblazer

The birth of the NAN nations saw the end of trucking in the West as the primary means of transporting goods, but the profession still lives throughout the UCAS and CAS states. Of those tractors that lead the smaller truck market, the Trailblazer is at the head of the class. With a reputation for dependability combined with a surprising amount of speed, Conestoga is likely to remain at the forefront of the industry for some time to come.

Similar Models: GMC Hauler

Other Features: Folding Bench Seat

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
C. Trailblazer	4/8	90	3	5	0	2	2	—	0	6	18,000

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
C. Trailblazer	2 + 1b	2d	D (750 l)	3 km/l	—	—	Tractor	1	8/8 days	152,000¥

TRANSPORTS—HEAVY

GMC 4201

This heavily built, box-like transport is known for its solid workmanship and reliability. Its very powerful engine can haul anything that can fit inside the 4201. It is unusually stable off-road as well, and it has a huge cargo and load capacity. Not surprisingly, the 4201 is popular in nations where civilized areas are rare but the transport of goods is common.

Similar Models: Ford F500, Dodge Ram Industrial and the VW X600

Other Features: None

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
GMC 4201	3/7	85	3	6	0	2	2	—	0	130	6,500

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
GMC 4201	2 + 1b	2d	D (500 l)	3 km/l	—	—	Hvy. Trans.	1	4/4 days	80,000¥

TRANSPORTS—MEDIUM

Ares Citymaster

The Citymaster urban riot-control vehicle functions as a mobile command post. This modern transport comes fully loaded and generally is outfitted with additional weapons and armor. The Citymaster is a formidable foe and a very expensive law-enforcement toy.

Similar Models: VW Urbano

Other Features: Gas Enviroseal, Life Support (20 man-hrs), Small Turret (1 CF Ammo Bin)

Ares Mobmaster

Ares has raised the bar again with its latest truck in the Master line: the Mobmaster urban-security vehicle. It has extended life-support and carries a hard-earned reputation among rabble-rousers and gangs as a mean strike-breaker.

Similar Models: VW Überwachen

Other Features: Gas Enviroseal, Life Support (30 man-hrs), Small Turret (1 CF Ammo Bin)

Ares Roadmaster

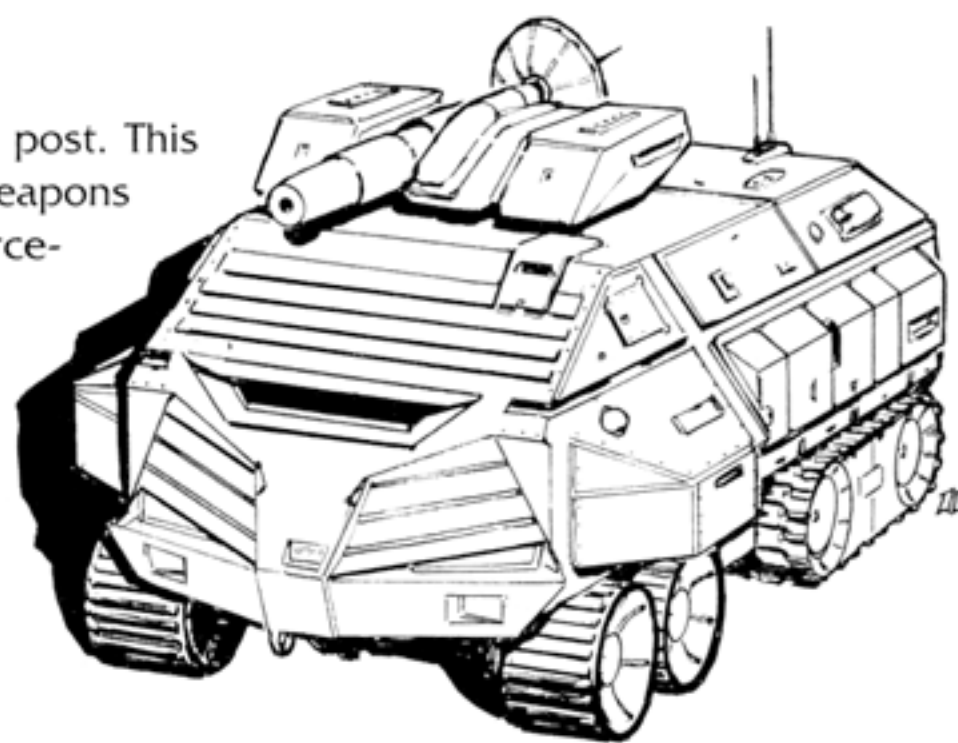
The Roadmaster is the basic model for the Ares Master series. Many runners modify Roadmasters rather than seeking out the more expensive and harder-to-obtain Master models. This large cargo transport can become a security vehicle or a mobile rigger's "captain's chair" with just a few modifications of easily interchangeable parts.

Similar Models: VW Brüllen

Other Features: None

DocWagon Citymaster Variant

DocWagon uses the best vehicles by necessity. When they put their stamp of approval on the versatile Ares Citymaster, it gave the Citymaster a significant sales boost. DocWagon outfits the Citymaster with enough medical equipment to make this truck into a mobile hospital, as well as outfitting it with two light machine guns to protect the patients and crew.





Similar Models: None

Other Features: Anti-theft System 6, Gas Enviroseal, Life Support (20 man-hrs), Small Turret (1 CF Ammo Bin), Medical Clinic (2 patients, 2 technicians, Rating 4)

DocWagon CRT Ambulance

DocWagon's staple vehicle is the CRT ambulance, a design that has become associated the world over with the DocWagon name. It is the workhorse of DocWagon's fleet and is immediately recognizable due to the unique reflective paint scheme used by the corp.

Similar Models: None

Other Features: Anti-Theft System 6, Medical Clinic (2 patients, 2 technicians, Rating 4)

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
Ares Citymaster	5/11	120	3	5	10	1	3	—	0	41	530
Ares Mobmaster	6/12	120	3	5	14	1	4	—	0	40	575
Ares Roadmaster	4/10	90	3	5	0	2	2	—	0	80	2,000
DW CM Variant	5/11	120	3	5	10	1	3	—	0	325 [324 PS]	780 [700 PS]
DW CRT	4/10	75	6	5	0	2	2	—	0	340 [324 PS]	1,450 [700 PS]

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
Ares Citymaster	2 + 5b	2d + 1x	D (250 l)	5.2 km/l	—	—	Med. Trans.	2	7/7 days	136,300¥
Ares Mobmaster	2 + 5b	2d + 1x	D (250 l)	5.2 km/l	—	—	Med. Trans.	3	9/9 days	173,000¥
Ares Roadmaster	2 + 1b	2d + 1x	D (250 l)	5.2 km/l	—	—	Med. Trans.	1	3/3 days	45,000¥
DW CM Variant	2 + 1b	2d + 1x	D (250 l)	5.2 km/l	—	—	Med. Trans.	2.5	23/23 days	455,000¥
DW CRT	2	2 + 1x	D (250 l)	4 km/l	—	—	Med. Trans.	1.5	18/18 days	361,000¥

VANS

DocWagon SRT Ambulance

Nothing says "Something has gone horribly wrong" like the appearance of the DocWagon SRT. Designed to accommodate one patient, this vehicle patrols a regular beat in order to respond quickly to calls. Over years of tweaking and upgrading its fleet of vehicles, DocWagon is emerging as the standard for medical vans and trucks.

Similar Models: Ford Medivan, Modified Chrysler-Nissan VS 780 and the Renraku ParaMed

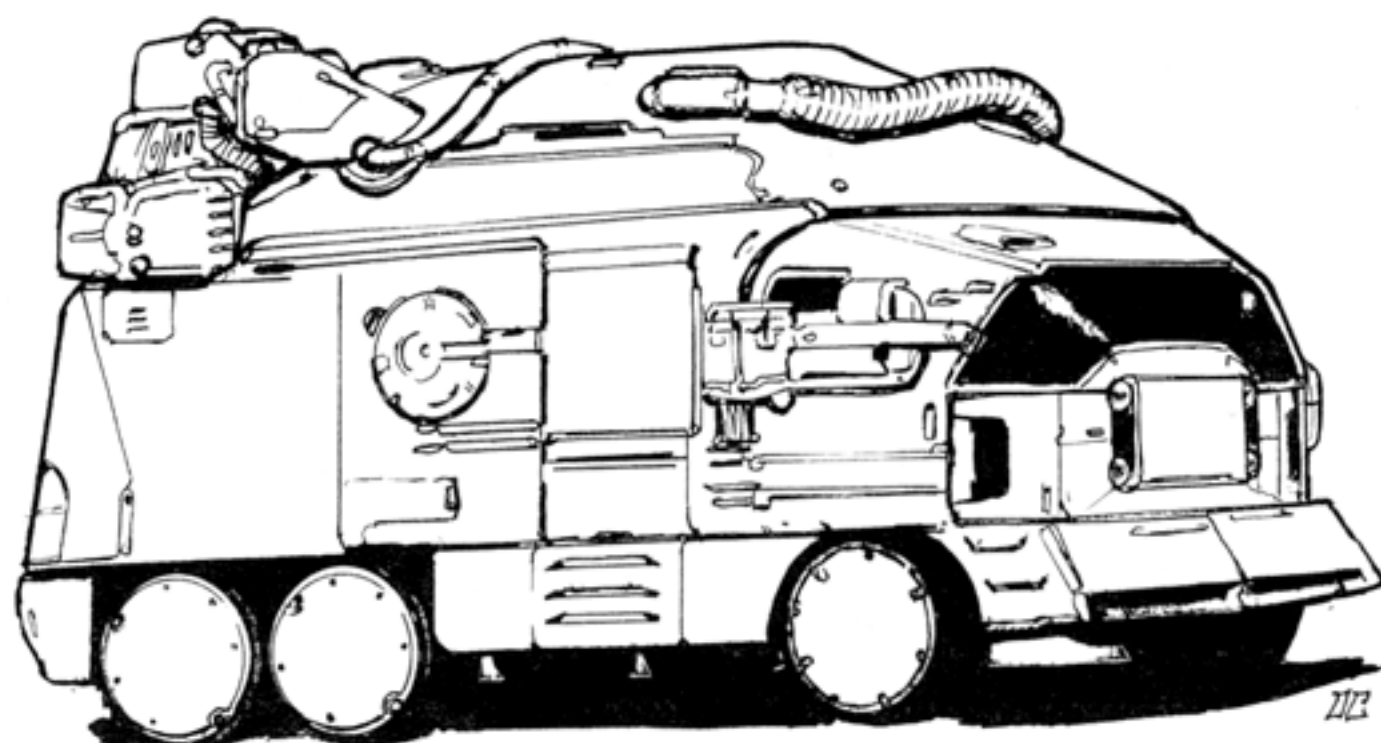
Other Features: Anti-Theft System 6, Medical Clinic (1 patient, 1 technician, Rating 4)

GMC Bulldog Step-Van

The Bulldog is an updated version of the standard delivery truck. It is the most common truck in the delivery business and its base model comes with concealed armor. Though everyone knows that the bulldog has "concealed" armor, only the most discerning eye can tell if it's the Standard or Security version, a mystery that has kept many packages safe that otherwise might not have been.

Similar Models: Dodge Ram, Ford F350 and the Chrysler-Nissan Packer

Other Features: Folding Bench Seat, also available in a security model



Leyland-Rover Transport

This sturdy, medium-sized van has plenty of interior space for transporting people or cargo. The electric engine responds well to the GridLink system, but the gasoline engine offers more power. A good suburban vehicle to have for a very inconspicuous look.

Similar Models: Nissan Coda, Dodge Caravan and the Mitsuhamu Shogun

Other Features: Folding Bench Seats on all models; available in electric or gas with minibus, pickup and closed bed options

Lone Star Black Mariah USPTV

The Black Mariah is the modern version of the celebrated "paddywagon." One part prison cell, one part tank and several parts oppressive vehicle of the Man. The Black Mariah can be seen rounding up gang members or quelling rioting mobs. It has enough armor and security features to keep suspects in and harmful elements out.



Similar Models: Knight Errant Securivan, Sioux Modified Nissan Sheriff and the Celebrian Conscript

Other Features: Gas Enviroseal, Life Support (12 man-hrs), 2 Mini-turrets (1 CF ammo bin each)

Renault-Fiat Eurovan

The Eurovan introduces a revolutionary concept in vehicle design. While the frame and chassis remain the same, the vehicle configuration is simply a body alteration. This allows Renault-Fiat to use one basic design to produce six different vehicles; any combination of camper, covered bed or pickup and gasoline or electric engine.

Similar Models: Volkswagen Superkombi V, Ford Engineer and the Renraku Busman

Other Features: Folding Bench Seat in the camper model; available in camper, covered bed, and pickup models

Volkswagen Superkombi III

Taking a cue from the Eurovan, the Superkombi is available in several different variants all based on the same frame and 120-liter engine. The rainbow of styles, accessories and modifications provide you with exactly the vehicle you want, making it more popular every year. The Superkombi comes with an outstanding warranty and a three-year money-back guarantee from Volkswagen.

Similar Models: Citroën Metravan, Honda Illustra and the Aztechnology Familia

Other Features: Folding Bench Seats on all models; available in standard (commuter), flatbed, covered bed, pickup, and RV models

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
DW SRT	4/10	80	8	4	0	2	1	—	0	162 [162 PS]	350 [350 PS]
GMC Bulldog	4/8	85	4	4	2	2	2	—	0	50	1,200
GMC Bulldog Sec.	4/6	85	4	4	5	2	2	—	0	50	960
L-R Trans. (E. C. B.)	4/8	75	4	4	0	5	2	—	0	70	234
L-R Trans. (E. M-bus)	4/8	75	4	4	0	5	2	—	0	70	84
L-R Trans. (E. Pickup)	4/8	75	4	4	0	5	2	—	0	70	234
L-R Trans. (G. C. B.)	4/8	105	8	4	0	2	2	—	0	44	1,200
L-R Trans. (G. M-bus)	4/8	105	8	4	0	2	2	—	0	34	800
L-R Trans. (G. Pickup)	4/8	105	8	4	0	2	2	—	0	50 [46 PS]	1,350
L. S. Black Mariah	4/6	100	4	4	9	2	2	—	0	50	1,255
R-F Eurovan (Camp.)	4/10	105	6	4	0	2	2	—	0	90	550
R-F Eurovan (C. B.)	4/10	105	6	4	0	2	2	—	0	60	1,500
R-F Eurovan (Pickup)	4/10	105	6	4	0	2	2	—	0	64	1,500
V-W S-kombi	4/8	105	7	4	1	2	3	—	0	10	150
V-W S-kombi (C. B.)	4/8	105	7	4	1	2	3	—	0	48	540
V-W S-kombi (Flatbed)	4/8	105	7	4	1	2	3	—	0	48 [44 PS]	540
V-W S-kombi (Pickup)	4/8	105	7	4	1	2	3	—	0	36 [32 PS]	340
V-W S-kombi (RV)	4/8	105	7	4	1	2	3	—	0	24 [20 PS]	800 [600 PS]

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
DW SRT	2	2d + 1x	G (95 l)	5 km/l	—	—	Van	1.5	4/14 days	270,000 ¥
GMC Bulldog	1 + 1b	2d + 1x	D (100 l)	4 km/l	—	—	Van	1	2/48 hrs	32,600 ¥
GMC Bulldog Sec.	1 + 1b	2d + 1x	D (100 l)	4 km/l	—	—	Van	1	3/72 hrs	52,600 ¥
L-R Trans. (E. C. B.)	2 + 1b	2d + 1s + 1x	E (200 PF)	0.5 km/PF	—	—	Van	1	3/72 hrs	47,000 ¥
L-R Trans. (E. M-bus)	2 + 2b	2d + 1s + 1x	E (200 PF)	0.5 km/PF	—	—	Van	1	3/72 hrs	47,000 ¥
L-R Trans. (E. Pickup)	2 + 1b	2d	E (200 PF)	0.5 km/PF	—	—	Van	1	3/72 hrs	47,000 ¥
L-R Trans. (G. C. B.)	2 + 2b	2d + 1s + 1x	G (120 l)	6 km/l	—	—	Van	1	3/72 hrs	51,000 ¥
L-R Trans. (G. M-bus)	2 + 4b	2d + 1s + 1x	G (120 l)	6 km/l	—	—	Van	1	3/72 hrs	51,000 ¥
L-R Trans. (G. Pickup)	2 + 1b	2d	G (120 l)	6 km/l	—	—	Van	1	3/72 hrs	51,000 ¥
L. S. Black Mariah	2 + 1b	2d + 1x	D (95 l)	4 km/l	—	—	Van	2	6/6 days	115,000x ¥
R-F Eurovan (Camp.)	2 + 3b	2d + 1x	D (95 l)	5 km/l	—	—	Van	1	3/72 hrs	53,000 ¥
R-F Eurovan (C. B.)	2	2d + 1x	D (95 l)	5 km/l	—	—	Van	1	2/48 hrs	34,000 ¥
R-F Eurovan (Pickup)	2	2d	G (95 l)	5 km/l	—	—	Van	1	2/48 hrs	38,000 ¥
V-W S-kombi	2 + 5b	2d + 1s + 1x	G (120 l)	5 km/l	—	—	Van	1	3/72 hrs	46,300 ¥
V-W S-kombi (C. B.)	1 + 2b	2 + 1s + 1x	G (120 l)	5 km/l	—	—	Van	1	3/72 hrs	47,700 ¥
V-W S-kombi (Flatbed)	2	2d	G (120 l)	5 km/l	—	—	Van	1	3/72 hrs	42,700 ¥
V-W S-kombi (Pickup)	2 + 1b	2d	G (120 l)	5 km/l	—	—	Van	1	3/72 hrs	42,200 ¥
V-W S-kombi (RV)	4 + 2b	2d + x	G (120 l)	5 km/l	—	—	Van	1	3/72 hrs	50,300 ¥



Drones

CRAWLERS

Ares Sentinel "P" Series Drone

The Sentinel "P" series is a semi-mobile, fixed-circuit perimeter patrol drone, a nasty surprise in a secured area. Able to move anywhere it monorail track leads, the Sentinel has a mini-turret and is encased in heavy armor. Designed to stand on its own and deter any potential intruders, the Sentinel serves clients who prefer to not hire hordes of security personnel.

Similar Models: Aztechnology Patroller, Éireann-Tír Geatóir and the Prometheus Guardian

Other Features: Remote-Control Interface, Rigger Adaptation, Gridlink, Micro-turret (1 CF Ammo Bin)

Aztechnology GCR-23C Crawler

The GCR-23C is a small drone designed to operate as a remote snoopers in rough rural or urban terrain. Tracks allow the Crawler to slowly but surely traverse rough ground, including stairs, allowing the 23C access to places that other drones might not be able to reach. As a note, the GCR's tracks are somewhat noisy and may cause some problems on a mission where stealth is required.

Similar Models: Renraku Ninja, Ares Tracker "Q" Series and the Mitsuhamma Fox Crawler

Other Features: Remote-Control Interface, Rigger Adaptation

Aztechnology Hedgehog Signal Interceptor

Need a recon platoon the size of a breadbasket? The Hedgehog drone identifies opposing command, control, communications and intelligence (C3I) transmitters. It uses the Aztech GCR-23C Crawler as its base, adding cool rigger emulation and decryption gadgets. An indispensable tool for finding out everything you're not supposed to know.

Similar Models: Celebrian Audiodrone, ATT Listener 700

Other Features: Remote-Control Interface, Rigger Adaptation, 2 Electronics Ports (Rigger Decryption 4, Rigger Protocol Emulation 4, 0.2 CF total), Autosoft: Electronic Warfare 5

Citroën Brouillard Smoke Generator

The Brouillard drone produces a continuous, wide-area smoke screen. Whether you're needing a little extra cover or trying to add a little mystery to your stage show, you can now create that dramatic smoke-filled effect with ease. Smoke has historically been an important strategic element in any confrontation and this drone makes it simple and easy to control. Bring a little confusion to that next firefight, or a little mystique to your hidden lair.

Similar Models: Renraku Evening Mist, Ares 327RC

Other Features: Remote-Control Interface, Rigger Adaptation, Special Machinery (Smoke Generator), Special Storage Area (Fog Oil, 5 CF), Special Storage Area (Graphite Smoke, 1 CF)

Ferret RPD-VI Perimeter Drone

The Ferret is a reliable, low-maintenance perimeter-security drone that has considerable storage capacity for its size. Depending on the nature of the drone's route, it could contain anything from medical equipment to tools, rescue equipment to weapons. The Ferret is a common utility at most megacorporate buildings.

Similar Models: Transys Janus Crawler, GM-Nissan Borderpatrol

Other Features: Remote-Control Interface, Rigger Adaptation, Spotlight (white light)

FMC-Stonebrooke TADS Salamander

The TADS (Target Acquisition and Designation System) Salamander is a tracked drone that uses BattleTac FDDM firmware to identify and mark targets for other vehicles to engage. Though the Salamander is not armed and dangerous by itself, once you've been spotted by it you're probably in immediate danger of getting shot, blown up, or otherwise having your hoop kicked in short order. The additional speed of the FMC makes it a popular security choice for discerning companies.

Similar Models: Ares Scout, Aztechnology GCR-65S and the Éireann-Tír Fear Faíre

Other Features: Remote-Control Interface, Rigger Adaptation, BattleTac FDDM Receiver

Gaz-Niki GNRD-71 BIS Snooper

The Snooper security drone can traverse even the most difficult terrain. It has six independently supported balloon wheels that enable it to handle off-road recon with amazing video clarity. Don't get carried away, however, with its amazing top speed. Even the newest rigger knows that balloon tires at top speed can turn a bump in the road into a launching pad, and while the Gaz makes a great crawler, it also makes a poor UAV.



Similar Models: Yamatetsu Watcher 4890, Transys Tyr

Other Features: Remote-Control Interface, Rigger Adaptation

GM-Nissan Doberman

The Doberman is a perimeter-patrol drone equipped with an external fixed firmpoint and heavy armor.

Similar Models: Yamatetsu Barghest, Aztechnology FWC-72K Chimera and the ATT Soldat

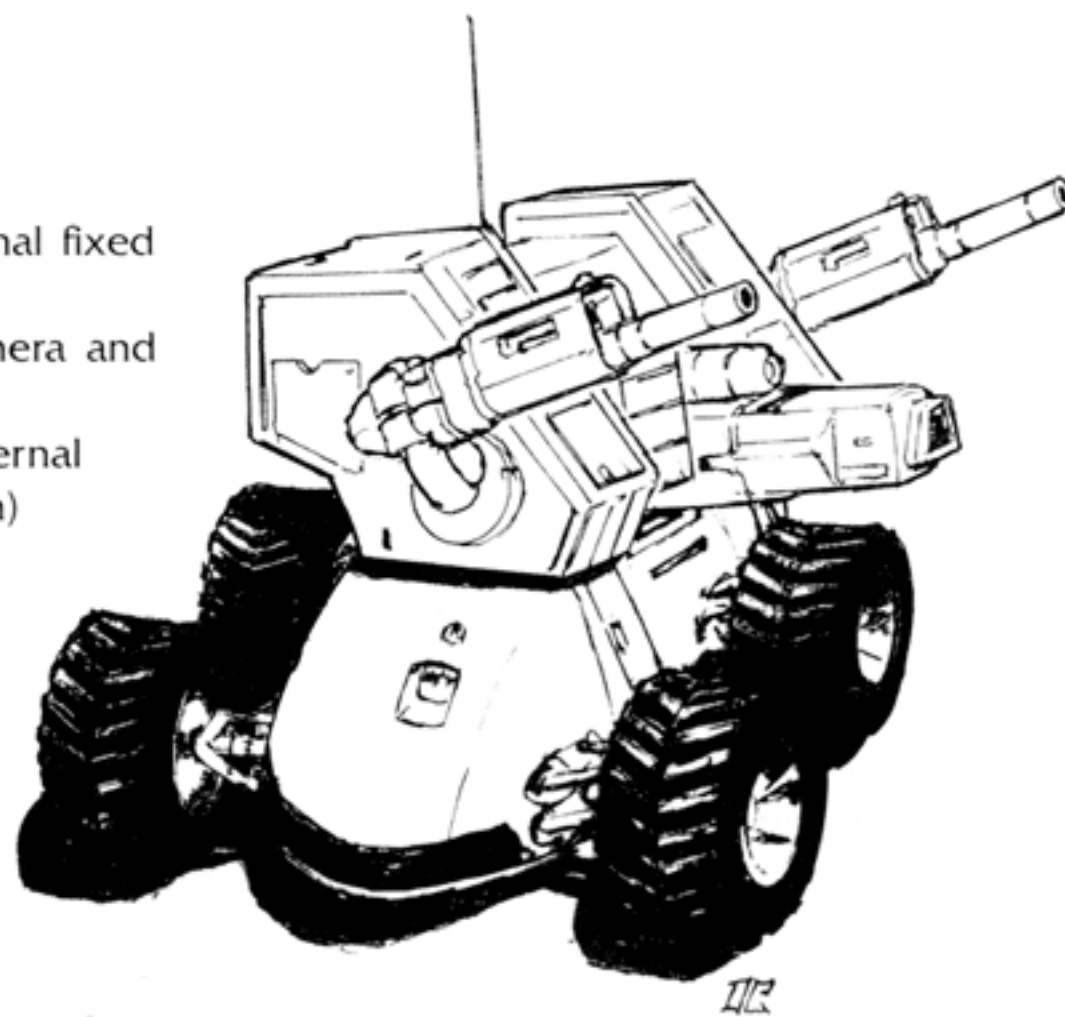
Other Features: Remote-Control Interface, Rigger Adaptation, External Fixed Firmpoint (0.4 CF Ammo Bin), Remote Micro-turret (1 CF Ammo Bin)

Integrated Weapons System DLK MK 6 Utility Machine

This versatile multi-purpose drone is used for maintenance and repair work. The MK-6 has a huge load capacity and can be used for floor delivery and other industrial applications. It's like a mobile garage. The armed variant comes with a fixed firmpoint, in case anybody wants to "borrow" your tools.

Similar Models: Yamatetsu Handyman, ATT Arbeiter and the Ares All-Purpose "R" Series

Other Features: Remote-Control Interface, Rigger Adaptation, 2 Mechanical Arms (STR 6) on the standard version; Remote Control Interface, Rigger Adaptation, Mechanical Arm (STR 6), External Fixed Firmpoint (1 CF Ammo Bin) on the armed version



MCT Hachiman

The Hachiman is MCT's state-of-the-art security drone and is used exclusively in "killing zones" and ultra-hot locales under MCT's control. They have not sold this drone outside their corporation. This crawler's sophisticated robotic brain allows it to use its armor and weapons to protect its turf from intruders but not harm authorized personnel. The Hachiman features a humanoid "head" and "torso" sculpted to resemble a samurai.

Similar Models: None known

Other Features: Ablative Armor 1, Robot-pilot Advanced Programming, Adaptation Pool 3, Robotic Reflexes 3, Remote-Control Gear, Remote Mini-turret with Ultramax Medium Machine Gun, Rigger Interface, Spotlight

Saab-Thyssen Bloodhound

The Bloodhound is a HAZMAT (hazardous materials) drone designed to identify, survey and mark areas contaminated by radiation, biological hazards or chemical contamination. A Saab gasoline engine powers this very versatile drone. It can go into just about any trouble spot, including amphibious environments.

Similar Models: ATT Geiger, GM-Nissan Hazard SM50

Other Features: Remote-Control Interface, Rigger Adaptation, Amphibious Operation 1, Mechanical Arm (STR 6, Cybersquirt Implant), Special Storage Area (Liquid Tank, 10 liters, 1 CF), Special Machinery (HAZMAT sensors)

Steel Lynx Ground Combat Drone

The Steel Lynx is a hardened ground-combat machine designed to clear out even the most defensible position. Where the Doberman is used for defensive security duty, the Lynx is meant for a more offensive role. It is big and fast and can be stuffed with ammunition, essentially becoming a remote-control tank.

Similar Models: Éireann-Tír Gaiscíoch, ATT Drache

Other Features: Remote-Control Interface, Rigger Adaptation, Remote Mini-turret (1 CF Ammo Bin)

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
Ares Sentinel "P"	4	25	2	1	12	7	0	3	4	1	25
Aztech GCR-23C	4/4	15	3	1	0	8	0	1	1	1	15
A. Hedgehog	4/4	15	3	1	0	8	0	5	4	1	16
Citröen Brouillard	4/4	50	5	2	0	4	0	1	1	0	250
Ferret RPD-VI	3/4	30	2	1	0	8	0	3	4	4	50
FMC-S. TADS	4/4	60	6	2	0	4	0	2	3	4	125
Gaz-Niki GRND-71	4/3	75	3	1	0	8	0	1	1	2	30
GM-N Doberman	3/5	70	8	2	6	2	0	2	1	2.5	50
IWS DLK MK 6	4/4	35	3	2	0	6	0	2	3	1	350
IWS MK 6 (Armed)	4/4	35	3	2	4	6	0	2	3	1.5	280



Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
MCT Hachiman	3/4	10	2	2	5 (7)	7	0	3	5	4	125
S-T Bloodhound	3/3	90	6	2	0	4	0	2	4	2	10
S-L Combat Drone	4/6	80	6	2	9	6	0	2	1	3	225

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
Ares Sentinel "P"	—	—	E (40 PF)	0.75 km/PF	—	—	Sm. Crawler (T)	2	2/48 hrs	32,000¥
Aztech GCR-23C	—	—	E (180 PF)	0.75 km/PF	—	—	Sm. Crawler (T)	1	2/24 hrs	3,750¥
A. Hedgehog	—	—	E (180 PF)	0.75 km/PF	—	—	Sm. Crawler (T)	2	10/10 days	200,000¥
Citröen Brouillard	—	—	G (100 l)	10 km/l	—	—	Med. Crawler (T)	1	2/24 hrs	13,000¥
Ferret RPD-VI	—	—	E (40 PF)	2.25 km/PF	3 min.	—	Sm. Crawler (W)	1	2/24 hrs	18,500¥
FMC-S. TADS	—	—	G (60 l)	15 km/l	—	—	Med. Crawler (T)	2	2/48 hrs	24,500¥
Gaz-Niki GRND-71	—	—	E (165 PF)	1.05 km/PF	—	—	Sm. Crawler (W)	1	2/24 hrs	8,500¥
GM-N Doberman	—	—	G (25 l)	10 km/l	—	—	Med. Crawler (W)	2	2/48 hrs	25,000¥
IWS DLK MK 6	—	—	E (100 PF)	0.75 km/PF	—	—	Med. Crawler (T)	1	2/48 hrs	21,000¥
IWS MK 6 (Armed)	—	—	E (100 PF)	0.75 km/PF	—	—	Med. Crawler (T)	2	2/48 hrs	22,000¥
MCT Hachiman	—	—	E (75 PF)	0.75km/PF	—	—	Med. Crawler (T)	2	NA	70,000¥
S-T Bloodhound	—	—	G (40 l)	10 km/l	—	—	Med. Crawler (W)	2	2/48 hrs	23,500¥
S-L Combat Drone	—	—	E (75 PF)	2.25 km/l	5 min.	—	Med. Crawler (W)	2	2/48 hrs	34,500¥

MINI-BLIMPS

Aerodesign Systems Condor Series (LDSD-23 and LDSD-41)

Aerodesign has all but cornered the market on mini-blimp drones with the Condor series. An affordable line of models and inventive advertising has pushed Aerodesign to the forefront of this niche market. The Condor mini-blimp appeals to a wide range of customers who appreciate its silent performance, and the solar option is one of the best-selling features.

Similar Models: Ares Cloudship Series, Renraku Buzzers

Other Features: SunCell Power

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
A. S. LDSD-23	4	60	3	2	0	10	0	1	1	1	50
A. S. LDSD-41	4	75	5	2	3	10	0	3	1	4	28

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
A. S. LDSD-23	—	—	E (25 PF)	5 km/PF	4 min.	VTOL	Mini-Blimp	1	2/24 hrs	9,000¥
A. S. LDSD-41	—	—	E (35 PF)	5 km/PF	5 min.	VTOL	Mini-Blimp	1	2/48 hrs	33,650¥

SKIMMERS

Sikorsky-Bell Microskimmer I and II

The Microskimmer ACV drone can carry a full suite of standard sensors in a chassis roughly the size and shape of an aerodynamic garbage can lid. It is quiet, durable and capable of maintaining high speeds. Its airtight design keeps bad environmental elements from affecting its equipment, including allowing the system to work on water. The Microskimmer II operates on methane power with an auxiliary electric battery engine.

Similar Models: ATT Schiffer, Éireann-Tír Airgead Beo

Other Features: Remote-Control Interface, Rigger Adaptation on the Microskimmer I; Remote-Control Interface, Rigger Adaptation, Ballast Tanks, Engine EnviroSeal, Auxiliary Engine (electric battery) on the Microskimmer II

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
S-B M-skimmer I	3	90	6	1	0	7	0	1	1	1	5
S-B M-skimmer II	3	90/45	5/3	1	0	7/7	0	1	1	1	5

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
S-B M-skimmer I	—	—	E (120 PF)	0.4 km/l	—	—	Sm. Skimmer	.5	2/24 hrs	7,500¥
S-B M-skimmer II	—	—	M (1,000 b)/ E (120 PF)	0.25 km/b/ 0.4 km/PF	—	—	Sm. Skimmer	.5	2/24 hrs	18,300¥



TRAILER

Ares Arms Sentry II

The Sentry II is an immobile (but portable) automated weapons stand that can be used with any standard remote control network, or as part of a BattleTac IVIS drone system. The Sentry is heavily armed and dangerous, as well as having its own generator so that a power outage will not affect it.

Similar Models: Éireann-Tír Leasrí, ATT Bewaffnete

Other Features: Remote-Control Interface, Rigger Adaptation, Micro-turret (Anti-Aircraft Capability, 1 CF Ammo Bin), Generator (12 hours of power)

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
A. A. Sentry II	—	—	—	2	0	7	0	4	4	1	145

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
A. A. Sentry II	—	—	—	—	2 min	—	Lt. Axle Trailer	2	3/72 hrs	43,500¥

UNMANNED AERIAL VEHICLES (UAVS)—FIXED WING

Aztechnology Liebre Surveillance/Pursuit RPV

This large drone has jet engine power in a lightweight package, giving it amazing speed. This fixed-wing drone features advanced sensors for superior surveillance capability. Unlike most surveillance drones, however, the Liebre can also handle pursuit duties. This dual-function makes the Liebre, while not cheap, one of the more popular UAVs on the market.

Similar Models: Mitsuhamma Silent Wind, Ares Rover 9230

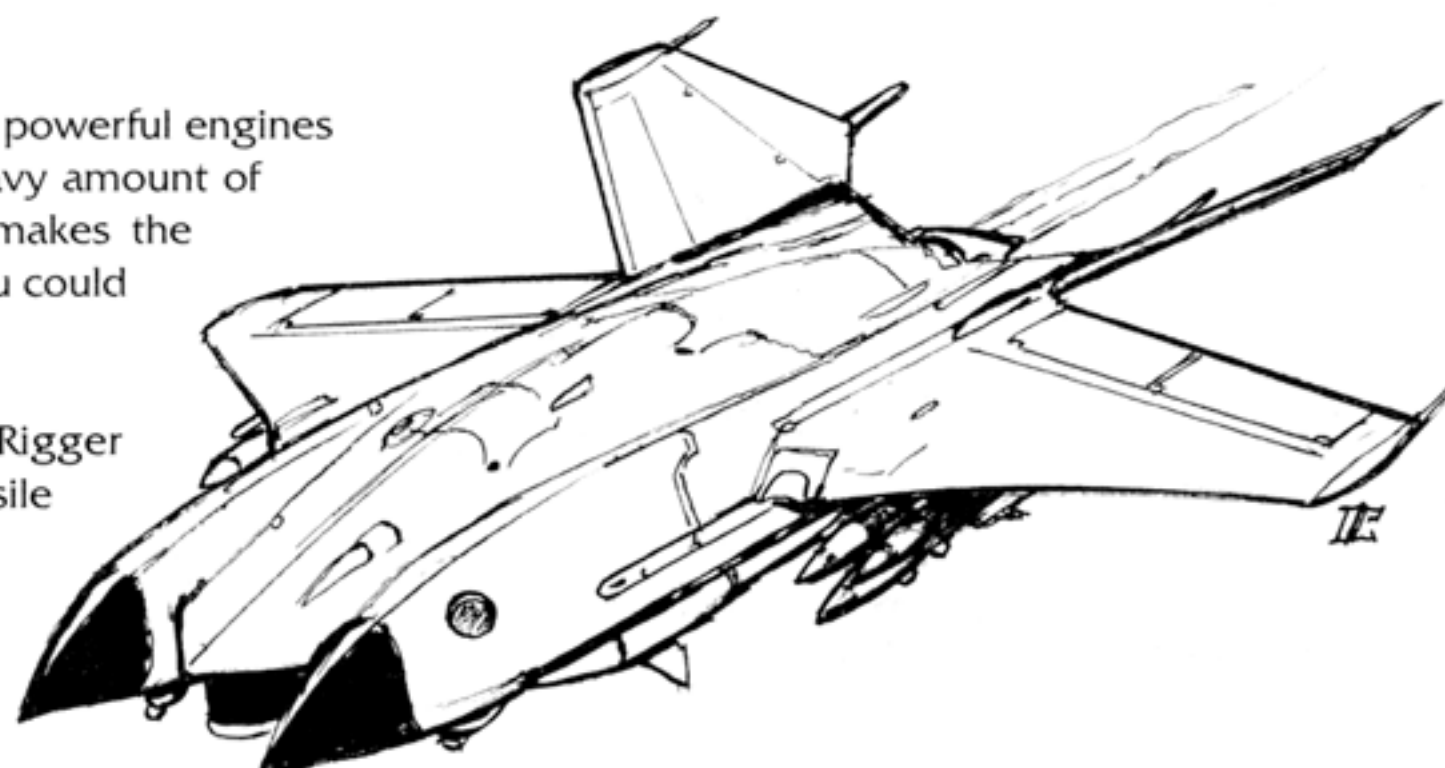
Other Features: Remote-Control Interface, Rigger Adaptation, External Fixed Hardpoint, Vindicator Minigun

CAS Wandjina RPV

The Wandjina combat drone has larger and more powerful engines than the Liebre, but it is much slower due to the heavy amount of armor and weaponry it carries. Still, that trade-off makes the Wandjina one of the most formidable aerial drones you could meet.

Similar Models: Sioux Stinger, Wuxing Wu Jin

Other Features: Remote-Control Interface, Rigger Adaptation, External Fixed Hardpoint, External Missile Mount



FMC-Stonebrooke TADS Firebird

The TADS (target-acquisition and -designation system) Firebird is a UAV drone that uses BattleTac FDDM firmware to identify and mark targets for other vehicles to engage. Twice as dangerous as its crawling cousin, the FMC-Stonebrook Salamander, the Firebird's speed and agility make it even harder to shake. A winner of *Popular Robotics'* Reader's Choice award.

Similar Models: Éireann-Tír Finscéal, Ares Sniper "P" Series

Other Features: Remote-Control Interface, Rigger Adaptation, BattleTac FDDM

GM-Nissan Spotter

The Spotter has been the standard among lookout drones for many years because of its affordable price and folding wings for easy transport. This winged stealth craft carries equipment similar to the gear carried by more specialized surveillance drones, but at a fraction of the cost. This feature alone makes it a staple among local security forces.

Similar Models: Yamatetsu SK275, Lockheed Optic-X

Other Features: Remote-Control Interface, Rigger Adaptation

GTE-Ford Retrans Unit

The mobile retransmission unit (more commonly known as a "retrans unit") extends a remote-control network's effective area by intercepting and retransmitting signals from a remote-control deck. This handy drone can effectively double the remote-control network's area, making it a lifesaver when you are at the limits of your transmission area. A must-have for any professional needing to cover a lot of ground.

Similar Models: ATT Verbindung, Fed-Boeing Courier

Other Features: Remote-Control Interface, Rigger Adaptation, Retrans Mission Unit

Pratt & Whitney Sundowner Aerial Sprayer

The Sundowner allows chemical dispersment over a wide area, just like its larger "crop dustin'" cousins. This unmanned aircraft features a sprayer system that is used to release chemicals from the air. Whether for crowd control or HAZMAT duties, this drone can be just what you need.

Similar Models: Cessna Mini-duster, Yamatetsu ChemCarrier

Other Features: Remote-Control Interface, Rigger Adaptation, Special Machinery (Sprayer)

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
A. Liebre RPV	3	60/1,620	75	3	4	5	0	4	4	5	25
CAS Wandjina	5	60/500	40	3	6	5	0	4	3	1	325
FMC-S Firebird	4	40/105	30	2	0	6	0	2	3	0	10
GM-N Spotter	3	40/200	30	1	0	6	0	2	1	0	10
GTE-F Retrans	4	40/105	30	2	0	6	0	2	1	4	115
P&W Sundowner	4	40/105	30	2	0	6	0	2	1	0	120

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
A. Liebre RPV	—	—	Jet (160 l)	0.5 km/l	10 min.	STOL	Lg. UAV	2	10/10 days	193,500¥
CAS Wandjina	—	—	Jet (350 l)	0.5 km/l	8 min.	STOL	Lg. UAV	2	6/6 days	119,000¥
FMC-S Firebird	—	—	Jet (230 l)	1 km/l	5 min.	STOL	Med. UAV	1	3/72 hours	52,000¥
GM-N Spotter	—	—	Jet (120 l)	0.5 km/l	3 min.	VSTOL	Sm. UAV	1	2/48 hours	33,000¥
GTE-F Retrans	—	—	Jet (120 l)	1 km/l	5 min.	Normal	Med. UAV	1	2/48 hours	40,300¥
P&W Sundowner	—	—	Jet (120 l)	1 km/l	5 min.	Normal	Med. UAV	1	2/48 hours	34,250¥

UNMANNED AERIAL VEHICLES (UAVS)—ROTARY WING

Éireann-Tír Prospero

This inexpensive drone makes a great entry-level recon rotary drone. Its low load capacity limits the amount of customization that can be done, but for the price there is none better. An ideal drone to flesh out a spotty security system.

Similar Models: ATT Nacht Eule, Lockheed Kestrel

Other Features: Remote Control Interface, Rigger Adaptation

Lone Star Strato-9 Surveillance Drone

Surveillance with a kick. The Strato-9 is a high-speed, high-altitude rotor drone with an exceptionally acute sensor suite. Surveillance isn't the whole of its capabilities, however. In order to give it that Lone Star kick, the drone is typically equipped with a medium machine gun as well as other crowd control gadgets.

Similar Models: Knight Errant Peep-a-lot, Ares Inquisitor

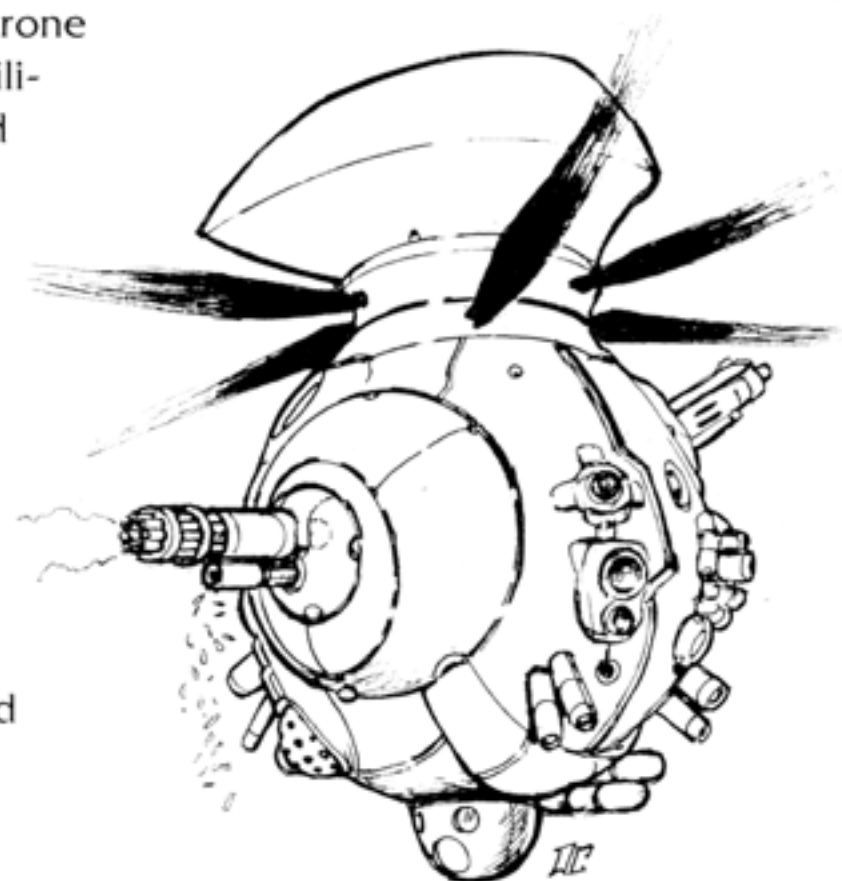
Other Features: ECM 2, External Fixed Hardpoint w/MMG (w/Gas Vent 3 Recoil Comp. and 500 rds. ammo), Remote-Control Interface, Rigger Adaptation

MCT-Nissan Roto-Drone

The Roto-drone is a simple, no-nonsense rotor-wing drone design. It is common throughout the UCAS in both professional and amateur circles, making it one of the most recognizable designs on the market. The Roto-drone is highly customizable, with many third-part companies providing modification kits and accessories.

Similar Models: Yamatetsu Watchdog, Renraku Elemental

Other Features: Remote-Control Interface, Rigger Adaptation



Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
E-T Prospero	3	70	9	1	0	5	0	2	1	0	10
L. S. Strato-9	3	100	9	2	0	4	0	2	5	1	20
MCT-N Roto-drone	4	70	6	2	0	5	0	1	1	4	150

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
E-T Prospero	—	—	Jet (120 l)	0.25 km/l	3 min.	VTOL	SM. UAV	1	2/24 hours	8,125¥
L. S. Strato-9	—	—	Jet (120 l)	0.25 km/l	5 min.	VTOL	Med. UAV	2	2/48 hours	30,000¥
MCT-N Roto-drone	—	—	Jet (150 l)	0.25 km/l	8 min.	VTOL	Med. UAV	1	2/24 hours	9,000¥



UNMANNED AERIAL VEHICLES (UAVS)—VECTORED-THRUST

Aeroquip "Redball Express" Long-Range Resupply Drone

This UAV's powerful jet engines allow it to haul goods across difficult terrain with minimal fuss. The Redball is a large drone designed for transporting supplies and equipment. With the ability to blast over heavy traffic and get the goods you need, this drone can be a lifesaver.

Similar Models: ATT Karawane, Ares Air-Supply

Other Features: Remote-Control Interface, Rigger Adaptation

Ares Guardian Drone

This vectored-thrust drone is small enough for indoor use, yet sturdy enough for outdoor applications. This flexibility is one of the many virtues of the Ares design, turning the Guardian into a mainstay of rigger-based security systems. While some critics have claimed that the Guardian is underpowered and difficult to control, its ability to provide controlled small-arms fire in any situation can't be underestimated.

Similar Models: Renraku Sentry, ATT Wacht

Other Features: Remote-Control Interface, Rigger Adaptation, Remote Mini-turret (1 CF Ammo Bin)

Cyberspace Designs Dalmatian

The Dalmatian is an inexpensive drone that is widely used across the security industry. It features a unique, limited hover capability that offsets its relatively weak acceleration speed, but the affordable price encourages many to ignore any shortcomings. Cyberspace Designs has long been a leader in providing inexpensive yet serviceable drones to the market, and their "True Breed" series promises to continue that trend.

Similar Models: Éireann-Tír Ulchabhán, Ares Sergeant

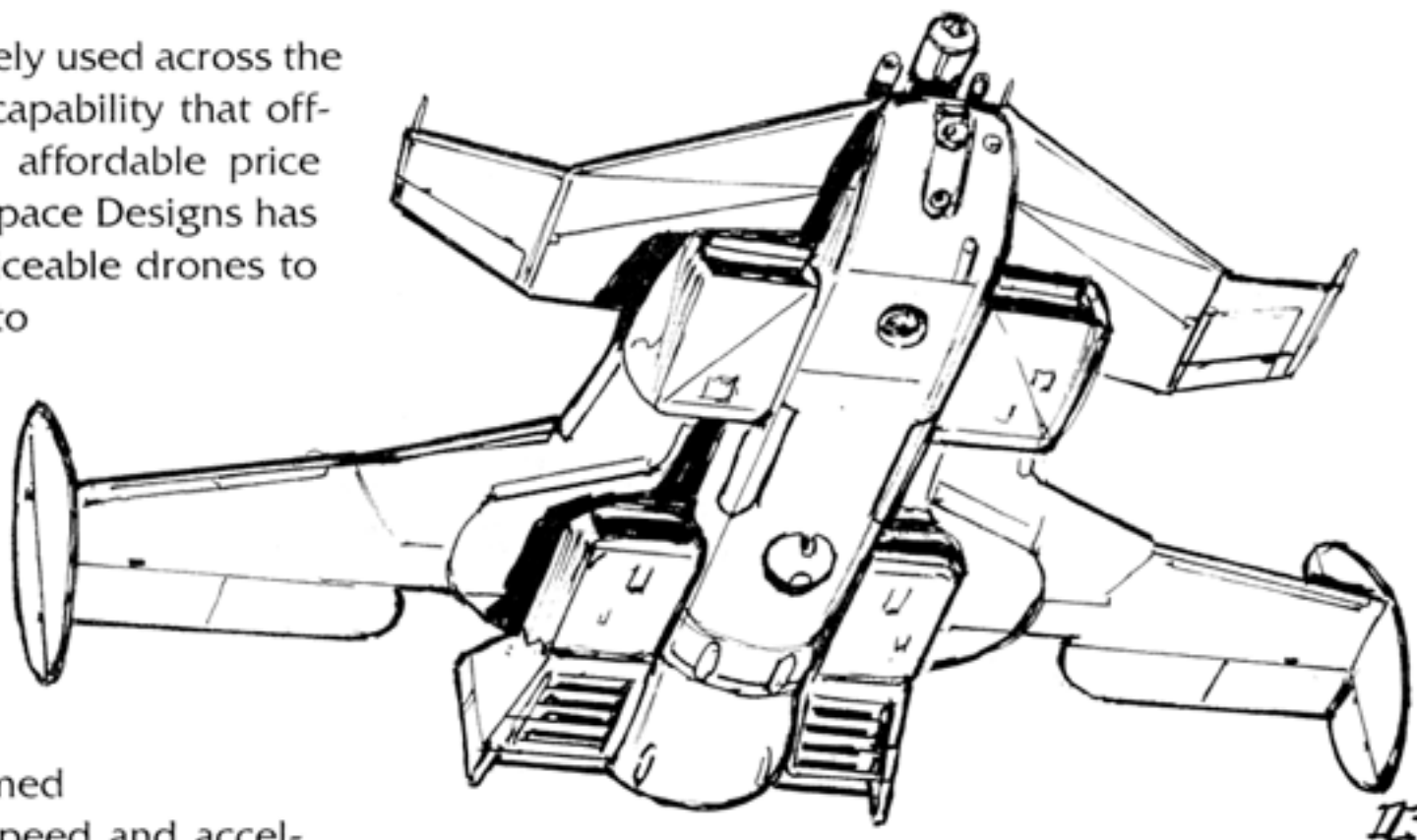
Other Features: Remote-Control Interface, Rigger Adaptation

Cyberspace Designs Wolfhound

The Wolfhound reconnaissance UAV drone employs an improved robotic pilot system programmed with detection-avoidance maneuvers. Its incredible speed and acceleration allow it to get in and out of trouble in a hurry. All in all, this drone has again shown that Cyberspace is at the top of its game.

Similar Models: Yamatetsu White Stag, Wuxing Azure Cloud

Other Features: Remote-Control Interface, Rigger Adaptation, Robotic Pilot, Adaptation Pool 2



Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
A. Redball Express	4	300	35	3	0	5	0	2	3	16	155
Ares Guardian	4	60	6	2	12	7	0	3	4	1	25
C. D. Dalmatian	3	105	8	2	0	6	0	2	1	3	80
C. D. Wolfhound	3	210	12	2	0	6	0	2	1	3	80

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
A. Redball Express	—	—	Jet (250 l)	0.4 km/l	—	VTOL	Lg. V-T UAV	1	4/4 days	80,500¥
Ares Guardian	—	—	EC (150 PF)	1km/l	—	VTOL	Med. V-T UAV	2	5/5 days	99,000¥
C. D. Dalmatian	—	—	Jet (300 l)	0.75 km/l	—	VTOL	Med. V-T UAV	1	2/24 hours	16,000¥
C. D. Wolfhound	—	—	Jet (300 l)	0.75 km/l	—	VTOL	Med. V-T UAV	1	3/72 hours	60,000¥

WALKERS

Renraku Arachnoid Mini-drone

This seventeen centimeter drone is rugged and versatile enough to go anywhere. The Arachnoid looks like a spider and can squeeze into anywhere a spider can fit, making it perfect for low-profile operations.

Similar Models: Ares Scorpion, Yamatetsu Stealth

Other Features: Remote-Control Interface, Rigger Adaptation



Shiawase Kanmushi Mechanical Crawler

The ten-centimeter Kanmushi drone is ideal for penetrating closely confined areas. With a sturdy quad-leg design that can cross the most difficult terrain, it has been de rigeur in surveillance circles for years. The only drawback to the design is its price tag, but the best never comes cheap.

Similar Models: ATT Spinne, Éireann-Tír Luch

Other Features: Remote-Control Interface, Rigger Adaptation

Toyota MK-Guyver Search & Rescue Robot

This large walker is a search and rescue specialist. The MK-Guyver drone can adjust its programming to respond to new and unexpected circumstances, a feature that has garnered much praise. Its mechanical arms and diesel engine are able to handle almost any situation, moving Toyota to the forefront of the robotics mass market.

Similar Models: GM-Nissan St. Bernard, Mitsuhamma Cricket

Other Features: Remote-Control Interface, Rigger Adaptation, Robotic Pilot, Adaption Pool 2, 2 Mechanical Arms (STR 10), Autosoft: Demolitions 6

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
R. Arachnoid	3/3	2	—	—	0	12	0	1	1	0	0
S. Kanmushi	3/3	2	—	—	0	12	0	1	1	0	0
T. S&R Robot	4	10	—	2	3	5	0	3	1	5	1,025

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
R. Arachnoid	—	—	E (10 PF)	0.5 km/PF	—	—	Micro Walker	1	2/24 hours	12,375¥
S. Kanmushi	—	—	E (4 PF)	0.5 km/l	—	—	Micro Walker	1	2/24 hours	9,350¥
T. S&R Robot	—	—	D (20 l)	4 km/l	—	—	Med. Walker	2	5/5 days	95,375¥

Fixed Wing Aircraft

AIRLINERS

Hawker-Ridley HS-895 Skytruck

The all-purpose Skytruck has a basic airframe that is often reconfigured by buyers to better suit their needs. Hawker-Ridley offers some basic configurations, but if anything more exotic is desired, a third party is generally contracted for the final refitting.

Similar Models: S-K Flugzeug, Ares TransSky

Other Features: None

Lockheed C-260 Transport

The Lockheed C-260 is a heavily armored multi-purpose transport commonly seen in military and mercenary circles. The plane's cargo space is enormous, capable of accommodating several vehicles and several thousand kilograms of equipment. Some of these craft get turned into flying headquarters, and the cargo space is turned into a living space or base of operations.

Similar Models: Fed-Boeing Aerovan 8975, Aztechnology Accareo

Other Features: None

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
H-R Skytruck	5	135/320	22	9	0	3	3	—	1	260	1,500
Lockheed C-260	6	600	35	9	12	2	3	—	1	3,000	15,000

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
H-R Skytruck	2 + 40b	2d + 1s	Jet (5,000 l)	0.75 km/l	—	Normal	Airliner	1	35/1 month	694,000¥
Lockheed C-260	5	1d + 1r	Jet (16,000 l)	0.6 km/l	—	Normal	Airliner	1	NA	4,875,000x¥

HIGH-SPEED COMMERCIAL TRANSPORTS (HSCT)

Lockheed "Arrow" HSCT

The Lockheed "Arrow" was plagued with setbacks during its development stage. Eventually the plane made it to the production line, and the craft was well-received. The Arrow is used for regular trans-Atlantic flights from the UCAS to various parts of Europe.



Similar Models: British Airline Concorde 3000

Other Features: 6 Partial Basic Living Amenities

Airbus A1570 HSCT

The A 1570 was one of the early HSCTs on the market and has survived despite declined use in recent years. The newer HSCTs are more fuel efficient and are generally larger, allowing airlines to make more nuyen per trip. The future of the A 1570 is uncertain, but efforts are being made to update the aging plane.

Similar Models: S-K Stern

Other Features: Rigger Adaptation, 6 Partial Basic Living Amenities

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
L. Arrow HSCT	6	125/2,500	60	10	0	2	4	—	3	250	15,000
Airbus A1570	6	125/3,000	80	10	0	2	4	—	4	360	10,000

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
L. Arrow HSCT	204	6d + 1s	Jet (120,000 l)	0.02 km/l	—	Normal	HSCT	1	NA	8,250,000¥
Airbus A1570	124	4d + 1s	Jet (120,000 l)	0.05 km/l	—	Normal	HSCT	1	NA	8,040,000¥

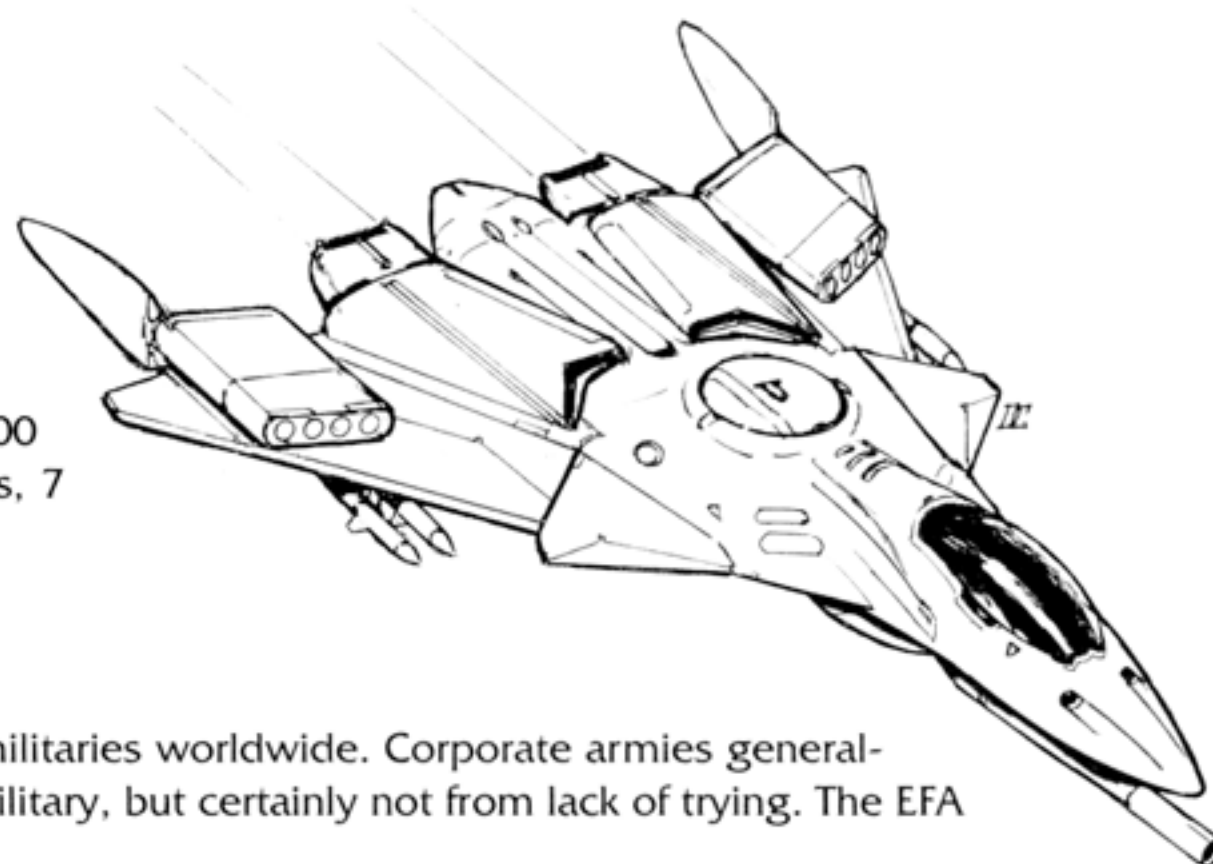
JET FIGHTERS

Aztechnology Halcón Ground-Attack Aircraft

Designed as a "tank killer", the Halcón generally sports twin Vigilant Autocannons and a grab-bag of rockets, unguided and guided missiles. The use of ground-following radar and autopilot allows the Halcón to fly at a very low altitude at top speeds. The Halcón has been around a few years and has proven itself in conflicts all over the globe.

Similar Models: Ares Penetrator XV, Fed-Boeing Lightning 4000

Other Features: Gas Enviroseal, 2 External Fixed Hardpoints, 7 External Missile Mounts, Thermal Baffles 4 (factored in), ECM 9, ECCM 9,



Bac-Dessault-MBB EFA Variants

The Bac-Dessault-MBB EFA is a stock jet fighter for several militaries worldwide. Corporate armies generally have models one generation behind those being used in the military, but certainly not from lack of trying. The EFA is the second-oldest EuroFighter design still being produced.

Similar Models: ATT Wespe, Lockheed A-3200

Other Features: Gas Enviroseal, External Fixed Hardpoint, 4 External Missile Mounts, Thermal Baffles 2 (factored in), ECM 4, ECCM 5

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
A. Halcón	5	150/1,800	80	7	12	6	4	—	9	3	2,600
B-D-M EFA	4	150/2,000	150	7	6	5	3	—	7	2	2,325

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
A. Halcón	1e	1c	Jet (2,500 l)	0.1 km/l	—	Normal	Jet Fighter	3	NA	4,500,000¥
B-D-M EFA	1e	1c	Jet (2,500 l)	0.1 km/l	—	STOL	Jet Fighter	3	NA	2,100,000¥

SINGLE-ENGINE AIRCRAFT

Fiat-Fokker Cloud Nine

This turboprop plane is an amphibious vehicle that seats six and provides a bit of space for cargo and luggage. The Cloud Nine's ability to land in the water makes it popular on the coasts and in remote areas without landing strips. Fiat-Fokker does well overseas by way of the Cloud Nine.

Similar Models: Cessna PR370, Lockheed Skylark

Other Features: Flotation Package, 2 Folding Bucket Seats



Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
F-F Cloud Nine	4	60/200	21	4	0	4	2	—	1	9	325
Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost	
F-F Cloud Nine	2 + 2b	4d	Jet (250 l)	2.2 km/l	—	VSTOL	Single Eng.	1	16/16 days	315,000¥	

TWIN-ENGINE AIRCRAFT

CASA J-229 Raven

The Raven is among the smallest of twin-engine aircraft, featuring twin micro-turbine engines. The body is actually a reinforced glider airframe, which accounts for its small size while allowing for more maneuverability. That added agility is crucial to the survival of the plane, considering its lack of armor.

Similar Models: Lockheed Arrowflight 324, Bac-Dassault Faucon

Other Features: Customized Engine (factored in), 2 External Hardpoints

Cessna C750

The Cessna C750 is a regular sight in hangars across the world. This classic craft can be outfitted as a cargo or passenger plane and serves as both on every continent. The Cessna's easy maintenance and infrequent problems make it a desirable craft commercially and privately.

Similar Models: Fed-Boeing P3SQ4, Ares Mercury

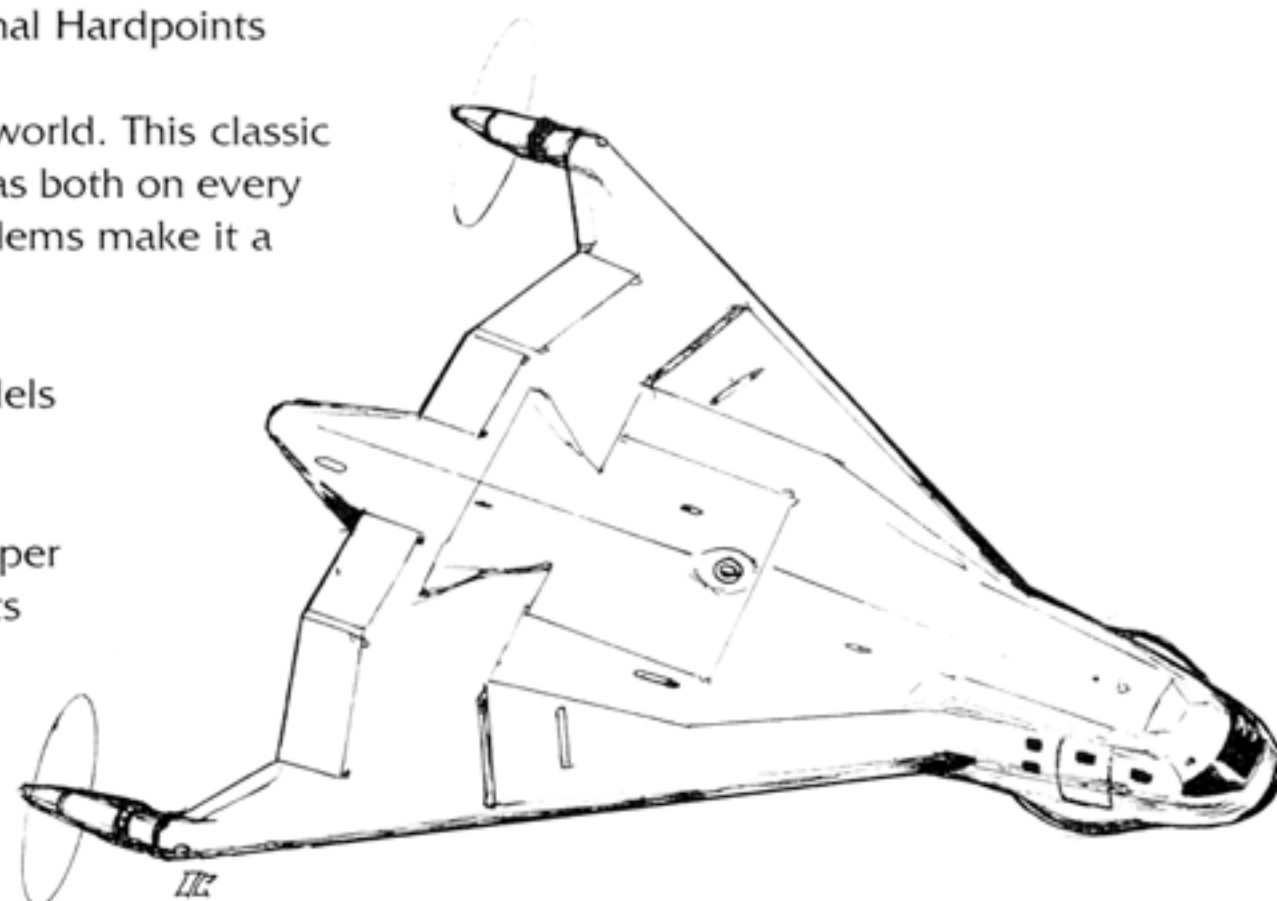
Other Features: Available in standard and passenger models

Embraer-Dassault Mistral

This mid-sized, twin-engine plane serves as a puddle-jumper and private plane for industries and individuals. The plane seats 17, so feel free to bring the co-habital partner on that business trip. The Mistral bears a striking resemblance to the discontinued Ares Daytripper, from whom Embraer-Dassault bought the design.

Similar Models: Cessna C860, CASA J-329 Kestrel

Other Features: None



Lear-Cessna Platinum I and II

The Platinum is a luxurious transport plane, usually well out of the price range of most ordinary citizens. It tends to carry only the corporate elite and eccentric venture capitalists. Both the Platinum I and II have satellite navigation capabilities while the Platinum II is faster, larger, smarter, more fuel efficient and much more expensive.

Similar Models: Gulfstream V-WL, Ares Galaxy VI

Other Features: 3 Folding Bench Seats on the Platinum I, 2 Folding Bench Seats on the Platinum II

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
CASA J-239 Raven	3	135/400	30	6	0	3	1	—	4	44	450
Cessna C750	5	135/340	22	6	0	4	2	—	1	48	1,100
Cessna C750 (P)	5	135/340	22	6	0	4	2	—	1	36	500
E-D Mistral	4	135/300	21	6	0	4	2	—	1	12	600
L-C Platinum I	4	135/330	24	6	0	4	3	—	2	29	400
L-C Platinum II	4	135/800	40	6	0	3	4	—	2	35	1,000

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
CASA J-239 Raven	2	1d	Jet (500 l)	1 km/l	—	STOL	Twin Eng.	2	17/17 days	331,000¥
Cessna C750	2	1d + 1f	Jet (500 l)	1 km/l	—	STOL	Twin Eng.	1	9/9 days	177,000¥
Cessna C750 (P)	4	1d + 1f	Jet (500 l)	1 km/l	—	STOL	Twin Eng.	1	9/9 days	167,000¥
E-D Mistral	17	1d + 1f	Jet (2,000 l)	1 km/l	—	VSTOL	Twin Eng.	1	18/18 days	362,000¥
L-C Platinum I	2 + 3b	2d + 1f	Jet (500 l)	1 km/l	—	STOL	Twin Eng.	2	11/11 days	213,000¥
L-C Platinum II	2 + 2b	2d + 1f	Jet (1,500 l)	0.5 km/l	—	STOL	Twin Eng.	2	22/22 days	427,000¥



ULTRALIGHTS

Artemis Industries Nightglider

Artemis Industries felt there was a void to be filled in the ultralight aircraft category, which prompted the firm to create the Nightglider. Despite other ultralights being on the market, the Nightglider's non-reflective mesh skin, silent electric engine and marketing campaign made it a moderately popular craft. The Nightglider has a deceptively large cargo area for a craft its size and is capable of carrying 200kg.

Similar Models: Fed-Boeing CX270 Ultra, Lockheed Sparrow

Other Features: None

Moonlight Aerospace Avenger

The Avenger is a multipurpose paramilitary aircraft featuring enhanced STOL capabilities. This ultralight has been used successfully in large-scale military operations, private infiltrations and corporate espionage. On the other hand, an avid fly-boy that can't afford a larger aircraft can still get in the air with one of these planes.

Similar Models: IFMU Einbruch, Bac-Dassault Stealth 4650

Other Features: 2 External Firmpoints

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
Artemis Nightglider	3	60	4	2	0	9	1	—	0	4	190
Moonlight Avenger	4	40/200	21	2	4	6	2	0	1	0	58

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
Artemis Nightglider	1	—	EC (100 PF)	0.25 km/l	—	STOL	Ultralight	1	2/48 hours	34,500¥
Moonlight Avenger	1	—	J (120 l)	1 km/l	—	STOL	Ultralight	2	3/72 hours	50,000¥

Hovercraft

HOVERCRAFT—HEAVY

GMC-Nissan Hovertruck

The behemoth of hovercraft, the GMC-Nissan Hovertruck enjoys the distinction of being the largest hovercraft on the market. Its competitors offer a few more whistles and bells than the Hovertruck, but none has its raw size.

Similar Models: Mostrans KVP-14XXL, Sikorsky-Bell HP Hovercraft

Other Features: Folding Bench Seat

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
GMC-N Hovertruck	5	120	5	5	0	2	1	—	0	94	1,850

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
GMC-N H-truck	2 + 1b	3d	D (500 l)	0.5 km/l	—	—	Lg. Hover	750	2.00	180,000¥

HOVERCRAFT—LIGHT

Sikorsky-Bell Red Ranger

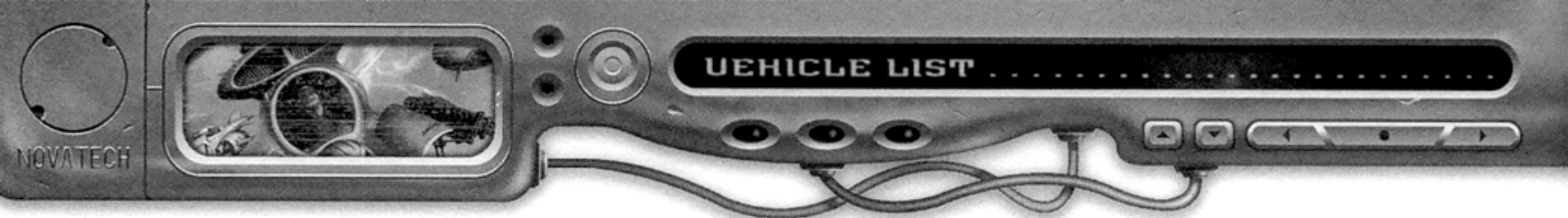
This speed-demon of a hovercraft is put to good use as a reconnaissance and scouting craft. The craft is popular in the private sector as well, getting lots of attention from weekend sportsmen. Unmodified, the Red Ranger wins tournament races regularly with its stock Fed-Boeing GS-1000 jet turbine engine.

Similar Models: Fed-Boeing Dragonfly, Renraku KX-55R3

Other Features: Amphibious Operation 3

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
S-B Red Ranger	3	270	16	3	2	2	3	—	1	10	98

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
S-B Red Ranger	2	2d	Jet (400 l)	0.5 km/l	—	—	Lt. Hover	1	17/17 days	326,000¥



HOVERCRAFT—MEDIUM

Chrysler-Nissan G12A

The G12A is an inexpensive mid-line hovercraft for those who just want to hover. Used for cargo routes that require some special consideration or passenger carriers, the Chrysler-Nissan craft is considered a reliable, moderate alternative to the other highly specialized, more expensive hovercraft on the market.

Similar Models: GMC Everglades, Celebrian Columbia

Other Features: Available in both cargo and passenger models

GMC Beachcraft Patroller

Coast guards, harbor patrol and Lone Star agencies all have hovercraft because pirates, smugglers and runners have hovercraft. The Beachcraft Patroller is fast enough to keep pace with smaller crafts and tough enough to take a beating. The Patroller model is a souped-up version of the Vacationer, which was produced first.

Similar Models: Ford Seaguard, Mostrans KVP-27S

Other Features: External Fixed Hardpoint (1 CF Ammo Bin)

GMC Beachcraft Vacationer

The Vacationer is the first GMC hovercraft to find commercial success. GMC marketed the Vacationer to families and well-to-do bachelors with swinging lifestyles, and it paid off. With space for six passengers and room to socialize, the Vacationer is an interesting alternative to your everyday yacht or motorboat.

Similar Models: Mostrans KVP-20T, Novatech Hummingbird

Other Features: Basic Living Amenities

Lone Star SWAT Hovertruck

While Lone Star typically contracts modifications to pre-existing vehicles, they found most hovercraft were not well suited to security work. With parts and an engine from various European corporations and assembled by Aztechnology, the SWAT has the versatility and armor that Lone Star desired.

Similar Models: Knight Errant Modified Mostrans KVP-27S, Yamatetsu Harbinger

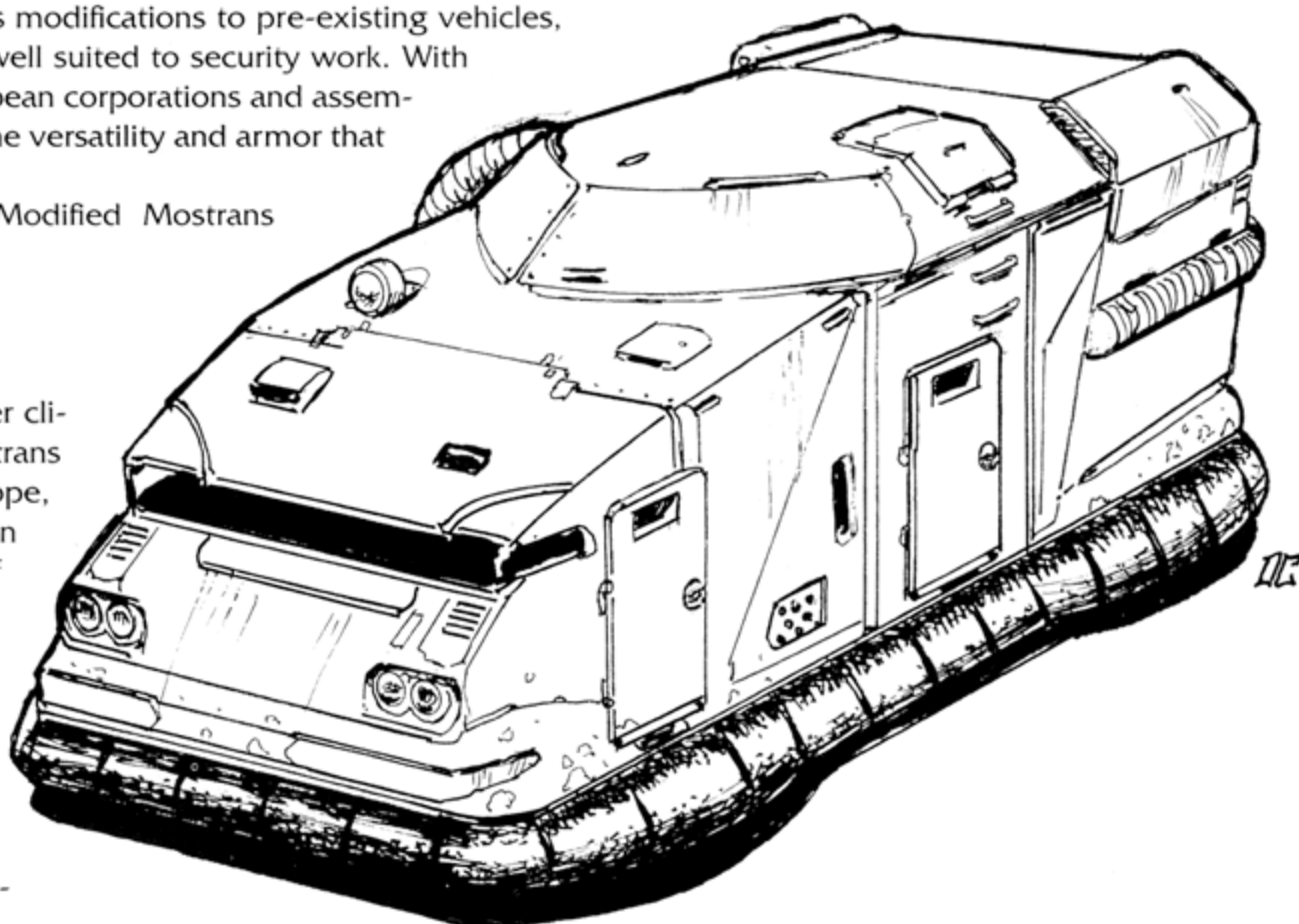
Other Features: None

Mostrans KVP-14T

Specially designed for harsh winter climates, the "Ivan" is produced by Mostrans of Moscow. Popular throughout Europe, the VKP-14T has caught on recently in North America. The recent addition of a water-tight boat hull makes the craft more suited for land/water terrain, although that isn't intended to be a primary function.

Similar Models: Sikorsky-Bell Hoveround, Chrysler-Nissan Missouri

Other Features: Available in standard and passenger models



Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
C-N G12A (Cargo)	4	120	5	4	0	2	2	—	0	66	1,000
C-N G12A (Pass.)	4	120	5	4	0	2	2	—	0	6	250
GMC Patroller	4	165	9	4	6	1	2	—	0	65	510
GMC Vacationer	4	105	7	4	0	2	3	—	0	180 [174 PS]	1,250 [600 PS]
L. S. SWAT	4	120	8	4	6	2	3	—	0	28	870
Mostrans KVP-14T	4	180	9	4	0	2	1	—	0	72	800
M. KVP-14T (P.)	4	180	9	4	0	2	1	—	0	18	300

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
C-N G12A (Cargo)	2	3d + 1x	D (400 l)	0.5 km/l	—	—	Med. Hover	1	3/72 hours	50,000¥
C-N G12A (Pass.)	10	2d + 1s	D (400 l)	0.5 km/l	—	—	Med. Hover	1	3/72 hours	45,000¥
GMC Patroller	2	2d + 1s	D (400 l)	0.45 km/l	—	—	Med. Hover	2	9/9 days	162,000¥
GMC Vacationer	2 + 2b	3d	D (400 l)	0.5 km/l	—	—	Med. Hover	1	15/15 days	287,000¥
L. S. SWAT	2 + 5b	4d + 1g	D (500 l)	0.5 km/l	—	—	Med. Hover	2	10/10 days	194,000¥
Mostrans KVP-14T	2	3d	D (400 l)	0.5 km/l	—	—	Med. Hover	1	6/6 days	102,000¥
M. KVP-14T (P)	11b	3d	D (400 l)	0.5 km/l	—	—	Med. Hover	1	7/7 days	121,000¥

Rotor Craft

ATTACK HELICOPTERS

Aztechnology Aguilar-EX

This is the premiere VTOL weapons platform featured by Aztechnology. The Aguilar-EX has received nothing but rave reviews and praise from those that use it for its specialized task of blowing things up. It has enough armor, speed, maneuverability and ordinance capacity for even the most discriminating buyer.

Similar Models: Ares Avenger, Sikorsky-Bell Peacekeeper

Other Features: External Fixed Hardpoint, 5 External Missile Mounts, ECM 16, ECCM 7

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
A. Aguilar-EX	4	350	27	5	5	2	4	—	7	2	1,560

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
A. Aguilar-EX	2	2d	Jet (3,000 l)	0.1 km/l	—	VTOL	Attack Hel.	3	NA	1,477,000¥

AUTOGYROS

Northrup Wasp (PRC-42B and PRC-42F Variants)

This small craft was designed for police and military service. It has grown in popularity in corporate security circles, where smaller corps want to flex some extra muscle. The 42F version offers an improved engine, upgraded handling and enhanced armor.

Similar Models: Sikorsky-Bell Stinger, Ares GCR-22S

Other Features: Micro-turret, ECCM 1 on both variants

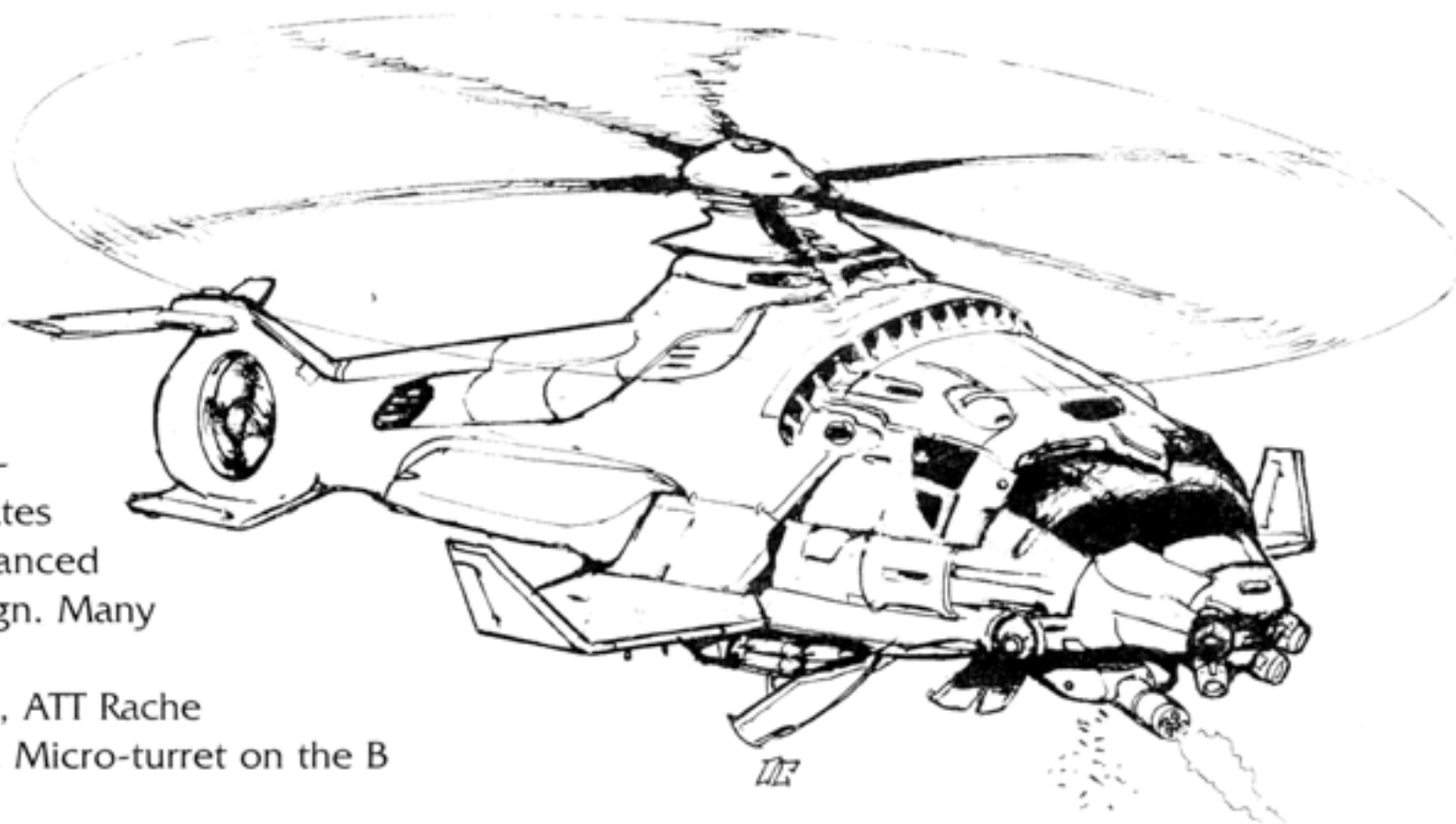
Northrup Yellowjacket

(PRC-44B and PRC-44F Variants)

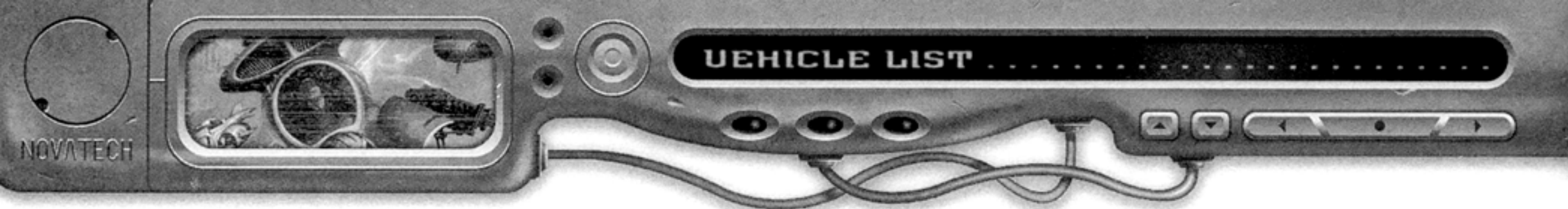
Northrup uses the Wasp chassis to create their combat helicopter, the Yellowjacket. With night-flying instrumentation, a strengthened airframe and enhanced weapon load-out, the Yellowjacket is a formidable light combat aircraft. The 44F variant integrates radar-absorbing materials, armor and enhanced weapon capabilities into the Yellowjacket design. Many border patrols employ the PRC 44F.

Similar Models: Yamatetsu Elemental PRX, ATT Rache

Other Features: ECCM 1 on both variants, Micro-turret on the B variant, Mini-turret on the F variant



Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
N. Wasp PRC-42B	3	130	15	3	0	3	0	—	2	2	68
N. Wasp PRC-42F	3	130	15	3	2	4	0	—	2	2	28
N. Y-J. PRC-44B	4	130	15	3	0	3	0	—	2	1	53
N. Y-J. PRC-44F	4	130	15	3	2	4	0	—	2	1	23



Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
N. Wasp PRC-42B	1	1d	Jet (250 l)	0.25 km/l	—	VTOL	Autogyro	2	3/72 hours	50,000¥
N. Wasp PRC-42F	1	1d	Jet (250 l)	0.25 km/l	—	VTOL	Autogyro	2	4/4 days	68,000¥
N. Y-J. PRC-44B	1	1d	Jet (250 l)	0.25 km/l	—	VTOL	Autogyro	2	3/72 hours	48,000¥
N. Y-J. PRC-44F	1	1d	Jet (250 l)	0.25 km/l	—	VTOL	Autogyro	2	4/4 days	72,000¥

CARGO HELICOPTERS

Ares Dragon

The Dragon is a solid, versatile cargo helicopter capable of accepting extra cargo containers. Ares still produces the Dragon, although few are made currently, due to early over-production. Corps with short-range delivery needs generally have a Dragon or three in their hangars.

Similar Models: Sikorsky-Bell Behemoth, Fed-Boeing CG-220R

Other Features: None

Hughes Aerospace Airstar 2050

The Airstar is known as the “corporate shuttle” among megacorporations that spare no expense for their upper management. Between its armored body and luxurious trappings, the Airstar is sure to spoil any lucky enough to need frequent rides.

Similar Models: Rolls-Royce Aristo, Fed-Boeing Senator

Other Features: Concealed Armor, High Living Amenities

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
Ares Dragon	5	260	10	7	0	3	3	—	1	95	3,250
Hughes Airstar	4	200	16	7	6	3	4	—	1	226(216 PS)	2100 (1650 PS)

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
Ares Dragon	3	3d	Jet (3,500 l)	0.25 km/l	—	VTOL	Cargo Hel.	1	30/1 month	590,000¥
Hughes Airstar	11	4d + 1s	Jet (4,500 l)	0.2 km/l	—	VTOL	Util. Hel.	1	NA	1,348,000¥

TILT-WING AIRPLANES

Ares TR-55 Class

The 55 T and 55 E are seen world-wide, and with good reason. The Traveler is a very affordable, reliable transport craft with VTOL capability. The luxurious 55 E is an impressive vehicle that executives and high-rollers display like an expensive watch. Ares accepts special orders for customizations to the 55 E.

Similar Models: Fed-Boeing Turboriders, Sikorsky-Bell Athena

Other Features: Available in C, E, and T models; 3 Folding Bench Seats available on the C model

DocWagon CRT Air Unit

The DocWagon crisis-response-team air unit is capable of touch-and-go extractions for incidents with multiple casualties. DocWagon purchases their air units from Hughes, who continues to produce certain models almost exclusively for DocWagon.

Similar Models: Daf Trauma Vaggon AeroMed

Other Features: Anti-theft System (Rating 6), 2 External Hardpoints, Medical Clinic (2 patients Rating 4)

DocWagon Osprey II

In “heightened circumstances”, a regular DocWagon air unit will not suffice. In hot zones and firefights, the DocWagon Osprey II is an appropriate alternative. DocWagon can no longer have these vehicles insured, so DocWagon contracts now have clauses for repairs to an Osprey II if used to retrieve a client.

Similar Models: Fed-Boeing RXT Unit, Daf Trauma Vaggon Blitz

Other Features: Anti-theft System (Rating 6), 2 External Hardpoints, Medical Clinic (2 patients Rating 4)

Fed-Boeing Commuter

This tilt-wing plane is commonly used as a city-airport shuttlecraft. Extravagant vacation resorts or corps employ Commuters for carting around guests, clients and VIPs. The Commuter is also a common sight for locales with limited runway space.

Similar Models: Mitsuhamma Jumper, IWS Aerobus

Other Features: None

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
Ares TR-55 C	5	320	12	5	5	4	3	—	1	24	100
Ares TR-55 E	5	350	12	5	0	4	3	—	1	25	500

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
Ares TR-55 T	5	350	12	5	0	4	3	—	1	7	500
DW CRT Air Unit	5	320	10	5	0	2	3	—	1	15	350
DW Osprey II	5	380	10	5	3	2	3	—	1	12	300
F-B Commuter	5	320	10	5	0	4	3	—	1	6	850

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
Ares TR-55 C	2 + 3b	2d	Jet (1,600 l)	0.6 km/l	—	VTOL	Med. T-W	1	17/17 days	338,000¥
Ares TR-55 E	11	2d	Jet (1,500 l)	0.6 km/l	—	VTOL	Med. T-W	1	17/17 days	338,000¥
Ares TR-55 T	14	2d	Jet (1,600 l)	0.6 km/l	—	VTOL	Med. T-W	1	18/18 days	350,000¥
DW CRT Air Unit	2	1d + 1r	Jet (750 l)	0.6 km/l	—	VTOL	Med. T-W	2.5	13/13 days	259,000¥
DW Osprey II	2	1d + 1r	Jet (750 l)	0.6 km/l	—	VTOL	Med. T-W	2.5	17/17 days	331,000¥
F-B Commuter	17	2d	Jet (750 l)	0.6 km/l	—	VTOL	Med. T-W	1	16/16 days	318,000¥

UTILITY HELICOPTERS

Agusta-Cierva Plutocrat

The Plutocrat is designed to get those with the nuyen where they need to be in a hurry. With leather seats, wood panelling and soundproofed walls, the Plutocrat can transport up to four people and their luggage in style.

Similar Models: Sikorsky-Bell Luxura, Rolls-Royce Golden Arrow

Other Features: Available in standard and security models; 2 Folding Bucket Seats, Reinforced Bench Seats, Partial High Living Amenities, Electronics Port w/Satellite Uplink on all models; Small Turret on security version only

DocWagon SRT Helicopter

The standard response team (SRT) helicopter is DocWagon's standard air ambulance. A common sight for runners or even average city dwellers, the SRT is an agile and steady craft. Many SRT pilots are considered the best urban helicopter pilots in the world.

Similar Models: Daf Trauma Vaggon-modified IWS Kommando

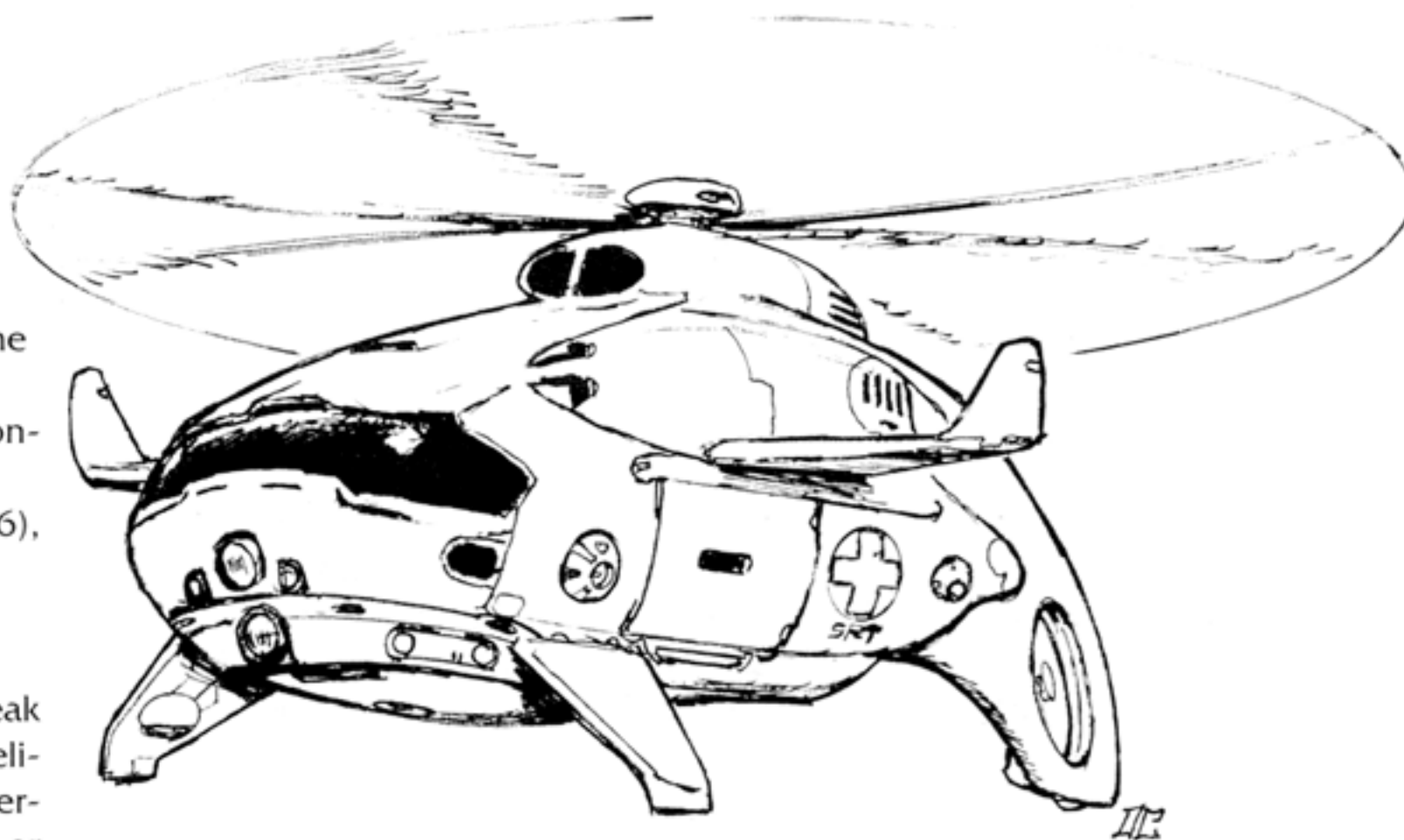
Other Features: Anti-theft System (6), Medical Treatment Gear (1 patient)

Hughes WK-2 Stallion

Hughes allows the WK-2's demand to speak for itself; it is the most widely produced helicopter in the world. It appears in numerous internal configurations as a transport or cargo craft or something in between. Spare parts and maintenance are never a concern, due to the sheer number of Stallions in operation.

Similar Models: IWS Kommando, Sikorsky-Bell Clydesdale

Other Features: Available in standard and DocWagon variants; Anti-theft System (6), 2 External Hardpoints and Medical Treatment Gear (2 patients) available in DocWagon model



Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
A-C Plutocrat	4	290	17	4	2	3	4	—	1	15	240
A-C Plutocrat (S)	4	290	17	4	2	3	4	—	1	8	140
DW SRT	5	250	18	4	0	3	3	—	1	5	700
Hughes WK-2	5	190	14	4	0	3	3	—	1	70	1,250
DW WK-2	5	190	14	4	6	1	3	—	1	4	200

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
A-C Plutocrat	2 + 1b	4d	Jet (1,500 l)	0.2 km/l	—	VTOL	Util. Hel.	2	21/21 days	407,000¥
A-C Plutocrat (S)	2 + 1b	4d	Jet (1,500 l)	0.2 km/l	—	VTOL	Util. Hel.	2	26/26 days	517,000¥



Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
DW SRT	1	2d + 1s	Jet (1,250 l)	0.2 km/l	—	VTOL	Util. Hel.	1.5	15/15 days	285,000¥
Hughes WK-2	2	2d + 1s	Jet (1,250 l)	0.2 km/l	—	VTOL	Util. Hel.	1	13/13 days	257,500¥
DW WK-2	2	2d + 1s	Jet (1,250 l)	0.2 km/l	—	VTOL	Util. Hel.	2.5	17/17 days	335,000¥

Ships

AIRCRAFT CARRIER

MF Akihito-Class Supercarrier

There are only six *Akihitos* currently in commission. The nuclear aircraft carrier is the flagship of the Japanese Imperial Navy, and a powerful reminder of the Empire's naval superiority in the Pacific. These ships are powered by three reactors and can carry up to 80 planes.

Similar Models: USS *Powell*-Class Supercarrier, SKS *Seemacht*-Class Supercarrier

Other Features: Aircraft Facilities (10 facilities, 80 planes), Flight Deck (325m, Angled, Catapult/Arrestor), ECCM 10, ECD 6, 2 Remote Large Turrets (12 medium Internal Missile Mounts each), 4 Medium Launch Control Systems, 4 Medium Remote Turrets w/ ANDREWS System, 5,500 Basic Living Amenities, 500 Improved Living Amenities

Model	Hand	Speed	Accel	Hull	Bulwark	Sig	Auto	Pilot	Sensor/ Sonar	Cargo	Load
MF Akihito	5	45 (20)	3	9	12	1/2	4	—	10/2	2,984,748 [158,500 PS]	8,424,995 [14,250,000 PS]

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
MF Akihito	—	4L + 6s + 6d	Nuclear	—	—	—	Hvy. Carrier	—	—	9.0 billion¥

CORVETTE

CSS Stuart-Class Corvette

This Ares-made vessel is produced in large numbers for the CAS navy. They're used primarily for coastal patrol or defense, but also provide supporting fire for surface action groups. Some special-mission *Stuarts* designated for anti-submarine missions carry MADCAPS in place of their typical load of Block II Outlaw missiles.

Similar Models: USS *Ohio*-Class Corvette, BAA *Jade Shark*-Class Corvette

Other Features: Medium Remote Turret (Victory Autocannon w/500 rds. in 2 CF), 2 Medium Remote Turrets (8 Medium Internal Missile Mounts), 2 Launch Control Systems, 35 Basic Living Amenities

Model	Hand	Speed	Accel	Hull	Bulwark	Sig	Auto	Pilot	Sensor/ Sonar	Cargo	Load
CSS Stuart	3	70 (30)	5	3	3	3/4	4	—	4/4	302/ [3,600 PS]	2,500 [52,500 PS]

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
CSS Stuart	—	2h + 2d D (24,000 l)	0.25 km/l	—	—	—	Corvette	—	—	60,000,000¥

FRIGATE

Shiawase Aohana-Class Frigate

After the establishment of corporate extraterritoriality, the Shiawase *Aohana* was one of the first corporate warships to hit the seas. The vessel was designed as a corporate escort, accompanying Shiawase convoys across dangerous waters. Since its debut, the *Aohana* has become a more popular vessel, with some foreign military powers purchasing the ship.

Similar Models: Wuxing *Zhen Wu*-Class Frigate

Other Features: Aircraft Facilities (1 helicopter), Medium Remote Turret (Light Naval Gun w/500 rds. in 16 CF), Medium Remote Turret (Victory Autocannon w/2,000 rds. in 13 CF), 2 Torpedo Tubes (20 torpedoes w/autoloader), 6 Heavy Launch Control Systems, 24 Heavy Internal Missile Mounts, 300 Basic Living Amenities



Model	Hand	Speed	Accel	Hull	Bulwark	Sig	Auto	Pilot	Sensor/ Sonar	Cargo	Load
S. Aohana	4	45 (20)	4	4	3	2/4	4	—	6/4	6,889 [21,250 PS]	75,000 [668,000 PS]

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
S. Aohana	—	4d + 1f	Jet (50,000 l)	0.15 km/l	—	—	Frigate	—	—	116,000,000¥

MERCHANTMAN

Cunard Princess Victoria Liner

Cruise lines across the globe employ the *Princess Victoria* to wine and dine their passengers and clients. While no single individual can vouch for the joys of owning one of these ships, a few of the Big Ten own them, just in case. A skeleton crew of 30 is the bare minimum required to operate this vessel.

Similar Models: Mitsuhamu *Calypso* Liner, Princess Cruises *Fairy Princess* Ocean Liner

Other Features: 30 Basic Living Amenities, 200 Improved Living Amenities, 100 High Living Amenities

Kvainer-Maersk Jorgensen-Class Merchantman

This smaller cargo liner is used for every sort of cross-continental cargo; cars, fruit, textiles, raw materials or any other import or export. The ship has limited sensor and sonar capabilities for negotiating iceberg-laden waters. Wuxing owns a fleet of these ships for its expansive transport business.

Similar Models: Wuxing *Zhen Lao*-Class

Other Features: Crane (5,000 kg), 25 Basic Living Amenities

Model	Hand	Speed	Accel	Hull	Bulwark	Sig	Auto	Pilot	Sensor/ Sonar	Cargo	Load
C. Prin. Victoria	4	50 (15)	2	5	0	3/2	4	—	4/1	39,300 [35,700 PS]	734,995 [750,000 PS]
K-M Jorgensen	5	25 (10)	1	7	0	2/2	3	—	1/1	300,000 [3,000 PS]	1,999,440 [37,500 PS]

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
C. Prin. Victoria	—	4d + 2s	D (10,000 l)	0.2 km/l	—	—	Med. Merch.	2	—	40,000,000¥
K-M Jorgensen	—	2h + 2d	D (24,000 l)	0.15 km/l	—	—	Hvy. Merch.	1	—	140,000,000¥

Submarines

ATTACK SUBMARINES

USS New Hampshire-Class Attack Sub

The *New Hampshire*-class sub is the latest design developed by the UCAS to replace the aging fleet of *Seawolf II* and *Toronto* attack subs. There are thirteen subs commissioned thus far, with plans to continue a regular bi-annual production schedule. Specifically designed for precise strike missions, the *New Hampshire* excels at insertion and extraction of SEAL divers and general search-and-destroy assignments.

Maximum Depth: 750 meters

Similar Models: BAA *Watersnake*-Class, HMS *Windsor*-Class

Other Features: Water and Engine EnviroSeal, Oxygen Generator, 6 Torpedo Tubes, 12 Heavy Launch Control Systems, 36 Torpedoes, Heavy Internal Missile Mounts, 105 Basic Living Amenities

Model	Hand	Speed	Accel	Hull	Bulwark	Sig	Auto	Pilot	Sensor/ Sonar	Cargo	Load
USS N. Hampshire	4	50/35 (22/15)	4 (2)	5	9	7/7 (6/4)	4	—	7/9	358 [11,700 PS]	2,282,360 [236,250 PS]

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
USS N. Hampshire	—	2h	Nuclear/ D (10,000 l)	—/ (0.25 km/l)	—	—	Attack Sub	—	—	860,000,000¥



COMMERCIAL BOATS

Kvainer-Maersk Triton-Class

The *Triton* is the most common commercial-transport sub around. The bubble-fusion reactor provides the sub with more than enough power while the oxygen generator operates when the sub is submerged, allowing it to stay underwater almost indefinitely. The *Triton* requires overhaul maintenance every twelve years.

Maximum Depth: 3,500 meters

Similar Models: Yamatetsu Jonah, Renraku Oyster Shell

Other Features: Water and Engine EnviroSeal, Oxygen Generator, 24 Basic Living Amenities

Model	Hand	Speed	Accel	Hull	Bulwark	Sig	Auto	Pilot	Sensor/ Sonar	Cargo	Load
K-M Triton	5	30/20 (10/2)	1 (1)	7	3	5/4 (5/3)	3	—	2/2	200,000 [2,940 PS]	15,000,000 [36,000 PS]

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
K-M Triton	—	4h	Nuclear/ D (10,000 l)	— (0.1 km/l)	—	—	Hvy. Cm. Sub	1	—	435,000,000¥

MINISUBS

Saeder-Krupp D. J. Locker

Keeping Lowfy's hand in land, air and sea transport, Saeder-Krupp produces this two-person sub for exploration, retrieval and rescue missions. The D. J. Locker comes with a spotlight and mechanical claw as standard features, typically used for underwater loading of the sub's isolated cargo hold. This sub looks deceptively large from the outside; the cargo holds and engine configuration take up an unwarranted amount of space.

Maximum Depth: 300 meters

Similar Models: Yamatetsu Selkie, Renraku ZT72

Other Features: Water & Engine EnviroSeal, Life Support (10 man-hours), Mechanical Arm (STR 12), Spotlight

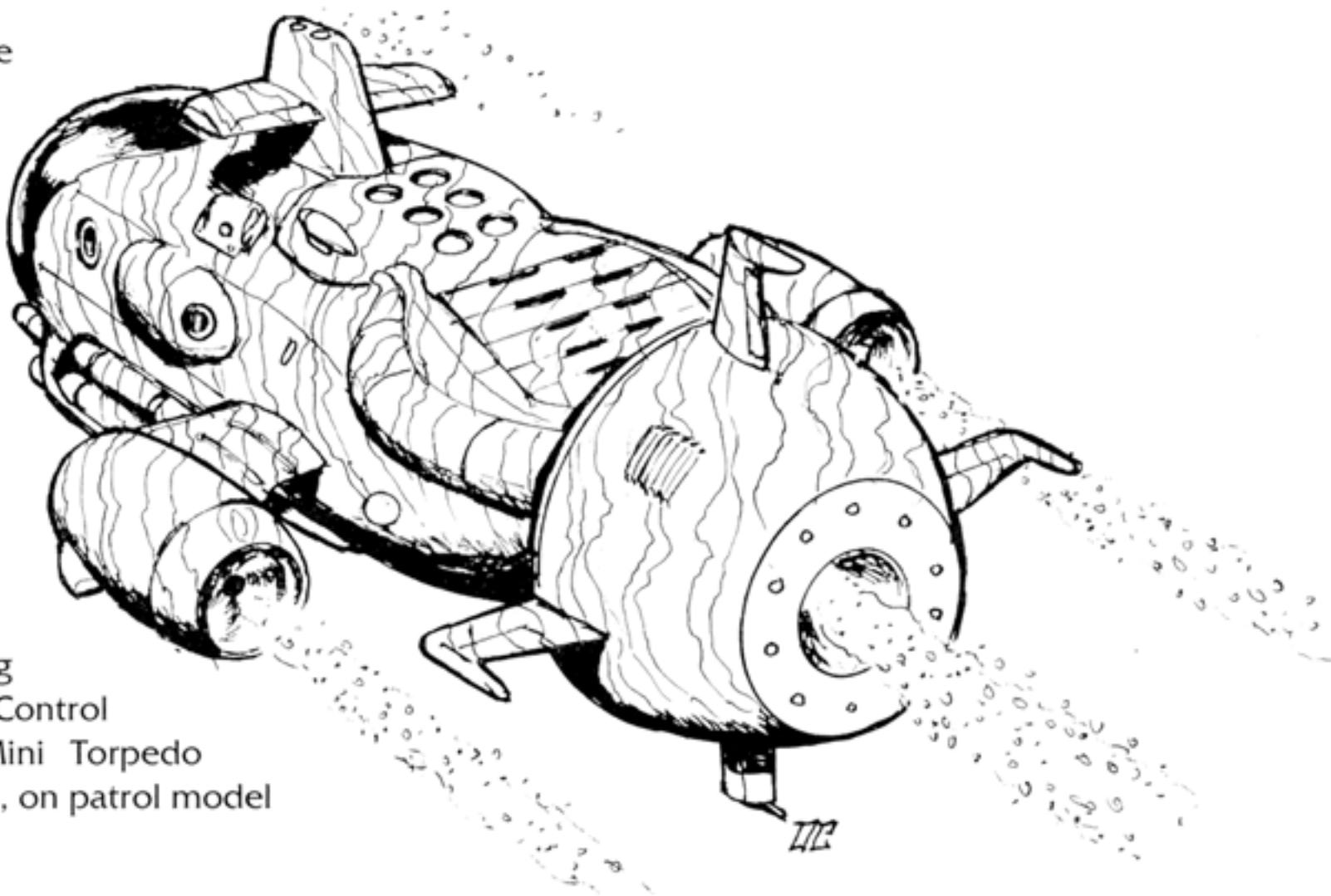
Vulkan Delphin RQ7

The larger version of the Electronaut, the Delphin can hold up to eight people with suitable accommodations. The RQ7 operates on electric batteries while submerged. When surfaced, it uses adiesel engine. While using the diesel engine, the batteries recharge (at a rate of 1 PF per hour). This allows for relatively extensive travel between refueling stops.

Maximum Depth: 150 meters on all models

Similar Models: Renraku Manta Ray, Yamatetsu Fathom

Other Features: Available in standard and patrol models; Water and Engine EnviroSeal, Life Support (100 man-hours) and 8 Basic Living Amenities on all models; 12 Medium Launch Control Systems (4 Mini-Torpedoes), 12 Internal Mini Torpedo Mounts, Mini-turret (1 CF Ammo Bin and HMG), on patrol model



Vulkan Electronaut

This sub was initially built for recovery missions to the submerged cities of North Germany and the United Netherlands. Produced by the Allied German States, the two-person mini-sub is available in a wide selection of utility models, making it very popular across the board. Its relatively low price tag and effective marketing has made the minisub a well-received recreational craft as well.

Maximum Depth: 50 meters

Similar Models: Proteus AG Diver, Yamatetsu Sea Horse

Other Features: Water & Engine EnviroSeal, Live Support (10 man-hours)



Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor/ Sonar	Cargo	Load
S-K D. J. Locker	3	15 (30)	3 (3)	4	0	8/8 (6/4)	2	—	0/1	3	410
V. Delphin RQ7	4	50 (30)	3 (4)	6	2	8/8 (6/4)	2	—	1/1	26	575
										[198 PS]	[1,200 PS]
V. Delphin RQ7 (P)	5	50 (30)	3 (4)	6	9	7/7 (5/3)	2	—	5/3	3	120
										[198 PS]	[1,200 PS]
V. Electronaut	3	15	4	4	0	8/8	2	—	0/0	4	150

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
S-K D. J. Locker	2	1h	E (250 PF)/ D (100 l)	0.5 km/PF (2 km/l)	—	—	Lt. Mini-sub	1	10/10 days	193,000¥
V. Delphin RQ7	4	1h	E (300 PF)/ D (300 l)	0.5 km/PF (1 km/l)	—	—	Med. Mini-sub	1	27/27 days	546,000¥
V. Delphin RQ7 (P)	4	1h	E (300 PF)/ D (300 l)	0.5 km/PF (1 km/l)	—	—	Med. Mini-sub	2	—	1,262,000¥
V. Electronaut	2	1h	E (250 PF)	0.5 km/PF	—	—	Lt. Mini-sub	1	3/3 days	45,000¥

PATROL SUBMARINE

Krasnaya Sormova Vaneyev-Class

Produced in the shipyards of Komsomolsk by the Krasnaya Sormova Shipbuilding Company. The Vaneyev was designed with economy and practicality in mind. It operates with a diesel/electric engine combination much like the Vulkan Delphin series of subs. The sub also comes equipped with a electrolytic oxygen generator, making extended voyages possible.

Maximum Depth: 400 meters

Similar Models: USS *Columbia*-Class, CSS *Savannah*-Class

Other Features: Water and Engine EnviroSeal, Oxygen Generator, 4 Torpedo Tubes, 4 Heavy Launch Control Systems, 24 Torpedoes, 85 Basic Living Amenities

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor/ Sonar	Cargo	Load
K. S. Vaneyev	3	45/30 (20/17)	3 (2)	4	9	6/4 (8/8)	3	—	4/4	823	41,985
										[6,600 PS]	[127,500 PS]

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
K. S. Vaneyev	—	2h	D (25,000 l)/ E (10,000 PF)	0.5 km/l (0.1 km/PF)	—	—	Patrol Sub	—	—	210,000,000¥

SEA SLED

Mitsuhamma Anago

Originally marketed to coastal resorts and scuba tours, the Mitsuhamma Anago quickly found a second market in security work as waterways were an often-overlooked security matter for corporations and wealthy waterfront property-owners. The Anago can pull up to six "passengers" in addition to the two seats on the jet ski-style frame.

Maximum Depth: 500 meters

Similar Models: Yamatetsu Tagalong, Proteus AG Porpoise

Other Features: Available in standard and security models; 6 Handholds available on both models, External Fixed Firmpoint (1 CF Ammo Bin) available on security model only

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor/ Sonar	Cargo	Load
M. Anago	3	35	4	2	0	9/9	1	1	1/1	2	450
M. Anago (Security)	3	35	4	2	0	9/9	1	1	1/1	0.5	440

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
M. Anago	2	—	E (60 PF)	0.8 km/PF	—	—	Med. Sea Sled	1	2/24 hours	13,750¥
M. Anago (Security)	2	—	E (60 PF)	0.8 km/PF	—	—	Med. Sea Sled	2	2/48 hours	15,000¥

Vector Thrust Craft

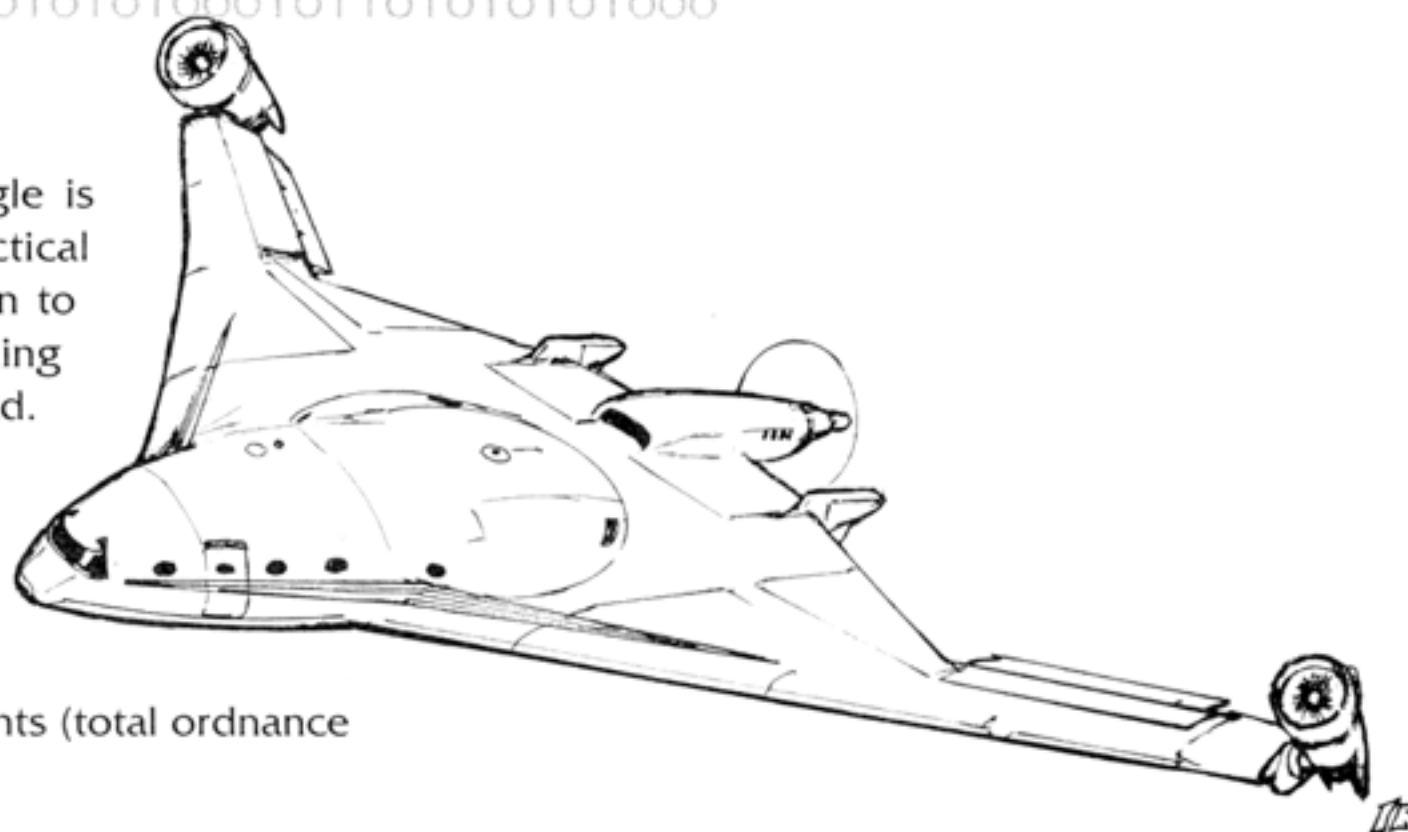
JUMP-JET FIGHTERS

Federated-Boeing Eagle

Designed to play many roles, the Fed-Boeing Eagle is generally classified as a VTOL mid-range tactical fighter/bomber. The jet has enough speed and precision to tangle with most high-performance fighters, while retaining the carrying capacity for a respectable bomb payload. Currently, the UCAS has the largest number of Eagles in their arsenal.

Similar Models: Sikorsky-Bell Rapier

Other Features: Gas Enviroseal, ECM 7, ECCM 8, RAM 2 (factored in), 2 External Fixed Hardpoints (1 CF Ammo bin each), Missile Launch System, 6 Missile Mounts (total ordnance weight 1,800 kg)



Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
F-B Eagle	4	1800	75	7	10	2	3	—	8	2.5	500

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
F-B Eagle	1e	1c	Jet (2,500 l)	0.1 km/l	—	VTOL	Jump-Jet	3	—	12,100,000¥

THUNDERBIRDS

Aztechnology Lobo Medium Scout LAV

This low altitude vehicle functions as a scout, but it's more than capable of taking care of itself. The heavily armored, well-armed craft has taken out or evaded craft well out of its class. The Lobo made its debut in the UCAS, and models were purchased by several corps and paramilitary organizations within a few years.

Similar Models: McDonnell-Douglas Precursor LAV

Other Features: ECM 6, ECCM 5, Medium Turret (1 CF Ammo Bin), Gas EnviroSeal

GMC Banshee

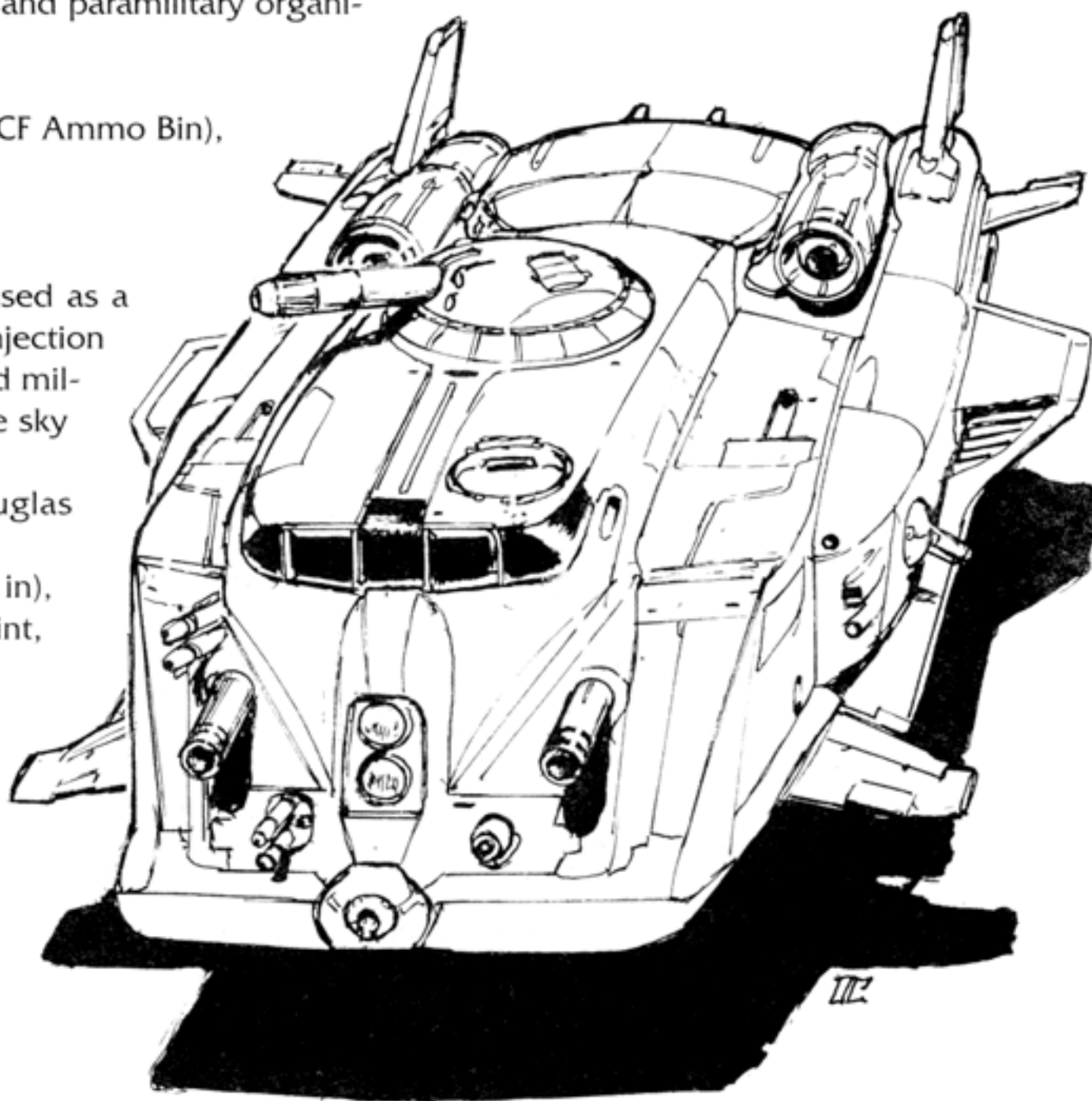
The Banshee is a light thunderbird, designed and used as a reconnaissance and courier vehicle. Despite early fuel injection problems, the line was well-received by the industrial and military industries. The Banshee can outrun everything in the sky short of a tactical fighter.

Similar Models: Ares Firebird, McDonnell-Douglas Interceptor

Other Features: ECM 5, ECCM 5, RAM 2 (factored in), Thermal Baffles 1 (factored in), External Fixed Hardpoint, Small Turret (1 CF Ammo Bin), Gas EnviroSeal

GMC "Harpy Scout" LAV

The Harpy Scout is somewhat misnamed as a "scout." It can certainly fulfill that role but is more often used for security patrol or deployed when unauthorized aircraft enter claimed airspace or "no-fly" zones. The Harpy is particularly popular in South America, where older aircraft tend to be the status quo and the newer Harpy has a sizable advantage.





Similar Models: Ares DR-270, USS Caravan-Class

Other Features: ECM 3, ECCM 3, RAM 2 (factored in), Thermal Baffles 2 (factored in), Gas EnviroSeal, Medium Launch Control System, 2 External Missile Mounts, Small Turret (1 CF Ammo Bin)

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
A. Lobo LAV	4	250/850	35	6	21	2	3	—	7	24	800
GMC Banshee	4	250/1,000	50	6	18	5	2	—	7	29	805
GMC "Harpy Scout"	3	250/850	45	6	15	6	2	—	5	24	1,000

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
A. Lobo LAV	3e	1c	Jet (7,500 l)	0.05 km/l	—	VSTOL	Thunderbird	3	NA	2,420,000¥
GMC Banshee	3e	1c	Jet (7,500 l)	0.05 km/l	—	VSTOL	Thunderbird	3	NA	2,560,000¥
GMC "Harpy Scout"	3e	1c	Jet (7,500 l)	0.05 km/l	—	VSTOL	Thunderbird	3	NA	2,210,000¥

Special Vehicles

ZEPPELINS

Airship Industries Skyswimmer

Airship Industries' Skyswimmer is a jaunty little dirigible designed for recreational use. The Skyswimmer's ducted-fan engines are powered by solar cells that provide the craft with a virtually unlimited range. The design also features VSTOL capabilities and a unique folding-wingtip design that enable Skyswimmers to land virtually anywhere.

Similar Models: Sikorsky-Bell Mississippi Belle

Other Features: SunCell

Goodyear Commuter-47

The Commuter-47 is a small, jet-powered dirigible designed for executive transport or personal use. The Commuter features fully enclosed passenger facilities and a triangular lifting-body shape. The design's glass-enclosed control cabin, located in the nose of the Commuter-47, provides pilots with wide, unobstructed views of the surrounding sky.

Similar Models: Wuxing Pelican

Other Features: None

Luftschiffbau Zeppelin LA-2049

The jet-powered Luftschiffbau LZ-2049 zeppelin is designed for low-end commercial use. It features a lifting-body airfoil design and an airframe constructed of reinforced carbon-fiber composites. The control section and passenger-cargo decks are built directly into the wing section.

Similar Models: Ares Helios

Other Features: None

Luftschiffbau Zeppelin LA-2051-C

Based on the same general construction principles as the LZ-2049, the 2051-C was designed with economy in mind. The 2051-C weighs less, carries more fuel, and can carry more total weight than the 2049. The newer craft also has lower maintenance costs, despite being a larger craft than its predecessor.

Similar Models: Ares Daedelus

Other Features: None

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
A. I. Skyswimmer	3	100	2	8	1	5	2	—	1	42	750
G. Commuter-47	3	250	15	8	1	3	2	—	1	50	1500
L. LA-2049	3	200	10	8	4	3	2	—	1	128	2400
L. LA-2051-C	3	140	8	8	1	3	3	—	1	110	3200



Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
A. I. Skyswimmer	2 + 1b	4d	E (1,000 PF)	0.25 km/PF	—	VSTOL	Zeppelin	1	12/12 days	240,000¥
G. Commuter-47	8 + 1b	3d	Jet (2,000 l)	1 km/l	—	VSTOL	Zeppelin	1	18/18 days	360,000¥
L. LA-2049	2 + 1b	3d + 1s	Jet (2,500 l)	1 km/l	—	VSTOL	Zeppelin	1	16/16 days	318,000¥
L. LA-2051-C	2 + 1b	1d + 1s	Jet (4,000 l)	1 km/l	—	VSTOL	Zeppelin	1	16/16 days	310,000¥

LOCOMOTIVE

Nordkapp-Conestoga Bergen

The Nordkapp-Conestoga Bergen is a diesel-powered articulated vehicle designed to serve isolated areas that lack rail transportation. A Bergen tractor module can be connected with up to five additional trailer modules to create a modern-day "road train" for hauling freight or the occasional passenger. The Bergen has proved popular in Eastern Europe, various Asian nations, North America's Midwest and the Australian outback.

Similar Models: Amtrak Ameritrain, TGV Bullet

Model	Hand	Speed	Accel	Body	Armor	Sig	Auto	Pilot	Sensor	Cargo	Load
N-C Bergen (Tractor)	3/6	90	2	8	6	1	4	—	2	5	400,000
N-C Bergen (Trailer)	—	—	—	8	3	2	—	—	0	1,008	80,000

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
N-C Bergen (Tractor)	4 + 2b	2d	D (2,000 l)	2 km/l	—	—	Switcher Loco.	1	38/38 days	750,000¥
N-C Bergen (Trailer)	2	2d + 1x	—	—	—	—	Freight Rail Car	1	10/10 days	227,000¥

SEMIBALLISTICS

Aerospatiale/Saeder-Krupp "Grande Concorde" Semiballistic

Semiballistic aircraft are a relatively recent development and are certainly new as a commercial flight option. Like most semiballistics, the General Dynamics SV250 looks more like a rocket than a plane and follows a parabolic-arc flight path in order to reach its destination. The SV250 is occasionally augmented with booster rockets and external fuel tanks for the trip into outer space.

Similar Models: None

Other Features: Rigger Adaptation, 8 Partial Basic Living Amenities

General Dynamics SV250 Semiballistic

This joint product of the French aircraft manufacturer and Europe's industrial powerhouse is indicative of Lofwyr's newfound interest in space. The Grande Concorde is used largely in the corporate sector, although pricey commercial tickets are available to those who can afford them.

Similar Models: None

Other Features: Rigger Adaptation, 8 Partial Basic Living Amenities

Model	Hand	Speed	Accel	Hull	Bulwark	Sig	Auto	Pilot	Sensor	Cargo	Load
A/S-K Gr. Concorde	5	200/1,500	60	2	1	2	4	4	4	250	8,000
G. D. SV250	6	200/1,000	50	2	1	2	4	4	4	300	12,000

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
A/S-K Gr. Concorde	126	6d + 1s	R (50,000 kg)	0.01 km/kg	—	Normal	SB	1	—	76,000,000¥
G. D. SV250	156	6d + 1s	R (50,000 kg)	0.01 km/kg	—	Special/Normal	SB	1	—	75,000,000¥

SUBORBITALS

Federated Boeing "China Clipper" Suborbital

The China Clipper is a commonly used carrier for trans-Pacific flights between the Far East and North America. While no longer the latest version of the suborbital class, the Clipper is still a mainstay of many fleets.

Similar Models: None

Other Features: Rigger Adaptation, 8 Partial Basic Living Amenities

Ilyushin IL-159 "Molniya" Suborbital

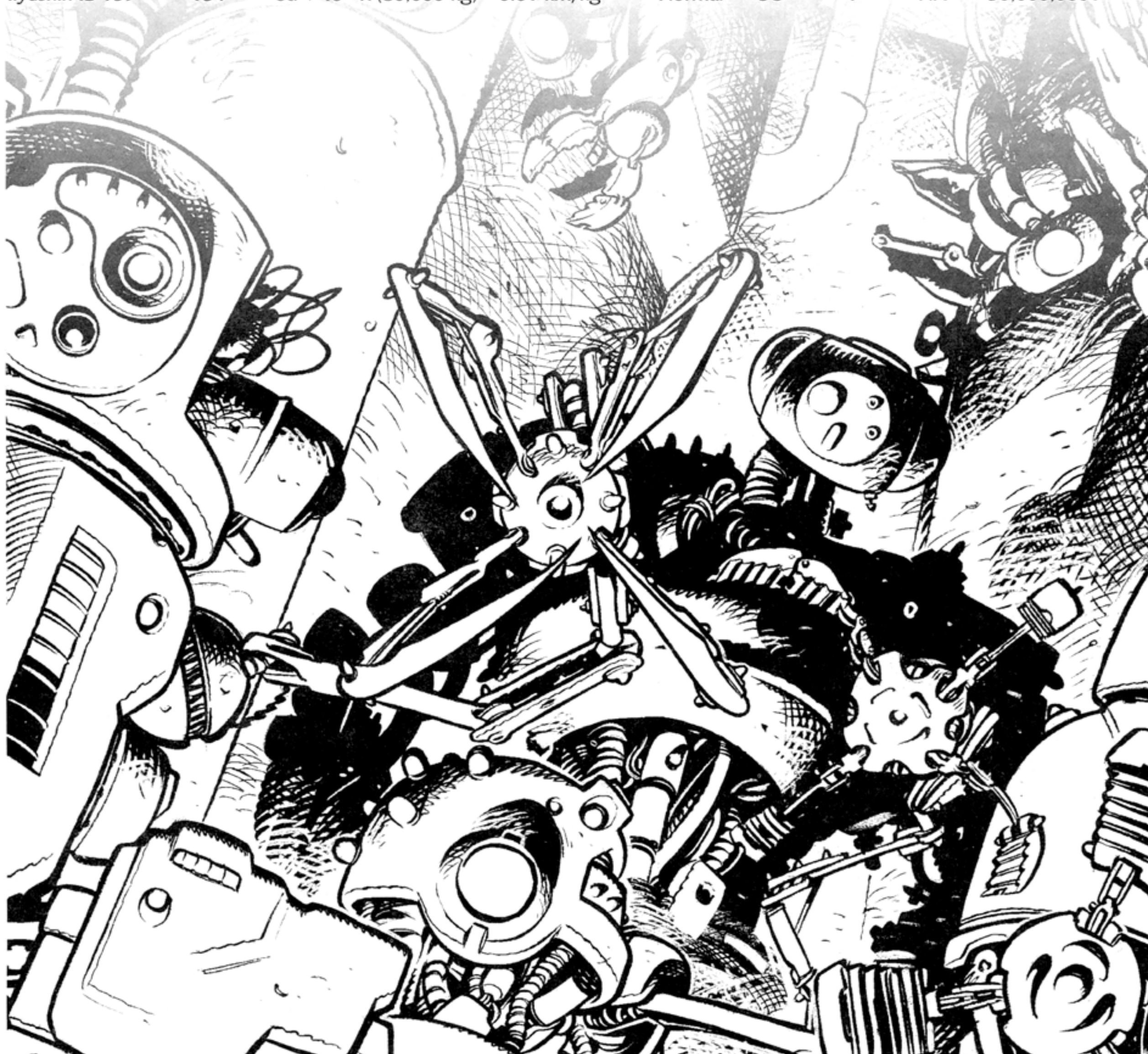
The Molniya is a new ship, created in a joint effort between Ilyushin and Yamatetsu. The ship is unusual as it caters to the Awakened traveler, with comfortable and secure sleeping berths as well as an on-board physician specially trained to work with the magically active.

Similar Models: None

Other Features: Rigger Adaptation, 8 Partial Basic Living Amenities

Model	Hand	Speed	Accel	Hull	Bulwark	Sig	Auto	Pilot	Sensor	Cargo	Load
F-B China Clipper	5	150/1,250	150	1	2	2	4	4	4	400	12,500
Ilyushin IL-159	6	150/750	80	1	2	2	4	4	4	580	20,000

Model	Seating	Entry	Fuel	Econ	S/B	L/T	Chass	SI	Avail	Cost
F-B China Clipper	156	6d + 1s	R (80,000 kg)	0.01 km/kg	—	Normal	SO	1	NA	32,000,000¥
Ilyushin IL-159	154	6d + 1s	R (80,000 kg)	0.01 km/kg	—	Normal	SO	1	NA	30,000,000¥



POWER PLANT TABLE

KEY

B = Body

		Load		Speed		Acceleration		Starting	Economy Rating			People	
	Start	Max		Start	Max	Start	Max	Fuel Code	In km/PF	Start	Max	Design	Space
												Points	(in Load)
BATTERY													
BIKES													
ATVs	30	120		60	90	3	6	5	50	0.4	1.6	30	
All Others	15	40		60	90	3	6	5	75	0.5	2	25	
BOATS													
Skiff	115	400		40	60	4	6	5	75	0.5	2.5	20	
Water Scooter	15	125		30	60	3	6	5	50	0.5	2	18	
All Others	30 x B	100 x B		30	55	2	5	5	40	0.4	2	8 x B	
CARS													
Crawler, Micro	0	4		5	40	1	4	12	4	0.5	2	108	
Crawler, Tracked (Small & Medium)	5 x B	250 x B		10	80	2	6	9 – B	5 + (35 x B)	0.75	2.25	15 x B	
Crawler, Wheeled (Small & Medium)	5 x B	150 x B		10	100	2	7	9 – B	5 + (35 x B)	0.75	2.25	15 x B	
Industrial Mover, Heavy	750	3,000		5	15	1	3	5	200	0.20	1.00	25	
Industrial Mover, Light	200	800		5	35	1	6	6	200	0.25	1.50	15	
Industrial Mover, Medium	400	1,600		5	25	1	4	5	200	0.20	1.00	20	
Sand Buggy	30	300		60	100	4	9	5	150	0.5	2.5	10	
Sedan	50	350		75	100	4	9	5	200	0.5	2.5	15	
Subcompact	40	160		60	100	4	9	5	150	0.5	2.5	10	
All Others	15 x B	100 x B		60	90	6 – B	10 – B	5	30 x B	0.4	2	5 + (5 x B)	
FIXED-WING AIRCRAFT													
UAV, Small	0	50		20/60	20/125	5	8	10	50	0.5	1	10	
HOVERCRAFT													
Skimmer													
Both Sizes	5 x B	300 x B		90	225	6	15	8 – B	120	0.4	1.6	10+ (10 x B)	
ROTOR CRAFT													
Tilt-wing UAV, Small & Medium	5	125		35	90	3	12	9 – B	50	0.4	1.2	25 x B	
UAV, Micro	0	3		10	25	3	8	12	4	0.25	1.25	15	
UAV, Small & Medium	5	125		35	90	3	12	9 – B	50	0.2	0.5	25 x B	
SUBMARINES													
Attack Submarine	750,000	3,000,000		25/20	35/30	2	4	8/8	15,000	0.1	0.25	65,000	+236,350
Bathyscaph	750,000	1,500,000		10/5	15/5	1	4	7/7	15,000	0.1	0.25	50,000	+127,500
Boomer	1,000,000	12,000,000		15/10	20/10	1	3	8/8	20,000	0.05	0.15	105,000	+236,250
Commercial, Heavy	8,000,000	32,000,000		8/5	16/5	1	3	6/6	15,000	0.05	0.1	64,000	+36,000
Commercial, Light	250,000	2,500,000		15/5	25/5	2	5	8/8	7,500	0.2	0.5	16,000	+24,000
Commercial, Medium	3,500,000	7,500,000		10/5	20/5	1	4	7/7	10,000	0.1	0.2	42,000	+30,000
Minisub, Light	250	1,600		15	45	3	5	8/8	150	0.5	2	35	
Minisub, Medium	550	4,000		15	60	3	5	8/8	200	0.5	2	248	
Minisub, Heavy	1,000	12,500		15	45	2	4	8/8	500	0.4	2	600	
Patrol Submarine	50,000	400,000		25/20	40/35	2	4	8/8	10,000	0.1	0.25	27,500	
Sea Sled, Small	20	250		45	120	5	9	10/10	50	1	5	12	
Sea Sled, Medium	50	750		35	105	4	7	9/9	60	0.8	4	15	
Sea Sled, Large	100	1,250		30	50	3	6	8/8	75	0.5	2.5	20	
SPECIAL VEHICLES													
Anthroform, Medium	20	100		10	40	—	—	6	40	0.5	2	150	
Anthroform, Large	75	375		10	50	—	—	5	60	0.5	1.5	240	
Locomotive, Express	80,000	200,000		40	100	3	8	3	600	0.05	0.20	800	
Locomotive, Streetcar	500	4,000		40	65	5	8	4	80	0.20	0.50	500	

	Load		Speed		Acceleration		Sig	Starting Fuel Code In km/PF	Economy Rating In km/PF		Design Points	People Space (In Load)
	Start	Max	Start	Max	Start	Max			Start	Max		
Mini-blimp	2	100	40	75	1	5	10	15	5	10	16	
Walker, Micro	0	4	2	8	—	—	12	4	0.5	2	108	
Walker, Small	5	25	2	15	—	—	8	40	0.5	2	80	
Walker, Medium	25	125	10	40	—	—	7	50	0.5	2	120	
Walker, Large	100	500	10	50	—	—	5	75	0.5	1.5	200	
Walker, Extra-Large	150	750	10	60	—	—	4	125	0.5	1.0	400	
Zeppelin	1,000	2,400	40	125	1	9	5	1,000	0.25	1	900	

CHEMICAL ROCKETS

SPECIAL VEHICLES

Semiballistic	8,000	15,000	200/750	200/1,500	40	60	2	50,000	0.01	0.02	250,000	
Suborbital	10,000	20,000	150/750	150/2,000	80	240	2	80,000	0.01	0.025	50,000	

DIESEL

BOAT

	Start	Load Max	Speed Start	Speed Max	Acceleration Start	Acceleration Max	Sig	Starting Fuel Code In km/l	Economy Rating In km/l	Start	Max	Design Points	People Space (In Load)
Skiff	300	750	45	100	5	9	3	20	5	10	35		
Speedboat	40	400	80	275	12	24	2	100	2	5	35		
Sport Cruiser	500	2,500	30	100	4	9	2	200	2	6	48		
Yacht	600	3,500	30	100	4	6	2	200	2	6	80		+1,500

CAR

APC, Tracked	3,000	7,500	55	80	5	8	2	200	2	4	400		
APC, Wheeled	2,000	6,000	60	120	5	8	2	250	2.5	5	350		
Caterpillar, Heavy	10,000	25,000	5	50	1	3	2	800	0.5	1.5	350		
Caterpillar, Light	2,000	5,000	5	60	1	4	2	300	2	5	150		
Caterpillar, Medium	5,000	10,000	5	55	1	4	2	600	1	2.5	250		
Caterpillar, Miniature	1,000	2,000	5	60	1	5	2	150	2.5	5	75		
Industrial Mover, Heavy	1,200	4,000	5	30	1	6	2	45	3	6	35		
Industrial Mover, Light	400	1,500	5	40	1	6	2	20	3	6	25		
Industrial Mover, Medium	750	3,000	5	35	1	6	2	30	3	6	30		
Limousine	180	900	80	140	8	12	2	60	6	10	65		
RV	1,000	3,000	80	150	4	9	2	100	4	8	35		+300
Sports Car	40	260	240	400	18	32	2	60	6	10	90		

SUV

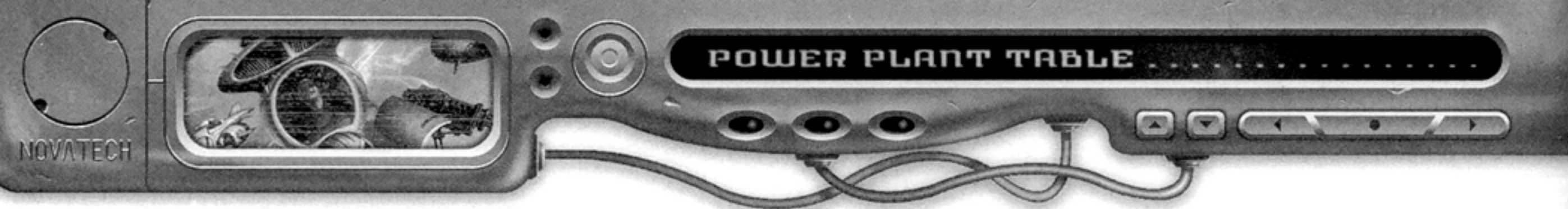
Van	1,000	3,000	80	175	4	9	2	95	4	8	35		
Tractor	7,500	20,000	60	120	3	4	2	750	3	6	80		
Transport, Medium	2,000	5,000	65	130	3	6	2	250	4	8	80		
Transport, Heavy	6,000	12,000	60	120	3	5	2	500	3	6	140		

HOVERCRAFT

Hovercraft, Heavy	1,000	5,000	90	150	5	10	2	400	0.5	2.5	175		
Hovercraft, Light	100	850	90	240	5	12	2	100	0.5	2.5	20		
Hovercraft, Medium	750	2,500	90	150	5	10	2	400	0.5	2.5	50		
Skimmer, Medium	25	400	90	180	6	15	4	25	0.25	1	120		
Skimmer, Small	10	250	90	180	8	20	5	25	0.5	1	80		

SHIP

Aircraft Carrier, Heavy	1,500,000	30,000,000	25 (15)	45 (25)	2	4	2/2	400,000	0.1	0.2	1,000,000	+14,700,000
Aircraft Carrier, Light	750,000	12,000,000	30 (15)	45 (25)	2	5	2/2	100,000	0.2	0.4	200,000	+5,925,000
Aircraft Carrier, Medium	1,000,000	15,000,000	25 (15)	45 (25)	2	4	2/2	200,000	0.15	0.3	500,000	+8,850,000
Corvette	20,000	400,000	30 (30)	90 (50)	5	10	3/4	10,000	0.25	0.45	25,000	+52,500
Cruiser	40,000	1,600,000	30 (15)	45 (25)	2	5	3/3	75,000	0.2	0.4	150,000	+1,125,000
Destroyer	60,000	1,000,000	25 (20)	45 (30)	3	6	3/3	60,000	0.2	0.4	75,000	+843,750
Freighter	20,000,000	100,000,000	15 (10)	20 (10)	1	2	1/1	40,000	0.1	0.15	500,000	+37,500
Frigate	45,000	800,000	30 (20)	45 (30)	3	7	3/4	50,000	0.2	0.4	50,000	+675,000
Harbor Tug	10,000	50,000	10 (5)	15 (10)	1	3	3/2	5,000	0.2	0.25	1,500	



	Load		Speed		Acceleration		Sig	Starting Fuel Code In km/l	Economy Rating In km/l		Design Points	People Space (In Load)
	Start	Max	Start	Max	Start	Max			Start	Max		
Merchantman,												
Heavy	2,000,000	20,000,000	15 (10)	25 (10)	1	3	2/1	20,000	0.15	0.24	150,000	+37,500
Merchantman, Light	50,000	500,000	25 (15)	50 (15)	2	5	3/2	5,000	0.3	0.6	10,000	+22,500
Merchantman, Medium	500,000	2,000,000	20 (15)	50 (15)	2	5	3/2	10,000	0.2	0.3	40,000	+30,000
Patrol Craft	5,000	15,000	35 (35)	90 (50)	6	12	4/4	5,000	0.4	1	10,000	+30,000
Trawler	25,000	75,000	10 (5)	60 (10)	2	6	3/2	5,000	0.2	0.3	5,000	
SUBMARINES												
Attack Submarine	750,000	4,000,000	30/25	45/30	3	5	6/4	10,000	0.25	1	120,000	+236,250
Bathyscaph	800,000	2,500,000	10/5	20/5	1	3	5/3	10,000	0.2	0.5	40,000	
Boomer	1,000,000	16,000,000	15/10	30/20	2	4	6/4	10,000	0.1	0.25	200,000	+236,250
Commercial Sub, Heavy	15,000,000	40,000,000	10/5	20/5	1	3	5/3	10,000	0.1	0.25	60,000	+36,000
Commercial Sub, Light	500,000	4,000,000	20/5	30/5	2	6	6/3	7,200	0.25	1	15,000	+24,000
Commercial Sub, Medium	5,000,000	12,500,000	15/5	30/5	1	4	5/3	10,000	0.2	0.5	40,000	+30,000
Minisub, Light	400	1,600	30	60	3	6	6/4	100	2	6	40	
Minisub, Medium	550	4,000	30	60	4	8	6/4	150	1	4.5	210	
Minisub, Heavy	1,250	10,000	25	50	2	5	6/4	150	1	4.5	540	
Patrol Submarine	50,000	400,000	30/20	50/40	3	6	6/4	15,000	0.5	1.5	35,000	+127,500
Sea Sled (all)	50 x B	500 x B	50 - (5 x B)	80 - (5 x B)	7 - B	12 - B	8/5	10 x B	4	10	10 + (5 x B)	
SPECIAL VEHICLES												
Anthroform, Large	150	600	10	50	—	—	3	25	3.6	5.4	480	
Anthroform, Medium	75	375	10	40	—	—	5	10	4	6	300	
Locomotive, Bulk	1,000,000	150,000,000	40	110	1	4	1	25,000	1	3	1,800	
Locomotive, Bullet	100,000	150,000	160	270	10	18	1	25,000	1	3	2,000	
Locomotive, Express	100,000	400,000	60	105	4	8	1	20,000	2	4	1,000	
Locomotive, Non-Rail	400,000	800,000	5	90	1	5	1	400	2	4	750	
Locomotive, Streetcar	500	4,000	40	65	3	8	2	120	3	6	600	
Locomotive, Switcher	400,000	800,000	5	90	1	5	1	400	2	4	750	
Mini-blimp	20	300	60	120	6	20	6	5	6	12	35	
Walker, Extra-Large	300	1,500	10	60	—	—	2	60	2	4	800	
Walker, Large	200	1,000	10	50	—	—	3	40	3.6	5.4	400	
Walker, Medium	100	400	10	40	—	—	5	15	4	6	240	
Walker, Small	25	125	2	15	—	—	6	5	4	6	160	

		Load		Speed		Acceleration		Starting Fuel Code	Economy Rating		Design	People	
	Start	Max		Start	Max	Start	Max	Sig	In km/PF	Start	Max	Points	Space (in Load)
ELECTRIC FUEL CELL													
BIKES													
Chopper & ATVs	80	220		50	125	4	9	4	60	0.25	1	63	
Off-Road	55	100		50	100	4	8	5	40	0.25	1	60	
Racing Cycle	30	100		120	240	10	18	4	40	0.25	1	92	
Scooter	55	100		50	100	4	8	5	40	0.25	1	60	
BOATS													
Skiff	50	200		40	80	5	8	5	75	1	2.5	45	
Speedboat	25	325		60	210	8	16	5	50	1	2.5	45	
Sport Cruiser	500	1,500		30	60	3	6	5	100	1	2.5	54	
Water Scooter	50	200		40	80	6	9	5	50	1	2.5	36	
Yacht	450	3,000		25	90	3	5	5	150	1	2.5	100	+1,500
CARS													
Armored Personnel													
Carrier, Tracked	2,500	6,000		50	75	4	7	5	100	1	2	600	
Armored Personnel													
Carrier, Wheeled	1,500	5,000		55	100	4	7	5	100	1	2	600	
Crawler, Tracked &													
Wheeled (Micro)	0	6		5	40	1	4	12	4	0.5	2	270	
Crawler, Tracked													
(Small & Medium)	5 x B	350 x B		25	100	3	8	9 – B	5 + (35 x B)	1.25	2.5	10 + (20 x B)	
Crawler, Wheeled													
(Small & Medium)	5 x B	250 x B		25	150	3	10	9 – B	5 + (35 x B)	1.25	2.5	10 + (20 x B)	
Industrial Mover,													
Heavy	1,000	3,600		5	20	1	4	5	200	0.20	1.00	40	

	Load		Speed		Acceleration		Sig	Starting Fuel Code in km/PF	Economy Rating in km/PF		Design Points	People Space (in Load)
	Start	Max	Start	Max	Start	Max			Start	Max		
Industrial Mover, Light	300	1,000	5	40	1	6	6	200	0.25	1.50	30	
Industrial Mover, Medium	600	2,500	5	25	1	5	5	200	0.20	1.00	36	
Limousine	25 x B	150 x B	80	140	7	12	5	150	1	2.5	20 x B	
RVS	750	2,000	75	150	4	8	5	400	1	2.5	50	+300
Sedan	25 x B	150 x B	80	140	7	12	5	150	1	2.5	20 x B	
Subcompact	50	500	80	120	5	10	5	125	1	2.5	25	
SUVS	300	20,000	90	150	5	10	5	200	1	2	50	
Sand Buggy	30	300	90	120	6	10	5	100	1	2.5	25	
Transport, Heavy	5,000	10,000	55	100	2	4	4	100	1	2.5	200	
Transport, Medium	1,500	4,000	60	110	3	5	4	100	1	2.5	120	
Van	300	20,000	90	150	5	10	5	200	1	2	50	
FIXED-WING AIRCRAFT												
Single Engine	150	1,000	60/120	60/400	15	20	6	100	0.8	2.4	75	
Twin Engine	300	2,000	135/250	135/400	15	20	6	150	0.8	2.4	100	
UAV, All Sizes	5 x B	100 x B	20 x B/80	20 x B/240	20	50	11 - B	25 + (25 x B)	0.5	1	20 x B	
Ultralight	0	200	15	75	3	6	9	50	0.25	1	100	
HOVERCRAFT												
Hovercraft, Heavy	800	4,000	75	120	5	8	5	500	0.25	1	196	
Hovercraft, Light	80	720	75	210	5	10	5	250	0.4	1.6	32	
Hovercraft, Medium	600	2,400	75	120		8	5	500	0.4	1.2	64	
Skimmer, Small	10	250	75	150	8	18	8	120	0.4	1.6	92	
Skimmer, Medium	25	400	75	150	6	10	6	120	0.4	1.6	144	
ROTOR CRAFT												
Attack Helicopter	1,500	5,000	75	120	15	25	5	500	0.1	0.25	3,000	
Autogyro	0	100	60	200	8	16	7	50	0.2	0.5	40	
Cargo Helicopter	800	10,000	60	180	6	15	5	500	0.1	0.25	240	
Rotary Wing												
UAV, Medium	20	800	60	180	5	15	7	50	0.2	0.5	80	
Rotary Wing												
UAV, Micro	0	5	15	50	4	10	12	4	0.25	1.25	40	
Rotary Wing												
UAV, Small	10	400	60	180	5	15	8	50	0.2	0.5	60	
Tilt-wing, Heavy	300	8,000	120	200	6	15	5	500	0.2	0.5	360	
Tilt-wing, Medium	300	2,000	140	250	7	15	5	250	0.25	0.65	100	
Tilt-wing												
UAV, Large	20	750	60	275	5	12	6	50	0.4	1.2	80	
Tilt-wing												
UAV, Medium	10	350	60	325	5	15	7	50	0.4	1.2	60	
Utility Helicopter	800	3,200	60	180	6	15	5	250	0.15	0.36	80	
SUBMARINE												
Attack Submarine	750,000	4,000,000	30/25	45/30	3	5	8/8	15,000	0.1	0.25	144,000	+236,250
Bathyscaph	800,000	2,500,000	15/5	20/5	1	3	7/7	15,000	0.1	0.25	100,000	
Boomer	1,000,000	16,000,000	15/10	30/20	2	4	8/8	20,000	0.05	0.15	225,000	+236,250
Commercial,												
Heavy	15,000,000	40,000,000	10/5	20/5	1	3	6/6	15,000	0.05	0.1	150,000	+36,000
Commercial, Light	500,000	4,000,000	20/5	30/5	2	6	8/8	7,500	0.2	0.5	32,000	+24,000
Commercial,												
Medium	5,000,000	12,500,000	15/5	30/5	1	4	7/7	10,000	0.1	0.2	90,000	+30,000
Minisub, Heavy	1,250	10,000	25	50	2	5	8/8	500	0.4	2	1,500	
Minisub, Light	400	1,600	30	60	3	6	8/8	150	0.5	2	72	
Minisub, Medium	550	4,000	30	60	4	8	8/8	200	0.5	2	500	
Patrol Submarine	50,000	450,000	30/20	50/40	3	6	8/8	10,000	0.1	0.25	50,000	+127,500
Sea Sled, Medium	100	1,000	40	70	5	10	9/9	60	0.8	4	36	
Sea Sled, Large	150	1,500	35	65	4	9	8/8	75	0.5	2.5	50	
Sea Sled, Small	50	500	45	75	6	11	10/10	50	1	5	25	
VECTORED-THRUST												
Thunderbird	3,500	6,500	250/320	250/720	20	50	5	1,000	0.1	0.5	2,500	
UAV, Medium	10	400	60	300	6	30	8	100	0.25	1	48	
UAV, Large	10	1,000	50	240	8	30	6	125	0.2	0.5	100	
SPECIAL VEHICLES												
Anthroform, Medium	50	200	10	40	—	—	6	40	0.5	2	375	
Anthroform, Large	100	500	10	50	—	—	5	60	0.5	1.5	600	
Mini-blimp	10	200	60	120	6	20	6	15	5	10	40	



Locomotive, Bullet Walker, Extra-Large	100,000	200,000	160	300	12	20	3	1,000	0.04	0.10	2,000	
Walker, Large	250	1,200	10	60	—	—	4	125	0.5	1.0	100	
Walker, Medium	150	750	10	50	—	—	5	75	0.5	1.5	500	
Walker, Micro	50	250	10	40	—	—	7	50	0.5	2	300	
Walker, Small	0	6	2	8	—	—	12	4	0.5	2	270	
Zeppelin	10	100	2	15	—	—	8	40	0.5	2	200	
	1,000	4,000	70	250	6	18	5	1,000	0.2	1	1,000	
	Start	Load Max	Speed Start	Speed Max	Acceleration Start	Acceleration Max	Sig	Starting Fuel Code In km/l	Economy Rating In km/l Start	Economy Rating In km/l Max	Design Points	People Space (In Load)
GASOLINE												
BIKES												
All-Terrain Vehicle	80	220	60	180	4	10	2	20	10	14	54	
Chopper	80	220	60	180	4	10	2	20	10	14	54	
Off-Road	60	120	60	100	4	8	2	20	10	14	55	
Racing Cycle	40	100	120	240	10	18	2	15	8	16	88	
Scooter	60	120	60	100	4	8	2	20	10	14	55	
BOATS												
Skiff	250	600	45	100	5	9	3	20	7	10	30	
Speedboat	40	360	75	240	10	18	2	100	3	6	30	
Sport Cruiser	650	1,500	30	100	5	9	3	200	4	8	36	
Water Scooter	50	250	45	90	6	10	3	20	7	10	29	
Yacht	500	3,000	25	80	3	5	3	200	2	5	60	+1,500
CARS												
Crawler, Tracked (Small & Medium)	5 x B	350 x B	25	100	3	8	6 - B	10 x B	10	15	5 + (20 x B)	
Crawler, Wheeled (Small & Medium)	5 x B	250 x B	25	150	3	10	6 - B	10 x B	10	15	5 + (20 x B)	
Industrial Mover, Heavy	800	3,200	5	25	1	5	2	45	1.00	2.50	33	
Industrial Mover, Light	250	800	5	45	1	7	2	20	1.25	3.00	24	
Industrial Mover, Medium	500	2,000	5	30	1	6	2	30	1.00	2.50	30	
Limousine	60	500	100	160	8	14	2	60	8	14	50	
RVS	350	2,500	80	120	5	8	2	95	5	9	40	+300
Sand Buggy	40	400	90	120	6	9	3	40	8	12	20	
Sedan	60	300	100	160	8	14	2	60	8	14	25	
Sports Car	40	260	160	270	10	18	2	60	6	10	70	
Subcompact	50	500	90	120	6	10	2	40	8	12	20	
SUVS	250	1,600	100	140	7	12	2	80	6	10	30	
Van	350	2,500	80	120	5	8	2	95	5	9	40	
FIXED-WING AIRCRAFT												
UAV, Small	0	100	20/50	20/150	20	60	6	40	1	3	25	
Ultralight	10	100	40/100	40/240	15	20	6	20	1	3	15	
HOVERCRAFT												
Hovercraft, Light	80	400	90	130	5	10	2	100	0.4	1.6	20	
Skimmer, Medium	25	300	90	180	6	15	4	25	0.25	1	96	
Skimmer, Small	10	200	90	180	8	20	5	25	0.4	1	72	
ROTOR CRAFT												
UAV, Small	5	125	40	90	4	10	4	60	0.2	0.4	25	
SUBMARINES												
Minisub, Light	200	800	30	60	3	6	6/4	80	1.5	4.5	36	
Sea Sled (all)	40 x B	200 x B	50 - (5 x B)	80 - (5 x B)	7 - B	12 - B	8/5	10 x B	3	9	5 + (5 x B)	
SPECIAL VEHICLES												
Anthroform, Medium	50	200	10	40	—	—	5	10	4	6	225	
Anthroform, Large	100	500	10	50	—	—	3	25	3.6	5.4	360	
Mini-blimp	10	200	60	120	6	20	6	5	5	10	25	
Walker, Extra-Large	250	1,200	10	60	—	—	2	60	2	4	600	
Walker, Large	150	750	10	50	—	—	3	40	3.6	5.4	300	
Walker, Medium	50	250	10	40	—	—	5	15	4	6	180	
Walker, Small	10	100	2	15	—	—	6	5	4	6	120	

	Load		Speed		Acceleration			Starting Fuel Code	Economy Rating in km/l		Design	People Space
	Start	Max	Start	Max	Start	Max	Sig	In km/l	Start	Max	Points	(In Load)
JET TURBINE												
BOATS												
Speedboat	40	200	100	350	12	24	1	100	0.5	2.5	60	+1,500
Sport Cruiser	750	3,000	40	120	6	12	1	200	0.5	3	72	
Yacht	800	3,600	40	120	4	8	1	200	0.5	3	150	
CARS												
APC, Tracked	3,000	6,000	70	150	5	9	1	250	0.8	2	500	
APC, Wheeled	2,000	5,000	75	200	6	10	1	250	1	2.5	500	
Caterpillar, Heavy	10,000	25,000	15	50	2	5	1	900	0.25	1.25	400	
Caterpillar, Light	2,000	5,000	20	80	2	7	1	400	0.8	2.4	200	
Caterpillar, Medium	5,000	10,000	20	60	2	6	1	800	0.5	1.5	320	
Caterpillar, Miniature	1,000	2,000	25	100	3	7	1	200	1	2.5	90	
Transport, Heavy	6,000	12,000	75	180	5	9	1	250	1	3	170	
FIXED-WING AIRCRAFT												
Airliner	10,000	75,000	150/600	150/1,000	35	60	2	5,000	0.4	0.6	1,000	
HSCT	10,000	25,000	125/2,400	125/3,200	50	125	2	120,000	0.02	0.05	10,000	
Jet Fighter	4,000	12,500	150/1,800	150/5,000	80	250	5	2,500	0.1	0.3	2,000	
Single Engine	250	2,000	60/320	60/400	20	35	3	750	0.5	0.75	100	
Twin Engine	500	5,000	135/500	135/800	30	42	3	1,500	0.5	0.75	150	
UAV, Small	5	825	20/100	20/400	30	150	6	40	0.5	0.75	40	
UAV, Medium	10	2,000	40/200	40/480	35	270	6	80	0.5	0.75	55	
UAV, Large	10	4,500	60 /300	60 /1620	40	570	6	120	0.5	0.75	80	
Ultralight	50	250	40/200	40/500	18	36	5	100	0.5	0.75	50	
HOVERCRAFT												
Hovercraft, Light	100	1,000	90	300	8	16	2	100	0.25	0.75	35	
Hovercraft, Medium	750	3,000	90	180	8	12	2	400	0.25	0.75	60	
Hovercraft, Heavy	1,000	6,000	90	180	8	12	2	400	0.25	0.75	200	
ROTOR CRAFT												
Attack Helicopter	1,500	5,000	250	350	20	35	4	3,000	0.1	0.3	1,500	
Autogyro	15	165	60	200	10	20	4	250	0.25	0.4	40	
Cargo Helicopter	850	12,000	120	350	10	25	3	1,000	0.2	0.35	150	
Rotary Wing UAV, Medium	20	900	60	200	6	18	4	120	0.25	0.4	50	
Rotary Wing UAV, Small	10	450	60	200	6	18	5	120	0.25	0.4	40	
Utility Helicopter	850	3,600	120	350	10	25	3	1,000	0.2	0.35	50	
SHIPS												
Aircraft Carrier, Heavy	2,000,000)	40,000,000	30 (15)	50 (25)	2	4	2/2	400,000	0.05	0.1	1,000,000	+14,700,000
Aircraft Carrier, Light	800,000	15,000,000	30 (15)	60 (25)	3	6	2/2	100,000	0.1	0.25	250,000	+5,925,000
Aircraft Carrier, Medium	1,500,000	25,000,000	30 (15)	50 (25)	2	5	2/2	200,000	0.08	0.2	600,000	+8,850,000
Corvette	20,000	400,000	50 (35)	100 (50)	5	10	3/3	10,000	0.15	0.3	35,000	+52,500
Cruiser	50,000	2,000,000	30 (15)	60 (25)	3	6	2/2	75,000	0.1	0.25	250,000	+1,125,000
Destroyer	75,000	1,000,000	30 (20)	55 (30)	3	7	2/3	60,000	0.15	0.3	100,000	+843,750
Freighter	30,000,000	125,000,000	15 (10)	20 (10)	1	2	1/1	40,000	0.05	0.15	600,000	+37,500
Frigate	45,000	800,000	40 (20)	60 (30)	3	8	2/4	50,000	0.15	0.3	75,000	+675,000
Merchantman, Heavy	2,500,000	25,000,000	20 (10)	25 (10)	2	4	2/1	20,000	0.1	0.2	200,000	+37,500
Merchantman, Medium	750,000	2,500,000	25 (15)	50 (15)	3	5	3/2	10,000	0.15	0.24	60,000	+30,000
SUBMARINES												
Bathyscaph	5,000,000	12,500,000	20/5	40/5	1	3	4/2	10,000	0.1	0.4	60,000	
Commercial Sub, Heavy	15,000,000	40,000,000	15/5	30/5	1	4	4/2	10,000	0.05	0.2	100,000	+36,000
Commercial Sub, Medium	5,000,000	12,500,000	25/5	45/5	2	6	4/2	10,000	0.1	0.4	75,000	+30,000
Minisub, Heavy	1,500	12,500	35	75	3	7	5/3	150	0.5	3	900	
Patrol Submarine	50,000	400,000	40/15	60/30	4	7	5/3	15,000	0.25	1	50,000	+127,500



	Load		Speed		Acceleration		Sig	Starting Fuel Code in km/l	Economy Rating in km/l		Design Points	People Space (In Load)
	Start	Max	Start	Max	Start	Max			Start	Max		
VECTORED-THRUST												
Jump Jet Fighter	2,000	9,600	700	2,000	50	150	3	2,500	0.1	0.3	12,000	
Thunderbird	4,000	8,000	250/400	250/1,000	25	60	3	7,500	0.05	0.3	1,600	
UAV, All	10	250 x B	50 x B	200 x B	4 x B	36	8 – B	60 x B	1.2 ÷ B	3.0 ÷ B	18 + (9 x B)	
SPECIAL VEHICLES												
Locomotive, Bullet	100,000	150,000	180	300	12	20	1	25,000	0.25	0.8	2,500	
Mini-blimp	100	500	80	320	10	30	4	25	0.25	1	50	
Zeppelin	1,000	5,000	100	350	12	32	2	2,000	0.25	1	1,000	
	Start	Load Max	Speed Start	Max	Acceleration Start	Max	Sig	Starting Fuel Code in km/l	Economy Rating in km/l Start	Max	Design Points	People Space (In Load)
JET PROPELLER												
FIXED-WING AIRCRAFT												
Airliner	5,000	15,000	135/320	135/500	22	35	3	5000	0.75	1.5	500	
Single Engine	175	1,200	60/130	60/450	20	25	4	250	1	3	50	
Twin Engine	350	2,500	135/280	135/500	20	28	4	500	1	3	75	
UAV, Large	20	350	60/150	50/550	20	60	6	100	1	3	55	
UAV, Medium	10	225	40/90	40/325	30	75	6	60	1	3	40	
UAV, Small	5	125	20/60	20/175	35	80	6	40	1	3	30	
Ultralight	15	150	40/120	40/250	17	21	6	60	1	3	20	
ROTOR CRAFT												
Tilt-wing, Medium	350	2,500	280	500	10	20	4	750	0.6	1	75	
Tilt-wing, Heavy	350	10,000	240	400	8	20	3	1,000	0.6	1	200	
Tilt-wing UAV, Large	20	800	60	300	6	15	4	120	0.6	1	50	
Tilt-wing UAV, Medium	10	400	60	350	6	18	5	120	0.6	1	40	
SPECIAL VEHICLES												
Mini-blimp	50	400	70	250	8	24	5	25	1	3	45	
Zeppelin	1,000	4,000	70	250	8	26	3	2,000	1	3	600	
	Start	Load Max	Speed Start	Max	Acceleration Start	Max	Sig	Starting Fuel Code in km/bar	Economy Rating in km/bar Start	Max	Design Points	People Space (In Load)
METHANE												
BIKES												
All-terrain Vehicle	60	150	40	120	3	8	4	250	1.25	2	36	
Chopper	60	150	40	120	3	8	4	250	1.25	2	36	
Off-Road	60	120	40	90	4	7	4	200	1.25	2	30	
Scooter	60	120	40	90	4	7	4	200	1.25	2	30	
BOATS												
Skiff	200	450	65	85	6	10	4	250	1	2.25	25	
Water Scooter	25	150	30	60	3	6	4	150	1	2.25	24	
CARS												
Crawler, Tracked (Small & Medium)	5 x B	300 x B	20	80	3	7	7 – B	100 + (50 x B)	0.75	2.25	20 x B	
Crawler, Wheeled (Small & Medium)	5 x B	200 x B	20	120	3	8	7 – B	100 + (50 x B)	1	2	20 x B	
Industrial Mover, Heavy	800	3,200	5	20	1	4	3	600	0.02	0.05	30	
Industrial Mover, Light	250	800	5	40	1	6	4	300	0.04	0.10	20	
Industrial Mover, Medium	500	2,000	5	25	1	5	4	450	0.03	0.09	25	
Limousine	60	400	100	150	6	10	4	500	1	2.25	20	
RVS	250	1,600	80	120	2	5	3	1,000	0.5	1.5	20	+300
Sand Buggy	40	300	90	120	6	10	4	400	1.25	2.5	15	
Sedan	60	400	100	150	6	10	4	500	1	2.25	20	
SUV	200	1,000	80	120	2	5	3	1,000	0.5	1.5	20	
Subcompact	50	350	90	120	6	10	4	450	1.25	2.5	15	
Van	250	1,600	80	120	2	5	3	1,000	0.5	1.5	20	

	Load		Speed		Acceleration		Sig	Starting Fuel Code in km/bar	Economy Rating in km/bar		Design Points	People Space (in Load)
	Start	Max	Start	Max	Start	Max			Start	Max		
FIXED-WING AIRCRAFT												
UAV, Small	0	80	20/40	20/120	15	50	6	200	1.25	3	20	
Ultralight	5	75	40/80	40/240	10	15	6	400	1.25	3	15	
HOVERCRAFT												
Skimmer, Both Sizes	10 x B	300 x B	90	180	5	20	7 - B	1,000	0.25	1	20 + (15 x B)	
ROTOR CRAFT												
UAV, Small	0	100	40	120	5	12	6	1,000	0.25	1	20	
SUBMARINE												
Sea Sled (all)	25 x B	100 x B	15	55 – (5 x B)	2	4	(10 – B)/(8 – B)	300 + (25 x B)0.4		2	12 + (4 x B)	
Minisub, Light	100	500	15	35	2	4	6/4	400	0.25	1	24	
SPECIAL VEHICLES												
Anthroform, Large	80	400	10	50	—	—	4	240	0.5	1	300	
Anthroform, Medium	25	125	10	40	—	—	6	200	0.5	1	180	
Mini-blimp	5	125	40	80	3	10	8	1,000	0.5	1	18	
Walker, Extra-Large	150	800	10	60	—	—	3	300	0.5	1	500	
Walker, Large	120	600	10	50	—	—	4	240	0.5	1	250	
Walker, Medium	30	150	10	40	—	—	6	200	0.5	1	150	
Walker, Small	5	35	2	15	—	—	7	150	0.5	1	100	
	Load		Speed		Acceleration		Sig	Starting Fuel Code	Economy Rating		Design Points	People Space (in Load)
	Start	Max	Start	Max	Start	Max			Start	Max		
NUCLEAR SHIPS												
Merchantman, Medium	800,000	3,000,000	25 (15)	50 (15)	3	5	4/3	—	—	—	100,000	+30,000
Merchantman, Heavy	3,000,000	30,000,000	20 (10)	25 (10)	2	4	3/2	—	—	—	400,000	+37,500
Freighter	50,000,000	250,000,000	15 (10)	20 (10)	1	2	2/2	—	—	—	1,000,000	+37,500
Cruiser	75,000	2,000,000	45 (20)	60 (30)	3	7	2/2	—	—	—	600,000	+1,125,000
Aircraft Carrier, Light	1,000,000	12,000,000	45 (20)	60 (30)	3	7	2/2	—	—	—	600,000	+5,925,000
Aircraft Carrier, Medium	2,000,000	30,000,000	45 (20)	60 (30)	2	6	1/2	—	—	—	800,000	+8,850,000
Aircraft Carrier, Heavy	2,500,000	50,000,000	45 (20)	60 (30)	2	5	1/2	—	—	—	1,500,000	+14,700,000
SUBMARINES												
Attack Submarine	750,000	4,000,000	40/35	60/40	3	5	7/7	—	—	—	250,000	+236,250
Boomer	1,000,000	16,000,000	25/20	40/30	2	4	8/8	—	—	—	360,000	+236,250
Commercial Sub, Heavy	25,000,000	40,000,000	15/5	45/30	1	3	5/4	—	—	—	140,000	+36,000
Commercial Sub, Medium	7,500,000	15,000,000	25/5	50/5	2	4	6/5	—	—	—	80,000	+30,000
SAIL BOATS												
Skiff	150	750	30	60	3	7	6	—	—	—	25	
Sport Cruiser	250	1,000	30	60	3	6	6	—	—	—	32	
Water Scooter	20	180	15	45	3	7	8	—	—	—	25	
Yacht	400	2,500	30	50	3	6	6	—	—	—	65	+1,500
SHIP												
Harbor Tug	1,000	5,000	30 (30)	50 (50)	1	3	3/2	—	—	—	2,000	
Merchantman, Light	25,000	150,000	25 (25)	40 (40)	2	5	3/2	—	—	—	20,000	+22,500
Trawler	5,000	50,000	25 (25)	40 (40)	2	6	3/2	—	—	—	8,000	

CHASSIS TABLE

VEHICLES

	Body	Start CF	Max CF	Handling	Armor	Autonav/ Pilot	Sensor/ Sonar	Seating	Entry Points	Design Points	Mark-Up Factor	Other Accessories & Features
BIKE												
All-Terrain Vehicle	2	2	15	4/4	0	0/—	0/—	2m	—	595	0.40	
Chopper	2	2	9	4/6	0	0/—	0/—	2m	—	108	0.30	
Off-Road	2	1	9	4/4	0	0/—	0/—	1m	—	338	0.25	
Racing Cycle	2	1	2	3/6	0	0/—	0/—	1m	—	180	0.30	
Scooter	2	0	2	3/6	0	0/—	0/—	1m	—	50	0.25	
BOATS												
Skiff	3	6	25	3	0	0/—	0/—	2	—	50	1.25	
Water Scooter	2	0	7	3	0	0/—	0/—	1	—	36	0.50	
Speedboat	3	0	30	4	0	0/—	0/—	1	1d	50	1.25	
Sport Cruiser	5	48	240	4	0	0/—	1/—	2	—	84	1.25	
Yacht	8	240	1,500	5	0	0/—	1/—	2	1d	160	1.25	+210 CF People Space, 10 High Amenities
CAR												
APC, Tracked	7	18	96	5/5	6	0/—	0/—	1	1d+1h+1x	800	1.00	
APC, Wheeled	6	18	96	4/6	6	0/—	0/—	1b	1d+1h+1x	750	1.00	
Caterpillar, Heavy	10	6	250	5/5	0	0/—	0/—	1	—	750	1.00	
Caterpillar, Light	5	6	30	4/4	0	0/—	0/—	1	—	300	1.00	
Caterpillar, Medium	8	3	18	4/4	0	0/—	0/—	1	—	500	1.00	
Caterpillar, Miniature	3	2	10	4/4	0	0/—	0/—	—	—	150	0.50	
Industrial Mover, Heavy	6	48	250	3/8	0	0/—	0/—	—	—	75	0.80	
Industrial Mover, Light	2	6	42	3/8	0	0/—	0/—	—	—	40	0.25	
Industrial Mover, Medium	4	18	52	3/8	0	0/—	0/—	—	—	55	0.40	
Limousine	4	6	250	4/8	0	0/—	0/—	4+2b	4d+1t	625	1.00	
RV	4	48	250	4/4	0	0/—	0/—	2	2d+1t	80	1.00	+162 CF People Space, 2 Basic Amenities
Sand Buggy	2	4	35	4/4	0	0/—	0/—	1b	—	40	0.40	
Sedan	3	6	30	4/8	0	0/—	0/—	4	2d+1t	50	1.00	
Sports Car	3	3	18	4/8	0	0/—	0/—	2	2d+1t	125	1.00	
SUV	4	18	54	4/6	0	0/—	0/—	2	2d+1t	70	1.00	
Subcompact	3	1	16	4/8	0	0/—	0/—	1	1d	30	1.00	
Tractor	5	6	52	5/12	0	2/—	0/—	2	2d	160	1.00	
Transport, Medium	5	80	400	5/12	0	0/—	0/—	2	2d+1x	160	1.00	
Transport, Heavy	6	120	800	5/12	0	0/—	0/—	2	2+1x	280	1.00	
Van	4	48	250	4/10	0	0/—	0/—	2	2d+1s+1g	60	1.00	
FIXED-WING AIRCRAFT												
Airliner	9	500	7500	6	0	3/—	1/—	2	5d	2,000	2.50	Standard L/T Profile
HSCT	10	360	800	6	0	4/—	3/—	124	6d+1s	20,000	2.50	Standard L/T Profile + 6 Partial Basic Amenities
Jet Fighter	7	6	64	6	0	3/—	5/—	1e	1d	2,000	2.50	Enviroseal (gas), Standard L/T Profile
Single Engine	4	21	63	5	0	1/—	1/—	2	2d	75	2.50	Standard L/T Profile
Twin Engine	6	48	600	5	0	1/—	1/—	2	2d	125	2.50	Standard L/T Profile
Ultralight	2	0	8	4	0	0/—	0/—	1	—	20	0.60	Standard L/T Profile
HOVERCRAFT												
Hovercraft, Light	3	6	24	3	0	0/—	0/—	2	2d+1t	50	2.00	
Hovercraft, Medium	4	60	240	4	0	0/—	0/—	2	2+1x	75	2.00	
Hovercraft, Heavy	5	100	480	5	0	0/—	0/—	2	2+1x	350	2.00	
ROTOR CRAFT												
Attack Helicopter	5	4	64	5	0	2/—	3/—	1	1d	1,000	2.50	VTOL L/T Profile
Autogyro	3	0	8	4	0	0/—	0/—	1	—	200	0.60	VTOL L/T Profile
Cargo Helicopter	7	80	600	5	0	1/—	1/—	2	2d+1r	1,000	2.50	VTOL L/T Profile
Utility Helicopter	4	50	75	5	0	1/—	1/—	2	2d+1s	500	2.50	VTOL L/T Profile
Tilt-wing, Heavy	7	72	640	6	0	1/—	1/—	2	2d+1s	1,200	2.50	VTOL L/T Profile
Tilt-wing, Medium	5	48	96	6	0	1/—	1/—	2	2d	600	2.50	VTOL L/T Profile
SHIPS												
Aircraft Carrier, Heavy	9H	2,500,000	3,000,000	5	6B	3/—	7/0	—	4L + 6s + 6d	3,000,000	7.0	+593,250 CF People Space, Flight Deck (325 meters, angled, w/cata-pult /arrestor cable) 4,600 Basic Amenities, 400 Improved Amenities

VEHICLE CHASSIS TABLE

NOVATECH

	Body	Start CF	Max CF	Handling	Armor	Autonav/ Pilot	Sensor/ Sonar	Seating	Entry Points	Design Points	Mark-Up Factor	Other Accessories & Features
Aircraft Carrier, Light	6H	800,000	1,250,000	5	4B	3/—	6/0	—	1L + 4s + 4d	500,000	5.0	+242,250 CF People Space, Flight Deck (100 meters), 1,900 Basic Amenities, 100 Improved Amenities
Aircraft Carrier, Medium	7H	1,000,000	1,750,000	5	6B	3/—	7/0	—	2L + 6s + 6d	1,500,000	6.0	+359,250 CF People Space, Flight Deck (150 meters, angled), 2,800 Basic Amenities, 200 Improved Amenities
Corvette	3H	375	1,000	3	0B	3/—	3/4	—	10d	50,000	1.50	+3,600 CF People Space, 35 Basic Amenities
Cruiser	6H	2,000	20,000	4	4B	3/—	4/3	—	12d	500,000	6.0	+47,250 CF People Space, 500 Basic Amenities
Destroyer	5H	1,700	11,000	4	4B	3/—	4/3	—	12d	200,000	6.0	+36,000 CF People Space, 375 Basic Amenities
Freighter	10H	750,000	10,000,000	5	0B	3/—	1/1	—	16d	1,200,000	1.50	+3,000 CF People Space, 25 Basic Amenities
Frigate	4H	1,700	10,200	4	3B	3/—	4/4	—	12d	100,000	5.0	+29,250 CF People Space, 300 Basic Amenities
Harbor Tug	1H	200	500	3	0B	2/—	0/0	6	2d + 1h	2,500	1.50	
Merchantman, Heavy	7H	250,000	625,000	5	0B	3/—	1/1	—	4d + 2h	300,000	2.0	+3,000 CF People Space, 25 Basic Amenities
Merchantman, Light	3H	2,400	32,000	4	0B	2/—	1/0	—	4d	30,000	1.50	+2,400 CF People Space, 15 Basic Amenities
Merchantman, Medium	5H	36,000	108,000	4	0B	3/—	1/0	—	4d	80,000	2.0	+2,700 CF People Space, 20 Basic Amenities
Patrol Craft	2H	125	500	3	0B	2/—	3/3	—	4d	20,000	1.50	+2,700 CF People Space, 20 Basic Amenities
Trawler	2H	400	1000	4	0B	2/—	0/0	15	4d	10,000	1.50	
VECTORED-THRUST AIRCRAFT												
Thunderbird	6	16	96	3	0	2/—	3/—	2e	1h+1s+1r	3,200	2.50	Enviroseal (gas), VSTOL T/L Profile
Jump Jet Fighter	7	6	64	5	0	3/—	5/—	1e	1c	24,000	2.50	Enviroseal (gas), VTOL T/L Profile
SPECIAL VEHICLES												
Barge	3H	2,000	4,000	—	0	—/—	0/0		1d or Open	1,000	1.00	Load: 1,000,000 kg (Max: 10,000,000 kg)
Locomotive, Bullet	9	4	200	5	0	2/—	1/—	2	2d	4,000	1.00	GridLink (Electric locomotives only)
Locomotive, Bulk	10	4	200	5	0	0/—	0/—	1	2d	3,600	1.00	
Locomotive, Express	8	4	200	4	0	0/—	0/—	1	2d	2,500	1.00	GridLink (Electric locomotives only)
Locomotive, Non-rail	8	10	80	3/6	0	4/—	0/—	1	2d	1,500	1.50	
Locomotive, Streetcar	6	160	240	4	0	0/—	0/—	1 + 10b	2d	1,500	1.00	GridLink (Electric locomotives only), all CF is for People Space
Locomotive, Switcher	8	10	80	4	0	0/—	0/—	1	2d	1,500	1.00	
Rail Car, Freight	8	800	2,000	—	0	—	0	—	1g	600	1.00	Load 80,000 kg (Max: 120,000 kg), SIG = 10-B
Rail Car, Long Passenger	8	960	1,200	—	0	—	0		4d	500	1.00	Load 24,000 kg (Max: 30,000 kg), SIG = 10-B
Rail Car, Short Passenger	6	480	800	—	0	—	0		4d	400	1.00	Load 12,000 kg (Max: 20,000 kg), SIG = 10-B
Semiballistic	2H	250	500	6	1B	4/4	0/—	126	6d+1s	500,000	1.00	Special L/T Profile, Rigger Adaptation, 8 Partial Basic Amenities
Suborbital	1H	300	750	6	2B	4/4	0/—	126	6d + 1s	100,000	2.00	Standard L/T Profile, Rigger Adaptation, 8 Partial Basic Amenities
Trailer, Heavy Axle	3	12	400	—	0	—/—	0/—	—	1d or Open	75	0.75	Load: 800 kg (Max: 1,600 kg), SIG = 10-B
Trailer, Light Axle	2	4	320	—	0	—/—	0/—	—	1d or Open	60	0.25	Load 150 kg (Max: 400 kg), SIG = 10-B
Trailer, 20-foot	5	400	600	—	0	—/—	0/—	—	1d or Open	100	1.00	Load: 2,000 kg (Max: 6,000 kg), SIG = 10-B
Trailer, 40-foot	6	800	1,000	—	0	—/—	0/—	—	1d or Open	150	1.00	Load: 6,000 kg (Max: 10,000 kg), SIG = 10-B
Trailer, 53-foot	7	1,200	1,600	—	0	—/—	0/—	—	1d or Open	160	1.00	Load: 10,000 kg (Max: 25,000 kg), SIG = 10-B
Zeppelin	8	48	150	5	0	1/—	1/—	2	2d	1,200	1.00	VSTOL T/L Profile



DRONES

All drones include a radio-controlled interface and rigger adaptation as part of their chassis for free.

	Body	Start CF	Max CF	Handling	Armor	Autonav/ Pilot	Sensor/ Sonar	Seating	Entry Points	Design Points	Mark-Up Factor	Other Accessories & Features
CAR												
Crawler, Micro	0	0.6	0	4/4	0	—/1	1/—	—	—	200	0.25	
Crawler, Medium												
Tracked	2	2	12	4/4	0	—/1	1/—	—	—	120	0.25	
Crawler, Medium												
Wheeled	2	2	12	4/6	0	—/1	1/—	—	—	120	0.25	
Crawler, Small												
(Tracked & Wheeled)	1	0	6	4/4	0	—/1	—/1	—	—	35	0.25	
FIXED-WING AIRCRAFT												
UAV, Large	3	2	25	4	0	—/1	2/—	—	—	2,210	0.25	Standard L/T Profile, Setup Time (10 min.)
UAV, Medium	2	1	12	4	0	—/1	1/—	—	—	1,200	0.25	Standard L/T Profile, Setup Time (5 min.)
UAV, Small	1	0	1	3	0	—/1	1/—	—	—	600	0.25	Standard L/T Profile, Setup Time (3 min.)
HOVERCRAFT												
Skimmer, Medium	2	1	10	3	0	—/1	1/—	—	—	150	1.00	
Skimmer, Small	1	0	5	3	0	—/1	1/—	—	—	50	1.00	
ROTOR CRAFT												
Tilt-wing UAV, Medium	2	1	12	4	0	—/1	1/—	—	—	1,460	0.25	VTOL L/T Profile
Tilt-wing UAV, Large	3	2	25	4	0	—/1	1/—	—	—	2,210	0.25	VTOL L/T Profile
UAV, Medium	2	1	12	4	0	—/1	1/—	—	—	240	0.25	VTOL L/T Profile
UAV, Micro	0	0	0	4	0	—/1	1/—	—	—	90	0.25	VTOL L/T Profile
UAV, Small	1	0	1	4	0	—/1	1/—	—	—	110	0.25	VTOL L/T Profile
VECTORED-THRUST AIRCRAFT												
UAV, Medium	2	1	20	4	0	—/1	1/—	—	—	70	0.60	VTOL L/T Profile
UAV, Large	3	2	25	4	0	—/1	1/—	—	—	160	0.60	VTOL L/T Profile
SPECIAL VEHICLES												
Anthroform, Medium	2	0	1.6	3	0	—/1	1/—	—	—	400	0.40	Mechanical Arms (2, STR 6)
Anthroform, Large	3	1	10	4	0	—/1	1/—	—	—	900	0.40	Mechanical Arms (2, STR 9)
Mini-blimp	2	1	8	4	0	—/1	1/—	—	—	45	0.50	VTOL L/T Profile
Walker, Extra-Large	4	8	36	4/4	0	—/1	0/—	—	—	900	1.00	
Walker, Large	3	4	16	4/4	0	—/1	0/—	—	—	425	1.00	
Walker, Medium	2	1	10	4/4	0	—/1	1/—	—	—	240	0.25	
Walker, Micro	0	0	0.4	4/4	0	—/1	1/—	—	—	215	0.25	
Walker, Small	1	0	4	4/4	0	—/1	1/—	—	—	165	0.25	

SUBMARINE LIST

	Body	Start CF	Max CF	Handling	Armor	Autonav/ Pilot	Sensor/ Sonar	Start/Max Depth	Seating	Entry Points	Design Points	Mark-Up Factor	Other Accessories & Features
Attack Submarine	5H	600	7,500	4	6B	3/—	5/6	400/800	—	2h	250,000	6.00	EnviroSeal (water & engine), Oxygen Generator, Torpedo Tubes (4), Heavy Launch Control Systems (4), +11,700 People Space, 105 Basic Amenities
Bathyscaph	5H	48	120	4	6B	3/—	0/3	8,500/12,000	10	1h	75,000	2.00	EnviroSeal (water & engine), Oxygen Generator
Boomer	6H	7,500	15,000	5	6B	3/—	6/7	400/1,000	—	2h	640,000	2.00	EnviroSeal (water & engine), Oxygen generator, Torpedo tubes (4), Heavy Launch Control Systems (4) +11,700 People Space, 105 Basic



	Body	Start CF	Max CF	Handling	Armor	Autonav/ Pilot	Sensor/ Sonar	Start/Max Depth	Seating	Entry Points	Design Points	Mark-Up Factor	Amenities Other Accessories & Features
Commercial Sub, Heavy	7H	200,000	320,000	5	3B	3/—	0/1	1,500/3,600	—	3h	150,000	2.00	EnviroSeal (water & engine), Oxygen Generator, +2,940 CF people space, 24 Basic Amenities
Commercial Sub Light	3H	6,400	16,000	3	1B	3/—	0/1	150/1,600	—	2h	15,000	2.00	EnviroSeal (water & engine), Oxygen Generator, +2,460 CF People Space, 16 Basic Amenities
Commercial Sub, Medium	5H	40,000	100,000	4	1B	3/—	0/1	1,000/2,400	—	2h	50,000	2.00	EnviroSeal (water & engine), Oxygen Generator, +2,700 CF People Space, 20 Basic Amenities
Minisub, Heavy	9	5	300	4	4	3/—	1/1	500/3,500	3	1h	1,280	2.00	EnviroSeal (water & engine), Life Support (20 man-hours)
Minisub, Light	4	0	25	3	0	1/—	0/0	50/300	1	1h	65	2.00	EnviroSeal (water & engine), Life Support (10 man-hours)
Minisub, Medium	6	3	200	4	2	2/—	1/1	150/1,000	2	1h	420	2.00	EnviroSeal (water & engine), Life Support (10 man-hours)
Patrol Submarine	4H	400	5,000	3	6B	3/—	2/4	300/600	—	2h	72,000	2.00	EnviroSeal (water & engine), Oxygen Generator, Torpedo Tubes (4), Heavy Launch Control Systems (4), +6,600 People Space, 85 Basic Amenities

SUBMARINE DRONES LIST

All drones include a radio-controlled interface and rigger adaptation as part of their chassis.

Sea Sled, Large	3	0	15	3	0	—/1	1/1	1,000/6,400	2m	—	40	1.50
Sea Sled, Medium	2	0	6	3	0	—/1	1/1	500/3,200	2m	—	25	1.25
Sea Sled, Small	1	0	2	2	0	—/1	1/1	150/1,600	1m	—	10	1.00



VEHICLE RECORD SHEET

VEHICLE

Name: _____ Model: _____ Type: _____

Control System Manual: Y N Datajack Port: Y N Rigger Adaption: Y N Remote Control: Y N

VEHICLE STATS

Handling: _____	Sonar Signature: _____	Seating: _____	Landing/Takeoff: _____
Speed: _____	Autonav: _____	Entry Points: _____	Accommodation: _____
Max. Speed: _____	Pilot: _____	Fuel: _____	Cavitation Threshold: _____
Acceleration: _____	Adaption Pool: _____	Economy: _____	Depth Rating: _____
Body/Hull: _____	IVIS Pool: _____	Cargo: _____	Stress: _____
Armor/Bulwark: _____	Firmpoints: _____	Load: _____	Total Cost: _____
Signature: _____	Hardpoints: _____	Setup/Breakdown: _____	

Maintenance Cost $([Total\ Cost \div 100] + [Stress \times 10])$: _____

Optempo Cost $(Maintenance\ Cost \div 100,000)$: _____

ELECTRONICS

	Rating	Flux Rating	Modified Flux	Max Flux
Sensors:	_____	_____	_____	_____
Sonar:	_____	_____	_____	_____
ECM:	_____	_____	_____	_____
ECCM:	_____	_____	_____	_____
ED:	_____	_____	_____	_____
ECD:	_____	_____	_____	_____

VEHICLE MODIFICATIONS/NOTES

VEHICLE CONDITION MONITOR

Light Damage	Moderate Damage	Serious Damage	Destroyed
+1TN # -1 Init.	+2TN # -2 Init.	+3TN # -3 Init.	Crash Test
NA	25%	50%	

Speed Rating Reduction

VEHICLE WEAPONS

Weapon Type	Mode	Ammo	Short/Medium/Long/Extreme	Damage	Handling
1. _____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____

Speed	Range	Body	Intelligence	Signature	Blast	Scatter
1. _____	_____	_____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____	_____



REMOTE CONTROL RECORD SHEET

SIGNAL CONDITION MONITOR

Command Channel	Simsense Channel	System Channel
Channel Disengaged		
Serious Degradation	+3TN #	+3TN #
Moderate Degradation	+2 TN #	+2 TN #
Light Degradation	+1TN #	+1TN #

REMOTE CONTROL DECK

Max Flux: _____ Decryption Module: _____
Current Modified Flux: _____ Protocol Emulation Module: _____
ECCM: _____ Rating: _____
Encryption Module: _____ Flux: _____
IVIS Master Unit: Y N FDDM Master Unit: Y N

FLUX RANGES

0	250M	6	12km
1	1km	7	16km
2	2km	8	20km
3	4km	9	25km
4	6km	10+	(2 x flux)
5	9km		+10km

SUBSCRIBED DRONES

Current: _____
Maximum Active (Rating): _____
Maximum Subscribed (Rating x 2): _____

Drone	Type	Pilot	Handling	Body	Armor	Signature	Adapt. Pool	Ivis Pool	Affiliated?(√)
1.									
2.									
3.									
4.									
5.									

Drone Weapons, Autosofts and Accessories

1.	
2.	
3.	
4.	
5.	

Drone Standing Orders

1.	
2.	
3.	
4.	
5.	

REMOTE NETWORK NOTES

DRONE WEAPONS

Weapon Type	Mode	Ammo	Short/Medium/Long/Extreme	Damage	Blast	Scatter
1.						
2.						
3.						
4.						
5.						

PLANES, DRONES and AUTOMOBILES

Living is rigging, omae. Like burning rubber down the highway at 150 klicks an hour with only your brain to guide you. What about making a drone an extension of yourself, or undermining the security of a whole building, manipulating every camera, motion detector or security door. But the biggest kick is blowing up a car full of goons without even jacking out—weapons of destruction at your mental command ... now that's road rage, my friend.

***Rigger 3** expands upon the basic rigging and drone rules provided in **Shadowrun, Third Edition** and offers advanced rules for robots, ships, security riggers and electronic warfare. **Rigger 3** also offers expanded vehicle listings and rules for vehicle design, construction and modification for any character.*

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9 781555 604028
ISBN# 1-55560-402-1 \$22.00