GURPS

Mecha

Mighty Battlesuits and Anime Fighting Machines

By David Pulver

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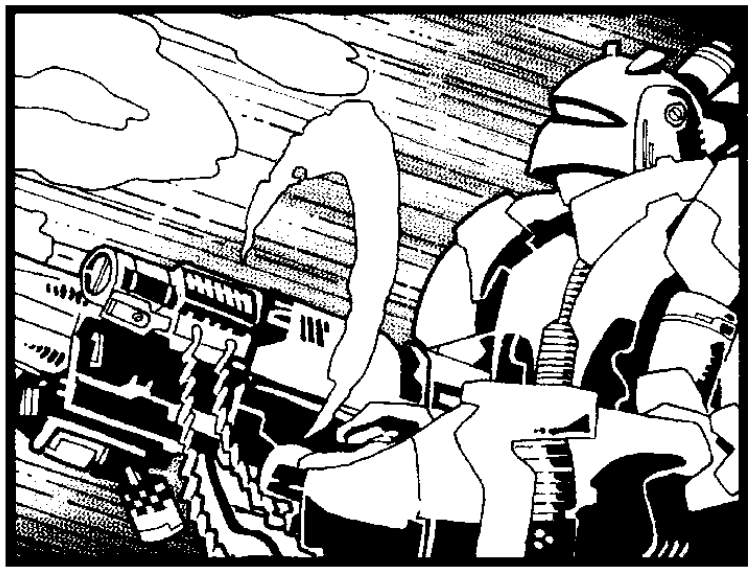

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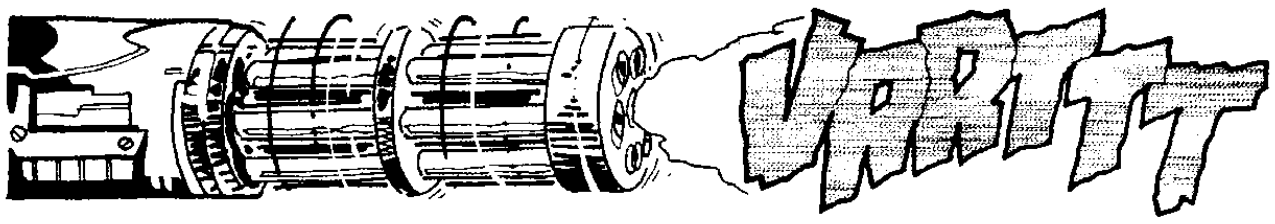


INTRODUCTION

About *GURPS*

Steve Jackson Games is committed to full support of the GURPS system. Our address is SJ Games, Box 18957, Austin, TX 78760. Please include a self-addressed, stamped envelope (SASE) any time you write us! Resources now available include:

Pyramid (www.sjgames.com/pyramid). Our online magazine includes new rules and articles for GURPS. It also covers the hobby's top games – ***AD&D, Traveller, World of Darkness, Call of Cthulhu, Shadowrun,*** and many more – and other SJ Games releases like ***In Nomine, INWO, Car Wars, Toon, Ogre Miniatures,*** and more. And Pyramid subscribers also have access to playtest files online, to see (and comment on) new books before they're released.

New supplements and adventures. ***GURPS*** continues to grow, and we'll be happy to let you know what's new. A current catalog is available for an SASE. Or check out our Web site (below).

Errata. Everyone makes mistakes, including us – but we do our best to fix our errors. Up-to-date errata sheets for all ***GURPS*** releases, including this book, are always available from SJ Games; be sure to include an SASE with your request. Or download them from the Web – see below.

Q&A. We do our best to answer any game question accompanied by an SASE.

Gamer input. We value your comments. We will consider them, not only for new products, but also when we update this book on later printings!

Internet. Visit us on the World Wide Web at **www.sjgames.com** for an online catalog, errata, and updates, and hundreds of pages of information. We also have conferences on Compuserve and AOL. ***GURPS*** has its own Usenet group, too: rec.games.frp.gurps.

GURPSnet. Much of the online discussion of ***GURPS*** happens on this e-mail list. To join, send mail to majordomo@io.com with "subscribe GURPSnet-L" in the body, or point your World Wide Web browser to: **http://www.io.com/~ftp/GURPSnet/www**.

The ***GURPS Mecha*** web page is at: www.sjgames.com/gurps/books/mecha.

Page References

Rules and statistics in this book are specifically for the ***GURPS Basic Set,*** Third Edition, Revised. Any page reference that begins with a B refers to the ***GURPS Basic Set*** – e.g., p. B102 means p. 102 of the ***GURPS Basic Set.*** A reference that begins with CI refers to ***GURPS Compendium I,*** CII refers to ***GURPS Compendium II,*** UT refers to ***GURPS Ultra-Tech,*** Second Edition, Revised and VE refers to ***GURPS Vehicles,*** Second Edition.

Mecha is the Japanese term for the mechanical devices that appear in their animated cartoons (or *anime*), from giant spaceships to robot cats. But in the West, the word "mecha" is identified with the most unique of these machines: giant piloted robots and battlesuits.

GURPS Mecha is a book about that kind of mecha and the people who use them – spit-and-polish space marines making planetary assaults, grim mercenaries fighting for money and honor, daredevil Space Force pilots in transformable mecha fighters, beautiful alien mecha-warriors come to defend Earth from invading monsters or brilliant engineers donning their own inventions to fight crime and evil as battlesuited superheroes.

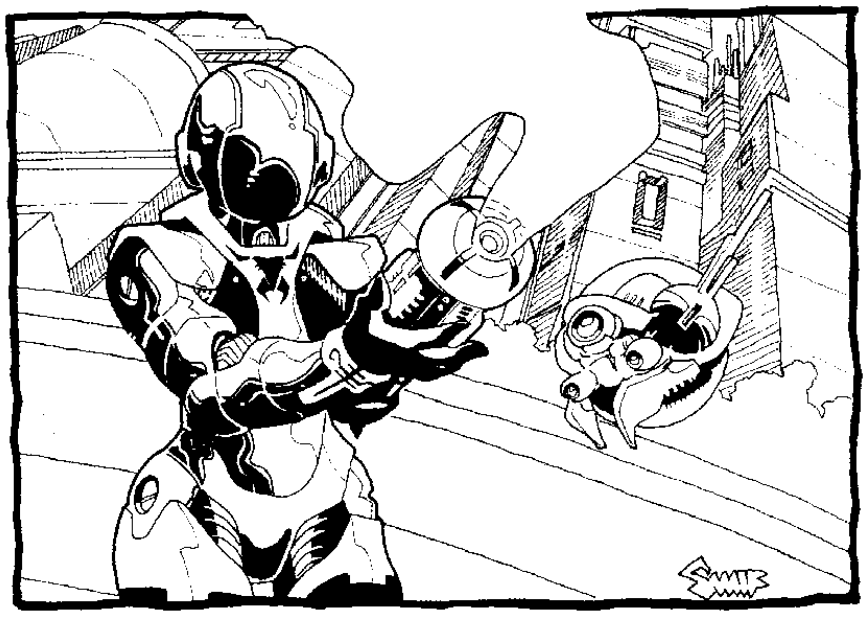
In these pages you'll find guidelines on running a mecha campaign inspired by Japanese anime or by western science fiction and comics, as well as material on building battlesuits and mecha for existing ***Supers, Space,*** and ***Cyberpunk*** campaigns. The mecha rules are based on ***GURPS Vehicles*** and ***Robots,*** but use a streamlined design sequence and add many new options to cover exotica like transformable mecha, superscience and powerful hand-to-hand weapons. There are also special cinematic combat rules designed to capture the flavor of the mecha genre.

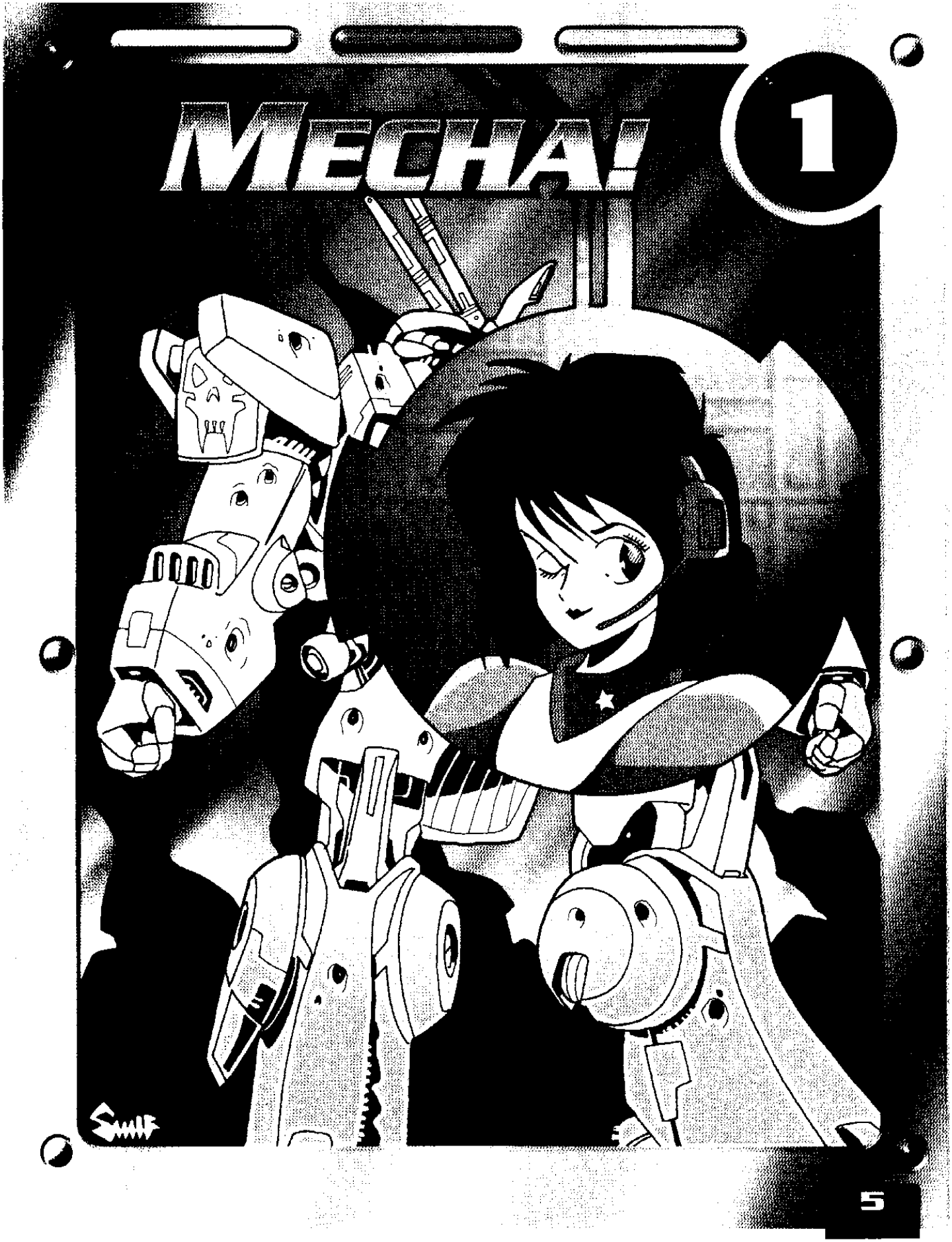
Finally, we've included a ready-to-use mecha campaign, *Cybermech Damocles,* in which a secret agency battles alien intruders.

So climb into the cockpit, check the head-up display, and power up the fusion reactor . . . and enter the world of ***GURPS Mecha!***

About the Author

David L. Pulver is a freelance game designer and writer. He's enjoyed stories about mecha ever since he read *Starship Troopers* in junior high school (was that really 17 years ago?) and is an avid fan of Japanese animation and manga. His first book was ***GURPS Ultra-Tech*** in 1989 – since then, he has written or co-authored some 20 roleplaying game supplements.




MECHA!
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Glossary

The mecha genre has developed its own language, including many terms originally derived from the Japanese usage.

AFV – Militarese for "armored fighting vehicle." The most important types are tanks (often "main battle tank," or MBT) and armored personnel carriers (APCs) that carry infantry.

Anime – This is the Japanese name for animated cartoons. Anime ranges from romance stories to giant robots to supernatural horror. In the last few years, English-subtitled and English-dubbed versions of anime have become widely available.

Battlesuit – A suit of powered armor; a mecha the size of a man.

ECM – Electronic countermeasures; jamming and stealth systems.

Japanimation – An older American term for anime.

Kawaii – Japanese for "cute." A favorite comment of invading ultra-tech aliens when they see Earth military hardware.

Manga – Japanese comics. Many manga are made into anime.

Mecha (*GURPS* Usage) – An anthropomorphic tank, or generally, any armored vehicle with legs.

Mecha (Japanese usage) – Any machine that appears in animation. Hardcore otaku insist this is the only proper usage.

Otaku – A Japanese pejorative meaning "seriously obsessed fan."

Transformable Mecha – A mecha that can alter its physical shape, usually from a humanoid shape to something else, like a fighter plane or motorcycle.

"Planet Gehenna," General Cobalt said grimly. "So that's where the Styx are holding our POWs."

"I'm afraid so, sir." Wing Commander Sirocco replied. "Slave labor in the thorium mines, without radiation suits."

The General frowned. "I want them out as much as you do, Commander, but you know how thin we're stretched. I can't spare much. One company, two at the most. A single corvette."

"An armored company and one corvette's all I need," Sirocco said. She activated a holographic map display. "These recon images are two days old. We codenamed the camp Stalag 13. It's in the mountains we call the Hellrakers."

The General studied the pictures, shaking his head. "Wing Commander, are you crazy? This is a fortress – laser and missile batteries, and two troops of Styx warriors. A single company? The air defense alone will murder you!"

"Right, sir." Her finger stabbed a point on the display, 200 miles east of the camp. "Instead, we'll land here, beyond their defense perimeter. We approach overland . . ."

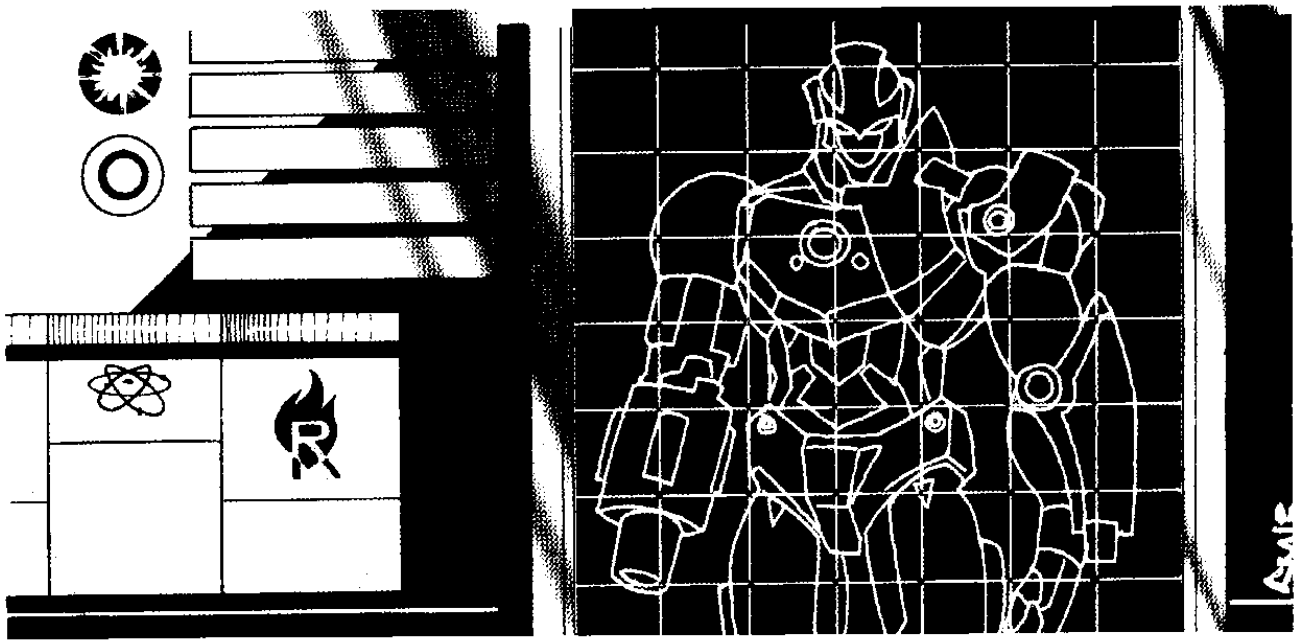
"Overland?" The General interrupted. "There's no way you'll get tanks through those mountains. And infantry or choppers alone won't stand a chance."

"So we won't use them." The holographic map was replaced by another image. It was a mechanical giant, a six-meter-tall knight in laminated armor, its body bristling with weapons.

"Mecha," the general said. "I'll be damned."

"The Seraph Delta," Sirocco corrected. "The Sixth Armored has just finished training with them. Moving on legs and jump jets, they can cross the mountains, storm that base and hold the space port long enough for a retrieval boat to arrive. A dozen Seraphs should handle a troop of Styx war-beetles." She paused, then added "Sir, I'd like to call it Operation Ardennes. During World War II on old Earth, the French left a sector lightly defended, because they didn't realize German tanks could cross heavy forest. The panzers punched through. And – "

"The local Styx commandant just made the same mistake," General Cobalt finished. For once, he was smiling. "Good hunting, Wing Commander. Bring our people home."



WHY MECHA?

A mecha combines the speed, armor and firepower of a tank with the all-terrain mobility of the infantryman. Its arms make it a useful combat engineering vehicle, while mecha with thrusters can even serve as space fighters or combat aircraft. As General Cobalt learned, the versatility of mecha gives a commander more options, making it easier to outmaneuver the enemy! Mecha are especially valuable for spacefaring military forces, since a walking machine can operate in almost any type of strange terrain that might be found on an alien world.

Even so, there are dozens of reasons why no sane military would approve a multi-purpose fighting vehicle that resembled a giant humanoid! Small battlesuits can be justified as extensions of personal body armor, but the criticisms of larger mecha are legion. An upright vehicle is a big target. The shape of a mecha is harder to armor than a simple turreted box like a tank. The control systems for walking would be difficult to build, expensive and hard to master. While specialized vehicles may not do everything a mecha does, they are cheaper and more effective.

But who cares?

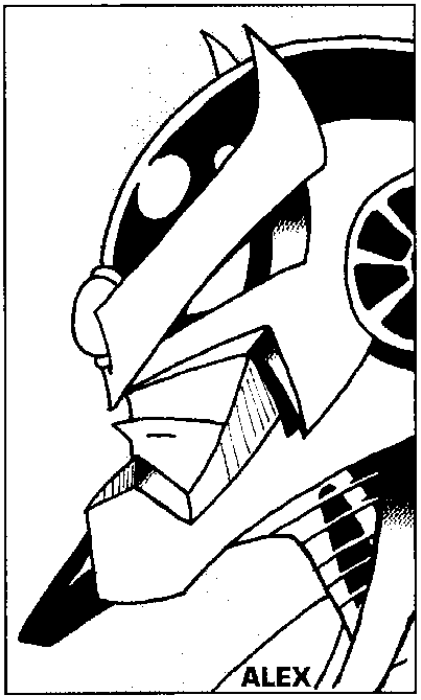
The number one reason why mecha exist in science fiction and comics is that they *look cool.* A giant semi-humanoid war machine is just so much more awe-inspiring than an ordinary tank or spaceship. In a cinematic campaign, that's reason enough!

Still, there's another reason besides aesthetic appeal that makes mecha a good focus for roleplaying adventures. More than most military vehicles, mecha are intensely *personal.* In a science fiction game featuring super tanks or spaceships, the vehicle crew must form a team. Inevitably, someone's PC gets stuck manning the engines or communicator while the rest of the players have fun piloting the ship and shooting things. Not so in a mecha. It's normally operated by a single pilot, so each PC can have his own vehicle, and every player can get right into the action.

In fact, a mecha really shouldn't be thought of as a tank, but as a *horse.* It's the ultra-tech equivalent of a cowboy's mount or a knight's trusty steed. Like the horse, a mecha's legged mobility allows it to go almost anywhere a person can go and then some: walk into town, swim underwater or – with thrusters – even fly into space. At the same time, the arms and legs of a mecha keep the action at a very personal level. A mecha in a fight can dive for cover, punch or disarm his foe, even grab a fallen friend and carry him to safety. A fight involving mecha is really one of *human* action rather than vehicle combat, but on a grander, gargantuan scale.

THE MECHA GENRE: A HISTORICAL OVERVIEW

Is there a "mecha genre?" Well, sort of. Its history really began in 1959, when Robert A. Heinlein published the science fiction novel *Starship Troopers.* His Mobile Infantry were space marines whose gorilla-sized suits of jet-equipped powered armor boosted their strength and mobility. Heinlein made his suits so believable that almost all later battlesuit designs have been based on the principles he set out. His novel tells the story of a naive teenager growing up in the military, and of the political system that sent him into battle; but the concept of powered battlesuits proved so popular that numerous other authors (and SF game designers) have created works featuring battlesuit troopers.



Campaign Settings

There are many possible settings for a mecha campaign. Some of the ones that work best are suggested below:

The Solar System: It's sometime in the next century or two, and Earth has colonies or bases on the moon, Mars and maybe the asteroids, other planets or in space, but interstellar space has yet to be conquered. Characters may travel a lot, or the adventures may be focused on a single planet or space station. The usual tech level is TL8 to TL9. The solar system is a favorite setting for an interplanetary war between rival human factions, or for an alien invasion. GMs may wish to adapt information from ***GURPS Terradyne*** for this setting.

Future Earth: Usually at TL8 to TL9, but focusing on Earth alone rather than interplanetary space. This may be a "cyberpunk" background (like ***GURPS Cyberworld***), but doesn't have to be. Perhaps a benevolent world government exists, the planet is torn by a global war or nothing much has changed except for mecha being available! The ***Ogre Miniatures*** book describes a useful setting for a future war that features battlesuits.

Interstellar: The campaign takes place in a background where rapid interstellar travel is possible. The background is usually at least TL10, and the campaign can span many worlds or may focus on a single one in detail. ***GURPS Space Atlas IV*** features an interstellar background in which the military forces use battlesuits and mecha.

Continued on next page . . .

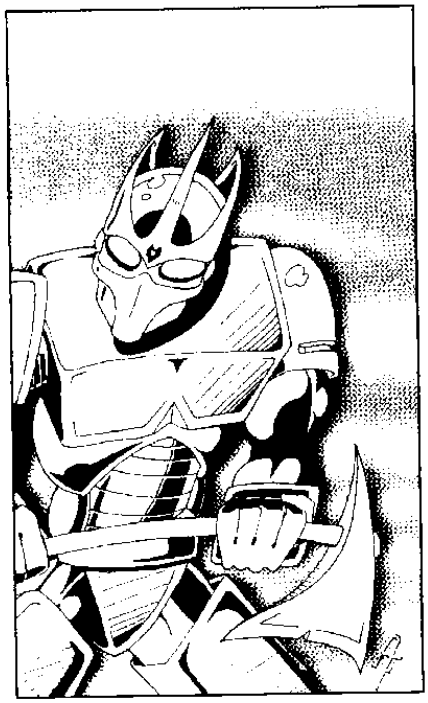
Campaign Settings (Continued)

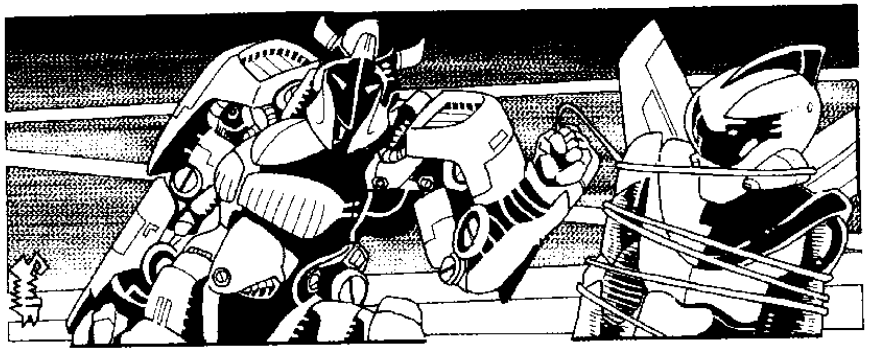
Post-Holocaust: The characters are survivors of an "end of the world" that didn't quite take. The setting may be the anarchy a few years after the devastation, or the new societies that evolve centuries later. The post-holocaust background is good if the GM wants to mix surviving ultra-tech artifacts like mecha with an overall lower-TL background. ***GURPS Reign of Steel*** features battlesuits and robots in a post-holocaust setting.

Present Day: An alternative to an ultra-tech future is to set the campaign on contemporary Earth or in the very near future. This is obviously easier on the GM. As mecha can't be built at TL7, all mecha will be secret experimental models, artifacts or the offspring of hybrid alien technology.

The Past: Time travelers may be equipped with mecha. It's not sporting to hunt dinosaurs or fight samurai in a battlesuit, but it is safe – unless your suit breaks or you run out of power!

Alternate Worlds: A mecha campaign can be set in another dimension, perhaps one where magic works. With a lot of research, the GM can set up an "alternate timeline" in which mecha are invented in an early era, such as the Victorian age or World War II, often with a nudge from visiting aliens or cinematic mad scientists. ***GURPS IST*** has battlesuits as early as the Vietnam War, as well as UN power armor troopers and battlesuited superheroes. Examples of pulp-era and WWII mecha are the *Kishin Corps* anime and Ben Dunn's comic *Valhalla*.





Super Battlesuits

Powered armor was also a natural for superhero comics, as it enabled an ordinary person to gain amazing powers through technology. One of the first battlesuited heroes was Marvel Comics' *Iron Man* (1962), in which millionaire CEO Tony Stark donned his invention to protect his company's interests and fight evil. Villains also used powered armor. Since the 1960s, the trend has been towards lighter and more form-fitting battlesuits.

Giant Super-Robots

On the other side of the Pacific, giant robot characters were appearing in Japanese comics. In 1969, creator Go Nagai came up with a radical twist on the usual story. He put a human pilot *inside* his giant robot and created a new type of machine: Mazinger Z, an anthropomorphic fighting machine that could be driven around just like a tank. Like earlier robots, Mazinger Z fought crime and monsters, but the human drama and story potential were heightened by having a flesh-and-blood person – the teenage son of the robot's inventor – riding in the cockpit. Mazinger Z was soon joined by other mecha and their pilots, and they foiled the plots of the villainous mastermind and *his* mecha, week after week. Kids loved it, and so did toy companies.

Mazinger Z ushered in a wave of "drivable giant robot" anime and live-action shows based on the same "super mecha" formula. To sell more toys, successor machines gained the ability to split up into several smaller mecha, or transform into different shapes. The anime and models were exported and imitated worldwide, inaugurating a "transforming robot craze" in America in the late 1970s. However, the shows were little more than toy commercials, and no one knew this better than their makers.

Mobile Suits

A few Japanese creators believed the "giant robot show" had more potential. The first to prove this was director Yoshiyuki Tomino, who created the series *Mobile Suit Gundam* (1979), making it a synthesis of the Japanese super-robot and the Western powered-armor tradition. Drawing inspiration from Heinlein's Mobile Infantry, *Gundam's* "mobile suits" were tank-sized versions of battlesuits, heavily armed with Gatling guns, missile launchers and particle beams. For the first time, huge, drivable mecha were treated as mass-produced weapon systems rather than unique super-inventions. Gundam's background featured rival human governments fighting for control of L-5 space colonies in our own solar system. The emphasis was on human drama (sometimes military soap opera). At times, the show was decidedly anti-heroic: the main protagonist, the angst-ridden teenage pilot Amuro Ray, not only failed to get the girl, he accidentally killed her. The show's most popular character was his arch-foe, the charismatic enemy ace Char Aznable.

Gundam's success spawned a host of sequels, parodies and imitators, ranging in tone from hard-edged realism to total silliness. Perhaps the most popular was *Macross*, whose precisely-engineered mecha designs turned the transformer concept into something almost plausible. Dubbed into English as *Robotech*, its combination of mecha war story and soap opera whetted many Western fans' appetite for anime. It also helped create an American domestic mecha industry centered around anime-based translations, novelizations, comics and roleplaying games, as well as original works like FASA's *Battletech* universe.

Cross-Genre Mecha

While the super suit and war story remain popular, creators in Japan (and to a growing extent, the West) continue to play with the concept of humanoid fighting machines. Over the last few years, a popular variation has been to mix mecha with other genres, producing cyberpunk mecha series like *Appleseed* and *Bubblegum Crisis*, Cthulhoid horror (*Iczer One*), police drama (*Mobile Police Patlabor*) and even epic fantasy (*Magical Knight Rayearth*). At the same time, the Heinlein-Tomino tradition of the mecha-as-war machine remains compelling, as demonstrated by recent works like William Keith's *Warstrider* novels or *Macross Plus*.

MECHA CAMPAIGNS

A mecha is simply a futuristic type of vehicle, like a spacesuit or a starship; it can be a prop in almost any kind of story! You can use this book in the same way, creating mecha and battlesuits for whatever campaign you need them, or you can create a campaign that is focused on the adventures of a group of mecha- or battlesuit-equipped characters.

Campaign Style

The first thing the GM should do is to decide whether a mecha campaign will be realistic or cinematic in tone . . . or if it will throw reality to the winds and go for a completely "over the top" feel.

Realistic Campaigns

Mecha themselves may be somewhat "unrealistic," but this style of campaign allows that one bit of whimsy and concentrates on making the rest of the action as plausible as possible.

Realistic mecha campaigns tend to center around the activities of organizations such as the military or police, as private individuals are unlikely to have such advanced weapons. Moreover, the characters tend to be equipped with mass-produced mecha rather than individualized, one-of-a-kind prototypes.

Combat, Close and Personal

A common element of the mecha genre is that most combats occur at fairly close range, for either situational or technological reasons. This helps put tank-sized or smaller vehicles like most mecha on an even footing with big spaceships, and allows for a more personal and gameable style of warfare. Here are some possible reasons for this:

Terrain: In cities, forest or other congested terrain, or within a spaceship or the tunnels of an alien hive, most battles will be close range anyway!

Good ECM: Sensor technology has fallen behind jamming systems. To some extent, this assumption is reflected in these rules. To reinforce it, the GM should ensure most mecha are designed with stealth and cloaking systems.

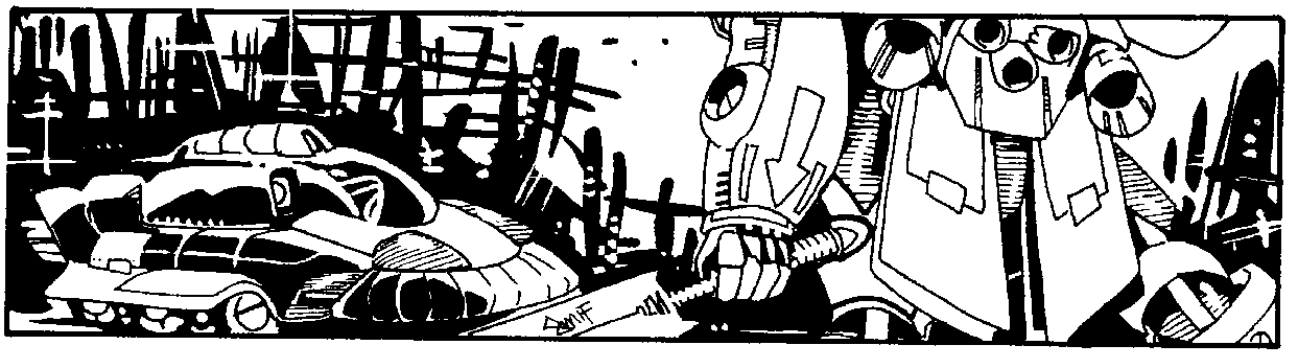
Super ECM: The GM can carry this farther, and postulate super electronic jammers or clouds of sensor-jamming particles that make visual identification the *only* sure way to detect things. *Mobile Suit Gundam* uses this method.

Selective Technological Amnesia: It's a technological dark age, and engineers have forgotten how to make targeting computers, radars or smart missiles. Fortunately, they still remember how to build and repair much more complex systems, like lasers and fusion reactors. In this kind of background, mecha should be built with sensors with ranges no greater than a mile or two, and with no computerized targeting programs.

Strange Physics: Just divide all weapon ranges by 10! Maybe propellent technologies are less developed?

Odd Atmospheric Conditions: An alien world can be designed where atmospheric conditions and radiation storms divide non-visual sensor ranges by 10 or more, or make homing missiles useless.

Weird Sense of Honor: Battles must be fought when the foe is in visual range, and perhaps only after he has been formally challenged. This can be part of a Chivalric Code of Honor. It works as long as both sides fight by the same code!



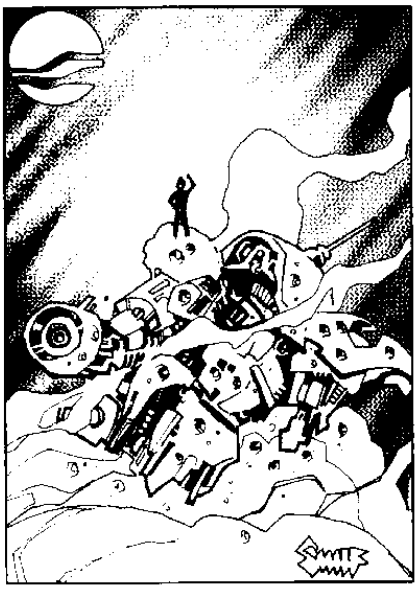
Staging Combat

Many players prefer a "zero-sum" approach to combat: fight until blown to bits, pursue the enemy regardless of your own losses, and so on. If the enemy does the same, any battle will turn into a bloodbath in which the PCs must kill or be killed.

To prevent this (and to allow for continuing villains!), the GM should have individual enemy mecha pilots show a sense of self-preservation. Have them seek cover or retreat if they are damaged, even if they aren't crippled. The same is true of foes running low on ammunition or fuel. Nearly any force will retreat after losing half or more of its numbers. Similarly, if one force pulls back while it's still more-or-less intact, the victors will sometimes choose not to pursue, especially if they've taken serious damage themselves. After all, if they've taken or held their objective, why should they risk being killed?

This approach helps the game. It's fairly realistic and it lowers the body count among PCs. More importantly, it facilitates roleplaying, allowing for dramatic exit speeches over the radio ("We'll be back!") and preserving continuing enemy NPCs for later rematches with the PCs – perhaps even a final to-the-death grudge match at a climactic moment.

If the players persist in forcing all-or-nothing combats, the GM can discourage it a bit by assigning a few less gung-ho NPC mecha pilots to their forces. These pilots can fight bravely, but after they take some hits, they can say things like, "Sir, we're all taking heavy damage, let's break off," or, "We're too badly shot up to pursue them, let's hold our objective and wait for reinforcements." If the PCs disagree – well, it gives them a chance to act heroic and use their Leadership skills!



In a realistic campaign, mecha designs tend to be functional and reasonably simple. Most are relatively small, and sometimes – as in much of Western science fiction – only battlesuits exist. Exotic designs like transformable mecha are rare or nonexistent. Weapons are things like autocannon, lasers and missile launchers. A single mecha is not the ultimate weapon. Attention is paid to the laws of physics, which may be bent but rarely broken.

The role of mecha in a realistic campaign should be carefully thought out. Why do these vehicles exist, and why are the PCs and their opponents using them? For instance, if interstellar travel exists, marines or mercenaries might be equipped with mecha because they are "general purpose" combat vehicles that can fight in any terrain on any world they visit.

Advantages: As the technology remains plausible, it is easy to borrow the background of an existing ***GURPS Space*** or ***Cyberpunk*** setting. Since PCs cannot rely on "super mecha" or cinematic fighting skills to defeat opponents, this makes it easier for the GM to set up challenging situations.

Disadvantages: Gamers who long to see their gleaming robot transform from a sleek fighter jet into an armored giant, or who want to smoke a dozen enemy mecha at once, may be disappointed. In combat, players must plan carefully and know when to retreat, or the heroes will end up very dead, very soon.

The Cinematic Campaign

This is probably the best style for no-holds-barred mecha action. The realism level is on par with a good Hollywood sci-fi movie: just enough to allow suspension of disbelief. Since 95% of cinematic mecha are Japanese-influenced, the genre conventions are those of anime – see *Game-Mastering Anime* on p. 19.

Cinematic adventures tend to be very dramatic. The heroes and their mecha are all that stands in the way of doom for their city or planet. The characters will often face seemingly overpowering odds. If they triumph, it will be worth it; if they die tragically or gloriously, at least it was for a cause!

A key assumption of the cinematic mecha campaign is that highly-skilled fighters have a big advantage. The mecha ace should have dozens of victories against average opponents until he meets his match in another heroic mecha pilot. The GM can simulate this by ensuring PCs and major NPCs are built on more points and – just as importantly – by arranging that a lot of encounters are with enemies of only average skill. This makes the inevitable confrontation between rivals more dramatic! The cinematic combat options in Chapter 3 are also useful, as they magnify the advantages of a skilled fighter.

Another advantage heroes and major villains have is their cutting edge mecha – larger, faster and more expensive machines, or sometimes even advanced prototypes a tech level or two above their opponents' mecha. The GM should ensure these aren't invulnerable, though: it's better to give a hero's mecha extra firepower or speed than to make it heavily armored. However, the PCs don't always have the best machines – it can be a worthwhile challenge for an ace pilot in an obsolete mecha to take on and defeat a technologically-superior opponent.

Advantages: A cinematic campaign simulates the kind of mecha action found in most anime. It also gives the GM and players a lot of options for creative character and mecha design. The combination of advanced mecha and cinematic combat rules makes it easier for the PCs to survive vehicle combat.

Disadvantages: Cinematic mecha may not fit well into existing world backgrounds. There are more options available to mecha and characters, so creating a balanced adventure is harder for the GM.

The Over-the-Top Campaign

This style of play tosses realism out the window. Think of it as the mecha equivalent of superhero comics. The enemies are evil galactic empires, alien space monsters or megalomanic super villains.

The genre conventions here are a mix of American superhero comics and Japanese live-action fighting team shows. The tone of a campaign may vary from fairly serious (like *Iron Man*, *Dangaio* or *Iczer One*) to camp (like *Power Rangers*). Usually, it's somewhere in the middle.

Mecha are exotic prototypes or alien machines. They may be sleek battle-suits or towering, baroque, one-of-a-kind monsters the size of skyscrapers! Most are two or more tech levels in advance of the background technology. Their weapons are as likely to fire lightning bolts or wind storms as missiles or cannon shells, and some are powerful enough to annihilate entire armies with a single shot.

Over-the-top characters are often kids or teenagers forced by weird circumstances into the role of mecha pilot. Or they may be superheroes in their own right, complete with costumes and exotic powers! Almost any character can fit into the campaign; in fact, the GM may wish to design the campaign around the PCs. If they work for the government, they will usually form an elite team. Just as often, they're private individuals, or were recruited by an exotic patron – usually a millionaire, alien or someone else with access to exotic mecha and secret bases.

Over-the-top action should use all the cinematic combat rules. Combined with their own super-mecha, PCs can defeat hordes of lesser opponents before a final confrontation with their archenemy!

Advantages: An over-the-top campaign can be lots of fun, especially for dedicated animation fans. This style fits well into a ***GURPS Atomic Horror*** or ***Supers*** campaign setting. It can also make for entertaining space opera games.

Disadvantages: The GM and players may have trouble taking an "over-the-top" campaign seriously, and it is easy for the campaign degenerate into camp or cliché. The GM will have to carefully balance the available mecha technology so that the PCs don't have too easy a victory on the one hand, or get obliterated by a super-powered villain's death machine on the other.

Mecha and Society

The GM should decide on the role of mecha in the campaign setting.

How Common are Mecha?

This is an important consideration for any mecha campaign. Here are some possibilities:

Artifacts: Mecha in the setting are products of other cultures. They are typically used by visiting aliens, or are ancient relics from a more advanced era. This is standard in a setting not advanced enough to produce mecha on its own, such as a contemporary or post-apocalypse Earth, or a medieval fantasy world.

Experimental: Mecha are not currently in production, but a few experimental models have been built, sometimes using technology a TL or more in advance of the rest of society. Only a few individuals or organizations have access to mecha. In fact, the public may not even know that working prototypes exist.

Limited Production: Mecha are past the prototype stage but are not in mass production. Perhaps there are only one or two companies building them. The only users are a few special agencies or military units, some of which may be using mecha on a trial basis. It may be difficult or impossible for ordinary civilians to buy mecha. Two real-world examples of this kind of "limited production" are spacecraft and stealth aircraft.

Mecha Academy

I want to see fifty push-ups, boys and girls. You think it's funny doing push-ups in a mecha, cadet Megumi? Okay, cadet, let's you and me try something more challenging . . .

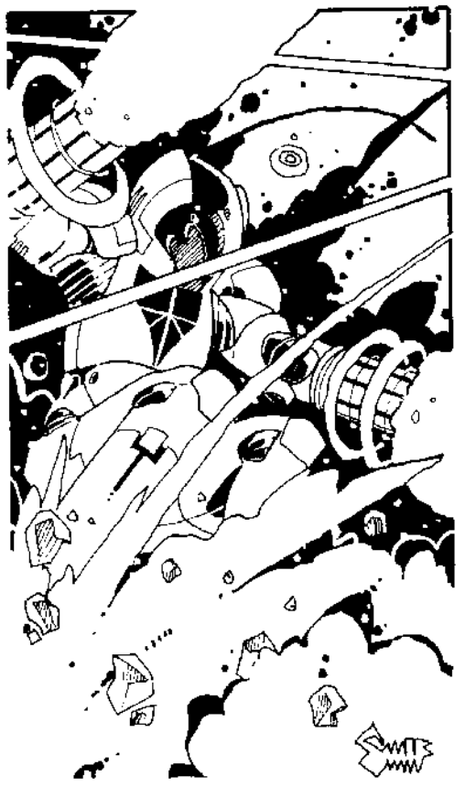
An entertaining way to start a military, gladiator or police campaign is to have the PCs begin as novice mecha cadets. The PCs will be completing their training, which is best run as a couple of adventures emphasizing roleplaying over combat. Not all the characters need be raw recruits: for instance, a veteran tank crewman might have been transferred to the mecha service.

They'll have to deal with hazing from rivals, upperclassmen or tough drill instructors, while working together to solve problems. The GM can encourage teamwork by organizing the characters into a single squad and holding out the reward of assignment to an elite unit if they do well as a group.

Competition between individual characters (PCs or NPCs) can be rewarded by offering the recruit who shows the best leadership or skill a few extra character points (to buy Military Rank or Reputation as "first in his class") or a chance to be assigned as the pilot of a special, more potent prototype mecha.

The culmination may be a "graduation exercise" that turns dangerous, giving the trainees a chance to show off their skills for real before they graduate.

Sources: Gunbuster, Metal Fighters Miku and *Starship Troopers.*



Widespread Production: Mecha are widely produced for various organizations. Depending on the type of mecha, they may be available for individual purchase. Purchase of new military mecha is probably restricted, but it may be possible to buy one on the black market. Civilian mecha are likely for sale.

Prior to TL8, mecha are always either experimental or artifacts. Of course, in a given setting it's quite possible that (for example) civilian mecha may be in limited production while fighting machines are only experimental, or vice versa. Similarly, the status of mecha may also vary between different nations or cultures. For example, an invading alien empire may have mecha in widespread production, while Earth only has them in limited production (equipping only their elite defense force).

Who Uses Mecha?

Some possible users of mecha include: the army, marines, navy or other military force, mercenaries, feudal knights, police, the space patrol, survey teams, special operatives, cargo handlers or construction workers (especially in hostile environments), emergency rescue teams, space miners, gladiators, criminals and super-villains, vigilantes and superheroes.

Tech Level of Mecha

The GM should decide on the usual TL (or range of TLs) of the mecha in the campaign. Mecha are most common at TL8-11. (At lower TLs, mecha are too hard to build; at higher TLs, flying anti-grav vehicles make mecha increasingly obsolete). Production mecha are normally of the same TL as the culture that built them, while artifacts and experimental mecha are often a TL or more higher.

Campaign Themes

A mecha campaign should have a central theme that draws all the characters together and helps the GM come up with adventures. Some possibilities are described below.

Mecha Troopers

"Trans-Sol's hired us to take the iridium mines on Epsilon Indi IV back from the rebels. We get paid if we don't damage the refinery. Local militia's a joke; couple of civil defense mecha left over from the Union Guard. Only problem is, the rebels hired some help too – the Steel Dog Irregulars. Baddest bunch of condottieri in space. 'Cept us, of course."

The characters are soldiers in a mecha- or battlesuit-equipped unit. The theme is mechanized warfare: the scope may be anything from a struggle between rival cities to an intergalactic war. The PCs may be key players performing vital missions that affect an entire war, or their own battles may simply mirror the greater conflict going on around them.

A military campaign's big advantage is that the PCs are under orders (or taking contracts, if they are mercenaries), which makes it easy for the GM to set up adventures. Possible missions include attacking or defending military objectives, patrols, escorting convoys, smash-and-grab raids, assault landings, peacekeeping, guerilla hunting, serving as shipboard troops, garrison duty, special operations like commando raids, or even providing disaster relief for a civilian population.

A military campaign requires a war, or at least an unstable time troubled by uprisings, terrorists or guerillas. Since it's a mecha campaign, the conflict should be one in which mecha can be important factors – if both sides are lobbing strategic nukes, there isn't much room for battlesuits. One side can be the aggressor, but the issue is rarely that black and white. A complicated war may have several factions involved.

Both sides may be changed by the conflict: a government may start out democratic, but become increasingly authoritarian as it marshals its resources to fight an all-out war. This can lead to people wondering whether or not they are on the right side – even leading a revolt against their own government.

The GM and players should work together to create an interesting and balanced military unit for the PCs to belong to. A good size is a squad or small platoon of battlesuits or a company of larger mecha, with about a dozen fighting troopers or mecha pilots composed of a mixture of PCs and NPCs. One of the PCs should be the leader, with enough Military Rank to command the unit, reporting to an NPC commander who comes up with the missions.

A unit might be an ordinary "line" unit (like a regular infantry or armor company, or a fighter squadron), a mercenary unit or even an elite special force. An interesting unit will have its own character and history (as well as uniforms and insignia). Some have a Reputation to live up to (or live down); e.g., the 77th Royal Armored Cavalry ("Stalking Tigers") is an elite unit of veterans famed for skill in jungle reconnaissance, while the 12th Air Assault Squadron ("Fruit Bats") is a dumping ground for slackers, misfits and troublemakers. Guess who gets the brand new mecha?

The unit is probably based at a military camp or operating from a carrier, such as a spaceship. The GM should work out what resources, defenses and capabilities the "parent" base or ship has. Are the PCs its only fighting unit, or one of many? Is the base or ship staffed or commanded by NPCs? Are there any civilians living near or within it?

Style: Usually realistic or cinematic.

Sources: Robert Heinlein's *Starship Troopers* or Joe Haldeman's *The Forever War*; *Mobile Suit Gundam*, *Armored Trooper Votoms* or *Superdimensional Fortress Macross*; ***Ogre Miniatures*** (game), ***Battletech*** (games, novels, cartoon); *Gall Force* series (anime).

Campaign Crossovers

Several other ***GURPS*** worldbooks are natural partners for ***GURPS Mecha.***

Mecha in *GURPS Supers*

This is a natural – just use this book to design super battlesuits! Larger, tank-sized mecha are rare in western superhero comics, but as long as the GM limits their ST, DR and firepower to the same levels as most supers, they fit in well.

Mecha in *GURPS Space*

GURPS Space is an excellent resource for any ***Mecha*** campaign that involves space travel or alien worlds. The standard ***Space*** background already features battlesuits used as military weapons and exosuits used as tools. Patrol officers may also wear them in dangerous situations.

Larger tank- or fighter-sized mecha may or may not exist, at the GM's whim – they do in the ***Space Atlas IV*** setting, but they aren't mentioned elsewhere. If they exist, they'll be used by forces that must fight on many different worlds and terrains, such as interstellar marines or mercenaries.

Mecha in *GURPS Horror* and *CthulhuPunk*

A few innovative mecha shows combine horror with mecha and superhero action. The threat is typically an alien invasion, except that the invaders are under the control of Things Man Was Not Meant to Know, and mecha action is mixed with encounters with writhing tentacles and flesh-morphing alien horrors. If you want to know how Cthulhu would do against a mecha, try it out! See the section on *Tentacled Horrors* (p. 26) for more details. The best source for this sub-genre is the anime *Iczer One*.

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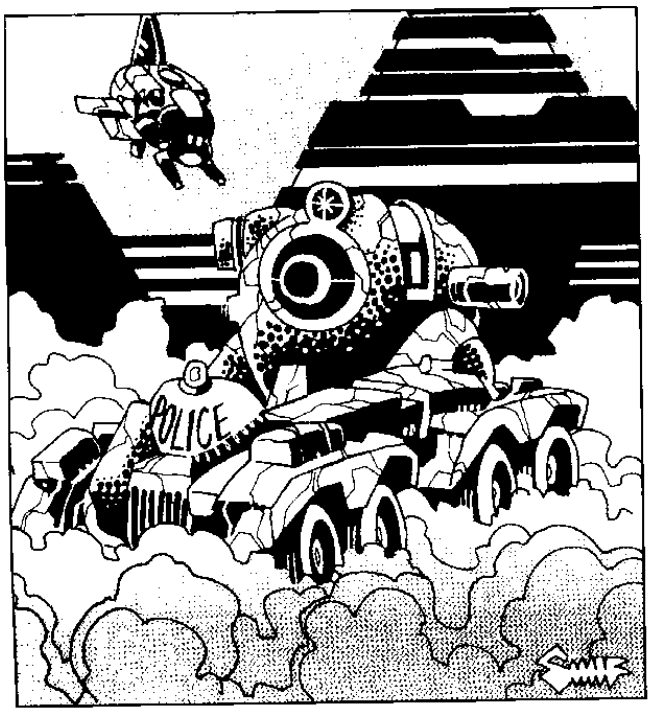


Campaign Crossovers (Continued)

Mecha in *GURPS Cyberpunk*

Mixing mecha with a cyberpunk setting is relatively common. Mecha can appear as early as TL8, and the same sort of technology that builds cyborg limbs and neural interfaces leads logically to battlesuits and perhaps to larger mecha as well.

In a ***Cyberpunk*** campaign, battlesuits are likely to be used by elite mercenary or government commando units, or by police SWAT teams. They can be the ultimate "anti-cyborg" weapon. Many will be equipped with neural interface systems. Big mecha in a cyberpunk world tend to be sinister but "realistic" designs, often resembling giant metal spiders. A few of these standing on guard outside a corporate HQ can deter demonstrators nicely! Mecha may also be used for non-military purposes, as power loaders or construction machines. However, if civilian mecha are widely available, they can easily be used by criminals – and so the police will need access to their own mecha to deal with them.

The best inspiration for a cyberpunk-mecha campaign are the works of Masamune Shirow, especially *Appleseed* and *Ghost in the Shell*. The anime series *Bubblegum Crisis* is a great cinematic campaign source.

Continued on next page . . .

Mobile Armored Police

"This is a code 636, calling all armored units. Armed terrorists using military-grade battlesuits have occupied Tokyo Bay Spaceport and taken hostages. All mecha-SWAT personnel, mount up and report for duty immediately . . ."

The characters are peace officers in an armored mecha police unit. Since battlesuits and mecha have little application for day-to-day crime, mecha cops will be members of an elite unit, like a SWAT team or space patrol. A mecha police agency often forms in response to a wave of mecha, alien or cyborg crimes that requires more firepower than normal police can handle. It may even be a special "Untouchables"-type task force whose sole purpose is to bring a particular master criminal to justice!

Adventures can mix criminal investigation, crime fighting and crisis intervention. Mecha crimes are likely to involve high stakes: hostage taking, space piracy, slavers, terrorism, drug and arms smuggling, grand theft, coups, et cetera. Good sources of ideas are cop shows – update the plots and give the terrorists or smugglers battlesuits instead of Uzis.

Besides simple crimebusting, continuing subplots can feature departmental rivalries and romances, political pressure from the mayor's or D.A.'s office, cops on the take, citizens' groups protesting police brutality, tense minority relations (perhaps aliens or cyborgs might count), testifying in major trials and dealing with nosy journalists. The "mecha division" might even be an experimental unit that must prove itself to budget-conscious superiors, or to citizens who fear mecha in the hands of police.

An alternative to the city cop approach is the "wild west." The characters are the only law on a colony planet or post-holocaust wilderness. This can also take place in space, with the patrol using space-capable mecha to police a frontier sector or a mineral-rich asteroid belt full of independent miners, ruthless corporations, cunning ore smugglers and claim-jumping pirates.

Style: Usually realistic or cinematic.

Sources: Appleseed, Dominion, Mobile Police Patlabor and *Bubblegum Crisis.*

Mecha Agents

"Dr. Boris Sultan has gone missing."

"Sultan, sir? Wasn't he working on the new stealth mecha for the Marines?"

"That's right, Special Agent Yoko. It's vital to our nation's defense. Sultan disappeared on the resort world Arcadia. We think the Imperial Secret Service may be involved."

"Agent Mallory and I will leave at once for Arcadia, sir."

"Stop by the lab first and see Dr. Gaussi. I think you'll find your battlesuit now transforms into a cycle."

"That sounds useful, sir."

The characters belong to rival secret agencies, noble houses, megacorps or mob factions equipped with mecha. Open war has not yet broken out, due to a balance of power or the efforts of a peacekeeper (like the emperor, the police or the U.N.), but intrigue, betrayal, secret projects (to build super mecha), raids (often to foil *enemy* secret projects) and other covert operations are ongoing. In a realistic campaign, characters may also face political interference or coverups from their own side.

Adventures can be recycled from action or spy movie plots: change a few details to fit the campaign. The agents will spend a lot of time outside their mecha, so they'll need good investigative and combat skills. Mecha fulfill the same role as cars, jet packs and helicopters in spy movies. They should be light battlesuits that can be easily concealed in luggage or a car to be quickly donned in an emergency, or specialized transformable mecha that can disguise themselves as ordinary spaceships, automobiles or motorcycles.

Style: Any.

Sources: Dirty Pair, Appleseed, Ghost in the Shell and *Hades Project Zeorymer.* Action movies like James Bond or old "vehicle action shows" like *Air Wolf* and *Knight Rider* can be helpful sources of inspiration.

Armored Supers

Laughing maniacally, Cyberdoom tossed another screaming security guard aside as he strode forward through the wreck of the Metropolitan Museum.

Outside, 15-year-old Nina Tempest looked carefully about, but everyone was watching the unequal battle. She dropped her lunch bag and spoke the words that activated the dimensional link:

"Midnight Armor up!" There was a flash of light and her school uniform vanished, replaced by the hard angles and lines of the voice-activated symbiotic battlesuit, the parting gift of the injured alien whose life she had saved at summer camp.

Cyberdoom was reaching for the case of priceless dinosaur eggs when the blast struck. He flew across the museum and smashed into a Tyrannosaurus' skeleton, scattering bones everywhere. Fortunately his armor saved him . . . but God! The power!

"Oops," said a small voice.

Cyberdoom staggered to his feet, and turned to find himself face to face with a figure in deep blue armor. A strange glow surrounded her. "Who the heck are you?" he shouted.

"Midnight Hurricane," Nina said. "And you're about to become extinct."

The characters are heroes drawn together by fate or whoever provided their mecha. They fight for revenge, justice or to protect society against evil, relying on their unique super-mecha. In over-the-top campaigns, some characters may have super powers, psi or magic!

There may be one big enemy or lots of different ones. The villains have usually developed or stolen powerful mecha technology, and may have other abilities as well. Their aims are typically global economic or political domination, plus the capture of the PCs' super-mecha. Suitable villains are ruthless corporations, sentient computers, alien overlords and mad scientists, as well as ordinary super villains. The enemy may have super-mecha of their own or rely on hordes of cheap mecha, psionic assassins, killer robots, lethal cyborgs or monsters.

Style: Usually cinematic or over-the-top.

Sources: Iron Man, Iczer One, Bubblegum Crisis, Genocyber, Moldiver, Iczelion, The Guyver, Mantis and *Power Rangers.*

Campaign Crossovers (Continued)

Mecha in *GURPS Psionics*

Many mecha shows feature characters with psionic powers – see the description of the Esper Weapon character type (p. 25). The Phoenix Project world doesn't have mecha as an integral part of it, but it wouldn't be surprising if Psibercorps or the Overmind Institute were working on a battlesuit that used a telepathic neural interface or enhanced the wearer's psi powers!

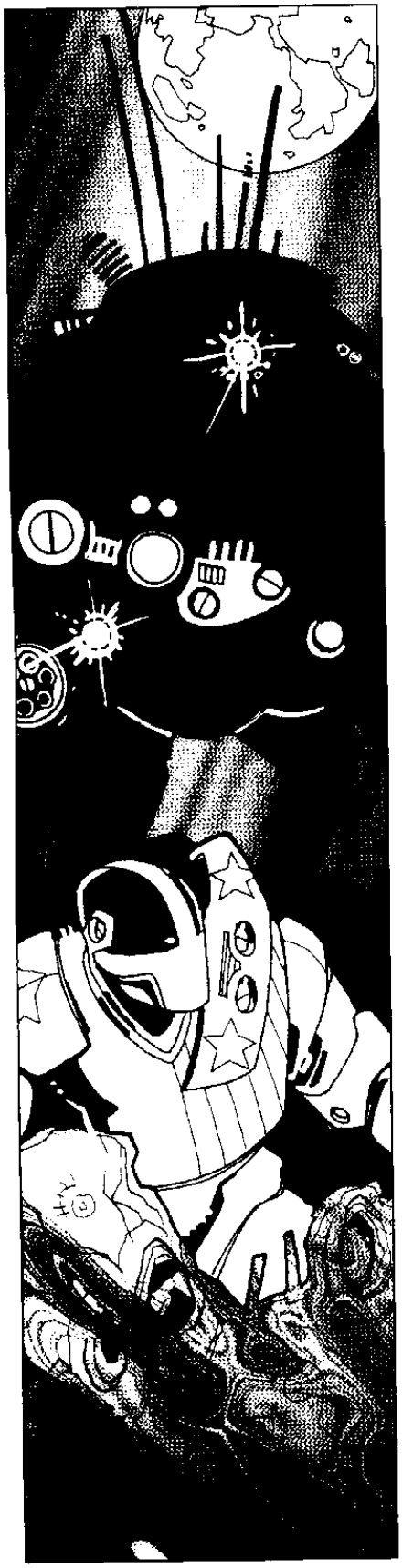
Space and the Battlefield

Even today, a satellite can spot a man or tank from orbit! What role do mecha (or infantry, or tanks . . .) have on a battlefield when orbiting spaceships and warsats can see their every move and rain down death from the ultimate high ground above?

If one side or the other has not achieved "space superiority," the GM can rule that most or all of the warships or battlestations are too busy fighting each other to make ground attacks. There may also be ground objectives that can't wait until space superiority is won (such as hostages), or which will help win it (such as spaceports or major radar sites). Even if you have total space superiority, the enemy may have infantry or armor occupying objectives you want to capture intact. In that case you'll have to send ground troops to flush them out!

Losing "space superiority" is certainly a military disaster. If nothing else, it makes it hard to move large bodies of troops without being spotted from orbit. It's easy to conceive of a situation where whoever controls orbit can decimate or destroy any armored offensive through space-launched "kinetic kill" missiles or powerful beam weapons.

But a key element of the mecha *genre* is that the space navy *isn't* the ultimate fighting force. The next sidebar presents some alternative rationales that may keep enemy ships or aerospace craft from blasting mecha off the battlefield, even if they do have the skies to themselves.



Wandering Mecha Pilots

"Help your village fight off those rampaging mecha bikers? When all you can offer is five dollars, ten gallons of hydrogen fuel and a square meal? Huh. Sounds fair enough to me."

The characters are mecha-equipped drifters, mercenaries, pirates or guerrilla fighters who wander the world having adventures. This works best in a dangerous setting where the next town or planet can bring a new challenge: a post-apocalypse Earth, an untamed frontier, a monster-filled fantasy realm or behind enemy lines. To keep the adventurers moving, some sort of push or pull is needed. For example, they could be chasing (or hunting) an enemy, on a quest for a particular artifact, escorting a princess or delivering a plague vaccine; or they might be survivors of a broken army or fleet, trying to fight their way home.

Style: Any, but usually cinematic.

Sources: Orguss, Genesis Survivor Gaiarth and *Robotech: The New Generation* (a.k.a. *Mospedea*).

Mecha Gladiators

"Only three seconds left before the bell, and Irondog has the Chrome Avenger in a servo-whining clinch, his armor can't take much more of this – oh, what's this? Surprise jump jets! Chrome is carrying the Irondog up with him, slamming his head into the ceiling in an amazing reverse vertical body slam! I bet that hurt!"

The PCs are competitors in mecha or battlesuit tournaments. These can be as violent as a Roman gladiatorial arena or as bloodless as pro wrestling. The GM can draw upon pro-wrestling or martial-arts plots and clichés. This can include the "championship fight," in which a string of qualifying tournaments spread over time and space see the PCs matched against lesser foes until they can advance to challenge the reigning champions for the World Mecha Title.

The prizes (or spinoffs, like huge TV ratings drawing corporate sponsors) should be big enough to justify million-dollar mecha pounding each other to scrap metal, although how much money filters down to the fighters themselves is up to the GM!

If fights are nonlethal, the emphasis will be on pins and throws, with the objective being to knock the opponent down or toss him out of the ring. More dangerous battles can be fought with punches and kicks, while very deadly fights may permit the use of melee weapons or even actual cannon and missiles. The GM should work out what rules, if any, apply to the battles.

Besides the PCs, the supporting cast usually includes a coach or trainer, mechanics, managers and the other teams. Rival teams should be as colorful as possible. Some may be honorable opponents. Others are "villains" who break the rules, stomp downed foes or use illegally souped-up mecha, but who get away with it because everyone is afraid to cross them! Rival teams can confront the PCs out of the arena, too. If six enemy mecha wrestlers walk into the PCs' gym-cum-garage and start tossing insults, will they fight now or save it for the arena?

Sometimes, mecha gladiators (and their machines) are hard-bitten, out-of-work war veterans seeking a way to use their military talents in peacetime. Others may be chosen as much for their sex appeal and performing talent as for fighting skill.

Besides money, the rewards of success could include stardom and a chance to do movies, concerts, commercials or charity benefits. This can lead to a conflict between combatants who believe the sport is everything and those who see it as a stepping stone to fame and fortune. Things can get nastier if gambling is involved. The local syndicate may try to fix the events, with gladiators being blackmailed into "throwing" a fight, or mecha being sabotaged before the game.

When they aren't fighting, low-ranked mecha gladiators could moonlight as mercenaries or street fighters, while more glitzy megastars finance side ventures like archaeological digs. In an over-the-top campaign, the characters may use their suits to fight crime as part-time vigilantes. Another very cinematic possibility is to have ordinary wrestlers or martial artists given mecha suits by some agency and turned into a super team.

A final variation is to follow the Roman gladiatorial paradigm in fact as well as name: pilots are slaves in the arena, maybe condemned criminals or even human warriors captured by aliens. Perhaps they can eventually escape the arena and lead a mechanized version of Spartacus' slave revolt!

Style: Any.

Examples: Armored Trooper Votoms, Metal Fighters Miku, Robo Jox and the *Metal and Lace* computer game. See also ***GURPS Martial Arts.***

Alien Invasion

"Lunar command reports all orbital stations have been destroyed. The aliens are assaulting across Copernicus Crater! Our battlesuit troopers can't stop them." The young lieutenant's voice broke. "My God, sir, are all our weapons useless?"

"Calm down, son," General Walters said. "Have Captain Ikari launch the Stormhawk squadron. His mecha are our last hope."

An alien race is out to conquer our world using superior military hardware. This has been a staple of mecha stories since H.G. Wells' aliens showed up in tripods. The GM must create an alien race and a good reason for the war. Possibilities include a desire to colonize a new world, paranoid xenophobia, a religious crusade, retaliation (we shot first!) or a simple desire to enslave all life in the galaxy. What if the aliens claim *we* are the ones who are trespassing in their space?

The invasion site is often Earth, but a colony world can also be invaded ("we have to hold out until reinforcements from Terra arrive"). The situation can also be reversed, with the heroes as members of a force that's invading an alien world.

An alien invasion can be handled as a simple war, with PCs serving as mecha troopers (p. 12), or a surprise attack or overwhelming force could wipe out our military right away. In the wake of defeat, the characters may be wandering mecha pilots (p. 16) fighting a guerrilla war. In an over-the-top campaign, the second line of defense could be some armored supers (p. 15) with more advanced hardware.

Just slugging it out with wave after wave of alien invaders can get old fast. To make things more interesting, keep the aliens and their motivations mysterious, then arrange things so each encounter will reveal a new piece of data about them. Some of this information may be militarily useful, some just interesting tidbits.

Surviving Orbital Strikes

Atmospheric Absorption

A beam fired from orbit must pass from the vacuum of space into progressively denser layers of atmosphere. The types of beams most effective in space (neutral particles and ultraviolet, x-ray and gamma ray lasers) are the ones most easily absorbed or dissipated by atmosphere. If a planet has a reasonably dense atmosphere (like Earth), the GM can rule that only the largest space battleships will be able to carry beam weapons that can hit ground targets. Also, building a big, ground-based weapon is easier than cramming one into a spaceship. At TL8+, fixed planetary defensive weapons may keep such battleships at a distance.

Electronic Countermeasures

If mecha and other armored vehicles carry ECM that make them difficult to spot at 1,000 yards, they'll be *very* hard to spot from a few hundred miles up, especially on overcast days or under forest cover. The GM can simply rule that spaceships can't hit a mobile, ECM-equipped target without someone on the ground to spot and direct the fire for them. Thus, spaceships work as long-ranged artillery rather than ultimate weapons.

Too Valuable to Risk

A space force is unlikely to be absolutely certain it has space superiority. What if the enemy has a hidden ground-based missile launcher or a squadron they haven't committed? A force with only a few ships (or only a few remaining!) may decide not to risk exposing them to possible ground fire, and instead pull them back after defeating opposing vessels rather than use them to bombard ground targets. Of course, it's more likely to do this if it has reason – this can be a good justification for the defenders to launch the occasional attack on the enemy fleet, even if outnumbered.

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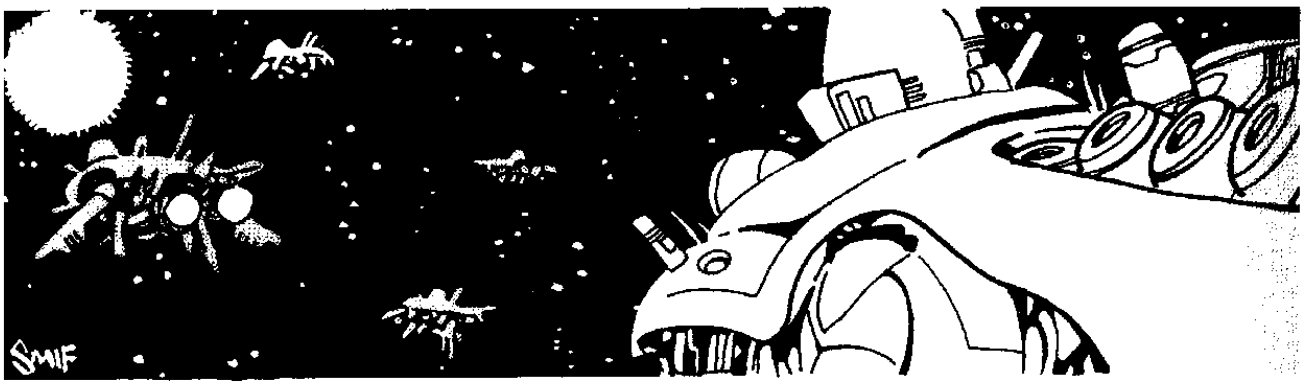


Surviving Orbital Strikes (Continued)

You'll Have to Wait to Be Killed

One side or the other may well have won space superiority, but that doesn't mean that the PCs' own mecha platoon is now the number-one priority for whatever super weapons are orbiting overhead. If the adventure is simply part of a larger engagement, then someone else may be getting smoked. This can be great news if the enemy has superiority, but disappointing if the PCs were expecting a bolt from the blue to help them out. Satellites and orbiting ships are often overhead for only a short time before their orbits carry them over the horizon, out of sight and range. If there aren't enough ships to provide complete coverage . . .

"This is Blue Seven Alpha, we are about to be overrun, we request immediate fire mission sector Red Zebra Niner, over."

"Sorry, Blue Seven Alpha, we have no assets currently overhead. Please hold out for ten minutes. Over."

Anime Aliens

Alien races are common in anime, although with some notable exceptions, the majority are identical to humans. Oh, there may be a few cosmetic features like pointy ears, sharp fangs, cute moth-like antennae, horns or green hair, but otherwise they look and act like people. The justification may be as simple as "parallel evolution," or more complex, such as both Earth and the alien worlds having a common ancestral race. However, that's window dressing; the real reason is to allow meaningful relationships and even romance to blossom between human and alien!

Where aliens do differ is in technology and society, as well as in simple details like language and dress. An alien society is often a distinctive and easily-pigeonholed culture like a feudal state or a race of warrior clones, or borrowed from a human model (e.g., an ultra-tech Shogunate Japan). Alien technology is also important; it could simply be superior, or very advanced in *different* areas – e.g., emphasizing biotechnology, psionics or even magic.

For more on aliens, see the *Characters* chapter.

The PCs themselves may become important by being the first to capture a live enemy prisoner (or by being captured and then escaping with vital information). It might turn out that the aliens have an objective that can be met by negotiation and not fighting, or have a hidden weakness to exploit.

Another type of invasion is the "infiltration." The aliens aren't strong or numerous enough to simply conquer us, or want to weaken us first, so they use stealth and either take people over or perform terrorist acts – this is a type of *Mecha Agents* (p. 14) campaign. Alien infiltrators need a way of blending in with humans: maybe they can change shape, just happen to look like us or rely on brainwashed or cloned humans. Of course, an infiltration can later turn into a full-scale invasion!

Style: Any.

Sources: Superdimensional Fortress Macross, Robotech, Iczer One and *Neon Genesis Evangelion.*

Secret Mecha Conspiracy

"You saw that helicopter explode on the news last night? Well, it was only a block from my house and debris went everywhere. That crate over there fell right through the roof and into my garage. Look, there's writing on it."

"Hmm. What do suppose an 'XM-20 neural interface-controlled semi-automatic battle mover' is?"

"Dunno. Let's open it."

A recurring theme in many mecha shows has someone stumbling into accidental possession of a classified prototype mecha . . . or a truckload of them. This GM can use this to explain how a "normal" person like a high school kid, biker or reporter becomes an armored superhero (p. 15) or joins up with some mecha agents (p. 14).

How did the protagonist get the mecha? Maybe one of the engineers working on the project realized the people running it had Evil Plans, so he stole the mecha and went to a friend for help. Perhaps the helicopter carrying it crashed in the hero's back yard, and he opened one of those crates. A variation on this is to have the character be a member of the agency who built the mecha and who discovers his bosses intend to use it in a sinister way, so he steals it.

The mecha's existence points toward a sinister military-industrial conspiracy. Its agents want to recover their prototype and eliminate anyone who Knows Too Much, like the fellow who found it . . . and anyone he showed it to. Of course, the PCs can use their new-found mecha to fight back and find out what's really going on. Is it part of a plot to overthrow the government? Or maybe it was developed using hybrid technology from a crashed UFO, and now aliens are about to invade Earth!

Style: Any.

Sources: Megazone 23 Part I, The Guyver, Madox-01 and *Mobile Police Patlabor.* The classic live action movie on this subject is *Blue Thunder;* replace the super-helicopter with a mecha and go on from there. See ***GURPS Warehouse 23*** for other views of conspiratorial, technological weirdness.

A Midsummer Night's Mecha

"Court Engineer, the Goblins' spider-mecha are massing for another assault, while overhead flies Sorgamon the Black, piloting the Unholy Gargomoth. Our Chromium Knights cannot stand against the rampaging fires of her plasma lance! Are we doomed?"

"Despair not, my king. Have you forgotten Bohemond the Half-Elven? We must not give up hope that he and the Five Companions will complete their quest and find Virgo Dragonstar. If that legendary mecha returns, it will be the evil Sorgamon and her foul minions' turn to tremble!"

This campaign combines mecha with fantasy. The setting is generally a feudal kingdom with pseudo-medieval European or Japanese trappings. Sometimes, there are fantastic races like elves, faeries or demons about. There's magic as well, or at least psi powers that look a lot like magic! The focus may be a war, a quest or even a dungeon crawl into ancient ruins to find lost, high-technology artifacts.

Fantasy mecha are usually relics from a technological past, magical artifacts or weird techno-organic constructs. They are generally weaker than mecha in other genres, with fairly light armor and relatively few ranged weapons; this gives things like dragons a fighting chance against them.

Player characters may be natives of the fantasy world, but are often Earth people accidentally or deliberately transported into the magical dimension (see the *Castaway* character type on p. 23 for details). Some of them may even be mages or members of fantasy races.

Style: Usually cinematic or over-the-top.

Sources: Aura Battler Dunbine, Magical Knight Rayearth and *Escaflowne of the Heavens*. The epic *Five Star Stories* also has a strong fantasy feel, but lacks magic.

Game-Mastering Anime

The rest of this chapter details some of the classic plot twists and cliches of the Japanese "giant robot mecha" anime genre. Adding these to a cinematic campaign can be fun, especially if the players are anime fans, but too much of this can result in the campaign degenerating into a parody of the genre. Use restraint.

Some of these cliches also fit the Western battlesuit tradition, notably "young heroes."

Revenge is Mine, Sayeth the Anime Hero

If the standard plot in Western fiction is "boy meets girl," the equivalent in Japanese animation is "blood-spattered revenge," most often vengeance for the death of family, a friend or a lover. This can motivate both heroes and villains. See also the *Vow of Revenge* disadvantage on p. 36 in the next chapter.

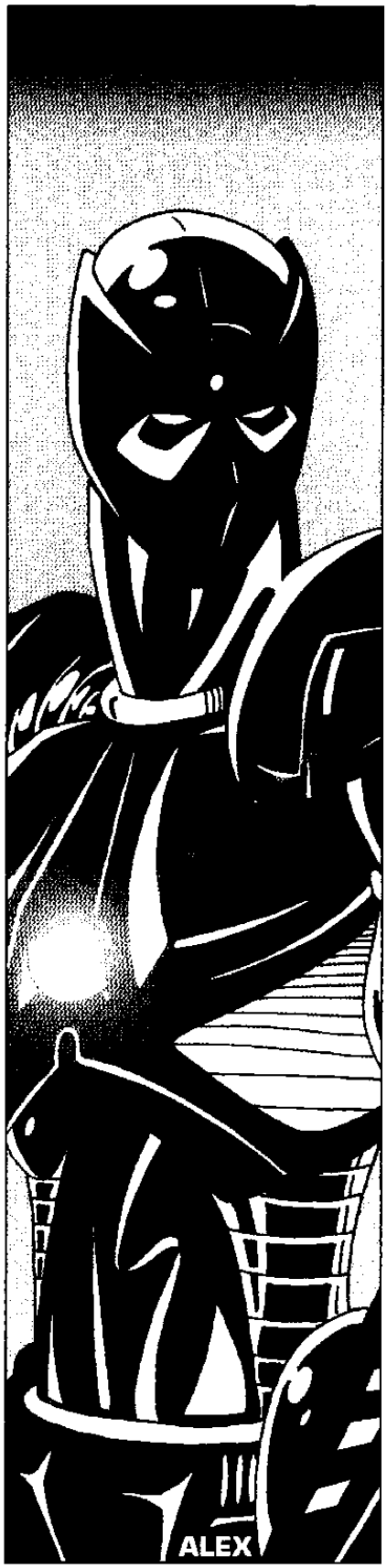
Young Heroes

The main characters are often kids, teenagers or young adults. Much of the roleplaying focuses on troubles, conflicts, romances and emotional maturation of young people. This isn't to say that all the characters should be young, but it will add to the genre feel if at least a few of the PCs are in their teens!

The Honorable Enemy

The classic anime mecha opponent is dashing, honorable and someone who you'd like as your friend – except he has a strong sense of obligation that binds him to his own side.

Unfortunately for soap opera-inclined GMs, it's hard for this to come through in battle, especially given how bloody-minded some players tend to be!



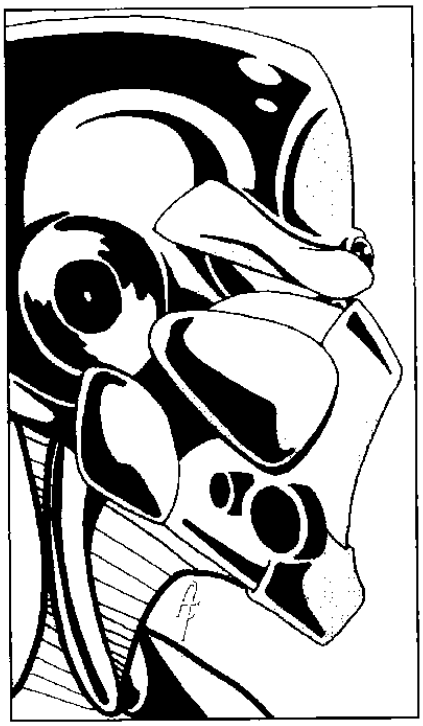
Telegraphed Attacks

This cliché comes right out of cheesy martial-arts movies. A 25mm Gauss cannon, heavy missile launcher or a force sword is so bland, right? Well, rename your weapons and shields so they sound powerful: "Magnetic Thunder Cannon," "Mega-buster Missile" or "Sword of the Burning Moon." Shout the name as you attack or parry with it! Do the same with shields and yell as you block with them. You can even name individual maneuvers: "Magnetic Thunder Cannon Autofire" or "Burning Moon Sword Parry!"

This doesn't have any game effect – or does it? A good name may be worth a +1 to Intimidation skill after it is demonstrated. In an over-the-top game, the GM can rule that anyone who doesn't shout the name of his weapon is -1 to attack or defend with it. Maybe the weapons are voice controlled, or the shout helps channel the user's *chi* (inner power) into the attack. Who knows?

Famous Last Words

A major PC or NPC who fails a HT roll to avoid dying does not expire immediately unless he's been totally vaporized, his head has been blown off or the like. He can't *do* anything or be saved, but he can gasp out some last words or a dying request. The GM can cut a "dying" PC's final words off at any time, though.



So the GM should introduce honorable enemies carefully, building up their reputation with stories about them told by other NPCs, or through non-combat encounters.

For instance, suppose a PC in a military campaign is limping back to base alone, on foot, with an injured comrade – both their mecha having been shot down. They are halfway home when, suddenly, a blue-painted enemy mecha appears. The blue mecha levels its 120mm cannon, the player thinks he's doomed – and then it turns and walks away. Why? The enemy pilot saw him through telescopic sensors, noticed he was young and handsome, and anyway, she felt it dishonorable to fire on a fellow pilot helping a wounded comrade. Later, the PC gets back and learns from a briefing that the chivalrous enemy was Lt. Jasmine Raz, the legendary Blue Devil ace. What happens if they meet again in battle?

This kind of relationship allows for interesting radio conversations during a fight. It could lead to dinner, drinks and possible friendship if you meet at a diplomatic function or during a cease fire. It might end in pathos if one of you regretfully blows the other out of the sky, or in bitterness if you don't fight each other directly but end up killing each other's comrades. It's even possible one of you will switch sides, if you become convinced that . . .

The Old Order is Corrupt!

With Japan's experience in World War II as an example, anime has often depicted warmakers in a less-than-flattering light. All sides often have politicians or arms manufacturers who use the war to further their own ambitions and wealth, or incompetent generals who send young soldiers to die pointlessly. Often, the conflict was started by misunderstanding, xenophobia, treachery or conspiracy. If this can be exposed, peace might prevail.

If the GM likes this kind of intrigue, it can lead to honorable characters on either side aligning themselves with various "peace factions and "war factions" in their own governments, and maybe a wholesale revolution. Of course, even if the enemy has purged the incompetent generals and corrupt politicians, there may still be a war on for ordinary "nationalistic" reasons – and the villains may be more efficiently led by an honorable, young anti-hero than a greedy, old general!

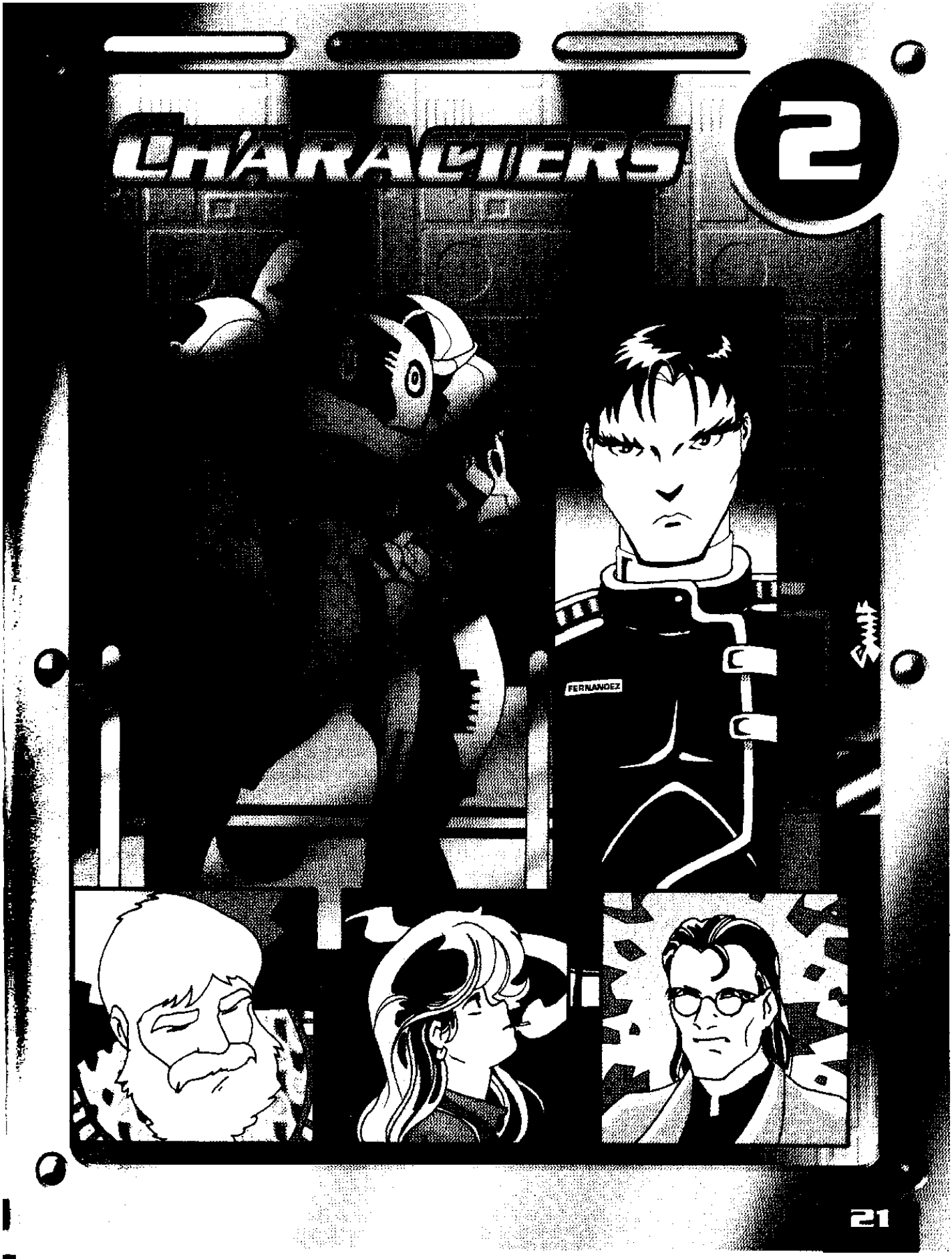
My Enemy, My Lover

Not only do anime characters often have honorable enemies, sometimes love can blossom on the other side of a targeting scope. This starts with grudging admiration of an enemy pilot and continues when it's discovered he/she is of the correct gender and sexy to boot. This is most likely if an encounter can take place outside a mecha, e.g., if taken captive, infiltrating an enemy stronghold or during a diplomatic function or truce.

Romance with the enemy is often viewed by one's friends or superiors as (a) treason, (b) a great opportunity to involve the lovestruck character in an espionage double-cross or (c) a wonderful symbol that brotherhood can prevail. As with a strong friendship, the result is often either defection to one side or the other, or a Romeo-and-Juliet style tragedy.

Sayonara, Tokyo

Animation has no special effects budget limit. As GM, don't be afraid to let big things blow up! Cities, countries or entire planets are devastated or threatened with devastation by monsters, nuclear weapons, ravening energy beams or asteroids or space colonies dropped from orbit. In retaliation, the heroes can win by blasting the enemy's battle fortress to bits – and watch the explosion take out the rest of their mecha armada as well.


CHARACTERS
2
FERNANDEZ

Mecha as Starting Equipment

A mecha itself costs no points: it's equipment, not an advantage (but characters may need an Unusual Background advantage to start with mecha of a higher-than-normal tech level).

PCs may want to start the campaign owning a mecha outright. The simplest way to do this is to have the character use a portion of his starting wealth to purchase the mecha as starting equipment. This represents a mecha he inherited, built, stole or otherwise acquired before entering play, not necessarily one he bought in a store. While a small battlesuit can run to over $100,000, and a large mecha is in the million-dollar range, this is well within reach of a Filthy Rich or Multimillionaire character.

Also remember that rootless characters, like wandering mercenaries or nomadic mecha-bikers, can put 100% of their starting wealth into equipment: the character may be "Filthy Rich" in name but – aside from his $1,500,000 mecha and his trusty sidearm – may still own little but his uniform. This is also appropriate for the techno-knight or mecha samurai who inherited his father's mecha, his title and very little else.

Other ways to start with enough cash for a mecha are the "trading points for cash option" (pp. B16, B83) and the *Trading Points for Equipment* and *Temporary Wealth* options (pp. CI17-18).

Combat mecha or exotic prototypes are probably not sold on the open market. If mecha are restricted, the GM should make sure the character's background squares with him starting with one. An inventor who built it himself should have Engineering (Robotics) skill, an aristocrat who inherited it needs Status, a thief who stole it should have an Enemy and a good story explaining how he did it, a bounty hunter should have the appropriate Legal Enforcement Powers, a mercenary who salvaged someone else's mecha off a battlefield needs Military Rank and the Mechanic skill to have repaired it, and so on.

GURPS Mecha characters can be built on whatever point total the GM wants for the campaign. We suggest 100-150 points for realistic campaigns, 150-250 points for cinematic games, and 250-500 points for over-the-top campaigns.

Major villains should be built on 250-750 points. The difference between them and the PCs should mostly be spent on advantages like Ally Group, Military Rank, Status and Wealth.

CHARACTER TYPES

This section details some of the types of characters likely to use mecha, as well as several archetypes from mecha animation and some suggested advantages, disadvantages and skills. Remember, these are simply archetypes, and many characters will combine a couple of character types into one – Outlaw/Idol/Vigilante for instance – or evolve from one type to another as the campaign progresses.

Note on Skills: "Mecha operation skills" are Battlesuit or Driving (Mecha), as well as Electronics Operation (Sensors) and (Communications). "Mecha combat skills" consist of Gunner (the specialization depending on the weapons used) and whatever hand-to-hand combat skills (Brawling, Broadsword, Karate, et cetera) are appropriate.

Armored Trooper

A soldier who operates a drivable mecha or battlesuit. He's trained and equipped mainly for ground combat, although he will often be space-dropped into action from orbit. Armored troopers can serve in a regular army formation, a mercenary unit or an elite force like the marines. All tend to think of themselves as a superior breed compared to ordinary infantry or tank crews.

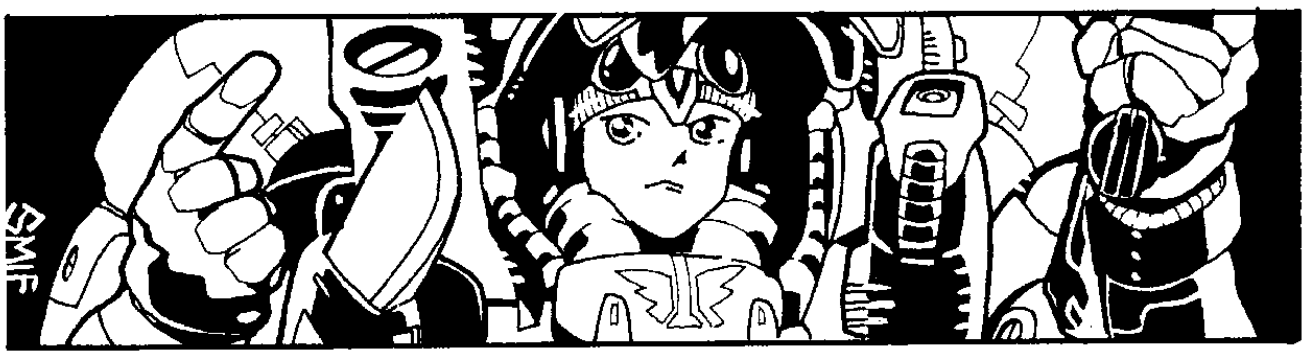
Even so, ground combat is dirtier and less glamorous than air or space combat – unlike the mecha flyboy, the trooper often lives on the front lines or spends days on patrol rather than just flying back to base after a short mission. Combat veterans are more likely to be shell-shocked survivors than daredevil aces.

Advantages: Alertness, Combat Reflexes, Luck, Military Rank.

Disadvantages: Extremely Hazardous Duty, Sense of Duty (Comrades). A rookie often has Gullibility or Overconfidence. A veteran may suffer from Flashbacks or Paranoia.

Skills: Battlesuit or Driving (Mecha) and Gunner are vital. Armoury, Camouflage, First Aid, Electronics Operation, Forward Observer and Survival are useful, as is a hand weapon skill, if the mecha uses one. Some units require Free Fall, Parachuting and Vacc Suit. Brawling and Carousing are common. Officers need Intelligence Analysis, Leadership, Navigation, Strategy and Tactics.

Example: Johnny Rico in *Starship Troopers*.



Bishonen

A bishonen is a beautiful but deadly *male* warrior. "Beautiful" is used precisely: a bishonen has long flowing hair, large dreamy eyes and a slight build. Their androgynous, "rock star" looks appeal equally to women and men; some get mistaken for girls at one time or another, with embarrassing consequences. A few bishonen go one step further: they affect a languid manner, dress in women's clothes or suck on roses between their teeth. Others aren't so keen on the fact that men keep asking them out.

To compensate for this – or thanks to all the fights they get into with embarrassed suitors – the elegant bishonen is often an extremely deadly warrior. More than that, though, he's a crafty and devious planner, Odysseus rather than Achilles, not above using assassination, betrayal, disguises and other stratagems to achieve his ends, even if he's one of the good guys. The Bishonen character type is generally combined with one of the others, like Enemy Ace, Idol or Techno-Knight.

Advantages: Beautiful or Very Beautiful (with *Bishonen Look* option – see p. 33), Combat Reflexes, Composed, Fashion Sense, Reputation, Voice and often Status.

Disadvantages: Laziness, Reputation (as transvestite).

Skills: Acrobatics, Acting, Artist, Detect Lies, Disguise, Interrogation, Knife or Force Sword, Savoir-Faire, Sex Appeal, Shadowing, Strategy.

Example: Yellow Dancer in *Robotech: New Generation.*

Castaway

The character could be anyone, but often he's either a trained soldier or a high school student. His life was pretty normal until he crash-landed on a primitive planet, was caught at ground zero when a dimension-ripping super weapon exploded or was kidnapped by fairies. Now he's not in Kansas any more. He may be trapped in another time, an alien culture or even an entirely new dimension, like a swords-and-sorcery world.

There's some sort of war or power struggle going on, he's fallen right into the middle of it and if he wants to stay alive, he's got to choose a side – probably the same one as the cute alien girl who pulled him out of his crashed ship and who is now hunted by the local villain's secret police, yes?

Worse, for one reason or another he's *important:* maybe his crashed mecha is more advanced than the local technology, he's a natural-born pilot or the space warp he fell through has given him psionic or magic powers. Perhaps he was summoned here by a mage casting a Planar Summons spell to answer a prophecy that a magical knight from another world would save the kingdom! Whatever, he's now got a chance to be more important than he ever was at home, to parley his influence into power, marry the local princess and lead the revolution against the dictator! But what if he's not the only human who ended up a castaway – and the others joined a different side?

Advantages, disadvantages and skills depend on what kind of character type ended up a castaway.

Example: Sho Zama from *Aura Battler Dunbine.*

Cop

A police officer in a mecha-equipped unit. Mecha cops often have more combat and less investigative training than normal police. They range from idealistic rookies to cynical, streetwise veterans. If a mecha unit hasn't yet been accepted by the regular police, it may be a dumping ground for troublemakers...

Mecha as Assigned Equipment

Someone serving in a mecha-using organization (whether his boss is a PC or an NPC) may be assigned a mecha, rather than having to buy one. This costs no points, but the character should have the appropriate Military Rank, Legal Enforcement Powers or Patron. The mecha is the property of the organization, not the pilot, and can always be taken away: "You're suspended, Detective Masato. I want your badge, your gun and your mecha."

Other Races

Non-human races are fairly common in the mecha genre, either as opponents or allies of humanity. See ***Compendium I*** (pp. 173-180) for racial design rules.

Hive Races

Fierce alien warriors that vaguely resemble giant insects are common opponents for humanity's mecha warriors. They usually have a sort of super-communist hive society in which various castes exist: fierce Warriors, mindless Workers, intelligent, breeding Queens and perhaps other castes as well. Hive races are often too alien to communicate with. Since this can be pretty boring, they sometimes have more humanoid allies, or perhaps a special interpreter or diplomatic caste. Hive races breed rapidly, look icky and are at least as xenophobic as people, making war with humanity almost inevitable.

Advantages: Some or all of Enhanced Strength, Extra Hit Points, Extra Legs, Fearlessness, High Pain Threshold, Infravision, Mindshare, Secret Communication, Super Jump and Teeth (mandibles). Upper castes may have psionic powers, such as Telepathy, used to relay orders.

Disadvantages: Bloodlust, Fanaticism, Hive Mentality, Intolerance (other species), Invertebrate.

Mecha: Hive races may not have mecha, although they usually have starships. Instead, they match superior numbers of infantry against human technology. If they do have mecha, the machines often have an insectoid appearance, with multiple legs.

Examples: The pseudo-arachnids of *Starship Troopers* are the classic "bugs." Other examples of mecha-fighting bugs appear in Robert Steakley's *Armor*, the space insects of the anime *Gunbuster*, the movie *Aliens* and the BEMs of the radically altered *Starship Troopers* anime.

Continued on p. 26 . . .

Besides ordinary police agencies, mecha cops may be corporate security, military police, frontier sheriffs, bounty hunters or space patrol officers.

Advantages: Legal Enforcement Powers. Better cops have Alertness, Combat Reflexes, Common Sense, Contacts, Danger Sense and Intuition.

Disadvantages: Duty, Honesty and Sense of Duty (to partner or the law). "Bad cop" disadvantages are Bully, Greed, Intolerance (Minorities) or Secret (On the Take).

Skills: Law and Professional Skill: Law Enforcement, along with mecha operation skills, are vital. Brawling, Judo or Karate, Criminology, Computer skills, Driving (Auto), Fast-Draw, Mechanic, Motorcycle, Fast-Talk, Beam Weapons or Guns (Pistol), Forensics, Intimidation and Shadowing are all worthwhile. The space patrol adds Astrogation, Piloting, Free Fall and Vacc Suit.

Example: Deunan Knute from *Appleseed*.

Criminal

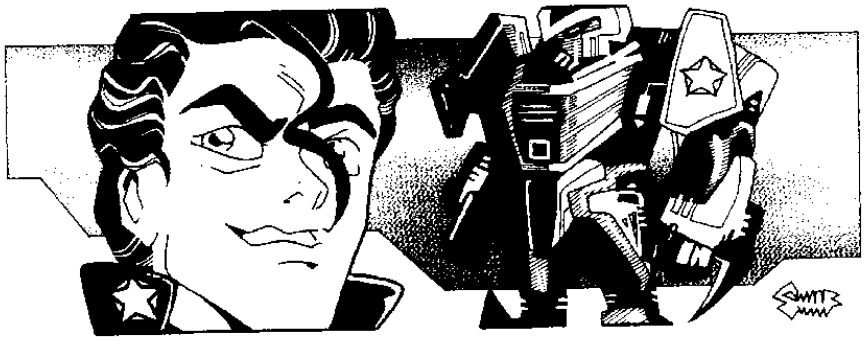
Mecha-using criminals are those who need mobility and firepower, such as pirates, bank robbers, marauding bandits, enforcers, world-conquering masterminds or terrorists. Criminals are normally motivated by greed, lust for power or revenge, but some claim "higher" motives: the "Robin Hood" bandit, the terrorist-cum-freedom fighter or the soldier whose government surrendered but who fights on as a pirate or guerilla.

Advantages: Ally or Ally Group (henchmen), Wealth (if successful) or Zeroed. A criminal with a cause may have a positive Reputation with some groups.

Disadvantages: Enemy (law enforcement or vigilantes). If dishonorable, Bully, Greed, Megalomania, Patron (crime boss), Reputation, Sadism, Secret Identity, Social Stigma or Vow of Revenge. Honorable criminals may have Pacifism: Cannot Kill or Pacifism: Cannot Harm Innocents, or perhaps some Code of Honor.

Skills: Combat and Thief/Spy skills, Intimidation. Crime bosses need Leadership.

Example: Doctor Doom, from *The Fantastic Four*.



Enemy Ace

The chief enemy mecha pilot, an honorable warrior who just happens to be on the wrong side. He is usually serving a superior, but often has a secret agenda of his own. The Enemy Ace conforms to the Armored Trooper, Exotic Warrior, Flyboy, Special Operative or Techno-Knight character type, but with these additions:

Advantages: Ally Group (lesser minions), Patron, Reputation.

Disadvantages: Bloodlust, Code of Honor (Samurai), Duty, Secret, Status and Vow of Revenge are all good.

Skills: Often adds Politics, Sex Appeal and Strategy.

Example: Char Aznable, from *Mobile Suit Gundam*.

Esper Weapon

The character is the fruit of a secret project to find or produce a psionic super soldier through drugs, mental conditioning or genetic engineering. Sometimes the project works perfectly. Often, the result is a dangerously unstable "loose cannon" with uncontrollable powers. Esper weapon characters are normally teenagers who have just begun to manifest their powers.

There are two main types of esper weapon: natural and artificial. An artificial esper weapon is a test-tube baby or vat-grown android, bio-engineered for psionic power. Those who were vat-grown have no real past, which can result in very inhuman personalities. Alternatively, they may have been raised by surrogate parents as normal people, while their true origin is kept from them until their powers begin to develop.

A natural esper weapon is someone with psi powers (often latent) who has been trained as a mecha pilot. Often, his innate abilities are enhanced by drugs, special training or implants. Unwilling subjects may be brainwashed or mind-wiped into amnesia and then coerced by the promise of getting their past back in exchange for cooperation. A mindwiped victim may even be tricked into believing he is an artificial person.

Esper weapons may still be working for whoever created or trained them, or they may have run away or been captured by the other side. A runaway may be uncertain about his origin and true identity; finding this out makes an interesting quest for a PC!

An esper weapon often has a super-mecha that only he can properly use, which enhances or is controlled by his powers.

Advantages: Psionic powers, Unusual Background.

Disadvantages: Amnesia, Berserk, Enemy (groups trying to capture or recapture the character), Flashbacks, Involuntary Duty, Social Stigma (Valuable Property) or Split Personality.

Skills: Psionic skills, plus (usually cursory) training similar to an ordinary Armored Trooper or Flyboy.

Example: Four Murasame, from *Mobile Suit Zeta Gundam.*

Exotic Warrior

The character is a visiting mecha warrior from a more advanced culture. She (less often, he) is often a runaway alien princess, bounty hunter or cop sent to apprehend a fugitive, or a super android come to defend Earth against invaders. The warrior typically resembles an attractive human with a few cosmetic changes.

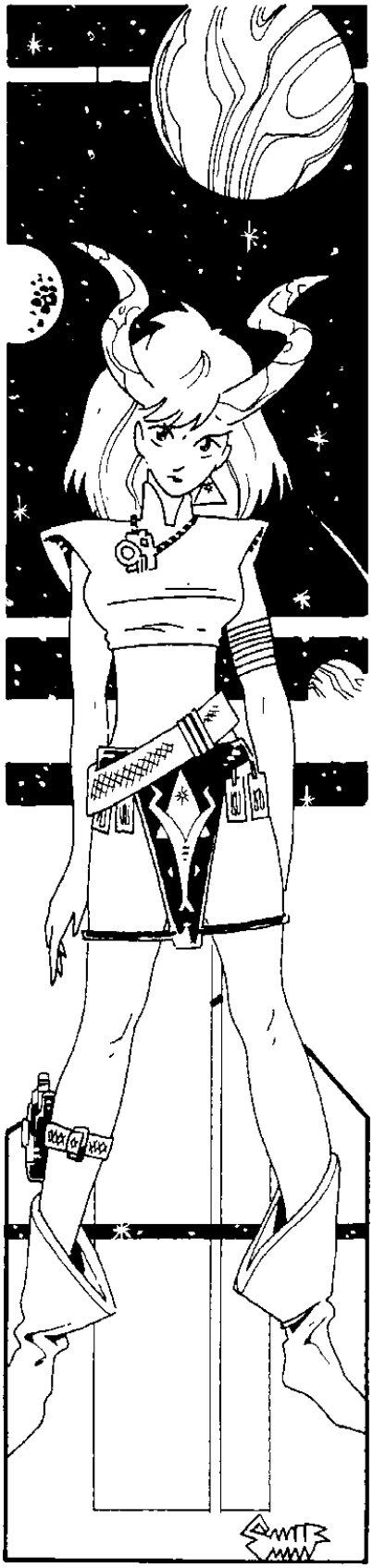
Exotic warriors sometimes have psionics, magic or super advantages, but may simply rely on advanced technology. An exotic warrior should be created like a Techno-Knight, Armored Trooper, Flyboy, Cop or Vigilante, but with these additions:

Advantages: Appearance, High Technology and sometimes Unusual Background (Superbeing). Superbeings take some of these advantages: Damage Resistance, Enhanced Strength, Extra Hit Points, Flight, Magery, Psionics, Rapid Healing, Super Jump and Vacuum Support.

Disadvantages: Add Social Stigma (Outsider). As an alien, the character may have an Unnatural Feature or unique racial disadvantages as well.

Skills: Regardless of profession, Acrobatics, Karate and any necessary Magic or Psionic skills are common.

Example: Iczer One, from *Iczer One.*



Other Races (Continued)

Tentacled Horrors

These are "indescribably horrible" aliens inspired by the works of H.P. Lovecraft, H.R. Giger and E.E. "Doc" Smith. The ones in anime have spacecraft, mecha and bizarre technological devices, making them even worse. Sometimes they can shapeshift to masquerade as humans! They may be inhumanly evil, or simply very alien.

Advantages: Some of Enhanced Strength, Extra Flexibility, Extra Hit Points, Morph, psionics, Super Jump and Teeth.

Disadvantages: Fanaticism, Hideous, Inconvenient Size, Intolerance (other species), Invertebrate. Cinematic monsters typically have Bloodlust, Lecherousness, Megalomania and Sadism.

Mecha: Often have a biomechanical structure.

Examples: The Paranoids of *Gall Force* or the Cthulwolf in *Iczer One*.

Continued on next page . . .

Flyboy

A military pilot of a flight- or space-capable mecha, often one that can transform into a fighter plane and which is based on a carrier ship. His missions take him into the high blue yonder or deep space; he'd rather fight in the sky than on the ground.

The archetypal flyboy is young, hot-blooded and supremely confident he can outmaneuver anything ever built. He maintains an icy cool in battle, wears aviator shades and a rakish silk scarf and races fast motorcycles when he can't fly. Of course, that's just one of the stereotypes: he's just as likely to be a grim, scarred veteran or shy teenager.

Some flyboys are aces; by military tradition, an ace is someone with five or more kills. The best aces are known for their "situational awareness," the ability to keep track of everything in a confusing battle so as to avoid surprises and strong opposition while spotting and picking off vulnerable foes.

Advantages: Military rank 2-4 and often Appearance. Mecha pilots more likely to make ace than buy the farm should have one or more of Acceleration Tolerance, Alertness, Combat Reflexes, Danger Sense, Luck and 3-D Spatial Sense. GMs building cannon fodder should avoid these advantages! A loyal wing man or buddy may be an Ally. Aces will have Reputation.

Disadvantages: Duty (to the military), Bad Temper, Enemy (a rival in one's own unit, or an enemy out to get him). Common are Compulsive Carousing, Flashbacks, Impulsiveness, Lecherousness, Obsession (Mecha Piloting) and Overconfidence.

Skills: Driving (Mecha), Piloting (Mecha), Gunner, Electronics Operation, maybe hand weapon skills. A minimum level of skill in Beam Weapons or Guns, First Aid, Navigation and Survival, and maybe Free Fall and Vacc Suit. Officers need Leadership and Tactics. Add Brawling, Carousing, Motorcycle and Sex Appeal for flyboys who live up to the mecha-jock image.

Example: Isamu Dyson in *Macross Plus*.

Gladiator

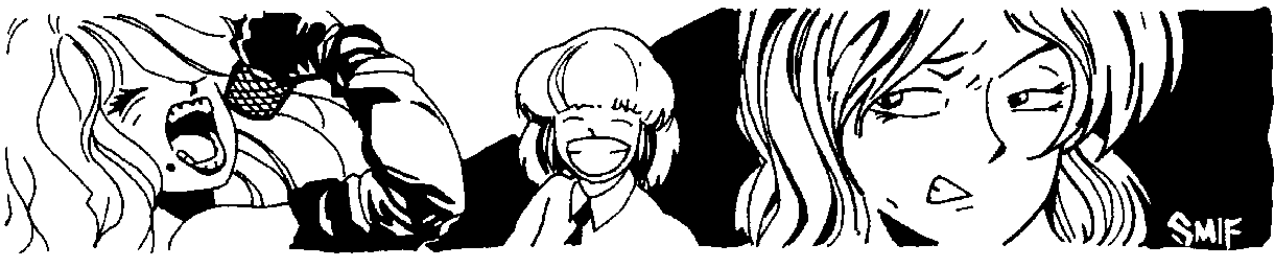
A professional arena fighter who uses a mecha. If fighting is for fun, gladiators are essentially sports performers, like pro wrestlers: up-and-coming rookie heroes, overconfident champions or brutal villains. If battles are bloodier, gladiators are often discharged combat veterans or meres between jobs.

Advantages: Allies (coach, teammates), Attractive, Combat Reflexes, High Pain Threshold, Reputation (as hero), Patron (manager or coach), Toughness or Wealth (if successful).

Disadvantages: Bloodlust (if a "villain" fighter), Enemies (rival fighters) or Reputation (as villain).

Skills: Battlesuit or Driving (Mecha), Brawling, any combat skills needed for the mecha's weapons. Sometimes Acrobatics, Karate, Judo or even Wrestling. Some gladiators are Idols (see p.27) with skills like Acting and even Singing!

Example: Miku from *Metal Fighters Miku* typifies the flashy mecha wrester; Chirico (*Armored Trooper Votoms*) is an example of a soldier-turned-arena fighter.



Idol ("Idoru")

This is a modern Japanese term for a celebrity performer, like a popular singer or movie star. An idol is traditionally the hero's love interest, and maybe the villain's as well, but some are also mecha pilots – rock singers who have double identities as mecha vigilantes, gladiators, or freedom fighters. In wartime, an idol can inspire mecha warriors or rally a dispirited populace to resist invaders. Occasionally, their influence extends to both sides – think of "Lili Marlene" in World War II. Thus, they can become powerful tools for propaganda. At least in cinematic games, music can be a form of cross-species communication in the event of alien contact! A few idols are more than human: alien idols are possible, and the "virtual idol" (a computer-generated singer) has appeared in at least two anime series.

Advantages: Beautiful or Very Beautiful (with *Bishonen Look* option if male; see p. 33), Charisma, Musical Ability, Reputation, Voice.

Disadvantages: Glory Hound, Manic-Depressive, Obsession (Performing), Stubbornness, Weirdness Magnet.

Skills: Acting, Dancing, Bard, Musical Instruments, Performance, Singing.

Example: Minmei in *Macross* or, for mecha-piloting singers, Priss and Vision in *Bubblegum Crisis*.

Instructor

This includes space marine drill sergeants, mecha academy instructors and gladiatorial coaches. Generally experienced veterans, they are harsh but fair disciplinarians who act as surrogate parents to their students. These may start out hating them, but often come to respect them and, if of the opposite sex, even fall in love. In the military, a drill instructor may be reassigned back to active duty, where he can continue to serve as a mentor for his graduates – who may now be of higher rank.

An instructor is built like an appropriate mecha pilot character (Armored Trooper, Gladiator, et cetera), with these changes:

Advantages: Composed, Eidetic Memory, Fit or Very Fit, Less Sleep, Reputation (as teacher).

Disadvantages: Obsession (Physical Training), Odious Personal Habit (Loud Voice) or Reputation (as harsh). Sometimes crippled (One Eye, One Hand, et cetera).

Skills: Intimidation, Running, Savoir-Faire (Military), Teaching.

Example: Sergeant Zim in *Starship Troopers*.

Mascot

A mascot is traditionally a child or teenager, younger than other team members and cute but not beautiful. Typical mascots include younger siblings, neighbors, yeomen, and orphans. A mascot may be a character's love interest; if so, she is the sensible "girl next door"-type the hero went to school with, who will probably be dumped later for someone more sexy and mysterious.

Other Races (Continued)

Synthetic Soldiers

These are members of a warrior race that reproduces artificially, usually by cloning or "test tube" births. Synthetic soldiers may have been created by aliens or humans. They could still serve their creators, or may have replaced them – sometimes humanity will evolve into such a race after a very long war. As they reproduce by artificial means, synthetic races often have little knowledge of natural procreation and sometimes consist only of a single sex.

Synthetic soldiers can be highly skilled "elite" warriors, cheap cannon fodder or something in between. They typically look human, although sometimes they have unusual size or other physical differences. A few such species are genetically-altered human/animal hybrids, with bestial features, sharp teeth, fur and even tails.

Synthetic soldiers often have nothing to live for besides war and military training, and little in the way of culture.

Instead of a race of synthetic soldiers, unique individuals may be created. These are "living weapons" with exotic special abilities or even physical or psionic super powers.

Attributes: Racial ST, DX and HT bonuses are common.

Advantages: Varies. Combat Reflexes, High Pain Threshold, Toughness and 3-D Spatial Sense are common. Occasionally Alertness, Attractiveness, Extra Hit Points, Fearlessness, Fur, Hard to Kill or Teeth.

Disadvantages: Duty or Fanaticism is usual, sometimes Slave Mentality. Bloodlust, Intolerance (non-warriors, opposite sex or non-clones) and Social Stigma are common. Giant warriors may have Inconvenient Size. A society of synthetic soldiers may even have a Hive Mentality. Zero-gee space warriors often have Skinny.

Examples: The Solenoids in *Gall Force*, the Zentraedi from *Macross*/*Robotech*, the Space Marines from Christopher Rawley's *War for Eternity*, the Taurans (and later, humanity) in Haldeman's *The Forever War*, the humanoid Cthulwulf in *Iczer One* and the Hawks and Glovers in Greg Bear's *Hard Fought*.

Military Unit Compositions

Characters in mecha campaigns often belong to military organizations. Military forces can have infinitely variable tables of organization, but these sidebars should give some idea what a typical unit's composition might look like.

Armored Mecha Unit

This is the mecha equivalent of a modern tank or armored cavalry unit. The lowest level of organization is an individual tank-sized mecha piloted by a sergeant (rank 1-2), or a *squad* of four to eight battlesuits, led by a corporal or sergeant (rank 1).

Higher levels of organization are:

Platoon or *Troop:* Three to six tank-sized mecha *or* three to six battlesuit squads, under a lieutenant (rank 3) and a sergeant (rank 2).

Company or *Squadron:* Two to five platoons led by a captain (rank 4). It will have support personnel such as medics or technicians attached to it. Battlesuit and tank-sized mecha platoons are sometimes mixed at this level. One platoon may be equipped with specialized scout or command mecha.

Battalion: A self-contained fighting force consisting of three to five companies under a major (rank 5). At battalion level, mecha and battlesuit companies are usually mixed to form a combined arms force. A battalion often has specialized platoon- or company-sized units attached to it, such as artillery, reconnaissance platoons or engineers. It will also have a support company of mechanics, cooks, medics, military police, staff, et cetera. An exception is units serving aboard a ship, which may use the ship's resources instead of having their own support troops.

Larger Units: A *regiment* or *brigade* is three to six battalions under a colonel (rank 6). A *division* is three to five brigades under a general (rank 7). An *army* is several divisions.

Note that pure-mecha forces can be pretty small: as a single platoon only needs 3-6 mecha pilots, even a small group of PCs can make up a good portion of a company's fighting strength! This allows gaming out reasonable military missions without the GM having to worry about too many NPCs being involved in the battles.

Continued on p. 30 . . .

A mascot can be a player character, but is more often a Dependent. Pre-teen mascots mostly get into trouble. A teenage NPC mascot typically fills "stay at home" jobs that action-oriented players find boring: cook, medic, radio operator, technician or whatever.

If the mascot can pilot a mecha, it's usually not very dangerous – perhaps something like a cargo loader.

Advantages: A mascot's most important advantage is Charisma: this explains why everyone looks out for him when he's fairly useless – and why the villains avoid shooting him. Appearance (Attractive) and Luck are nice to have. Some mascots have Common Sense; others display a total lack of it.

Disadvantages: Youth is essential! Combat Paralysis, Curious and Gluttony are common. Mascots sometimes have Dependents of their own: a cute pet or robot, or a toddler they've adopted.

Skills: Cooking, Computer Operation, Computer Hacking, Driving, Electronics Operation, First Aid, Mechanic, Running or Scrounging.

Example: Mackie in *Bubblegum Crisis.*

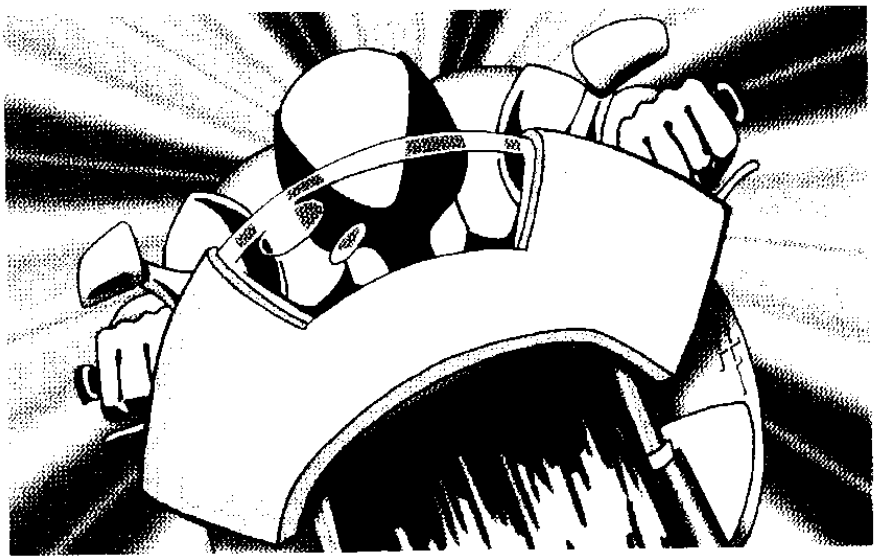
Masked Warrior

This is a mysterious character who wears a mask or battlesuit to disguise his true identity. While most superheroes fit into this tradition, this cliché is also common in anime.

A villainous masked warrior is usually one of the top enemy aces or warriors, whose mask enhances his aura of menace among friends *and* foes. The heroic version is the anime equivalent of Clint Eastwood's "man with no name." He first appears as a mysterious stranger who aids our heroes against the villains and vanishes into the sunset, only to return later on as things get tougher.

The masked warrior hides his face for a reason, often a scar marring his otherwise handsome visage. That's just an excuse, though – the real reason is to disguise his true identity. Maybe he's a PC's long-lost relative, a woman disguised as a man, part machine or secretly working for the good guys even though he's on the enemy's side. Maybe he's just shy. Maybe all of them at once! The secret can be revealed at an appropriately dramatic moment in the campaign – during a final showdown, or after he has been captured.

Kamen is Japanese for mask, so masked warriors with a flair for stating the obvious sometimes go by the name Kamen-something, like Kamen Rider ("masked rider"). This is more common for superheroic types.



A masked warrior character normally conforms to the Armored Trooper, Criminal, Enemy Ace, Exotic Warrior, Flyboy, Special Operative or Vigilante archetype, with these additions:

Advantages: Appearance, Military Rank, Reputation.

Disadvantages: Appearance, Reputation, Secret.

Skills: Disguise, Intimidation, Savoir Faire.

Example: Char Aznable in *Mobile Suit Gundam.*

Mecha Base Personnel

If the mecha crew are part of a larger military or police organization, they may operate from a base or spaceship. A base crew can be all NPCs, or can include some PCs; it's a good source for dependents or love interests. The characters most likely to encounter mecha pilots or battlesuit troopers are:

The stoic commander. Often calm and unruffled in the face of crisis, he rarely seems to leave the control room.

The second in command, a younger version of the commander and possible love interest for a mecha pilot.

The perky dispatch or communications operator who acts as the link between mecha pilots and base. A possible Mascot.

The operations crew, who man the base's sensors or weapons from the control room and, if the base is a ship, pilot it.

The ground crew who service the characters' mecha. One of them may be a full-fledged Mecha Engineer (see below).

The doctor, medic or nurse who patches the characters up.

A large base will also have cooks, quartermasters, gun crew, techs, security guards and others. Some of them can be full-fledged characters, but most are simply faceless "extras."

Advantages: Appropriate Military Rank or Legal Enforcement Powers. The commander (and maybe second in command) may have Charisma, Intuition and Strong Will if he is competent. Love interests for PCs need an appropriate Appearance.

Disadvantages: Duty is common, plus a few others to round them out. Most base commanders have one or more eccentricities, plus a Sense of Duty to their crew.

Skills: Whatever is needed for the job. The commander and second in command have Leadership and Strategy, the operations and communications crew need Electronics Operation, ground crew require Armoury and Mechanic, and so on.

Example: Commander Gloval in *Robotech.*

Mecha Engineer

An inventor or engineer who specializes in mecha. This archetype includes its fair share of absent-minded old professors, but just as many are clear-headed, twenty-something prodigies. All share an obsession with trying out new mecha technology and a pride in their designs. "Second generation" designers are common: these are continuing a parent's work, often after a brutal murder by rivals. Mecha engineers may work for the military, a corporation or themselves. Some are motivated by a cause (like winning a war or helping people) while others are in it for the wealth, fame or simply the desire to invent things.

In realistic campaigns, a mecha engineer rarely pilots his own machine, but in cinematic settings, the mecha designer is sometimes also a wealthy techno-knight or super.

Advantages: Dependent (younger relative), Gadgeteer, Reputation, Wealth and sometimes High Technology and Multimillionaire.

Military Unit Compositions (Continued)

Fighter Wing

Mecha that are flight- or space-capable sometimes use navy or air force-style organization, especially if they are deployed on carriers.

Pair or *Section:* Two mecha, a leader and a wing man, both usually lieutenants (rank 3). Pairs often operate independently.

Squadron: Three to six pairs under a squadron leader (rank 4). A small base or carrier may only have one squadron aboard, with the squadron leader reporting directly to the ship's captain or base commander (who is usually rank 5 or 6).

Group or *Wing:* Two to four squadrons under a major or colonel (rank 5, and often still flying his own mecha) reporting to a rank 6 or 7 carrier captain or base commander.

Mecha Police

A police unit equipped with mecha might be organized something like this:

Team: Two police officers (partners), with mecha or battlesuits.

Squad: Three to five teams under a police sergeant.

Two or more squads will then form the actual unit, which may be called an "Armored SWAT Team," "Special Vehicle Division" or the like, normally under a "squad commander" or "captain."

Disadvantages: Absent-Mindedness, Alcoholism, Sense of Duty.

Skills: Armoury, Computer skills, Electronics, Engineering, Mechanic or Research; in over-the-top games, Science!

Example: Yang Newman in *Macross Plus*, or for inventor-turned-mecha pilot, Tony Stark in *Iron Man*.

Outlaw

A young rebel who combines disdain for authority with a love of fast motorcycles and mecha. In a post-holocaust or frontier setting, he's a member of an outlaw pack that rides mecha instead of motorcycles, or maybe a guerilla freedom fighter. In a modern or cyberpunk background, he's often an ex-biker recruited into a mecha team for his quick reflexes and fighting spirit . . . or maybe he just stole a cool-looking motorcycle to take it for a joy ride, only to discover it can transform into a battlesuit; who built it and why?

Advantages: Ally Group, Combat Reflexes, High Pain Threshold, Toughness.

Disadvantages: Bad Temper, Pirates' Code of Honor, Enemies (police, rival gangs), Impulsiveness, Reputation, Youth.

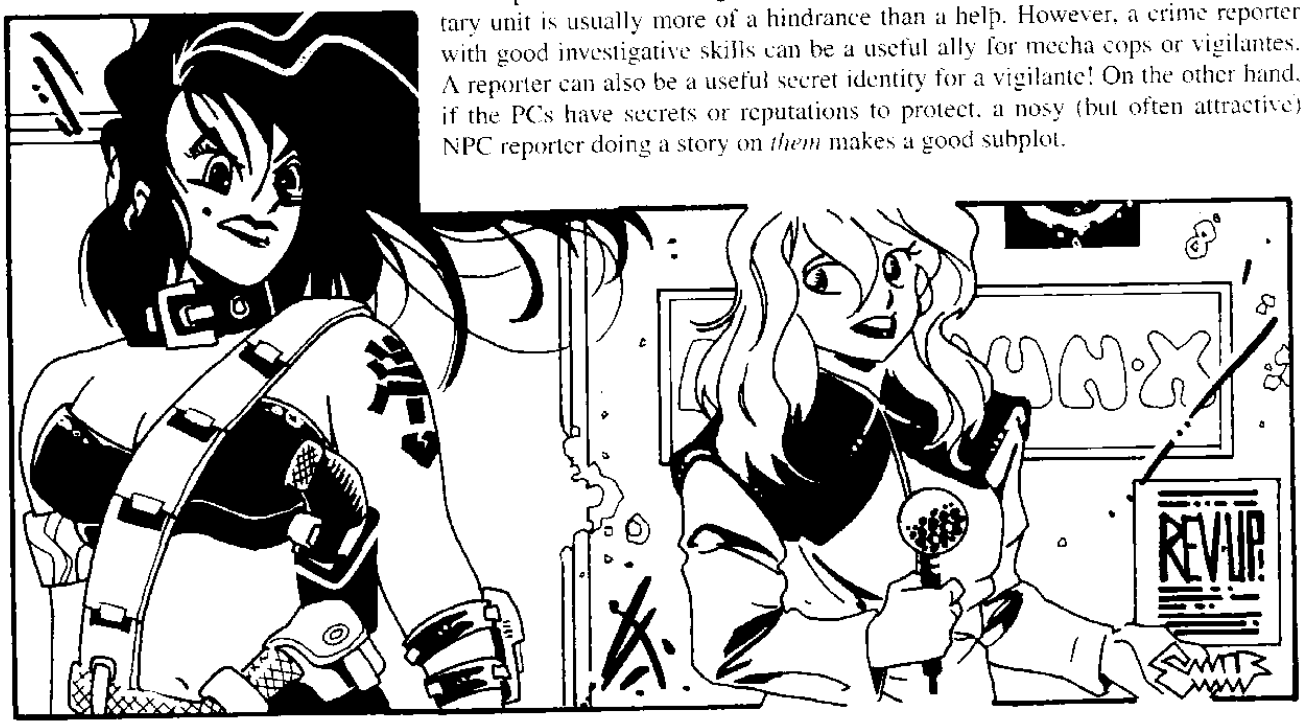
Skills: Mecha operation and combat skills, Brawling, Intimidation, Knife, Mechanic, Motorcycle, Scrounging, Streetwise.

Example: Priss in *Bubblegum Crisis*.

Reporter

This is the crusading reporter, war correspondent or gung-ho news photographer who chases mecha-connected stories. If government propaganda is covering up defeats that its mecha forces have suffered, the reporter heads to the front lines to ferret out the truth. When the alien mecha crash-lands on Earth and its beautiful pilot eludes the authorities, he's the one who makes first contact with her. If a conspiracy loses a top-secret super mecha, it's the reporter who stumbles upon the missing prototype.

Reporters also make good NPCs. A war correspondent assigned to a military unit is usually more of a hindrance than a help. However, a crime reporter with good investigative skills can be a useful ally for mecha cops or vigilantes. A reporter can also be a useful secret identity for a vigilante! On the other hand, if the PCs have secrets or reputations to protect, a nosy (but often attractive) NPC reporter doing a story on *them* makes a good subplot.



A reporter usually doesn't have a mecha (unless he's found one by accident), but one anime series had war correspondents with their own flight-capable news mecha!

Advantages: Attractive, Contacts, Favor, Intuition, Patron (news agency).

Disadvantages: Curious, Enemy (authorities), Obsession (peoples' right to know), Weirdness Magnet.

Skills: Computer skills, Detect Lies, Driving, Interrogation, Photography, Shadowing, Streetwise, Video Production, Writing.

Example: Hibiki in *Macross II*.

School Kid with a Destiny

The character is a teenager, not yet out of high school, who is living an ordinary life that is suddenly turned upside down because he is . . .

. . . the child of a mecha designer. When the enemy makes a sudden attack, he's the only pilot around, so he climbs into the prototype's cockpit, reads the "quick start" manual and shows why he is destined to be the world's greatest mecha warrior.

. . . revealed to belong to an ancient family line of warriors against evil. Now evil has awakened and his mentor tells him it's time to fight back.

. . . transported into a magical dimension by someone who needs an otherworldly savior and mecha pilot.

. . . a newly-awakened psi, with exceptional abilities that make him just the person needed to pilot the new super mecha.

. . . picked for undefinable reasons (such as inner strength, sheer accident or a cute face) by a visiting exotic warrior to co-pilot a super mecha in a fight to save the world.

. . . the only one who has the genetic or mental ability to properly meld with a new super mecha's neural interface.

. . . living a lie, and he's really part-alien, a clone or an android, destined to become a mecha pilot. Now the enemy is here, and his guardians must reveal the truth.

Or something else equally outrageous and life-changing!

Whatever the reason, the safety of his family, school and maybe the entire world is resting on his shoulders – and he still hasn't had a first date! His worst enemy is likely to be his own lack of self-confidence and youthful naivety.

Many Japanese school kids wear uniforms: a sailor suit for girls and a black, high-collared, button-up suit for boys. These uniforms are such a recognizable part of the anime genre that they deserve mention here!

Advantages: Luck, Intuition, and in some cases Bonded Mecha, Destiny, Karmic Ties, or Reawakened. An Ally (an older mentor figure or a best friend) is useful.

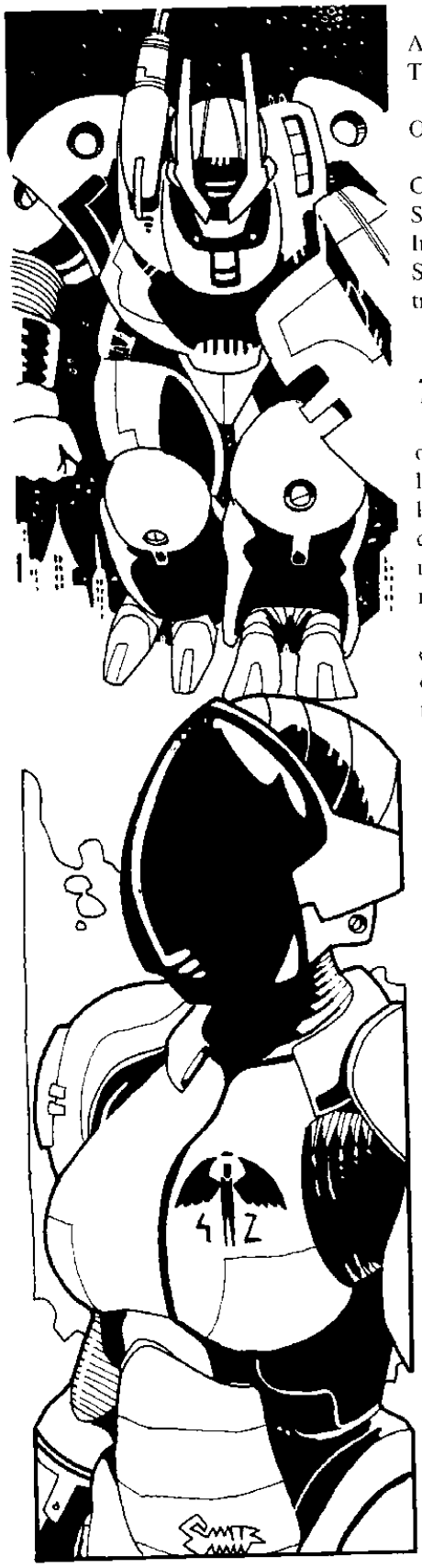
Disadvantages: Youth, Dependents (family), Gullibility, Honesty, Sense of Duty, Shyness, or Truthfulness.

Skills: Whatever he learned in school or whatever his family or guardian taught him. This may sometimes include special training.

Example: Amuro Rey in *Mobile Suit Gundam*, Nagisa in *Iczer One* or Shinji in *Neon Genesis Evangelion*.

Special Operative

A member of an elite, mecha-equipped commando unit, usually working for the government or military. Some operatives are freelance, such as a ninja clan or a group of ex-special forces mercs. Special operatives use whatever tools they need to complete the mission. Battlesuits and mecha are very potent weapons, especially with advanced stealth, sensor technology and flight systems. However, a special-ops soldier doesn't rely only on his suit: he's deadly with or without it.



Advantages: Military Rank or Legal Enforcement Powers (unless freelance), Alertness, Combat Reflexes, Danger Sense, Eidetic Memory, Intuition, High Pain Threshold, Strong Will or Toughness.

Disadvantages: Bloodlust, Extremely Hazardous Duty, Fanaticism, Overconfidence, Sense of Duty (comrades or nation).

Skills: The same as for an Armored Trooper, but add some or all of Acting, Climbing, Computer Hacking, Demolition, Electronics Operation (Security Systems), Escape, Forgery, Interrogation, Guns or Beam Weapons, Holdout, Intelligence Analysis, Karate, languages, Psychology, Sex Appeal, Scrounging, Stealth, Swimming, Tactics and Throwing. If there are aliens, operatives may be trained in Xenology – know your enemy!

Example: Major Kusanagi in *Ghost in the Shell.*

Techno-Knight

In some cultures, mecha pilots are a feudal aristocracy like medieval knights or samurai. A pilot might be an ordinary knight, a noble or part of a royal family. Such a character could also be deposed or disgraced and trying to regain his lost honor, lands or throne. The honorable warrior-prince living in exile from the decadence and corruption of the imperial court is a useful archetype. So is the noble or royal brat run away from home to see the world or avoid an arranged marriage. If an heir later falls in love with a commoner, this can get interesting.

Techno-knights should start with at least enough Wealth to afford their parents' mecha. Some inherited mecha could be damaged or obsolete (and thus cheaper), but others are relics from an age when mecha were more advanced than they are today!

Advantages: Status 2+, Ally (servant or squire, who is often a technician) or Ally Group (retainers), Appearance, Combat Reflexes, Heir or Wealth, possibly with Multimillionaire. Inheriting an advanced mecha requires High Technology. In some settings, royalty have hereditary magical or psionic powers.

Disadvantages: Code of Honor (Chivalric, Gentleman's or Samurai) is a must. Other good disadvantages are Duty (to feudal lord), Impulsiveness, Overconfidence, Stubbornness and Vow.

Skills: Driving (Mecha), Gunner and/or melee weapon skills are vital. Other appropriate skills are Savoir-Faire, an Artistic skill and maybe Diplomacy, Heraldry, Leadership or Politics. Technical skills are often left to one's retainers.

Example: Ladios Sopp, in *Five Star Stories.*

Vigilante

The vigilante operates outside the law to pursue a vendetta, oppose a conspiracy or simply to right wrongs and fight evil. A good origin is important. Perhaps he was an armored trooper whose loved ones were killed by criminals, so now he uses his military skills to fight crime. Or maybe he's a mecha designer whose invention was stolen by an evil organization; now he's dedicated his life to opposing them. Vigilantes on a team don't all need the same background, but they should have a common cause!

Advantages: Alternate Identity, Combat Reflexes, Reputation (as hero), Strong Will, Filthy Rich, High Technology or Patron is useful to provide the necessary advanced suits and headquarters.

Disadvantages: Enemy (villains or the law), Flashbacks, Obsession, Reputation (as vigilante), Secret (Vigilante), Sense of Duty, Vow of Revenge.

Skills: Mecha operation and mecha combat skills, Intimidation.

Examples: Tony Stark (*Iron Man*). The Knight Sabers from *Bubblegum Crisis* are an example of a vigilante team.

Advantages, Disadvantages and Skills

This section discusses particular options for character creation in a mecha-oriented campaign.

Advantages

Acceleration Tolerance p. CI19

This is useful for pilots of flying mecha.

Ally Group p. B232, p. CI19

A mercenary captain, gang leader or feudal lord should take the Ally Group advantage. The commander of a regular military force doesn't need it – while he may have troops under him, they belong to the organization, not to him personally.

Appearance p. B15

Major characters (heroes or villains) are typically good-looking. They also may have . . .

Chromatic Hair Colors: This is among the first things people notice about the characters in some anime mecha shows. They have blue, purple, green or even pink hair! Why? Are they punks? The real reason is to make it easier for new viewers to tell the characters apart, but feel free to give your characters chromatic hair anyway; maybe it's a future fashion trend!

Bishonen Look: This means you are an androgynous beauty, equally appealing to both sexes. In game terms, this is a +0% (no extra cost) enhancement to Beautiful or Very Beautiful appearance. If you have it, average your reaction bonus for either sex and apply the average to both; e.g., Beautiful would give a +3 to reaction from *both* sexes, rather than +2 from the same sex and +4 from the opposite. Also, if you are Very Beautiful, *both* sexes can resent your good looks (a -2 penalty instead of the bonus) if they have reason to dislike you! Most Bishonen are male, but a female can have this kind of androgynous beauty – although in this case "bishonen" (beautiful boy) is a misnomer.

Cute Characters: Some anime characters, usually young female mascots, are *devastatingly cute* rather than beautiful, with huge eyes and puppy-dog smiles. To create such a *kawaii* character, take a combination of these three advantages: Attractive, Charisma and Pitiable (5 points, p. C129).

High Technology p. CI26

Use this if characters are to start with experimental or artifact mecha more advanced than the campaign's average TL.

Military Rank p. B22

The GM should carefully regulate the range of Military Rank that PCs can start with. Rank 5 and up involve commanding larger forces than most GMs will want to deal with – see *Military Unit Compositions* (p. 28). On the other hand, while anyone may be assigned a battlesuit, the military may require a minimum rank of sergeant (1-2) or lieutenant (rank 3) before a soldier is trusted with a multi-million dollar mecha.

If one PC is supposed to outrank the others, it's a good idea to discuss this with all the players before the campaign begins.

Multimillionaire p. B237, CI27

This is a vital advantage if a private citizen wants to run a mercenary company or bankroll a mecha-equipped superhero team.

Patrons p. B24

An ordinary military or police force doesn't count as a Patron unless it is a fairly "intimate" one like a secret agency. However, a character in an organization often has a senior officer as a Patron. This is useful for characters who like to disobey orders, and can explain why they haven't been drummed out of the service. A typical admiral, general or police commissioner will be worth about 10 points as a Patron.

Someone who works for a non-military organization will often have a Patron who provides equipment, e.g., a scientist who invented the mecha, but does not adventure himself. A Patron of this sort is worth at least 20 points (equipment worth more than starting wealth, technology better than the world's norm).

Psionics p. B165ff; see also GURPS Psionics

Psi powers are fairly common in some mecha campaigns, usually as Telepathy or Precognition, but the GM should always have the final say on whether they exist. Psi powers might mark the character as a new type of highly-evolved human, or they could be the result of an experiment – see *Esper Weapon* (p. 25). Aliens often have psi powers of their own. Some mecha are built to enhance or be controlled by psi powers – see *telepathic interface* (p. 98) and *psibernetic web* (p. 104). Being psionic normally requires an Unusual Background.

Unusual Background p. B23

Mecha campaigns, especially cinematic ones, often feature alien races, psis or even supers or mages. Any such character should require GM permission to play. Since mecha tend to counterbalance super or psi abilities, an Unusual Background charge of 10 points for aliens, 25 points for psionics and 50 points for magic or super powers is fairly appropriate. See the Esper Weapon (p. 25) and Exotic Warrior (p. 25) character types for in-genre examples.

Wealth p. B16

A good starting wealth for most mecha campaigns is $15,000. If characters must purchase their own mecha, Wealthy or Very Wealthy will buy a battlesuit, while Filthy Rich can afford a tank-sized machine. Also, expenses such as hangar space, fuel, ammo, lubricants, coolants and spare parts can be hefty. A million-dollar mecha requires some $25,000-$30,000 a year to maintain, putting its maintenance out of reach of characters with less than Comfortable wealth – unless, of course, they are members of an organization that can pick up the tab.

New Advantages

Bonded Mecha — 20 points

A mecha is "psychically bonded" to you. When not in use, it is stored in an invisible extradimensional pocket that is anchored to either your body or some sort of focus device. If the mecha is in the pocket or stored within the focus, you must concentrate for one turn to cause it to appear.

A drivable mecha (i.e., one with a cockpit) will manifest in the nearest open space that's big enough for it to fit into. If you want to board it, you don't have to climb in. Instead, as long as you are no farther away from the mecha than twice its height, you can concentrate for one turn and an exotic energy beam will reach out and suck you into the mecha. You pass directly through the mecha's hull, appearing in its cockpit.

A battlesuit is even more convenient, as it will appear around your body. This "transformation sequence" can be quite elaborate, as bits of the suit materialize and lock together around you. If the suit can't be worn with clothing, the suit trades places with your outfit, which is stored in the pocket dimension until you change back. In over-the-top games, this transition sometimes gives a brief glimpse of your nude body, especially if you're female. Modesty may be preserved by an instant change or a flash of light, or by spinning about at high speed in the process.

Banishing the mecha also takes a turn of concentration. If the mecha is a battlesuit, you must be wearing it to banish it. (Thus, someone could knock you out and remove your suit if they wanted to capture it). If the mecha has a cockpit, you must be outside it but touching the mecha in order to make it vanish.

Bonding with a mecha is always the result of some unique process, accident or ritual. The symbiosis may result from a magical enchantment or some form of TL16 super-gadget. Decide which: if it's magic, it won't work in a no-mana area, while a "reality stabilizer" (p. UT81) would prevent a super-gadget from working. You can only bond with a single mecha. If it is crippled or destroyed, getting a replacement may require many adventures.

This advantage costs more than the ***GURPS Supers*** Costume advantage because it allows characters with big, bulky machines to infiltrate enemy installations while seemingly unarmed.

Various enhancements and limitations can be applied to it:

Bootstrap Option: For +100% to cost, you can send the mecha into its dimensional pocket with you aboard! The pocket is only as large as the mecha – you can't move around in it, so this just gives you a safe place to hide and rest. Returning takes one turn: you and your mecha reappear where you vanished or, if something occupies that spot, in the nearest open space.

Voice-Activated: For -20% to cost, the mecha can only appear or vanish if you shout a code phrase or magic word. You can't summon the mecha if you are gagged, lose your voice, et cetera.

Focus: For -20% to cost, you possess a unique focus (like a medallion or magic sword) which you must wear or hold to summon or banish the mecha. Optionally, the focus may *be* the mecha: it transforms into the mecha when the mecha is summoned and transforms back into the focus when it is banished.

Other limitations (p. CI110) can be taken: Costs Fatigue, Limited Use, Preparation Required, Takes Extra Time, Takes Recharge, Unconscious Only and Unreliable are all reasonable.

Examples of bonded mecha appear in many anime and manga. See *The Guyver, Battle Binder Plus, Magical Knight Rayearth, Metal Fighters Miku* and *Iczer One*.

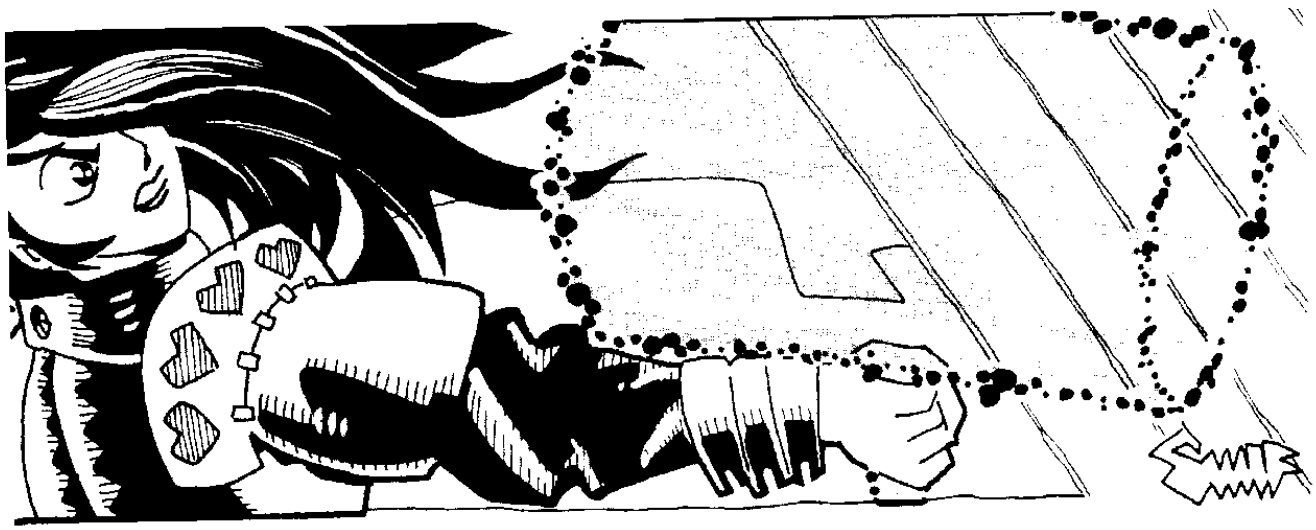
Interface Talent — 5 points

In some settings, only certain people can use neural interfaces; anyone without a special kind of interface talent goes mad or suffers other trauma when they try to use them.

At the GM's option, Interface Talent may have other prerequisite advantages or disadvantages, such as Strong Will or even Youth (perhaps only the young can adjust).

Shojo Mallet — 1 point

Only female characters in a *silly* anime-style campaign can take this – and many do! If you have it, you can instantly clobber a male who you catch acting rude, lecherous or unfaithful toward you. For example, if you see your boyfriend staring at another girl, or a guy insults you or makes a rude pass, you can punish him! Take a free action (p. B107) and roll a Contest of your Will vs. his own, adding +5 if you have Bad Temper, Jealousy or Berserk. If you succeed, you pull a giant, multi-ton mallet out of thin air and clobber the offender flat! He's mentally stunned and takes 1 hit damage (DR won't protect). If you fail, no hammer appears; you give the jerk a withering look and you can't use this shtick for an hour of play.



DISADVANTAGES

The stereotypical mecha warrior PC often has the standard "heroic" disadvantages of Impulsiveness and Overconfidence. Other disadvantages worthy of comment include:

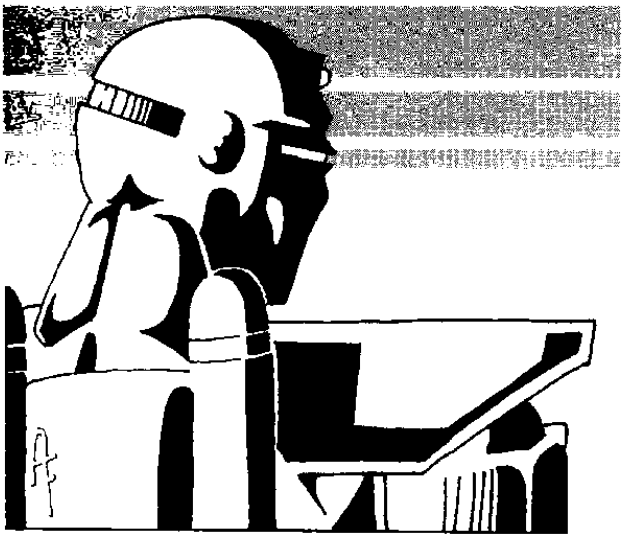
Code of Honor p. B31

In a setting in which mecha are the new techno-knights, the Chivalric Code is quite appropriate. Some high-ranking military officers may also honor the Gentleman's Code, while a gang of mecha-bikers or space pirates would follow the Pirate's Code. Some Japanese-influenced warriors may follow *bushido*, the way of the warrior, which is the samurai code of honor. This is perfect for the honorable enemy who loyally serves an evil cause or villainous master: though they find their master's actions distasteful, they still follow him out of bushido.

Samurai Code of Honor: A samurai must have a master: a feudal lord or, in the modern world, the leader of a corporation, government or military organization. The master must be obeyed in all things, regardless of one's own feelings. A samurai must answer any challenge or insult to his master. Pain, discomfort and death must be faced stoically. Disrespect from a social inferior must be punished as harshly as possible. The only way to leave service without permission is to commit *seppuku* (ritual suicide). *-15 points.*

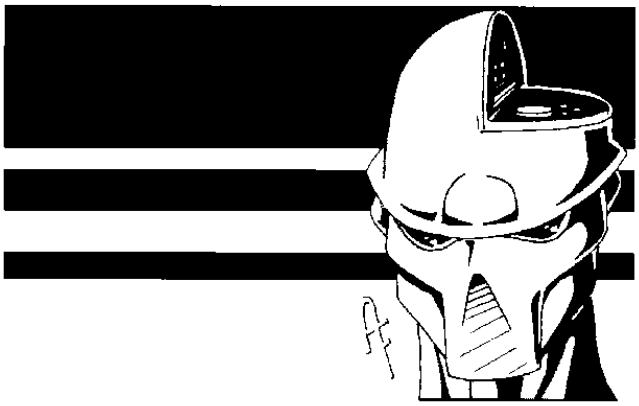
Dependents p. B38

Characters in a mecha campaign have the usual assortment of lovers, under- or over-age relatives and so on – see the Mascot character type (p. 27) for typical Dependents.



Duties and Sense of Duty p. B39

Characters who are in the military or a police force may have a Duty. A Sense of Duty toward comrades (-5 points) is common for "good" characters and helps unify a group of PCs.



Enemies p. B39

Enemies don't have to be trying to capture or kill you – the disadvantage also covers people who "work against you." In the cinematic tradition, this includes the arch-rival who is ostensibly on your side but who is jealous of your success or wants something you have: your lover, your position as team leader or your reputation as ace of aces. One problem – usually the rival is about as good as you are, and often he is richer and better looking! A rivalry may be recent (hate at first sight), date back to a specific slight or even be a childhood thing. Trouble is, often you're both in the same organization, academy, school or whatever, and when things get tough, you have to work closely together against the real enemy – especially if they're threatening the person you *both* love!

Flashbacks p. B240, C190

This is a good disadvantage for angst-ridden mecha warriors who have become tired of all the killing. Flashbacks also go nicely with a Vow of Revenge (p. 36). Characters who have been brainwashed often have Flashbacks!

Gluttony p. B33

In anime, kids and young women often have this disadvantage *without* being overweight – it's a "cute" trait.

Gullibility p. B33

Extremely common among raw recruits!

Involuntary Duty p. B238, C177

Brainwashing is a common feature of more angst-ridden mecha storylines. One side (not always the villains!) brainwashes a prisoner or talented innocent into serving them as a mecha pilot. A brainwashed pilot often has Amnesia, Flashbacks and a Split Personality as well! They aren't the only ones in trouble – if you've just discovered your missing kid sister is piloting the enemy mecha, do you open fire?

Lecherousness p. B34

Lecherousness is common for both realistic and cinematic mecha pilots, who tend to be a hot-blooded lot. A common cin-

ematic trait of young anime males is to combine Lecherousness with *Shyness*. The shy lech is too nervous or inexperienced to directly make a pass at an attractive female if he fails a Will roll. Instead, he will spy on her while she is undressing or showering, steal her underwear, buy photos of her from her sister, et cetera. The appropriate female response is a hefty slap or blow, which leaves the lecher mentally stunned. In anime tradition, a Shy and Lecherous male should also have the quirk "Gets nosebleeds when aroused."

Lecherous aliens, especially humanoids or those with tentacles, may be attracted to humans.

Pacifism p. B35

A few student demonstrator anti-war activists can be an interesting encounter for military characters when they get back to the home front on leave! A common character type in the military genre is the "failed pacifist" – someone opposed to fighting in principle, but who fights because he's been drafted or to protect himself and his comrades. He doesn't suffer penalties in battle, but may end up working toward a peaceful resolution of the conflict (or deserting!). This is a quirk.

Secret p. B238, p. C178

This is a very common disadvantage for honorable villain characters and also for the Masked Warrior type (p. 28). In the anime tradition, common secrets are:

- Born heir to a deposed monarchy or political dynasty.
- Having a parent who is, or was, a major villain.
- Being an alien prince or princess.
- Having been born as a bred-for-battle "living weapon."
- Being a battlesuited vigilante (a "secret identity").
- Having psionic powers.
- Being a clone of a dead warrior or scientist.
- Being a member of a secret society like the Yakuza (Japanese mafia) or an outlawed revolutionary group.
- Disguised as the opposite sex (with bishonen look).

A variation on this is the "Unknown Secret" - the GM comes up with a secret that the *player* doesn't know either, but which will be shattering to him when it is revealed during play. This works well if the secret is something that happened during the PC's childhood: he may not know that he is really the wanted heir to the throne, or was born in a test tube as an Esper Weapon (p. 25).

Shyness p. B37

This is common because it's a stereotypical Japanese cultural trait. In a Japanese setting, many youths have it; those who don't stand out as leaders or rebels. Mild Shyness is also a good trait for young, clean-cut military or police recruits.

Social Stigma p. B27

Psis or androids created as Esper Weapons (p. 25) or ultimate mecha fighters will usually be "valuable property" (-10 points).

If the GM decides to set a campaign in Japan, a foreigner (or "gaijin") has the "outsider" Social Stigma. For that matter, so will an alien living among humans, or vice versa.

Vow of Revenge p. B37

A vow of revenge for a dead loved one or friend killed by the enemy is a staple part of the genre, often explaining why the character became a mecha pilot. This also gives the GM a

good "hook" for adventures. "Blood-stained revenge" is an integral part of Japanese samurai tradition and an element of many anime mecha shows. Characters who feel particularly wronged may vow to destroy an entire organization or even an empire!

However, revenge does not have to be "personal" in the sense that a vengeful character is consumed with hatred. The Japanese see "revenge" as a facet of *giri*, "an acquired debt." A character may simply feel an overpowering *burden* – a feeling that the departed won't rest until the debt of honor is fulfilled. It's even possible that a character will respect the person he has vowed to destroy. Sometimes the pressure of giri turns a good person into a villain, at least temporarily. For instance, the daughter of a villain may be a good person, but if her father was killed by the heroes, she may still feel a need to follow in his footsteps to avenge him.

As with other vows, point cost is variable. It can range from -15 points (you devote all your time to hunting down and destroying a powerful foe) to a -1-point quirk (you'll seek revenge if you meet the enemy, but make no special effort to track him down).

Youth p. B29

Underage characters are very common as mascots or even mecha pilots. A military disaster or high casualty rate could result in fresh cadets being suddenly thrust into front-line service as mecha pilots. Guerilla wars will also use anyone. In very cinematic games, a kid often ends up in the cockpit because his father was the mecha designer, or because he has some unique talent - see the School Kid with a Destiny character type (p. 31).

SKILLS

Several skills are especially useful or noteworthy in games using mecha.

Mecha Operation Skills

These skills are used to drive or pilot a mecha, or to operate its various subsystems.

Control Skills, DX and Skill Rolls: If a character is wearing a battlesuit, or driving or piloting a larger mecha, his DX and DX-based skills when using its limbs are limited by his *control skill*. This is Battlesuit skill for battlesuits, Driving (Mecha) for drivable mecha moving on the ground and Piloting (Mecha) for flying mecha. When making a DX roll (e.g., to use a mecha's arms, maneuver or avoid falling), use the *lower* of the operator's DX or control skill. When making a DX-based skill roll that involves the use of the mecha's arms or legs (except to fire ranged weapons), use the *lower* of the appropriate skill-1 or the operator's control skill-1.

Battlesuit p. B49

Note: Battlesuit should be treated as a Physical/Average Vehicle skill; this is a change from the ***Basic Set.***

Battlesuit skill is used to make all control rolls when operating a mecha that has a battlesuit system, and determines the battlesuit's Dodge.

Driving (Mecha) p. B68

This skill is used to operate mecha equipped with cockpits. Driving (Mecha) skill is used to make all control rolls or dodges while moving on legs or jumping.

If the mecha has transformed into a configuration in which it moves on wheels or another motive system, use the appropriate vehicle skill, usually a Driving specialization, Motorcycle or Piloting. For example, a mecha that has effectively transformed into a four-wheeled vehicle would use Driving (Automobile).

Electronics Operation p. B58

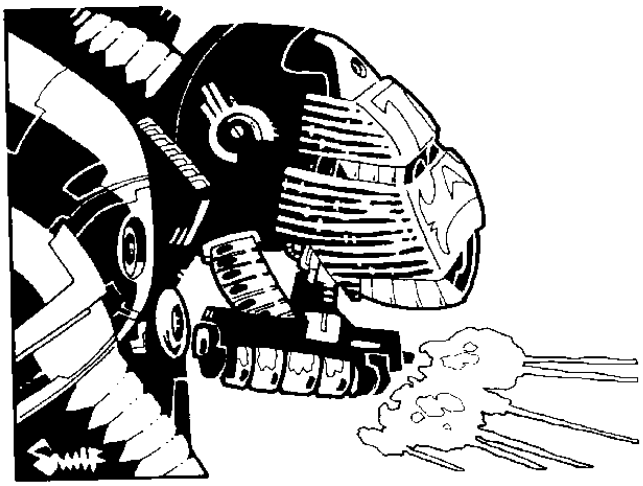
Mecha pilots normally have some skill in Electronics Operation (Sensors) and Electronics Operation (Communications).

Piloting p. B69

Piloting (Mecha) can be used to fly a mecha in any environment. Alternatively, use Piloting (Vertol) *unless* the mecha is transformed into fighter mode *or* is flying in space, in which case Piloting (Aerospace) applies.

Mecha Combat Skills

These skills are used to operate a mecha's weapons.



Gunner p. B50

Weapons built into or carried by mecha generally use Gunner rather than Guns or Beam Weapons skill. Specializations for the weapons described in ***GURPS Mecha*** are:

Beams – Covers all beam weapons. The GM can break it down into one skill per beam weapon type (laser, x-ray laser, et cetera) if desired, but really, the operating principles should be much the same for all of them.

Cannon – Covers all autocannon, minicannon and Gatling cannon.

Gauss Gun – Covers Gauss guns.

Grenade Launcher – Covers all grenade launchers.

Machine Gun – Covers machine guns and miniguns.

Missile – Covers guided missiles.

Mortar – Covers all mortars and gun/mortars.

Railgun – Covers all railguns and Gauss cannon.

Brawling, Judo, and Karate pp. B50-51

These skills, along with Boxing (p. CI132) and Wrestling (p. CI136), can all be used in battlesuits. Karate or Judo cannot be used if a mecha has a cockpit rather than a battlesuit system, unless it also has a neural interface. Brawling and Karate can also be used with claws, talons and contact weapons built into arms or legs (see p. 51).

Other Combat/Weapon Skills p. B49ff

A mecha wielding a giant sword, axe, forceblade, or other hand weapon uses the normal weapon skill. This also applies to shields and thrown weapons.

Other Skills

Acrobatics p. B48

Acrobatics (and acrobatic dodges) are possible in a mecha, but with a penalty equal to its Size Modifier plus an extra -4 if the mecha has a cockpit rather than a battlesuit system.

Armoury p. B53

Use the "Vehicular Weaponry" specialization for mecha weapons.

Engineer p. B60

The specialization to design mecha is Engineer (Vehicles). The GM can optionally require Engineer (Robotics) or Engineer (Mecha).

Heraldry p. B58

In "feudal" backgrounds, mecha shields, banners or armor may be painted with heraldic designs!

Mechanic p. B54

"Robotics" is the specialization for mecha and battlesuits.

Parachuting p. B48

Mecha often deploy by parachute, hence this skill is useful.

Stealth p. B67

You can use Stealth with a mecha, but at a penalty equal to its Size Modifier.

Tracking p. B57

A big mecha is easier to track because it leaves wider footprints and makes a larger trail through brush. Add the mecha's Size Modifier to Tracking rolls. Success gives an idea of size and also weight (from the depth of the print relative to size).

MECHA IN ACTION 3

There are two main types of mecha: drivable mecha, which have cockpits, and battlesuits, which have battlesuit systems. A rule referring simply to "mecha" applies to either type.

INSIDE YOUR MECHA

In the Cockpit

A drivable mecha's cockpit consists of a seat, computerized controls and various integral electronic, life support and safety systems.

Access: This is either through a hatch or via an aircraft-style cockpit canopy, depending on the design. If a mecha is three or more yards tall, it is difficult or impossible for a normal person to climb aboard from ground level unaided. Mecha hangars come with step ladders, gantries, slides or other devices, or the mecha assumes a kneeling position when parked

Control: A pilot usually uses joysticks and foot pedals to control legs, arms and any thrusters; firing controls are also placed on the control sticks. A computerized gyro-stabilization system keeps the mecha balanced. Some designs supplement or replace ordinary controls with neural interfaces (see p. 97). Instrument, targeting and sensor data are shown on multi-functional displays controlled by a computer terminal.

HUDs: Vital data is superimposed on a "head-up display" over the pilot's field of view or projected onto his helmet. At TL9+, the pilot is surrounded in a holographic virtual reality display. The HUD adds +1 to Electronics Operation skills for mecha sensor or communication systems, and gives an extra +1 to Free Fall and Piloting skill. It also lowers weapon SS numbers – see *Ranged Combat Modifiers*, p. 50.

The View: A mecha cockpit has either a transparent canopy or armored view ports. In battle, a blast shield slides down to protect them, and the pilot's only "natural" view is through a small optical periscope or tiny vision slit (-2 to Vision rolls). For better vision, a television camera is built into PESA sensors – see *Sensors*, p. 47.

Hearing and Speech: All cockpits include an external microphone and speaker, so the pilot can hear things or talk with people outside the mecha. The speaker volume can be cranked up, enabling the pilot to be heard over the noise of a battlefield.

Wearing Battlesuits

A battlesuit must fit like a glove for its kinesthetic control system to function. This puts some limits on who can fit inside a particular suit and what the operator can wear.

Pilot Weight: A battlesuit is rated for its *pilot weight*, which determines how large a person can wear that particular suit. A wearer will only fit into a suit if his own weight and that of any armor or clothing is no greater than the suit's *pilot weight* rating, nor less than 80% of it.

Fitting: Even if a person fits into the correct pilot weight range, a battlesuit system must still be refitted each time a different person uses it. (The one exception is if the new user is of the same sex and has exactly the same height and weight.) Adjusting a suit to a new user takes two hours and requires a successful Armoury (Mecha)+2 roll. Failure means two more hours are required; critical failure damages the suit, requiring minor repairs using Mechanic skill before it can be used again.

Clothing: A person wearing a battlesuit may not wear clothing any heavier than a skin-tight outfit like a body stocking or briefs. Some types of ultra-tech

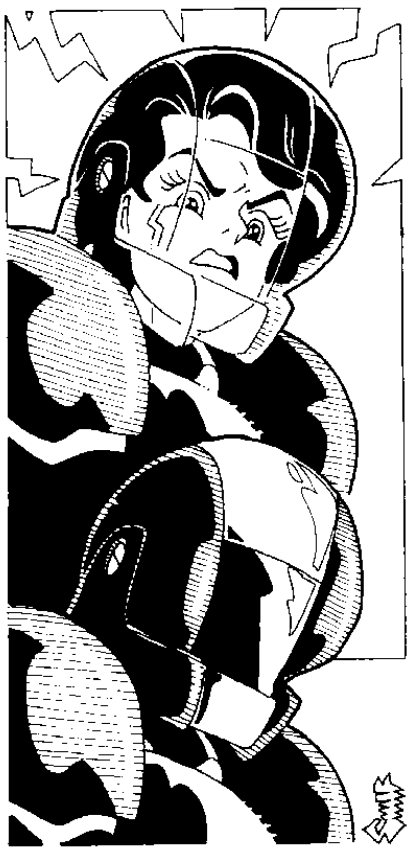
Battlesuit Faceplates

A battlesuit with an armored turret has a transparent faceplate. This lets the wearer use his own vision, even if no sensors are installed.

Anti-Glare: A battlesuit user can be blinded by sudden bright flashes, so the faceplate is designed to polarize to protect the user against blinding light. If desired, the user can hide his features by always keeping the plate tinted or mirrored.

Visor: The faceplate has a hinged visor, and can be opened or closed in one turn, exposing the wearer's face to the world. (Someone can also force it open by grappling the head and making a ST-20 roll.) If the visor is open, the suit loses its armor PD and DR on the front of location 5 (face), is no longer sealed or air-tight, and its sensor, HUD, computer targeting and anti-glare functions will not work. However, opening the visor does let the wearer talk without a comsuite, eat or drink, kiss someone, feel the wind on his face or use his sense of smell . . .

Suits with No Faceplates: A battlesuit with the "no faceplate" option has no visor – it can't be forced open, but the user is dependent on a PESA for vision; if it stops working, he can't see out.



armor are described as skin-tight, and these can be worn with a suit. Their DR will protect the pilot, but not the suit, from any damage that penetrates. There is one exception to these restrictions: if a suit has no armor at all, or has only open-frame armor, the user can wear any armor or clothing compatible with the pilot weight.

Suiting Up: A battlesuit is generally designed with a hatch or clamshell hinge at its waist. This allows the wearer to open it up, step into the legs and pull on or squirm into the rest of the suit. The helmet may be attached, or it may be screwed on separately. A battlesuit takes four minutes to put on and two to remove. Much of this time is spent screwing or locking fastenings securely into place and checking out systems like power or life support. Some suits have a "quick access" option. Via superior ergonomics or technology, these take only (30 - Battlesuit skill) *seconds* to put on, or half that to remove.

Control: A battlesuit isn't driven, it's *worn.* In a normal suit, the wearer's limbs extend fully or partially into the arms and legs. When the pilot tries to move his limbs, sensors in the suit detect the attempt and the suit's arm or leg motors copy the intended motion while amplifying its force. Learning to control this requires considerable effort, which is the main reason that the suit requires a special skill.

Controls for other systems, such as thrusters or sensors, may be located within suit gloves, on the suit arms or within the helmet. A battlesuit helmet includes the same head-up display (HUD) a mecha cockpit has. Helmet controls are operated by using neck or jaw muscles, voice control or even by sensing eye movements as the user stares at a menu on the HUD. Some suits may also use a direct neural interface.

MECHA AND MOVEMENT

A mecha is maneuvered very simply: the pilot chooses any normal basic or advanced combat maneuver and the mecha follows that maneuver, just as if it were a person. Thus, a mecha can take a Move maneuver, aim or make a snap shot, feint in hand-to-hand combat or even enter close combat with another mecha.

Mecha use the normal movement rules for humans, with the modifications described below; flying mecha use the rules for flying animals described in the ***Basic Set.*** Transformable mecha can alter their configuration and with it their performance; see pp. 100-103.

Sometimes, mecha pilots must make a *control roll.* This is a roll against the skill used to control the mecha, usually Driving (Mecha) or Battlesuit.

General Movement Rules

Order of Action

A mecha pilot uses his own Move score, rather than that of the mecha, to determine when his mecha acts in a turn.

Move Score

A mecha's Move score is equal to its basic Move modified by Encumbrance. A mecha uses its Move score exactly like a character, with one exception. Its Move attribute may be a split score, e.g., 10/15. If so, the first (lower) Move is used normally, while the second (higher) "enhanced Move" is used only when sprinting in a more-or-less straight line.

Besides Move, mecha have two statistics that humans lack:

Staging Combat

Mecha have high speeds and their weapons have very long ranges. For this reason, GMs may wish to avoid using a hex map for combat unless the fight comes down to close quarters. We recommend "abstract advanced movement," in which spatial relationships are kept track of in the GM's head or on a large-scale map, but which uses all normal movement rules.

To prevent the game from turning into a turkey shoot, the GM should carefully describe terrain, structures and distances. Be sure to include features that can block line of sight, provide cover, and so on:

"Okay, your PESA shows two Seraph Deltas have just crossed the ridgeline 1,900 yards away."

"Yikes! Do I see anything nearby for cover?"

"A stone farmhouse 40 yards away to your right, and those light woods you came out of are still 10 yards behind you."

"I sprint for the building at Move 30, firing my Gauss gun at the lead Seraph . . ."

Fast Movement and Encumbrance

To better reflect the effect of encumbrance on very fast movement (Move 10+), the penalties to Speed and Move for various encumbrance levels become . . .

Light: Move × 0.8, round down.

Medium: Move × 0.6, but minimum Move 7.

Heavy: Move × 0.4, but minimum Move 6.

Extra-Heavy: Move × 0.2, but minimum Move 5.

Example: A mecha has Move 22 but medium encumbrance. Its Move becomes 13.2, rounded to 13.

Traveling by Mecha

Use the mecha's top speed in mph, modified by encumbrance as above, to determine how fast it can travel.

Actual "cruising" rates should be about 60% of this top speed. See *Terrain* (p. 58) for the effects of terrain on movement speed.

Walking

Walking and running are not at all like moving on wheels. A running mecha, like a running human, moves by tossing its center of gravity off the ground while kicking backwards. A mecha going much faster than 20 mph does so by making a series of leaps.

This means that a mecha moving at 40 mph will only touch the ground every 10 yards or so. It will skip blithely over 20-foot ditches, minefields and the like without even having to use thrusters. So what happens when a 40-ton mecha marches down the street?

Very little. A mecha is generally fairly light for its size, and the soles of its feet are like snowshoes, disproportionately large. The ground pressure exerted by most mecha is not much more than twice that of a human being. A mecha won't normally punch holes in the pavement with its feet.

However, the full weight of the mecha *will* come down on any imperfection in the terrain. A mecha's footprint may only be half an inch deep on soft ground, but twigs, branches, anthills, rises in the ground and enemy infantry will be flattened.

Step

GMs may wish to use the *Increased Step for High Move* rules (p. CI172) for mecha.

gMR is the mecha's *ground maneuver rating*, a measure of the maximum g-force a mecha can safely use during a maneuver on the ground. It is normally used only when attempting to turn while traveling at high speed. Flight-capable mecha also have an aMR (*aerial MR*) statistic, used when the mecha is flying.

SR is the mecha's *stability rating*. If a control roll fails by more than gSR (on the ground) or aSR (if flying), the pilot loses control. A walking mecha falls over, "colliding" with the ground at a speed equal to its height plus the distance it moved this turn (both in yards). A flyer spirals out of control; the mecha can do nothing but dive downward at its present speed + 10 yards/turn until the pilot can recover (a Piloting-5 roll).

Encumbrance and Move

Rather than recalculate a mecha's statistics whenever it carries something, as is done in ***GURPS Vehicles,*** GMs should use the standard encumbrance rules with mecha. If the mecha is moving on two or three legs, use the rules on p. B76. Otherwise, treat it as a beast if moving on the ground (p. B145) or a flyer if airborne (p. B139). See also p. CI14 for detailed encumbrance rules.

When calculating encumbrance, use the mecha's *Lift ST* if it is flying or *Body ST* if it is moving on the ground.

Encumbrance subtracts from both normal and enhanced Move.

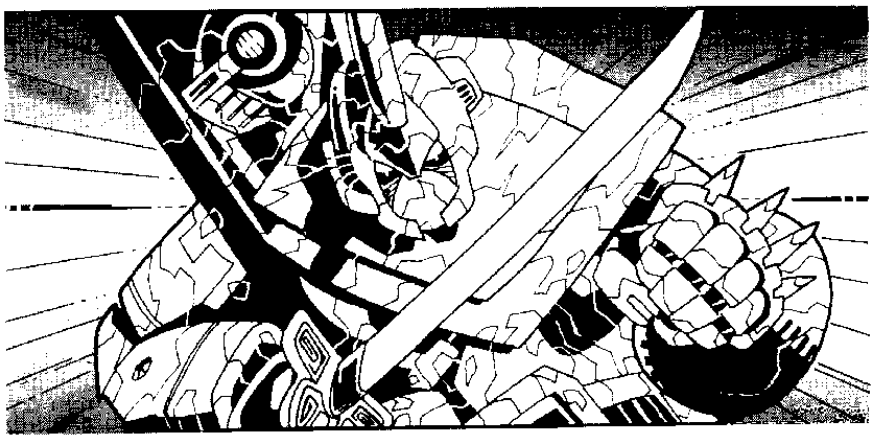
Multi-Hex Mecha

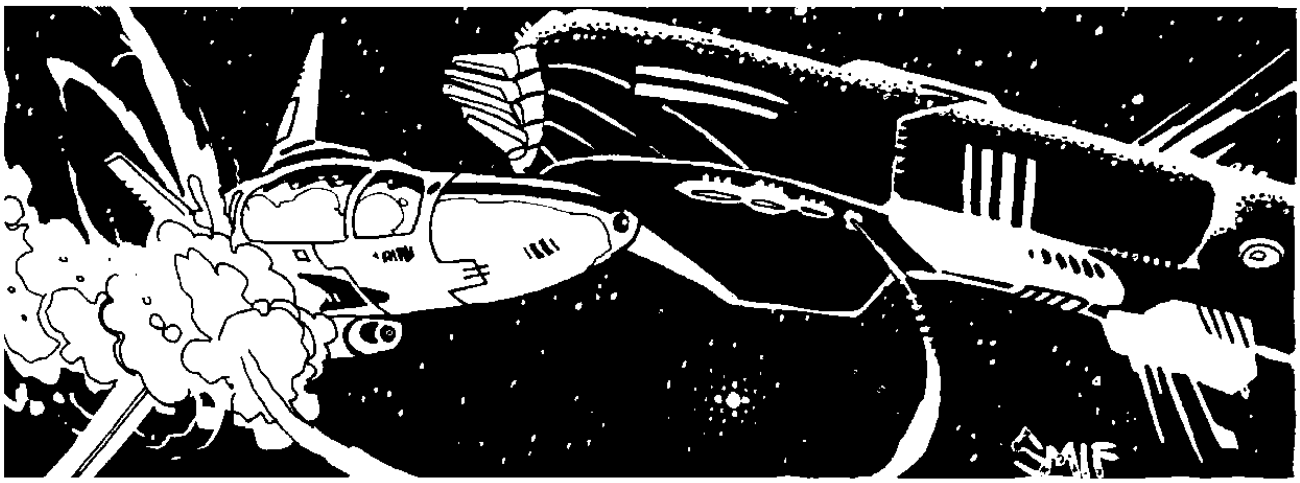
Most large mecha occupy multiple hexes. Use the rules for multi-hex animals on p. B141.

Move Maneuvers

A mecha uses a Move maneuver just like a human. Remember, it's possible to move and fire ranged weapons at the same time! (See p. B117.) A mecha with legs can move across just about any terrain a human can, moving at full speed either on or off road. See *Terrain*, p. 58, and p. B107 for rules for movement points and crossing rough terrain.

Enhanced Move and Sprinting: Some mecha have a split Move score, with a normal and enhanced Move. The mecha can only use an enhanced Move while sprinting (p. B108). Instead of a +1 yard bonus, the sprinting mecha uses its higher enhanced Move. (A mecha without an enhanced Move can sprint normally.) GMs may allow a sprinting mecha to change facing, but if so, use the *Turning Radius* rules on p. B139; the maximum g-force a mecha can use is equal to its gMR statistic when on the ground or its aMR statistic when in the air. (In effect, enhanced Move works the same way as the Enhanced Move and Super Running advantages do for characters.)





Costs for Movement: The sidebar of this name on p. B107 applies to mecha, except that the rules for obstructions and bad footing are somewhat altered because mecha can be very large.

Bad Footing: On treacherous ground such as swamps, mud, loose gravel or ice, the cost to enter each hex is increased by 1, 2 or more movement points at the GM's option. Movement on stairs costs double. Movement in water or other liquid whose depth is at least 1/6 the mecha's height costs double. Water that is at least 1/3 the mecha's height reduces movement to 1 yard per second; in a swift current, a control roll is needed as well. Failure means the mecha makes no progress, while failure by more than gSR means it falls over and is carried at least 3 yards downstream.

Dense Woods: A mecha moving or flying through dense woods or similar terrain can safely use its normal Move. If it uses its enhanced Move, the GM should require a control roll each turn to avoid colliding with a tree (DR 6, 2d×10 HP).

Obstructions: A mecha that is using legs for movement can step over *obstructions* – such as bodies, wrecks or barricades – without penalty if the mecha's Size Modifier is at least 2 greater than that of the obstacle. If the mecha's Size Modifier is only one greater than the obstacle's, it costs +1 movement point per obstruction to pass through the hex. If the mecha's Size Modifier is equal to or less than the obstruction's, the hex is effectively blocked, and trying to pass through it will result in a collision. The Size Modifier of an obstruction can be found using the table on p. B208, based on the obstruction's height; e.g., a 6' wall (2 yards) is Size Modifier 0.

Mecha on Wheels: A mecha using wheels or foot rollers only gets its full Move if it spends the entire turn on a floor, road or smooth rock. Across ordinary firm grass or packed earth its Move is halved; through thick woods or other soft sand, Move is 15% of normal, and it is reduced to 10% of normal over broken ground, or 1/20 normal through swamps or mud.

Movement in the Air

Flying mecha use the flying rules on p. B139, along with the rules described above. However, some mecha designs will have a stall speed. If a mecha has a stall speed, it can only take off by moving along the ground until it reaches that speed. Once airborne, it cannot fly any slower than its stall speed; if it tries, it will lose control and eventually collide with the ground.

Jumping Mecha

Any mecha or battlesuit with legs can jump, but because of the way mecha limbs work, they use slightly different rules than humans!

A high or broad jump may replace the movement portion of a Move, All-Out Attack or Step and Attack maneuver.

High Jump: Height is up to 25' (or 8 yards) × (ST/Wt.)

Broad Jump: Distance is 50' (or 17 yards) × (ST/Wt.) and height is 12.5' (or 4 yards) × (ST/Wt.).

Wt. is loaded weight in pounds and *ST* is the mecha's lower body ST. Note that distances in yards are rounded off.

Boosted Jump: A mecha with thrusters or contragrav can cut them in for a second to boost a jump. Subtract their combined thrust and lift from Wt. when calculating jumping distance (but effective weight cannot go below 5% of actual weight).

If the mecha is jumping to a higher or lower elevation, it reaches the chosen elevation at the end of the jump. Otherwise, it reaches its maximum height halfway through the jump.

Landing

A jumping mecha normally lands facing the same direction it was facing when it jumped. The pilot can choose to make a control roll to change his facing. If he succeeds, he can assume any desired facing upon landing. If he fails, he is still facing forward, while if he gets a critical failure, he lands prone and "collides with the ground" at a speed of (jumping distance in yards + 10) yards per second.

Skill Rolls and Jumping

No skill roll is needed for a jump unless the mecha uses thrusters. If using thrusters, make a control roll when the mecha lands. Failure means the mecha trips and falls instead of landing, and is assumed to "collide with the ground" as described under *Landing*, above.

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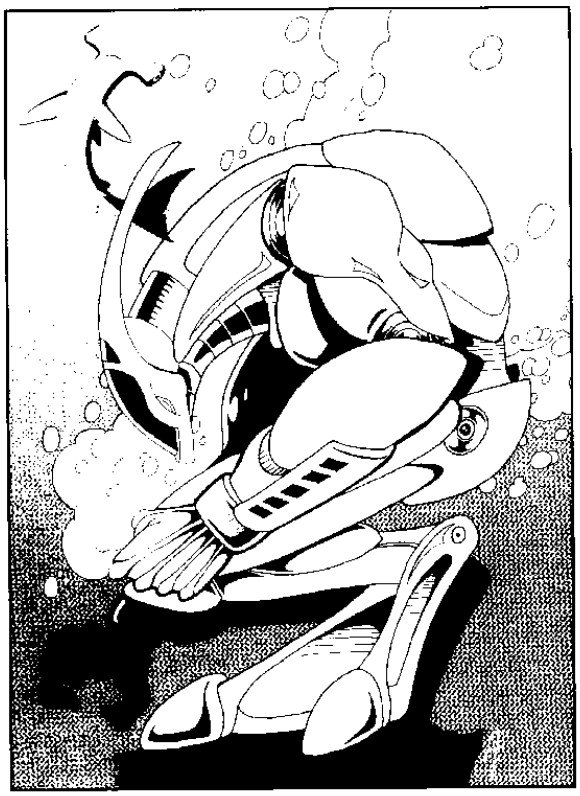


Movement On or Under Water

Sealed mecha can walk along the bottom of a body of water: this is usually mud – see *Bad Footing*, p. 43. An unsealed mecha submerged in water will flood. It will lose 1d percent of its body and turret hit points (minimum 1d hits) plus a further 1d% every minute until disabled. The occupants will start to drown.

Space Movement

The normal rules for maneuvering do not apply in space, since there is no gravity or friction, nor is top speed a factor (assuming the mecha does not approach the speed of light). A mecha's Move, MR and SR statistics are not applicable. Instead, its space performance is determined by its *sAccel* (space acceleration), which is rated in gravities (g).

Every turn, a mecha that uses a Move maneuver can increase or decrease its velocity by up to 10 yards per second per g of space acceleration. Thus, a mecha with 0.2 g acceleration could alter its velocity by 2 yards per second each turn.

In space, a mecha that accelerates in one direction retains its velocity until it cancels it by accelerating in the opposite direction. Changing facing will not affect this.

The *step* portion of a maneuver in space cannot be used to move one or more hexes, but can be used to change facing.

Long-Distance Space Travel

To determine the time required for a space voyage, decide the length of time the vehicle accelerates, and calculate the speed which that gives. Then divide that by two (to allow for deceleration). This gives the speed; the trip time is the greater of the selected acceleration time or distance divided by speed.

With constant acceleration to a mid-point, followed by deceleration to slow down (and assuming the mecha has enough fuel or power to manage this), the travel time (T) in hours is:

T = Square root of [0.0000508 × (D/A)],

where *D* is the distance in miles and *A* is the acceleration in g.

If time is vital and duration (T) and distance (D) are both fixed, the needed acceleration in g (A) is:

A = (0.0000508 × D)/(T × T).

Similarly, when a mecha travels this way in space for a fixed time (T) with an acceleration A (given in g), the distance it covers (D) is:

D = 19,700 × A × T × T.

Ground-to-Space Movement

To get into space from a planet, a mecha must be able to reach orbital velocity. For Earth, this is 17,800 mph. For other planets, this is 17,800 mph × the square root of (M/R), where M is the planet's mass in Earth masses and R is its radius in Earth radii. To leave the orbital gravity well and head out into deep space, an escape velocity of 1.414 times orbital velocity is required, or just over 25,000 mph for Earth.

If a mecha's air speed is higher than orbital velocity, the mecha can fly into orbit. If its top speed is lower (as is more likely), it can still reach orbit if it has an sAccel rating and its space propulsion system can operate for the necessary time without running out of fuel or power. The required time in seconds is:

Jumping Mecha (Continued)

Combat While Jumping

A mecha can fire ranged weapons *during* a jump. If it jumped high enough, it may be able to see over intervening terrain or the horizon – but remember, everyone else can also see it! A jumping mecha fires at -6 to skill.

A mecha that is jumping *over* terrain ignores it for movement penalty purposes, but does not get any cover from it either!

A mecha whose jump intersects with something will collide with it – use the normal collision rules, with speed equal to (jumping distance in yards + 10) yards per second × local gravity. The target always gets a Dodge roll to avoid a jumping mecha. The normal collision (p. 51) and landing rules (above) apply.

A mecha that can jump higher than its target's height can try to forgo a collision and instead land atop its target, stomping it flat while taking no damage itself.

This requires a skill roll at -3; failure means the mecha collides normally with the body of the target instead. Success inflicts *double* normal stomping damage – see *Collisions* (p. 51). Damage is applied to the target's turret, or to the top of its body if it has no turret. If the target is prone, it will go to the front or back. The mecha must make a control roll at -5 after doing so to avoid falling over.

[orbital speed (in mph) - top air speed (in mph)]/[21.8 × sAccel (in g)].

This assumes the mecha has a means of lift independent of its thrusters, like wings or contragrav. If it doesn't, the thrusters must also lift the mecha, so subtract local gravity (1 g on Earth) from sAccel – obviously, an sAccel over 1 g is required in such a case.

Use the same procedure to see if a mecha can reach escape velocity, substituting it for the orbital velocity.

An object in low orbit is normally *at least* 150 miles up and moving at orbital speed.

Space-to-Ground Capability

There are two steps involved in getting down from orbit: shedding orbital velocity and making a soft landing.

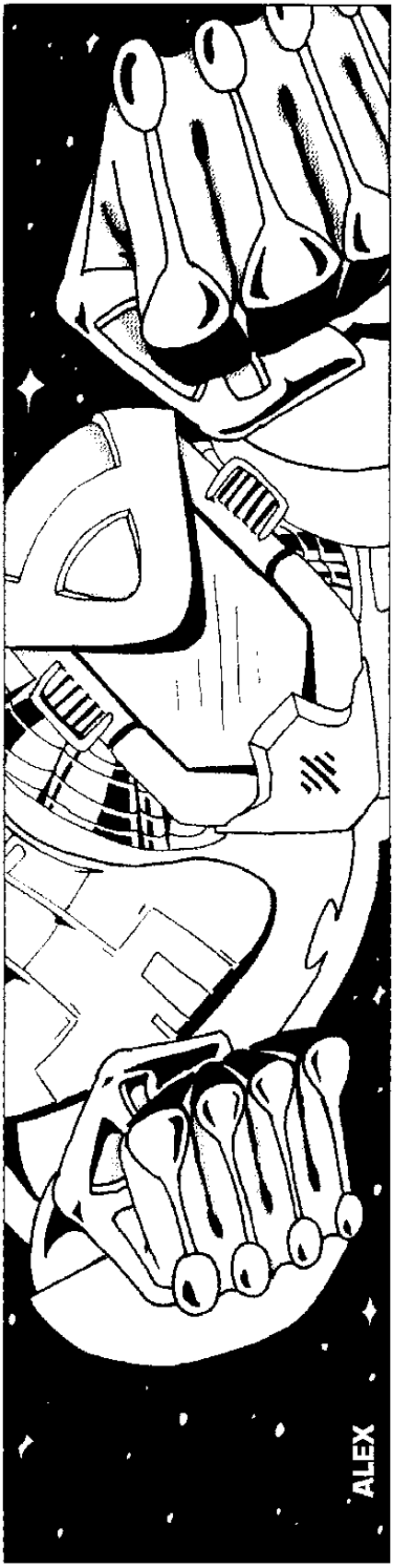
For a planet with no atmosphere, the only way to shed velocity is with a mecha that has a sAccel rating. Use the same rules as for entering orbit, except there is no need to worry about lift. Once the vehicle has killed its orbital velocity, it lands safely provided it can maintain sAccel greater than the local gravity for at least 30 seconds.

For a world with an atmosphere, velocity can be shed as above, but if the desired sAccel can't be maintained, the only way to do it is via aerobraking – using the atmosphere itself to slow the mecha. Even a mecha without a sAccel can aerobrake. Time required for this reentry maneuver is (orbital velocity - top air speed)/1,500 minutes. The maneuver is dangerous, requiring a Piloting (Aerospace) skill roll. A great deal of heat is generated: the mecha takes (4 × minutes spent aerobraking) points of fire damage to the underside of its body, any wings and any subassemblies (like legs) mounted under the body or on the wings. All other subassemblies take 1/4 this damage. Standard ablative armor will burn off, while fireproof ablative armor and non-flammable armor survives intact. If the Piloting roll fails, multiply the damage to each location by the amount the roll failed by; on a critical failure, treat as a failure by 20!

After aerobraking, the mecha can be assumed to be about 15,000 feet up and moving at its top air speed, or about 1/20 of orbital velocity if it has no air speed. It makes a soft landing if it can deploy a parachute (see below) or is flight-capable. Otherwise, it will collide with the ground.

Reentry via Drop Capsule: It can be risky to drop mecha "naked" from orbit. However, special capsules (see *Drop Capsules*, p. 109) are available that are shaped and armored to resist the heat of reentry. Pick an intended drop zone (DZ) and roll vs. the Piloting skill of the dropping ship's pilot to see if the capsule ends up there. Success by 0 means it is within 2,000 yards of the DZ; reduce this error by 200 yards times the degree of success. Failure means it is off by 2,000 yards times the degree of failure. A drop capsule will usually break up a few thousand yards up, releasing the mecha on a parachute.

Parachuting Down: Non-flight-capable mecha that are making an orbital drop usually kill their speed using parachutes. The mecha deploys a series of chutes, typically at about 12,000 yards altitude, which kill its velocity by about 20 mph per second. After 50-60 seconds, the mecha reaches the ground. As the mecha is descending, the pilot can try to steer the chute via a Parachuting roll; the DZ can be adjusted by 400 yards times the degree of success. A Parachuting roll is needed to land safely. Failure can mean a drift off course, being snagged in a tree or damage equivalent to a fall from 10 yards up. A mecha being blown off course can shed its chute and jump down. The GM can apply modifiers for terrain or buildings in the DZ (e.g., -3 if heavy woods or over a city). A parachuting mecha cannot dodge.



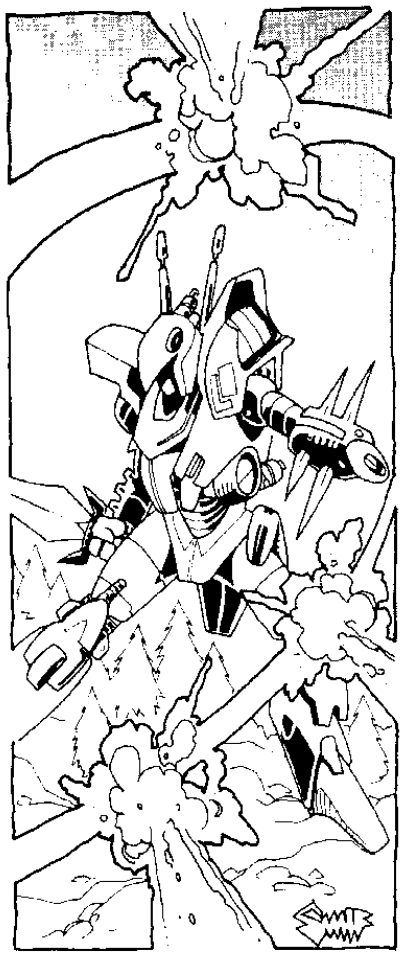
Using Computers

A computer is included in all mecha cockpits. A battlesuit system with the "suit computer" upgrade also has one. Mecha computers use a voice interface.

Every computer has a *Complexity* rating, which governs the software it can run and how fast it will run. Each +1 Complexity represents an order-of-magnitude increase in performance.

In order to do anything, a computer must be provided with programs (see *Software*, p. 94), which also have a Complexity rating. A computer of a given TL and Complexity cannot run higher-TL or higher-Complexity programs.

The number of programs that can be run concurrently is also based on Complexity: a computer can run two programs of its own Complexity, 20 programs of its Complexity-1, 200 of its Complexity-2 and so on. Programs of various Complexities can be mixed; e.g., a computer can run *one* program of its own Complexity and *ten* programs of one lower Complexity instead. Running or switching a program takes one second.



MECHA SYSTEMS

This section describes how certain subassemblies and components function.

Using Legs

A mecha can use its legs to walk, run, kick, jump and so on. Walking and running are covered in the movement rules.

Lower Body ST: A mecha with legs has a *Body ST* value based on its leg drivetrain power. This is used when pulling, slamming or calculating encumbrance for ground movement.

Kicking: A mecha's effective ST when kicking is based on its *Body ST*. If the mecha has more than two legs, each individual leg won't be as strong: divide effective leg ST by half the number of legs when kicking. An ordinary kick from a mecha's leg does thrust+2 crushing damage, based on this ST.

Reach: If it becomes important, a particular leg can kick with a reach of (its area/20) + 1 yard.

Using Arms

If a mecha has arms, it can use them like a human can. A manipulator arm has a hand similar in capability, if not shape, to a human's. Thus, a mecha with two arms will have the same manipulatory ability as a human, while a mecha with a single arm will have the same capabilities as a one-armed human.

Some "arms" may be *strikers*. A striker is an arm that lacks a hand. It can push or smash, but not wield, manipulate or lift things. If a mecha only has one arm that isn't a striker, it will be effectively one-handed. If all its arms are strikers, it has no manipulatory ability.

Arm Motors and Arm ST: All mecha arms have an arm motor, representing its artificial muscles, servo motors or whatever. Each arm motor is rated for *Arm ST*, which may differ from the overall Body ST of the mecha. Use Arm ST when using that arm to punch, push, lift, grip or wield a weapon. Sometimes, Arm ST may vary between arms. If a mecha uses a pair of arms with different ST for a two-handed task, average their ST scores.

Basic Damage: This is based on the arm's ST. See p. B248 or C110 for thrust and swing damage for ST 20+.

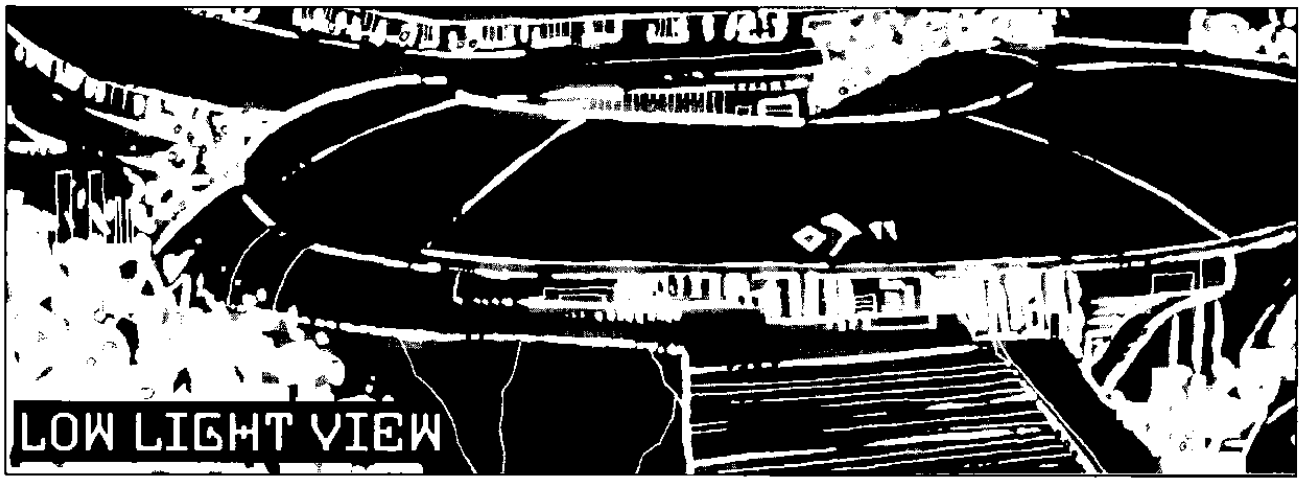
Punching Damage: A mecha's metal arms do the same punching damage that a human with brass knuckles does: thrust/crushing, based on their ST.

Reach: Mecha arms often have a reach of 2 or more hexes. Each hex of reach beyond the first adds +1 to *swing* damage when using a weapon and +2 to any attempt to grapple. Note that long arms can be attacked in other hexes, just like long weapons (p. B110).

Extra Arms: A mecha may have more than two arms. This lets it perform multi-handed tasks, like carrying multiple ready weapons. The pilot can use them all in concert during normal situations, like lifting, catching, digging or carrying. The ability to make multiple combat actions is only possible if the pilot has the Full Coordination advantage (see p. C156). However, a mecha in close combat can grapple with multiple manipulator arms at once. This gives a +2 modifier per extra arm (over the first two) on attempts to grapple or pin, or to break free from a grapple or pin.

Throwing a Mecha: A mecha that has grappled its opponent can throw it, if the grappler is strong enough to lift its victim. If a mecha is thrown, it *takes* the same damage as it inflicts (see p. C111).

Rocket Arm: An arm with this option can launch its fist as a ranged attack. The rocket fist attack has SS 5, Acc 2, 1/2D range equal to Arm ST and Max range equal to twice Arm ST. Picking up and reattaching the fist takes 30 seconds; until then, the arm is effectively a striker arm. At TL12+, the fist can fly back and reattach itself a turn later! Damage inflicted by the rocket arm is normal punching damage plus 2d.



Sensors

Mecha use two main types of sensors: the *PESA* and the *AESA*. Sensors are normally controlled by the mecha's pilot, and what they see is displayed on his HUD.

Passive Electromagnetic Sensor Array (PESA)

This is a multi-mode, electro-optical sensor; basically, a television camera with additional telescopic and infrared settings. It can function in any one of the modes described below; switching modes takes one second. Its line of sight is blocked by very solid objects, and it cannot see over the horizon. A PESA can also function as a digital camera, storing images of anything it sees in the mecha's computer memory. Multiply PESA range by 10 in the vacuum of space.

"Daylight TV Mode" – In DLTV mode, the sensor transmits an ordinary television picture from an array of external cameras to the pilot's monitor screen so the pilot can see outside the mecha without needing to rely on vulnerable windows. It also functions as an electronic telescope. The TV camera can zoom in on distant objects and magnify them, provided there isn't something in the way, like terrain or a cloud. DLTV mode suffers the same penalties that human vision does from fog, darkness, smoke, et cetera. The degree of telescopic magnification is equal to the PESA's range in miles; thus a 2-mile range PESA has 2× magnification. If a mecha has a chameleon system, rolls to hit or spot it via either DLTV or unaided vision are at -3 if instant chameleon (-6 if unmoving) or -6 if intruder chameleon (-10 if unmoving).

"Low-Light TV Mode" – LLTV mode is exactly like DLTV mode, but the mecha electronically amplifies low light levels. This gives the pilot the equivalent of Night Vision and Color Blindness. It won't work in total darkness, but faint starlight is adequate.

"Thermograph Mode" – This is a high-resolution infrared mode. Within the PESA's range, it allows the user to recognize objects by their heat contrast; people and machines show up as silhouettes. While surface detail is fuzzy, the user can tell hot objects from cold and (for example) can spot a cold metal gun under a man's jacket, track warm footprints left on cold ground or spot a hidden, powered-up vehicle or warm-bodied person. It adds +2 to rolls to spot living beings during daylight and +4 to Tracking rolls if the trail is no more than an hour old. Thermograph works in up to total darkness with no penalty and can see through fog, cloud or smoke, though not special "hot smoke." A thermograph is sensitive enough to be able to resolve heat shapes concealed behind brush or through

Using Comsuites

Most mecha have communication suites (comsuites). Here's how they work:

Radio: All comsuites have a multi-channel radio. In a mini or basic comsuite, it has a range of 100 miles at TL8, 1,000 at TL9 or 5,000 miles at TL10+. An advanced comsuite has 10 times that range. Any radio in range and on the correct channel will be able to detect the broadcast, unless it is also within the radius of a working area jammer. A radio can be set to transmit with reduced maximum range to reduce the likelihood of detection.

Scrambler: All radios incorporate a scrambler encryption system. If the sender and receiver use scramblers with the same settings, a message will be gibberish to anyone else listening in. A computer can be used to decode some or all of a scrambled message; see the *Cryptanalysis* skill (p. B245, p. CI156).

Global Positioning System (GPS): All comsuites have this system. It links up with friendly orbiting navigation satellites or ships overhead to provide precise location data, accurate to within 5 yards. However, without a satellite or ship it is useless, which can be a problem if one side has lost space superiority.

Radar and Laser Detector: All comsuites have sensors that detect the presence of an operating radar (or an AESA operating in radar or imaging radar mode) at out to twice the radar's range. Passive radar is not detected. They will warn the pilot whenever a new radar is detected. All comsuites will also detect working ladars or any laser beam, such as a laser sight or communicator, but only if the laser is pointing at the mecha, and then only out to the laser's normal range. Advanced comsuites can also pinpoint the distance and direction to the sensor, and can identify its type, if it's known (e.g., "Earth Space Force APG-702 AESA in imaging radar mode").

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Using Comsuites (Continued)

Laser Communicator: Basic and advanced comsuites (only) have a tight-beam communicator that uses a modulated laser beam. It has a range of 200 miles at TL8 or 2,000 miles at TL9+. It requires a direct line of sight to another laser communicator to use, but its signal can't be intercepted or jammed. However, intervening clouds, smoke, fog or falling snow interfere with the beam and block communication.

IFF: Only basic and advanced comsuites have this system, which stands for "identify friend or foe." A mecha's IFF responds automatically with an encoded "friendly" signal whenever it is *detected* by a radar or ladar set to a properly-coded frequency. This allows mecha to identify their allies using long-range sensors, where they would otherwise be just blips or silhouettes on the screen. To work, both mecha must be using the same set of up-to-date identity codes. There is a risk that the enemy might be able to discover the response codes, by capturing an IFF system or via espionage, and mimic them. As a security measure, a force will regularly change all its IFF settings; in the chaos of war, though, it's possible a particular unit may not receive the updates in time, leading to tragic mistakes.

Inertial Navigation System (INS): Advanced comsuites have a precision inertial mapping and navigation system. It uses a gyroscopic system, updated by star tracking or geomagnetic systems, to continuously fix the mecha's position relative to know map coordinates. It adds (TL-2) to the pilot's Navigation skill when trying to find position, and effectively gives the pilot Absolute Direction.

The Horizon

The distance at which a viewer can no longer see something because it has vanished behind the curvature of a planet or similar body is called the *horizon*. AESA and PESA sensors cannot see over the horizon; neither can vision. Weapons fire is only possible over the horizon using guided missiles or indirect fire.

A rough formula for determining the horizon in yards:

Horizon = Square root of [(D × 1,760 × H) + (H × H)].

Where *H* is the sum of object's and observer's heights in yards above the local base level and *D* is the planet's diameter in miles (for Earth, about 7,915 miles).

thin walls, though this requires an Electronics Operation (Sensors) roll at a penalty equal to the wall's (HT + DR), and the shapes are fuzzy silhouettes.

Active Electromagnetic Sensor Array (AESA)

An AESA is basically an advanced form of multi-mode radar. It cannot see over the horizon and is blocked by terrain features such as buildings or hills. An AESA is never affected by darkness.

It can use the following modes:

"Search Radar Mode" – The sensor functions as a long-ranged radar set, emitting pulses of radio or microwave energy over a wide area. It detects objects as these pulses reflect off them and bounce back to the sensor. Tank-sized or smaller targets detected by search radar show up only as "blips" on a screen with a range, course and speed; details such as the target's shape or color are not resolved. Smoke, hot smoke, fog and clouds have no effect on search radar mode.

"Low-Res Imaging Radar Mode" – When switched to low-res imaging mode, the radar's range is half that listed for the AESA. However, resolution is much sharper, allowing it to determine the general size and shape of objects of any size.

"High-Res Imaging Radar Mode" – This reduces range to 1/50 the search radar range (about 35 yards of range per mile of AESA range), but detail equivalent to human vision can now be resolved. A face might be recognized, for instance, although flat details like color or writing cannot be determined.

"Ladar Mode" – This mode uses a laser beam rather than a radar beam for scanning. It has a range equal to half that of the AESA and gives detail equivalent to high-res imaging radar. However, it does not function through clouds, smoke, heavy rain, falling snow, thick fog or special anti-laser smoke such as prism or blackout gas. Ladar works underwater at 5% of its normal range.

"Targeting Mode" – All of the above modes also have a targeting mode. This allows the AESA to feed range-finding information to all ranged weapons that are fired at a single target that is in range and already detected by it, giving +2 to hit. In targeting mode, an AESA may not detect new targets, but may track those it has already detected.

Sensor Skill Rolls

A pilot can use only one type of sensor (and sensor mode) per turn, or ignore sensors and use his own eyes. A player who switches sensors should inform the GM!

The GM can assume that sensors will normally detect anything within their range, line of sight and arc of vision. Assume that unaided human vision is good up to about 1.5 miles (multiplied by any magnification for a PESA) or the horizon, and that thermographs and AESAs are limited by their range.

Otherwise, assume detection is *automatic* if the enemy is on fire or announces his presence by firing, signalling, et cetera. Skill rolls *should* only be required to detect important objects under difficult conditions. In general, only roll if one or more of the penalties in the *Sensor Modifiers* sidebar (p. 49) applies. These take into account objects that are in cover, darkness or concealed by ECM or stealth systems. Once an object is spotted, there's no need to roll again unless it somehow becomes harder to detect than it previously was.

A detection roll is made against Electronics Operation (Sensors) skill if using a PESA or AESA, or against IQ if using normal vision. Add the Size Modifier of the object and apply any appropriate modifiers for distance:

Object within 1/10 sensor range: +6
Object within 1/4 sensor range: +4
Object within 1/2 sensor range: +2
Object within sensor range: +0

Use the result that gives the highest bonus. Treat naked-eye vision as having a range of 1.5 miles, or about 3,000 yards; this is multiplied by the magnification of any DLTV/LLTV, binoculars, et cetera.

Other Modifiers: Situational modifiers for cover, ECM, et cetera appear in the *Sensor Modifiers* sidebar.

Comsuites and Detection: A comsuite can detect the use of AESA sensors – see *Comsuites*, p. 47. No roll is needed.

MECHA IN COMBAT

Attacks on a mecha can be made against either the mecha's body, individual subassemblies (turret, arms, legs, wings) or wheel positions, each of which is considered a "location."

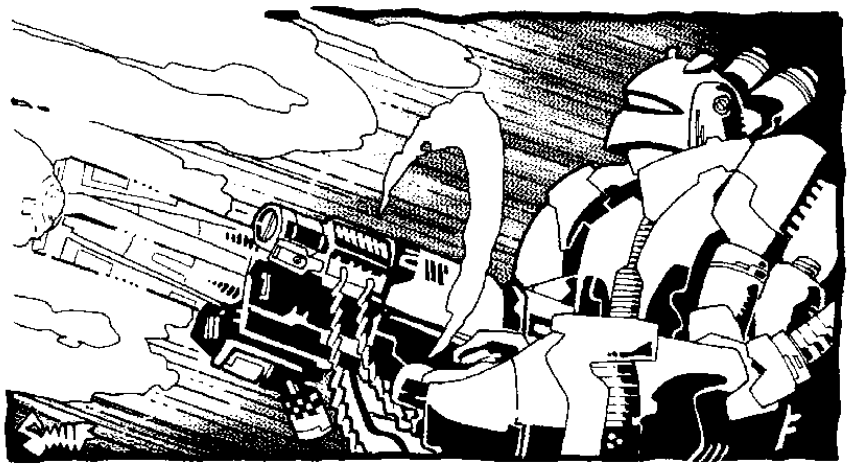
Normally, the attacker chooses which location will be struck. If firing at locations other than the body, use that location's Size Modifier.

If a subassembly is folded (in a transformable mecha), it can't be hit. Also, in collisions or in hand-to-hand combat, the GM can rule that the relative size of the combatants limits what can be attacked. For example, if a human swings a sword at a 30' tall mecha, the only location he can really hit is the machine's legs.

Area attacks, such as concussion from explosions, are always assumed to strike the mecha's body.

Using Multiple Weapons: Even if a mecha has more than one weapon, a single character can fire only a single weapon or a single set of *linked* weapons at once. If a character fires linked weapons, they must all be used against the same target. *Exceptions:* Linked homing missiles can be fired at different targets. A neural interface allows the interfaced character to fire several different ranged weapons or sets of linked ranged weapons at once, at a -2 to skill per extra weapon or set of linked weapons firing. (No single weapon can fire more than its normal RoF, however.)

Multi-Crewed Mecha: In a mecha with more than one crew member, each crew member with a set of controls may fire a weapon or set of linked weapons, provided they all fire different ones! However, weapons built into or carried on wings, arms or hardpoints can only be fired by the person piloting the mecha.



Sensor Modifiers

All Detection Rolls

Object in cover:
Prone behind cover, head/turret down: -7
Prone/crawling without cover: -4
Any position, only head/turret exposed: -5
Body half exposed or behind light cover: -2
Crouching/Kneeling with no cover: -2
Object concealed by (use only highest penalty):
Light woods: -1 per 50 yds*
Dense forest: -1 per 5 yds*
* Based on the thickness between the observer and the target.

Vision Rolls Only (including DLTV or LLTV)

Bad light: -1 to -9, unless LLTV mode
Total darkness: fails automatically!
Naked eye from within closed cockpit: -4
Line of sight passes into/through:
Blackout gas: totally blocked
Dense smoke: -1 per yd*
Cloud bank, fog or blizzard: -1 per 5 yds**
Water: -1 per 5 yds*
Light mist: -1 per 50 yds**
Object using (use only highest penalty):
Good camouflage: -2
Instant chameleon: -6 (-3 if moving)
Intruder chameleon: -10 (-6 if moving)
* Based on the thickness between the observer and the target. ** Based on range between the observer and target.

Vision (including DLTV/LLTV) fails automatically if the line of sight passes through 10+ yards smoke or dense fog, or 50+ yards of blizzard, water or dense forest.

Thermograph or Infrared Only

Object is hidden by:
Blackout gas or hot smoke: -1 per yd*
Being underwater: -1 per yd*
Blizzard: -1 per 5 yds**
Falling rain or snow: -1 per 50 yds**
Object using:
Infrared Cloaking:
if Basic: -1 × (TL-4)***
if Radical: -2 × (TL-4)***
* Based on the thickness between the observer and the target.
** Based on range between the observer and target.
*** Unless object is presently using a fusion air-ram, TL9 reactionless thruster or any kind of rocket engine.

Thermograph or infrared detection fails automatically if line of sight is blocked by 10+ yards of blackout gas, hot smoke or water, or 50+ yards of blizzard or dense forest.

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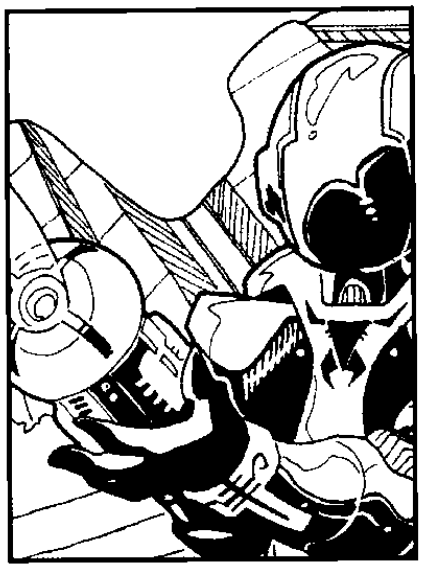


Sensor Modifiers (Continued)

Radar or Imaging Radar Only

Object is using:	
Basic Stealth:	-1 × (TL-4)
Radical Stealth:	-2 × (TL-4)
Deceptive jammer:	-1 × jammer rating
Line of sight passes into/through:	
A body of water:	-2 per yd
Falling rain or snow:	-1
Radius of active jammer:	-1 × jammer rating
Chaff cloud:	-2 per yd or a flat -5, whichever is worse

Ladar Only

Object is using:	
Basic Stealth:	-1 × (TL-4)
Radical Stealth:	-2 × (TL-4)
TL10+ distortion jammer:	-1 × jammer rating.
Instant chameleon:	-6 (-3 if moving)
Intruder chameleon:	-10 (-6 if moving)
Line of sight passes into/through:	
A body of water:	-8
Thick fog or smoke:	-1 per yd
Mist, clouds, falling rain or snow:	-1 per 5 yds
Chaff cloud:	-2 per yd or a flat -5, whichever is worse
Prism cloud or blackout gas:	fails automatically!

Chaff, deceptive jammers and area jammers have no effect on higher-TL sensors. Radar detection automatically fails if line of sight is blocked by solid objects, 5+ yards of chaff, or 50+ yards of dense woods or jungle. Ladar detection has the same limit, and also fails automatically if LOS is blocked by 5+ yards of dense fog or smoke, or 50+ yards of cloud banks or mist.

Ranged Combat

Ranged Combat Modifiers

These considerations apply especially to mecha:

Size Modifier: The Size Modifier for a mecha is determined during the design process. For other targets, use p. B201. If the target is the body of the mecha, use the mecha's Size Modifier. If the target is a subassembly, use the subassembly's own Size Modifier. If an attack against a wing or turret subassembly misses by 1, it hits the body instead.

Fixed-Weapon Skill Level Limit: If firing a beam or gun that is built into the body (unless in a casemate), a wing or a hardpoint, the user must aim the weapon with the mecha's body, so his Gunner skill may not exceed his mecha operation skill-3.

Recoil: Recoil penalties do not apply when using mecha weapons; the mecha's body safely absorbs the recoil.

HUDs: All normal mecha and battlesuit cockpits incorporate a HUD with built-in pupil scanner. If the mecha has a head-up display, the SS of its weapons is -4 for TL8 HUDs or -7 for TL9+ HUDs.

Neural Interface: If a mecha has a neural interface accessory, it gives a +4 bonus to Gunner skill.

Active Targeting: If a mecha has an AESA sensor system, it can use it to "target" with, giving a +2 to attack any one object within range. See *Active Electromagnetic Sensor Array (AESA)*, p. 48.

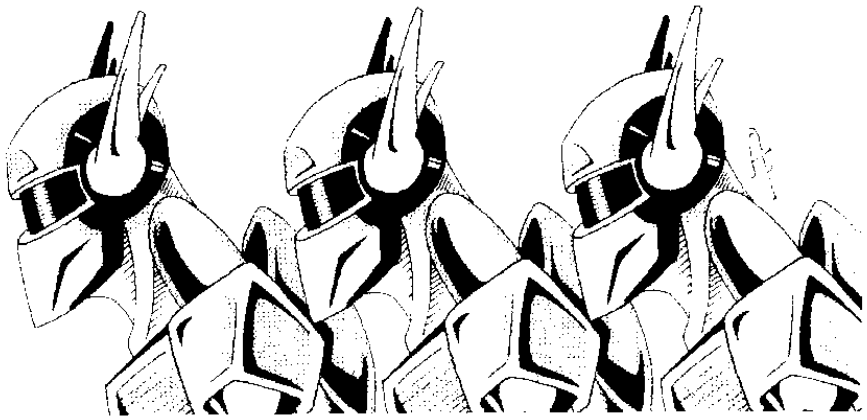
Targeting Computer Bonus: Most mecha have computers that give a bonus to hit. This applies to all ranged attacks made by the mecha, unless the computer is disabled.

Moving while Firing: A mecha that fires while moving suffers the penalties noted on p. B117.

Terrain: A mecha or other vehicle in a clump of light woods is -2 to be hit, or -4 if in dense forest or jungle. Mecha can also drop prone, just like a human (see p. B118).

Cover: Battlesuits and mecha can take advantage of the same cover modifiers that humans get when leaning around buildings, over ridges or crater rims, behind wrecks, et cetera. The GM should remember that the cover must be proportional to the mecha's size. A 4' high garden wall can provide half cover to a 7' tall battlesuit standing behind it, but not a 30' tall drivable mecha! On the other hand, a sturdy brick house would be just the thing to kneel down and take cover behind.

Sensors, Concealment and ECM: Attacks are assumed to be aimed visually unless the attacker was using a different sensor mode that turn – if a mecha has a



PESA or AESA, players should inform the GM at the start of the turn which sensor mode is being used. For bad weather, smoke, darkness, ECM, et cetera apply the penalties from the *Sensor Modifiers* table (sidebar, p. 49), depending on which sensor the mecha is using to aim its weapons with (or the visual modifiers, if not using sensors).

Firing in Space

Without gravity or atmosphere to get in the way, guns and beam weapons have superior range in space.

Beam Weapons: Multiply ranges as follows: ×100 if an x-ray laser, ×50 if rainbow laser or particle beam, or ×10 if flamer, plasma, blaster or ordinary laser.

Guns: Ignore Max and 1/2D ranges – the projectiles will keep on going. Indirect fire is not allowed.

Missiles: These maneuver the same way as mecha; replace their normal Speed, End and Max figures with sAccel 10 g (15 g at TL11+) and End 1.5 minutes.

For more detailed space combat rules, see p. VE187.

Critical Hits

If the attack was a critical hit, the mecha gets no defense roll. See the *Critical Hit Table* (p. 57).

Hand-to-Hand Combat

Assuming they have arms or legs, mecha can fight like large humans (or animals). This requires a Step and Attack or All-Out Attack maneuver, and can't be combined with ranged weapon fire.

See *Using Arms* (p. 46) and *Using Legs* (p. 46) for punch and kick damage. If a mecha has manipulator arms, it can use a hand weapon. A mecha can dodge, or it can parry melee attacks with its arms or a hand-held weapon. It may also block, if it has a shield (see p. 110).

Skill: When brawling or using a hand weapons, use the *lower* of the relevant combat skill (e.g., Brawling or Broadsword) and the pilot's control skill.

Collisions

When a moving vehicle crashes into something, this is a collision. For small mecha like battlesuits, the GM may wish to use the normal ***GURPS Slam*** rules (p. B112). Otherwise (and optionally, at any time), the GM should use these collision rules.

Note: ***GURPS Vehicles*** has much more detailed rules for collisions.

Avoiding a Collision

If two objects maneuver into contact with one another, this normally results in a collision. However, one or the other object may be able to avoid a dangerous *crash:*

Dodging: A mobile object may be allowed a Dodge roll to avoid a collision. On the ground, only an object that is much smaller than the one it is about to collide with can dodge: its Size Modifier must be at least 3 less than the larger object's. In mid-air or space collisions, there is no size restriction. Make a normal Dodge roll, except PD doesn't help. A success will move the dodging character the same distance as his usual "step." If that's far enough to escape, the dodge succeeds!

Stepping Over: In a potential ground collision, a mecha with legs and a Size Modifier at least 2 greater than the other object can opt to step over it without colliding at all. Thus, a large mecha can choose to avoid running a person over.

Dischargers

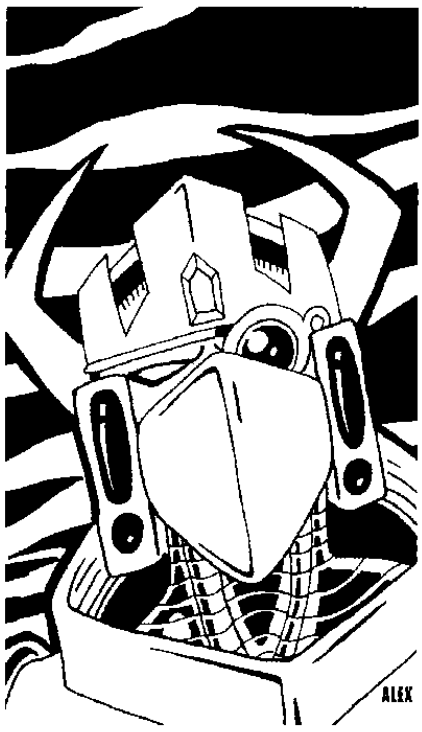
Some mecha have *dischargers.* These are launchers for countermeasures such as smoke grenades or flares. Each discharger is loaded with a single shot. Any or all of a mecha's dischargers may be fired per turn. Firing a discharger is not a combat maneuver: it can be combined with dodging. Multiple dischargers can be fired at once, which is useful if you want to launch a few different types of decoys. Countermeasures include:

Smoke is used to create a thick smoke screen, 20 yards in diameter, that obscures vision and blocks ladar. See *Sensor Modifiers* (p. 49) for the penalties. It lasts for 300 seconds divided by wind speed in mph (max. 300 seconds).

Hot Smoke: As above, but lasts half as long and penalizes infrared and thermograph sensors as well.

Chaff bursts into a 100-yard diameter cloud of conductive strips designed to reflect radar signals, which produces a huge, diffuse target that can conceal things behind or within it. It penalizes radar and ladar detection; see *Sensor Modifiers* (p. 49). However, the cloud itself shows up very well on radar or ladar, so the presence of "a cloud of chaff" will be known at least. It disperses in 150/(wind speed in mph) seconds (max. 150 seconds). Air-launched chaff drifts downward at 5 yards/turn.

Flares burn brightly in the infrared and visual spectrum, at frequencies designed to lure away incoming homing missiles (see p. 53).



Angle of Fire

A weapon can normally only fire in the direction it is facing, plus a few degrees off to either side ("angle off") and up (elevation) or down (depression). The exact arc of fire is described below, and depends on where the weapon is installed:

In Body: The weapon can fire with a 15° angle off to right or left and with a 15° elevation or depression.

In Turret: As above, but it can be rotated to face any direction, effectively giving a 180° horizontal arc of fire for limited rotation, or a 360° horizontal arc of fire for full rotation.

In Wing or on Hardpoint: The weapon can fire with a 15° angle off from the side it is attached to (thus, a weapon in a right wing can fire at 15° off to the right). The weapon also has a 15° elevation and depression.

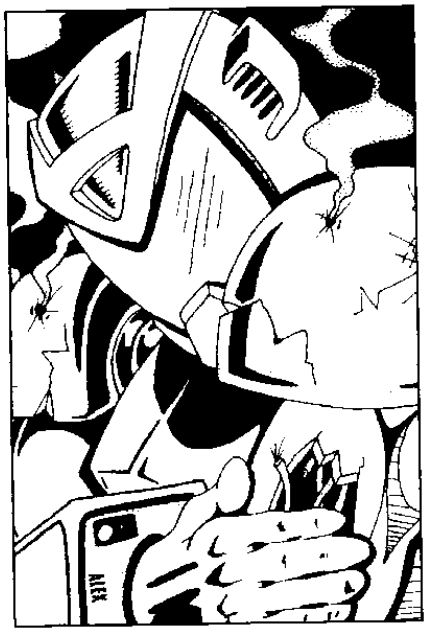
In Arm or Hand-Held: A weapon mounted in or held by an arm can fire in whatever direction the arm is pointing in – the same arc of fire as a human holding a gun.

In Leg: The weapon can point in whatever direction the leg points – but it cannot be fired on any turn that the mecha is moving further than a step. Also, unless flying, no more than half of the vehicle's legs can fire weapons at once.

In Pod: If mounted on a wing or arm, the weapon fires forward, as if in a wing or on a hardpoint; if mounted on the back, it fires upward and can only be used to hit targets directly overhead, or for indirect fire.

Sensor Arc of Vision

Use the angle of fire rules for weapons (above), based on where the sensor is mounted.



Damage from Collisions

An object that collides with something *inflicts* dice of crushing damage equal to (its original hit points × collision speed in yards per second)/100, rounded up to the nearest full die. This is the same as (hit points × collision speed in mph)/200. For mecha, use body hit points; for living beings, hit points normally equal HT.

Collision speed is based on how far the striking object moved in a straight line the turn before it hit; normally, the struck object can't inflict more damage than the striking object, unless the collision is head-on (in which case their speeds should be added together). If the damage die spread from a collision is awkward, the GM should simplify it into whatever spread he prefers: 110d can become 11dx10, for instance.

Hitting Buildings and Immovable Obstacles: If a moving object hits a fixed structure like a building, it inflicts normal collision damage on it and *takes* the same damage, to a maximum of the damage it inflicted *or* the sum of the structure's HP and DR, whichever is *less*. If colliding with the ground, a hill or some other object with more-or-less infinite hit points, the moving object takes (its own body hit points × collision speed in yards per second)/100 dice crushing damage. Reduce damage by -2 per die for collisions with water or -1 per die for collisions with snow, soft mud, et cetera.

DR and Collisions: DR will protect the vehicle normally, but the crew may get mashed up anyway – see below.

Collision Aftermath: If two objects collide, check for knockback. If one object knocked the other back but wasn't knocked back itself, it pushes the other aside and continues on. The other object may also be knocked down – see the knockback rules (p. B106) and *Mecha and Knockback* (p. 54). If a moving object crashes into an immovable object, it also stops.

Whiplash and Concussion: If a mecha is knocked aside or stopped by a collision, its occupants take whiplash damage: 1d-2 damage per 10 yards per second of collision speed. This damage is *not* absorbed by armor (but Toughness does protect!). Damage doubles if not either wearing safety belts or in a battlesuit. A womb seat reduces whiplash and concussion damage by an effective DR equal to twice its TL.

Stomping: A mecha moving on legs can avoid a collision and instead *stomp* an object that has a Size Modifier two or more less than its own. The victim can dodge to avoid the stomp. Otherwise, a stomp does normal kicking damage, with an extra +1 per ton of loaded mass (round fractions up). This doesn't count as an attack, but a mecha can only stomp one person per two legs unless the mecha is really huge, in which case a single leg's stomp can cover (leg surface area/100) 1-yard hexes.

Defenses

When hit, a mecha gets a passive defense roll based on the armor on the location hit or its deflector screen PD, unless the attack was an explosion. PD also adds to Dodge and other active defenses – again, except versus explosions.

Shields: A mecha with a ready shield can get extra PD from it against frontal attacks, but the shield risks destruction; see *Shields* (p. 110), in Chapter 6.

Dodge

A mecha with a gMR of 1+ (on the ground) or an aMR of 1+ (in the air) may dodge. A mecha's Dodge score is not based on its Move. Instead, it depends on the pilot's control skill and how the mecha is moving:

On the ground, Dodge is skill/2 if on two legs, skill/3 if on three or more legs, or skill/4 if moving on wheels.

In the air or in space, Dodge is skill/3.

Round all fractions down. Combat Reflexes and mecha PD will increase Dodge in the normal fashion. However, if the sum of PD and Dodge exceeds 14, treat it as 14.

Dodge and Drop: A mecha moving on the ground on two legs may drop prone while dodging, earning a +3 bonus to Dodge, even vs. ranged weapons. It can't do this if it used its enhanced Move this turn. For more on Dodge and Drop, see p. CII63.

Parry

The pilot of a mecha with arms can parry just like a human does, either barehanded or, in the case of manipulator arms, with a hand weapon. The normal restrictions on parrying apply (i.e., ranged attacks, except for thrown weapons, can't be parried).

The combat skill (e.g., Brawling, Broadsword, et cetera) the pilot uses to parry cannot exceed Battlesuit skill if wearing a battlesuit or Driving (Mecha) if in a drivable mecha.

Block

A mecha can use a shield or force shield to block with; see *Shields* (p. 110), in Chapter 6. The pilot's Shield skill cannot exceed Battlesuit skill if wearing a battlesuit or Driving (Mecha) if in a drivable mecha.

Retreating

A mecha can only retreat (see p. B109) if it is either moving on legs or flying and has no stall speed, and only if it did not use its enhanced Move that turn.

Misses and Scattering

When an attack that produces an explosion or releases smoke, gas or other chemicals misses or is dodged, it will still go off *somewhere.* Use the *Scattering* rule on p. B119, except the distance may be greater: take the amount by which the attack roll failed or the Dodge roll was made, treat it as a negative number and look it up on the *Speed/Range* column of the table on p. B201. Read across to the adjacent *Linear Measurement* column to find the distance the attack missed by, to a maximum of 1/10 the range to the target (at least 1 yard). In the air or space, scatter can be ignored unless the target was close to the ground and the attack came from above.

Homing Missiles

Homing missiles are rockets fitted with a homing guidance system and steering capability.

GURPS Vehicles has extensive rules for missile guidance systems that tie into its detailed electronic detection system. For ***Mecha,*** a simpler system is used, as only a few types of homing missiles are included.

Lock-On: Locking on requires an Aim maneuver. Roll to hit normally with the missile, using the missile's skill as *both* its skill and its Accuracy. The gunner's skill does not apply. These additional modifiers do apply:

Target is using:
- *Basic IR cloaking* ..... *-1×(cloak's TL-4)*
- *Radical IR cloaking* ..... *-2×(cloak's TL-4)*

On this or the previous turn, target discharged a ***flare*** *of equal or higher TL than the homing missile* ..... *-5*

Target using IR jammer ..... *-1 × jammer rating*

Target using TL10+ deceptive jammer ..... *-1 × jammer rating.*

IR cloaking has *no effect* if the target used a fusion air-ram or any kind of rocket engine on this or his last turn. A jammer or flare has *no effect* if it is of lower TL than the homing missile it is trying to jam.

Fire and Explosion

A fire isn't a pleasant thing for a mecha. There are several ways a mecha can catch fire:

Flame Attacks: These are attacks that are especially likely to start fires, including explosions, flamers, lasers, flamethrowers, Molotov cocktails, depleted uranium rounds and anything else the GM thinks likely to start a fire. If a flame attack *penetrates* the DR of a mecha (or hits a mecha with flammable ablative or wooden armor), it may catch fire. Roll 3d vs. the penetrating damage done by the flame attack (or vs. *any* damage, if the mecha has flammable armor). If the roll is less than the damage, the hit location is on fire.

Fuel Tanks: Some types of fuel have a *Fire* number, as described under *Fuel and Fuel Tanks* sidebar (p. 86). A check for fire must be made any time a body or subassembly housing such a fuel tank takes damage greater than half its hit points from any kind of attack. Roll 3d; if less than or equal to the Fire number, the tank catches fire (add +4 to Fire number if the attack was a flame attack).

Once a fuel tank catches fire, roll 3d each second versus half the tank's Fire number. "Success" means the tank explodes. The vehicle takes 6d×15 damage per gallon of gasoline, diesel or jet fuel in the tank, or 6d×25 per gallon of rocket fuel. If the vehicle has a self-sealing tank, only one-quarter damage is done – the rest of the energy is dissipated tearing the tank apart against the resistance of the seal.

Every ten seconds that a fuel tank is on fire, 1d×5% of its total fuel capacity is burned away. When all the fuel is gone, the tank is no longer on fire.

Power Plant or Thruster Hits: Damage to a power plant, jet or rocket engine that uses flammable fuel may result in a fire. If the power plant or engine is disabled (as the result of a critical hit or by disabling the location it occupies), roll three dice vs. the Fire number of the power plant or thruster's fuel. If equal to or less than the Fire number, the vehicle catches fire.

Continued on p. 56 . . .

Firing: If the lock-on roll succeeded, the missile can be lauched on the following turn; launching a missile is an attack. If it failed, the firer can try again next turn. *Exception:* if the roll failed by 1 or 2, or was a critical failure, *and* the target had an IR or TL10+ distortion jammer, the missile is launched at the wrong target. It will miss; at the GM's option, it may chase an enemy mecha, building, rock, et cetera.

Tracking and Flight: Once launched, the missile will move toward the target at its listed *Speed*, covering that number of yards each turn. A missile will always try to keep its target in front of it and in its arc of vision (see p. B115) – if it cannot do so, it has lost its target. To do so, each turn it may change direction by up to 30°, climb or dive. A missile can only move for a number of seconds equal to its *Endurance*. After this is exceeded, it will self-destruct.

Decoys: If the target has a decoy discharger loaded with flares, it can launch one to confuse the incoming missile. (Launching more than one flare has no extra effect.) Flares only work if they are of the same or higher TL as the missile. On any turn a flare is launched, the missile's owner rolls 3d vs. the missile's skill minus the flare's TL; if the roll fails, the missile is decoyed away and effectively destroyed.

Shooting at Missiles: Missiles can be fired at, though their small size and high speed makes them hard to hit! Small missiles have a Size Modifier of -4, medium missiles are -2, large missiles are 0. The missile's speed is its Spd attribute. Ten points of damage will knock any missile off course or blow it up.

Dodge: Missiles that hit can be dodged. If the Dodge roll fails, the target will be hit. PD is treated as 0 vs. homing missiles.

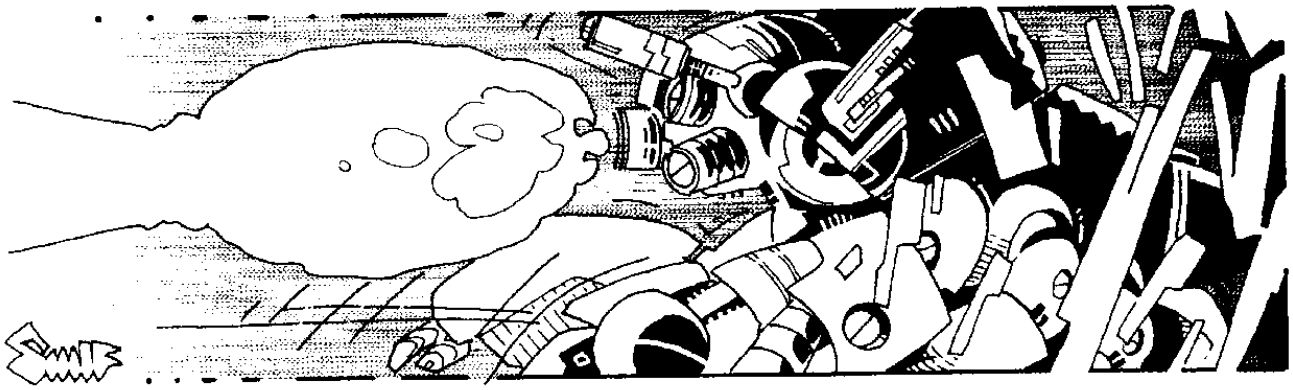
EFFECTS OF DAMAGE

When a location is hit, subtract its DR from damage. (If the mecha has a force screen, first subtract the screen's DR.)

Ablative Armor: The PD and DR of this armor work normally, but for every 10 points of damage that strike the armored location, whether or not it is resisted by the ablative DR, one point of ablative DR is destroyed; for body or turret armor, DR is only lost on the face attacked – right, left, back, front, top or underside. If a mecha has an outer force screen or a layer of non-ablative armor, only damage that actually penetrates to the ablative armor reduces its DR. Lost DR can be replaced the same way hit points of damage are repaired.

Mecha and Knockback

Even if no damage penetrates DR, a mecha can suffer knockback. The number of hits required to knock a mecha back 1 hex is 100 times its loaded mass in



tons. The pilot of a mecha that is knocked back must make a control roll to avoid falling over. If a mecha overturns, it can normally right itself in two turns, rising to a kneeling and then standing position.

Damage Effects

Damage that penetrates DR is applied only to the location hit and reduces that location's hit points. Thus, unlike a human, damaging an arm does not affect the body's hit points. Each body, subassembly or wheel is a location. If a location is reduced to 0 or fewer hit points, it is disabled; see *Disabled Locations* (Below).

If a location holds a cockpit, battlesuit system, explosive ammunition or fuel tank, penetrating damage may have further effects:

Any damage that penetrates DR may injure an occupant in a cockpit or battlesuit system in that location; see *Occupant Injuries*, below.

Damage of half or more a location's original hit points may cause an ammo explosion if the location houses volatile ammo; see *Ammunition Explosions* (p. 57).

Damage of half or more a location's original hit points may cause a fuel fire if the location houses a fuel tank with a Fire number; see *Fire and Explosion* (p. 54).

Occupant Injuries

If a battlesuit system or cockpit occupies the damaged location, there is a chance that the occupant may be hurt.

If a location containing a cockpit, standing room or a battlesuit system loses hit points from an attack, anyone in the location may be injured by fragments or the attack itself. Roll 1d for every 100 points of penetrating damage (or fraction thereof). On a 6, one random or GM-chosen occupant (normally the pilot, unless there is more than one person) takes half the penetrating damage inflicted, up to a maximum of 50 hits. DR (e.g., from worn armor) protects normally, but if the attack has an armor divisor, then that is also applied to the DR of the character's own armor.

Exception: If the attack's damage was greater than the location's actual hit points, damage is inflicted on a 5 or 6 and the maximum damage is 100 hits.

In addition to the above, if any battlesuit's turret, arm, leg or body takes damage that reduces it to 0 hit points or less, the wearer will always be damaged. Apply half damage past 0 hits to the matching location on the pilot. For example, if a battlesuit were hit in the turret and the damage reduced the turret's hit points to -5, the pilot's own head would take half that, rounded down, or 2 hits of damage. If the turret were hit again for 4 points of damage, the pilot would take another 2 points of damage and the turret would be at -9 hit points.

Note that a person in a master-slave battlesuit (see p. 96) only occupies one location, and a person is not "inside" a battlesuit that has transformed into a cycle-like configuration.

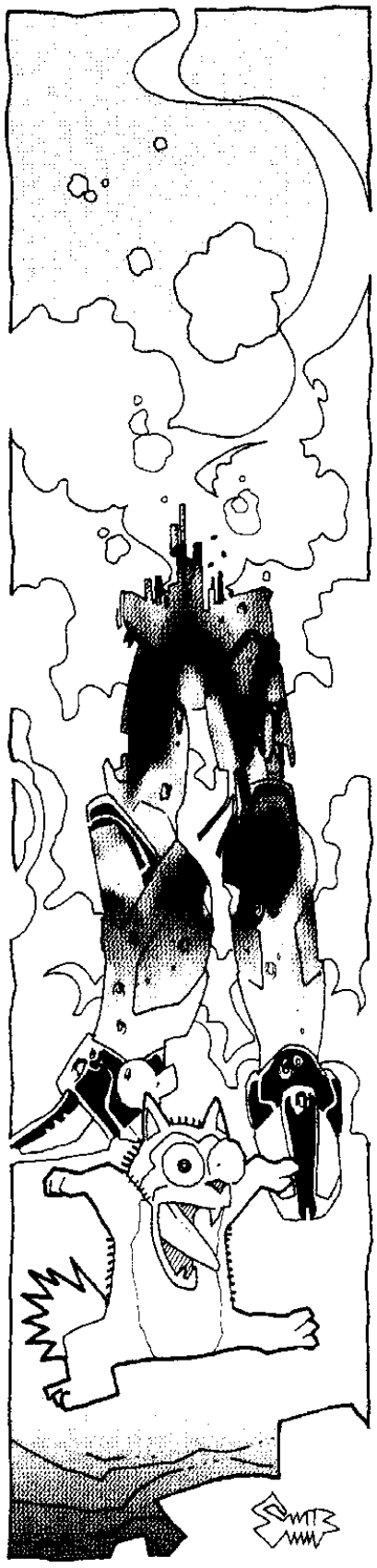
Fire: If a character is in a location that is on fire, he takes normal fire damage each turn, as described on p. B129.

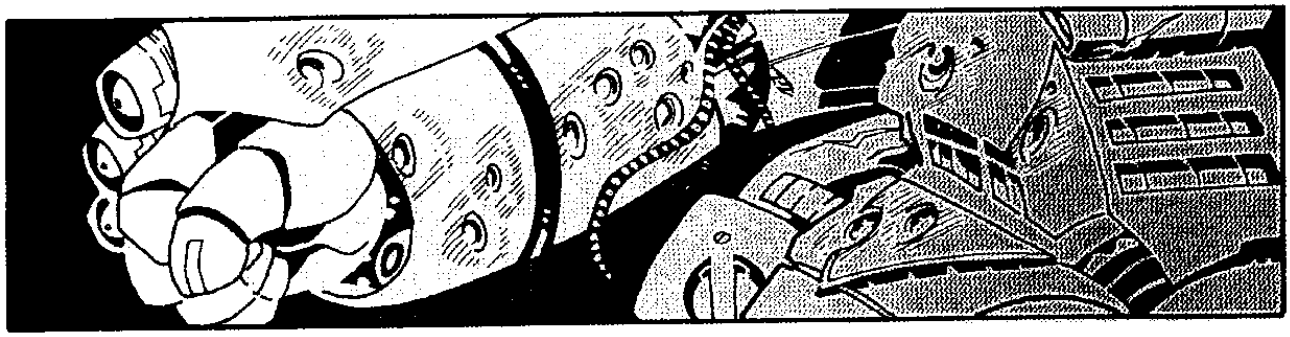
Disabled Locations

If a location is reduced to 0 or fewer hit points, it has suffered very serious damage and may stop working. The effects depend on the location, and take place in addition to any checks for occupant damage, ammo explosion or fire.

All Locations: Disabling *any* location disables all components within it; if a lifesystem is disabled, it will still have its remaning man-hours of life support once it is repaired.

Disabled Body: The mecha's Speed and Dodge are halved, cumulative with





Fire and Explosion (Continued)

Effects of Fire

A mecha on fire suffers 2d damage, plus another 2d every 10 seconds, ignoring DR. Fire damage is always applied to the location where the fire is taking place. The crew may be able to put the fire out by using fire extinguishers (see p. 81), diving the mecha into water, et cetera.

Any crew who occupy the location that is on fire suffer the effects of fire and suffocation described in the ***Basic Set.*** Their personal armor protects normally.

Fire can spread or die. Every ten seconds, each fire may spawn another fire. This occurs if the fire did 8 or more hits of damage after modifiers. However, if an individual fire did less than 4 hits of damage after modifiers, that fire dies out. If a fire totally destroys a location, the fire there also dies.

Fire-Fighting

A mecha cockpit normally includes a compact fire suppression system. This is an automatic chemical fire extinguisher with outlets throughout the mecha's body. Fire suppression systems get a roll to put out a fire immediately, with an extra roll every ten seconds. Make a separate roll for each fire raging in the vehicle, rolling against the system's TL+3 on 3d. *Modifiers:* -1 per separate fire going on at once.

A mecha cockpit with the "no fire suppression" downgrade lacks this system, but the crew can use hand-held fire extinguishers to fight any fires in the same location as the cockpit. A pilot or crew member can't do anything else if fire-fighting, and can only fight one fire at a time. Roll the extinguisher's TL+2 or less on 3d to succeed, or roll 6 or less without an extinguisher, every ten seconds. A critical failure means the fire-fighter takes 2d burn damage. The DR of fireproof clothing will help against this damage.

A battlesuit lacks fire-fighting gear. If a fuel tank or power plant is on fire, the wearer should abandon the suit – although if a companion has a hand-held fire extinguisher, he can try to use it to deal with the flames (see above). See *Wearing a Battlesuit* (p. 40) for the time required to get out.

any penalties for leg damage. The mecha is also on the verge of massive system failure – it will stop working in a short time. Roll 3d vs. the mecha's HT when it is first reduced to 0 or fewer hit points, and again at the start of each turn. On a failed roll, the entire mecha is effectively "knocked out." If it was moving on the ground on the previous turn, it will crash. If it was flying, it enters an uncontrollable dive. If it was in or under water, it starts to flood and sink. If it was in space, it simply floats there.

Disabled Subassembly: The subassembly no longer functions. All components in it stop working. Cargo stored there is inaccessible. Energy, fuel or ammunition in it cannot be used. In addition, some specific effects apply to certain subassemblies:

Arm – The arm can no longer move, strike, manipulate or hold anything. Anything the arm was holding is dropped and may take damage from the fall, if the mecha is tall enough.

Leg – The leg is crippled and cannot be used to move or kick. If a mecha has two legs and one is disabled, the effects are the same as when a human suffers a crippled leg: it falls down and can only move by crawling. If it has three or more legs, the pilot must make a control roll to avoid falling; also, divide ground Speed and Move using legs by the number of legs, rounding up – that's the speed lost for each leg that is crippled. If all legs on one corner or side are gone, the mecha falls and can only crawl.

Wing – The mecha may no longer safely fly in a configuration that has unfolded wings (the aerodynamics are wrong). If it attempts to do so, its aerial Move, Speed and MR are cut in half and it gains an "infinite" stall speed; the pilot must make a control roll each turn. On a failed roll, the mecha goes out of control and enters an uncontrollable dive. When it hits the ground, inflict falling damage on it, multiplied by its weight in tons.

Turret – The turret can no longer rotate. It is stuck facing in whatever its last direction was.

Wheel – Each wheel is an individual location. If an attack cripples one wheel and the mecha has only two, its Speed and Move on wheels drop to 0. If a mecha has three wheels, its Speed and Move on wheels drop to 0 when the front wheel or both rear wheels are crippled. If it loses one rear wheel, halve Speed and Move. If the mecha has four or more wheels, its Speed and Move on wheels drop by 10% when a wheel is lost, and are halved when half or more are lost; if it loses all wheels on two corners, Speed and Move are reduced to 0.

Disabled Locations & Trapped Crew

If a pilot or crew member is within a location that is disabled, he may be trapped. Roll 1d. On a roll of 5-6, he is stuck in debris. One frantic roll to escape is allowed each turn, made vs. ST-7, or a more deliberate attempt can be made every ten seconds, rolling vs. ST-3. A failed roll inflicts 1d damage; DR does not protect. A trapped character cannot eject.

Destroying Mecha

If a location is reduced to -5× its original hit points, it isn't just disabled – it's totally destroyed. If this happens to a subassembly, there isn't much difference in game terms except it is much harder to repair and the subassembly is blown clean off. If the body is destroyed, so is the mecha; all subassemblies attached to it are disabled.

Mecha Critical Hit Table

Critical hits allow individual components to be damaged. If a mecha takes a critical hit, it gets no defense roll.

Mecha Critical Hit Table (Roll 3d)

3 – Triple normal damage; also, if there is a computer in that hit location and any damage penetrated DR, it is destroyed! (If there are multiple computers, the largest one is destroyed.)

4 – Double normal damage. Also, if the hit struck the body of a winged mecha and did damage in excess of 5% of body hit points (minimum 1 hit) after DR, the rudder system is damaged. In a configuration with unfolded wings, aMR is halved, rounded down, and it may not dodge.

5 – Bypasses 90% of armor DR (i.e., divide armor's DR by 10) and does normal damage. Also, whether any damage penetrated the mecha or not, a sensor in the location hit (if any) is disabled.

6 – Normal damage; also, if there is a power plant in the location, the largest one is badly damaged and its output is halved (if this result occurs a second time, the plant stops working). This will reduce the mecha's speed if the mecha cannot provide sufficient power to the propulsion system. If the mecha has an energy bank but no working power plant, treat as #14.

7 – Normal damage; also, if the attack penetrated DR, fire breaks out in the area hit! See *Fire and Explosion* (p. 54).

8 – Normal damage; also, if the mecha has weapons in the location hit, one is struck in the barrel and disabled.

9-11 – Normal damage only.

12 – Normal damage; also, if the attack penetrated DR, any one item of miscellaneous equipment in the location hit is disabled (GM's option). This can include things like overload boosters, cargo or the gear necessary for a transformable mecha to transform (trapping the mecha in its current shape).

13 – Bypasses 90% of DR (i.e., divide armor's DR by 10) and does normal damage.

14 – If the mecha has an energy bank in the location hit, half the maximum kWs of storage capacity (along with half the stored power) are lost. If the mecha has no energy bank, treat as #6.

15 – Normal damage; also, if any damage penetrated DR and there is a communications or electronic countermeasures system in the location hit, one such system is disabled (GM's option).

16 – Double normal damage; also, if the mecha has a fuel tank in the location hit, check for fire and it develops a leak. 1d% of the total fuel capacity leaks out immediately, plus (unless the tank is self-sealing) 1d% every minute.

17 – Triple normal damage.

18 – Double normal damage; if the location hit contains explosive ammunition and any damage penetrated, it explodes. See *Ammunition Explosions* sidebar. If no ammunition, treat as #3, above.

Ammunition Explosions

If a body or subassembly that contains explosive ammunition or missiles is reduced to 0 hit points, check for an explosion. Roll 1d: An explosion occurs on a roll of 6, or on a 5-6 if the damage was inflicted by a flame attack (see above).

To determine the damage of an ammunition explosion, use the damage of 1d shots (or whatever's left) in the weapon or any magazines in the location. If there are multiple choices, use the largest-caliber weapon. That's the force of the explosion. Damage from the explosion is applied immediately to the body or subassembly where the ammunition was stored. The mecha's DR does not protect!

If the ammo was in an anti-blast magazine, roll 3d against its TL+6. If the roll succeeds, the explosion does no damage, but all explosive ammunition in the location was destroyed.

Antimatter and Nuclear Power Plant Explosions

If an antimatter power plant is disabled, it explodes; damage is 6d×10,000 per kW of output per year of useful life left in the plant. All damage is explosive concussion damage. The area may also be contaminated by radiation – see p. CII145ff for radiation rules.

Nuclear power plants incorporate failsafes to keep bad things from happening should they break down. They work . . . most of the time. However, there is a 1 in 6 chance that a fission or fusion plant will undergo an energy release if disabled – this is not a nuclear blast, but the release of (possibly radioactive) steam or high-energy plasma contained within the system. Damage is 6d concussion per kW of output.

An antimatter, fission or fusion power plant (but not an NPU) can be rigged to self-destruct. For an antimatter plant, this is merely a matter of turning off the containment system. For a fission or fusion plant, a successful Engineering (Nuclear Weapons) skill roll is needed. Damage for antimatter plants is as above; damage for fusion or fission plants is 6d×100 per kW of output.

Ejection

Mecha cockpits with the "ejection seat" upgrade possess a rocket escape system that can instantly blast the occupant out of the mecha and then (if in atmosphere) deploy a parachute to land him safely. A person strapped into an ejection seat can activate it in one second: a panel slides open and the seat blasts out.

Ejection unseals the mecha, compromising life support and waterproofing. The mechanism blasts the user and his seat 160 yards up. If the seat senses it is within an atmosphere, it automatically opens a parachute, enabling the occupant to float down for a soft landing. If the user is inside a building when ejecting, he (and anything he slams into) takes 8d×4 damage.

Ejecting counts as the character's action for the turn. If one crewman is unconscious, another can eject both of them.

An ejection seat has a 50% chance of working if the body or subassembly housing it is disabled. If not, the seat, canopy, et cetera is stuck and the occupant can't get out. He can try a ST-6 or Mechanic-6 roll to unjam it each turn. This can get desperate if the mecha is on fire or out of control!

For more details on ejection, see pp. VE161-162.

THE BATTLEFIELD

This section discusses things that mecha can blow up, get stuck in, hide behind or crash into.

Terrain

Most terrain will fit into one or more of these categories. Terrain often reduces the top speed that a vehicle can reach while moving through it.

Hard: This is a paved road, salt flat, aircraft runway or the like. All vehicles move at full speed.

Soft: This is ordinary grass, dry earth, packed sand or muddy dirt roads. A vehicle with legs moves at full speed. One with wheels moves at half speed (2 movement points per hex).

Broken: This is rocky, cratered or very hilly terrain. It may be barren or covered with vegetation. A vehicle with legs uses its full speed, while one using wheels moves at one-quarter speed (or 4 movement points per hex). Visibility depends on whether you are atop a hill, in the open or in a gully. There's lots of cover (p. B118).

Quagmire: This includes mud, swamp, riverbanks, marsh, very soft sand, the sea bottom and deep snow. A vehicle with legs uses half speed (or pays 2 movement points per hex), while one using wheels will be stuck.

Light Woods: Soft, broken or quagmire terrain may also be covered with light woods. The only effect is that visibility is reduced: it rarely exceeds 500 yards. A mecha in light woods is -2 to be hit.

Forest: Soft, broken or quagmire terrain may be covered with dense woods or jungle. Visibility rarely exceeds about 50 yards. Vehicles with a Size Modifier under +2 are not penalized, nor are those massing 50 tons or more that have no wings *and* a front body DR of 50 or more. Most other vehicles have their speed halved (or pay 2 movement points per hex), but vehicles that have a Size Modifier of +2 or more *and* unfolded wings cannot move at all! A mecha in a forest is normally -4 to be hit.

Snow-covered or Icy: Any of the above types of terrain can be described as "snow-covered" or "icy." Mecha using enhanced Move must make a control roll each turn or fall over.

Ridges and Buildings: A mecha over a ridge line or behind a building can't be spotted except from a higher elevation. A mecha with a turret can choose to expose only the turret, making it harder to hit but still allowing it to attack with turret-mounted weaponry. Battlesuits and mecha can take advantage of the same cover modifiers that humans get when leaning around buildings, over ridges, et cetera.

Buildings

Mecha will often crash into, out of, or through buildings, or simply shoot them. A mecha's dimensions govern whether it can fit through doors, hallways and so on without breaking things, while the *Collision* rules (p. 51) cover the damage a mecha inflicts when it crashes into a building. But what happens to the *building?*

A building is rated for its width and length in yards, its height in stories, its DR, its hit points (HP) and its breach capacity (BC).

DR is the building's average damage resistance, while *hit points* are per hex of wall. Typical DRs and hit points: wood (DR 4, HP 20), concrete (DR 4, HP 60), glass and steel (DR 5, HP 10), light brick (DR 6, HP 40), stone (DR 8, HP 90), thick stone (DR 8, HP 180), bunker or fortress (DR 100, HP 200).

If damage equals or exceeds building hit points, it causes a one-hex-wide breach. Damage from a single attack in excess of hit points "blows through" the building rather than doing more damage, *unless* the damage resulted from either an explosion or a collision with an object of Size Modifier +2 or greater. If so, divide the penetrating damage by hit points to determine the total number of one-hex breaches inflicted on the building. (For a collision, the maximum number of breaches is the Size Modifier of the colliding mecha.) New breaches are created alternately to the right and left of the original breach (and then upward or downward from it, if the building has additional stories above or below the breach).

Breach capacity (BC) is the number of breaches a building can take before collapsing into rubble. If the number of breaches to a single story exceeds BC, it and all stories above it fall. For buildings with a reinforced frame and foundations (like steel-framed skyscrapers or bunkers), BC is 0.25 × length (yds.) × width (yds.) × number of stories. For other buildings, like ordinary brick or wooden houses, shops, barns or schools, BC is 0.125 × length (yds.) × width (yds.), with a minimum BC of 1.

Collapsing Buildings: A building whose breach capacity is exceeded takes three seconds to collapse per story of height. Everyone in it takes dice of damage equal to building (HP + DR)/4 per story of building height. The building could also fall sideways, crushing mecha or people outside.

Fire: A building can be set on fire. Use the same rules as for vehicle fires (see *Fire and Explosion* sidebar p. 54), with wooden buildings being more vulnerable. Fire damage accumulates from turn to turn for the purpose of causing breaches.

OPTIONAL RULES FOR MECHA COMBAT

The GM decides which of these rules are in force at any given time. For example, at the start of a large battle, rules for Quick Kill might be in effect, to be dropped after most of the minor NPCs on both sides are eliminated.

Playability Rules

Mecha have a lot more weapons and systems than individual characters do, and so require more work from the player and GM. These rules are aimed at easing that workload.

Quick Automatic Fire

Armed with a pair of 30mm Gatling guns, you close on the enemy mecha and squeeze the trigger, releasing a spitting hail of hypersonic death . . .

Indirect Fire

Mecha, like tanks, normally fire at targets in direct line of sight using high-velocity projectiles or beam weapons.

However, guns can also use indirect fire – lobbing a projectile in a high ballistic arc, like an artillery shell. Heavy homing missiles can also use indirect fire. A mecha can angle its weapons to perform indirect fire simply by tilting its body using its legs. Indirect fire has 2.5 times normal maximum range, but has a *minimum* range of 1/4 normal maximum range.

Indirect fire can be made against a visible target, or against a map reference beyond line of sight with the help of a forward observer in communication with the firer. It takes two seconds to transmit target coordinates between Datalinked computers, or 2d+5 seconds by voice communication.

Only aimed shots are allowed, and only *range* modifiers apply to the attack roll: size and speed of the target aren't important, nor are cover, concealment, smoke or ECM (except in preventing the gunner or observer from spotting the target in the first place). Indirect fire is always treated as being beyond 1/2D range, regardless of actual range. Thus, there is *no* Accuracy bonus. If relying on an observer to spot the target, there is a -5 penalty; this is reduced or increased by the amount by which the observer makes or fails his Forward Observer skill roll (see p. B243, p. CI151).

If a hit is achieved, it means the round came in over the target hex, striking from overhead. Explosive and special damage from indirect fire is normal; crushing and impaling damage is halved as if the attack were being made at or beyond 1/2D range, regardless of the actual range. If the attack misses, see *Scattering* (p. 53); however, further shots may be corrected for greater accuracy, provided the gunner or forward observer can see where they fell. The second corrected shot at the same target is at +4, the third and subsequent shots at +8. If using a forward observer, correcting fire takes the same time as transmitting coordinates.

More detailed rules for indirect fire appear on p. CI160 and pp. VE179-180.

Orbital Strikes

Beam Weapons

Craft in orbit may fire down at map coordinates to attack targets they cannot see, but which someone in communication with them can. Use the indirect fire rules (above), except that the Accuracy bonus still applies up to 1/2D range, and maximum range is not increased. The normal range to target for an orbital strike (low orbit) is about 200-700 miles. Most beam weapons won't have that kind of range, but a few might!

Kinetic-Kill Weapons

Mecha or spaceships in low orbit can also launch orbital strikes with missiles. To do so, the orbiting craft must have detected a target or be in communication with someone on the ground who has.

Kinetic-Kill Missiles: A homing missile with B/IRH guidance can be used as a orbital kinetic-kill missile. After it is launched, it takes ten minutes to fall through the atmosphere. About one second from impact, the missile will switch on its homing sensor and scan the ground below it. It will pick the closest object to its target hex that matches the profile of whatever it has been programmed to home against – usually anything with a Size Modifier of +1 or more that looks like a vehicle, robot or battlesuit, unless it has been programmed to attack a building. It ignores friendly units equipped with functioning IFF systems.

If there is a potential target, resolve the attack as if the weapon were an ordinary homing missile launched down at the target from 10,000 yards up. Because it has gravity on its side, the missile's statistics alter. It has its normal skill, but its effective endurance is only one turn and speed is 10,000. If it hits, its damage is treated as crushing rather than explosive and is multiplied by ten, but it loses its armor divisor.

. . . and then play grinds to a screeching halt as you realize that with RoF 60 per gun, you may have to roll to see whether 30 different four-shot groups hit, were dodged and did damage before you know what state the enemy is left in.

But don't despair: high volumes of automatic fire can be playable.

Very High RoF: For identical automatic weapons with a single or linked RoF of 20 or more, instead of resolving fire in normal 4-round groups, use 20-round groups and refer to the table below:

Roll Made By	*-3*	*-2*	*-1*	*0-1*	*2-4*	*5+*
Number of Hits	0	1	5	10	15	20

Thus, if the roll needed to hit is 14 and a 12 is rolled, 15 rounds hit the target. If the RoF does not divide evenly by 20, either ignore the excess or calculate fire for it in groups of four.

Defense vs. Groups: Make one defense roll per entire *group* rather than vs. individual shots within the group. This can be used for 4-round (or smaller) groups or for larger, 20-round groups. This is fairly realistic and will speed up play considerably.

Damage by Group: This is suggested when using weapons with very high rates of fire (RoF 20+). It is a real headache to roll damage individually for 10, 15 or 20 shots at a time. Instead, roll damage only *once* for the entire group, subtract any DR, and then multiply the damage that penetrates DR by the number of shots in the group. This will mean sometimes, if you get a low roll, no shots in the group will penetrate, while other times a great deal of damage will be done. However, this is not entirely unrealistic: assume the entire group hit at a bad or good angle, or struck a particularly strong or weak point in the armor!

Downgraded Autofire

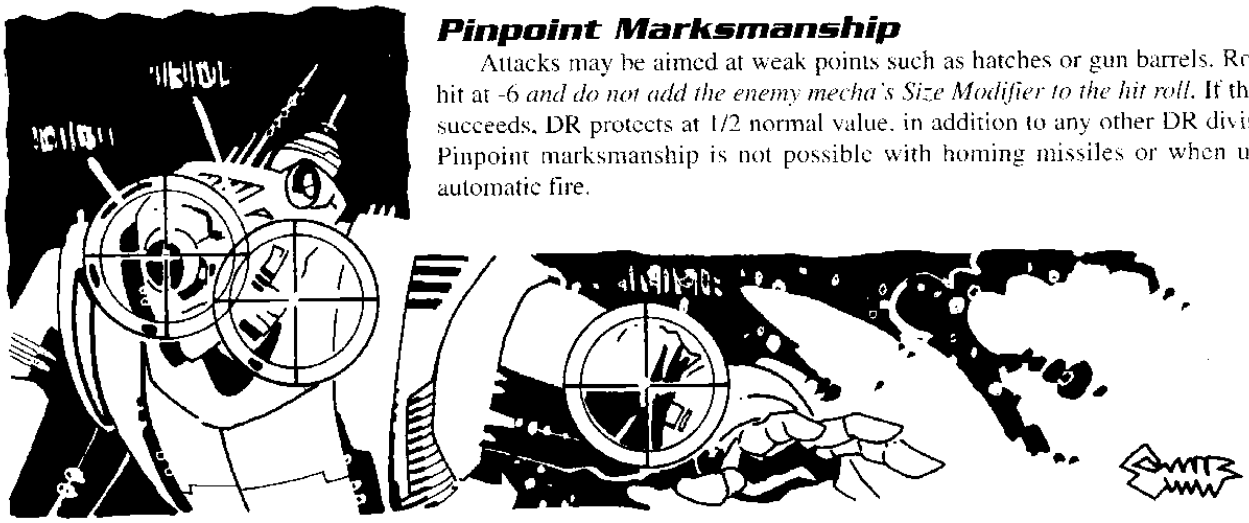
The *Aiming Successive Groups* rule (p. B112) makes snap shots with automatic weapons extremely lethal, and gives them a great advantage over other weapons which must aim for a turn to get an Accuracy bonus. For play balance, see the optional combat rules in the sidebar of p. CII67.

Cinematic Rules

The rules in this section are intended to make combat more dramatic. They include rules that favor high-skill characters and those that simply enhance the cinematic feel.

Pinpoint Marksmanship

Attacks may be aimed at weak points such as hatches or gun barrels. Roll to hit at -6 *and do not add the enemy mecha's Size Modifier to the hit roll.* If the hit succeeds, DR protects at 1/2 normal value, in addition to any other DR divisors. Pinpoint marksmanship is not possible with homing missiles or when using automatic fire.

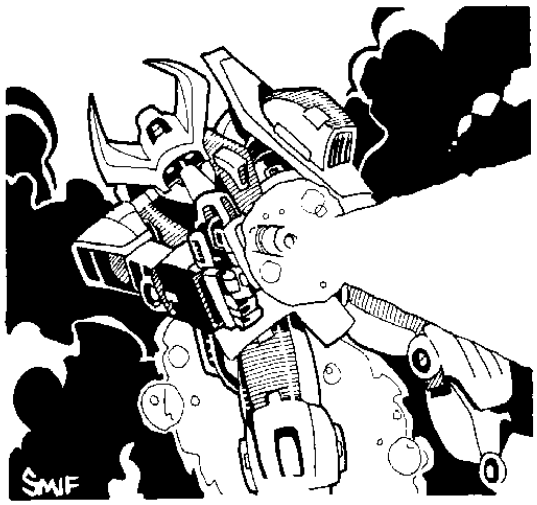


Quick Kill

This rule allows PCs to quickly disable or destroy enemy mecha, and reduces the burden of record-keeping for the GM.

If this rule is in force, when an enemy mecha's DR is penetrated by even one point of damage, that location is disabled as if it had been reduced to 0 hit points. As a result, there is no need to keep track of damage . . . just which subassemblies have been eliminated. A hit to the body will disable the entire mecha. If desired, roll 3d vs. the mecha's HT when damage penetrates the body: if the roll fails, the mecha blows up and the pilot is killed. Otherwise it is crippled and the pilot can eject or escape.

This rule is best left to battles involving large numbers of NPC mecha, as it speeds up the combat and reduces the workload imposed on the GM. It should not be applied to attacks against mecha controlled by PCs or by major NPCs (GM's option). It does allow player characters to duplicate the massive carnage that anime mecha aces often wreak on hordes of low-grade enemy units. However, turnabout is fair play: the Quick Kill rule can also be used to allow major villains to make short work of a PC's Ally Group!



Silly Combat Rules

Many of the *Silly Combat Rules* found on p. CII76ff are very applicable to an over-the-top mecha campaign!

Hollywood Automatic Weapons, *Cinematic Knockback* and *Imperial Stormtrooper Academy* should definitely be used.

Cinematic Explosions are recommended, but are only applicable to PCs caught outside mecha or in unsealed mecha.

Bulletproof Nudity is definitely applicable. Wearing a battlesuit whose only protection is cheesecake armor (p. 104) is worth a +1 PD for male characters or +2 PD for females.

Infinite Ammunition is in genre, but should *not* apply if using missile or rocket launchers: in cinematic anime, these normally run out of ammunition after a single salvo or two, forcing the pilot to turn to different weaponry.

Gun Control Law, *Larger than Life*, *Martial Artists Anonymous* and *Martial Arts Etiquette* don't fit most over-the-top mecha genre campaigns. Use them only in mecha gladiators or armored supers campaigns where martial arts and hand-to-hand battles are going to be emphasized over ranged combat.

The other silly combat rules (e.g., *Exploding Eyeballs*) can be used or not, as the GM wishes.

Dogfighting Combat

Flying and space movement speeds are so high that actually mapping out an aerial or space combat can be very difficult and time consuming. To simplify play, these "dogfight" rules can be used for purely aerial or space combat engagements between small numbers of mecha.

GMs may also wish to experiment with using these rules for high-speed ground combat, especially if the mecha involved are jump or flight capable and leaping about in all directions!

Dogfights consist of two phases, initial contact and the dogfight itself. They are played out in *rounds* of 10 seconds each.

Initial Contact

The GM decides on the range at which the encounter occurs and how quickly the mecha are closing or passing. Range can be set at anything (usually line

Extreme Environments

One of the main reasons for building mecha is to operate in hazardous environments. ***GURPS Space*** gives very detailed rules for the effects of alien environments on individuals. These rules expand them to cover mecha.

Heat and Cold: If the mecha is sealed, its life support system can protect against extremes of heat or cold. Otherwise, the crew suffer the same way an unprotected individual would.

Different Gravity: This will make the vehicle lighter or heavier. However, do not alter its statistics based on this, since most of them actually are a function of mass rather than weight. There are some exceptions:

1) If the mecha has no wings, recalculate its effective motive thrust based on the actual weight of the vehicle. This will affect Speed, Move and jumping distance.

2) Multiply stall speed by the local gravity.

3) Any penalties for moving in hilly or mountainous terrain should be multiplied by local gravity.

4) Multiply collision, falling and whiplash/concussion damage by local gravity if the mecha falls or crashes into the ground.

5) In less than 1 g, the mecha will have less traction; therefore, multiply its effective gMR by the current gravity and round to the nearest 0.25 gMR.

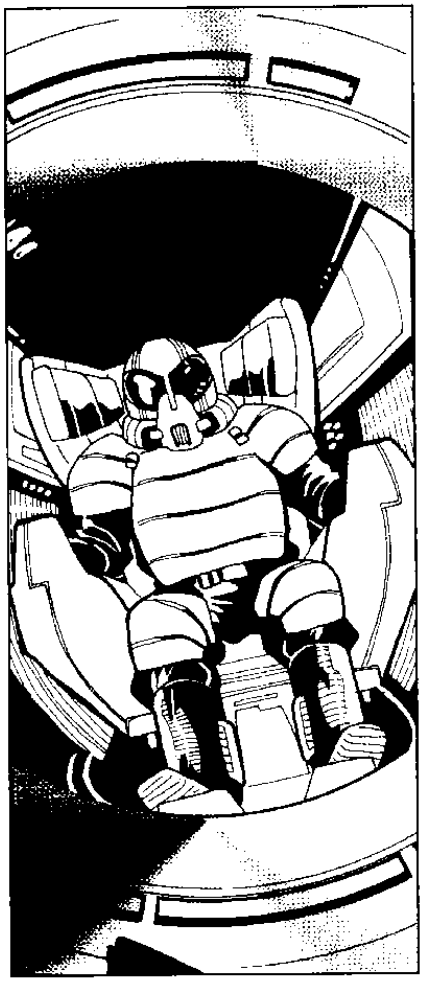
Atmospheric Pressure: If the mecha has a stall speed, divide it by atmospheric pressure. In vacuum or trace atmospheres, stall speed becomes infinite; however, if the mecha could fly with 0 stall speed to begin with, recalculate top speed as if it had radical streamlining, due to the lack of air resistance. Jet and air-ram engines are useless (no lift or thrust) in atmospheres with a pressure under one-half atmosphere.

Life Support

Cockpit Life Support: Unless it has the "no lifesystem" downgrade, a mecha cockpit includes a life-support system. This provides air, climate control and waste relief for the crew, and also includes space for a day's rations. At TL8-10, it provides only 24 man-hours of air – that is, 1 day of air for one person, 12 hours if two people are squeezed in, and so on. Stored air is only used up if outside air is unbreathable; otherwise, the mecha draws in outside air. A cockpit with the "extra air" upgrade has 12 additional man-hours of air. TL11+ mecha cockpits have unlimited air due to advanced molecular recycling systems.

Battlesuit Life Support: A battlesuit system only has a life-support system if it has the "limited lifesystem" or "full lifesystem" upgrade. A battlesuit life-support system provides six hours of air, plus six hours per "extra air" upgrade.

Some mecha have NBC kits instead of or as well as life support. These filter chemical, biological or radioactive contaminants out of the air, but are useless in a non-oxygen atmosphere.



of sight or the best mecha's sensor range, whichever is less), while speed should be taken to be equal to one-third the sum of the mecha's top speeds.

Every 10 seconds, each mecha should check to spot the other using the detection rules, or the GM can simply rule both mecha begin with their opponents spotted. As soon as one mecha has spotted the other, proceed to *The Dogfight*, below.

If there are multiple mecha involved, the range of the encounter is the same for all and speed is based on the lowest in the group. If one foe is detected, assume all are. This isn't realistic, but it is playable.

The Dogfight

A dogfight begins when one mecha that has detected another initiates combat action. The 10-second round is used. The dogfight consists of five steps each turn.

Step 1 – Maneuvering Contest

At the start of each round, the pilots roll a Quick Contest of control skills (usually Piloting). If one mecha has not detected the other, its pilot doesn't roll and is assumed to lose automatically. However, the first pilot must still roll. Modifiers to skill are:

+1 per g (or fraction thereof) that your aMR (sAccel, if in space) exceeds your opponent's.

+2 if you were closing on your foe in the previous round and he was retreating.

+2 if you have detected your foe but have not been detected yet.

-1 per full 50 mph of stall speed your mecha has; +2 if it can fly but has no stall speed!

A pilot who wins by 5 or more, or via a critical success, selects his *and his opponent's* aspect from the *Aspect Table*, below.

A winner by 1-4 gets his opponent to choose one of the aspects on the table – but may prohibit his foe from taking one aspect (usually "Closing: front facing opponent") if he wishes. After his foe has picked, the winner then chooses an aspect for his own mecha from the table.

The two outcomes above also apply to a pilot whose foe has not yet detected him and who makes his skill roll by 5 or more or by 0-4 respectively.

If the contest is a tie, if both pilots fail their rolls or if a pilot whose foe has not yet detected him fails his roll, the aspect is determined randomly for each mecha:

Aspect Table

1 – Retreating: your back facing opponent.
2 – Neutral: your left side facing opponent.
3 – Neutral: your right side facing opponent.
4 – Neutral: your top facing opponent.
5 – Neutral: your underside facing opponent.
6 – Closing: your front facing opponent.

If you are on the ground and your foe is flying, the only aspect possible for you is "your top facing opponent."

If both you and your foe are on the ground and your mecha is neither jump nor flight capable, you can't take (or force your foe to take) aspect #4-5; reroll it if it comes up randomly.

Step 2 – Range Determination

The GM determines the range (in yards) between the foes. This is the same as on the previous round (or the initial encounter range, if this is the first round) modified as follows:

Both mecha are closing: The range decreases by 1d yards times the sum of their top speeds in mph.

One mecha is closing and the other is neutral: The closing mecha may reduce the range by any amount up to either 5 yards times his top speed in mph or the actual range between them, whichever is less. If he can reduce the range to zero, he can choose to initiate a collision, ramming the side of the enemy that is facing him; the other mecha gets a Dodge roll to avoid it.

One mecha is closing and the other is retreating: The faster mecha may increase the range (if he is retreating) or reduce the range (if he is closing) by any amount up to five yards times the difference in top speeds in mph. Again, if range is reduced to zero, he may initiate a collision, ramming the enemy's rear if a dodge fails.

Both mecha are neutral: Roll 1d. On a 1-3, range increases by 1d yards times the difference in speeds in mph; on a 4-6, range increases by 1d yards times the sum of the speeds.

One mecha is retreating and the other is neutral: The retreating mecha may increase the range by any amount up to either five yards times his top speed in mph or the actual range, whichever is less.

Both mecha are retreating: The range increases by 1d yards times the sum of their top speeds in mph.

Keep a record of the range – it will set the range for next round. If range ever drops to within a few dozen yards, the GM may wish to stop using the dogfight rules and switch to regular combat.

Step 3 – Direct Fire

Mecha closing on their opponents fire first, followed by neutral mecha, followed by retreating mecha. On a tie, the effects are simultaneous; the GM can resolve the shooting in whatever order is desired. Note that if a mecha hasn't detected its enemy yet, it cannot dodge or fire.

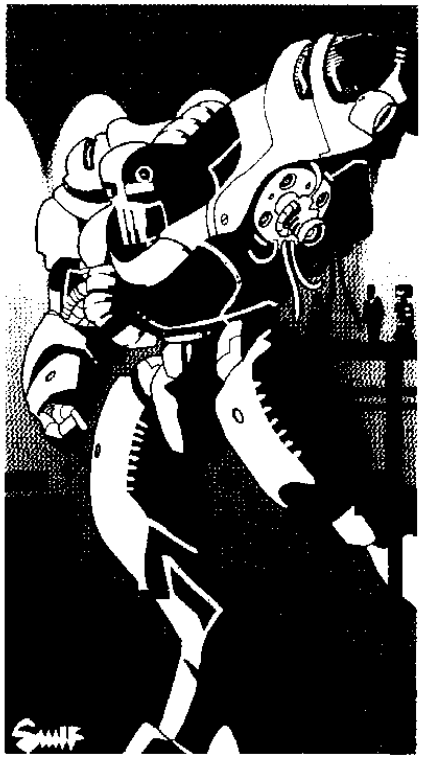
How a mecha faces its opponent and what the modified range is (Step 2) determines what weapons can fire, based on the usual arc-of-fire rules and weapon ranges. Resolve *one turn* of fire – most of the ten-second round was spent maneuvering.

Gun and beam fire is resolved using the normal ranged combat rules, but apply a -4 penalty on weapons not fired by the pilot into the forward arc. Calculate Speed/Range modifiers normally, except that Speed is assumed to be half the target mecha's top speed (this represents the changing speeds during maneuvering). If a pilot has weapons he can attack with but hasn't used, he may designate some of them for "point defense fire" – if these aren't used, they can shoot at incoming missiles. Missiles are fired in the next phase.

Step 4 – Guided Missile Fire

A missile launcher (or set of linked launchers) can be fired if the range is no greater than 10 times the missile's Spd statistic and the target is within arc of fire and maximum missile range. A pilot who has not detected his enemy cannot fire at all. If he has detected enemy sensors (e.g., with a radar/laser detector) but not his foe, he can dodge or use decoys against enemy missiles, but cannot fire. All missile fire is simultaneous.

If a missile requires a roll to lock on, make the roll. If the lock-on fails, no further tries are allowed this turn. If it succeeds, the missile is fired. If the target can launch decoys (flares), give him one attempt to deploy them and see what happens. If not decoyed, assume a missile will hit the target unless dodged or shot down. If the target mecha has unused ranged weapons dedicated to point defense, they can shoot at the missile. If the missile is not shot down, it strikes



Maintenance, Breakdowns, and Repairs

Most mecha are at least as complex as tanks or jet fighters. In a realistic campaign, GMs may wish to worry about maintenance, breakdowns and so on – see p. CII6 for maintenance and *Ground Vehicle Breakdowns* on p. CII7. For this reason, mecha in realistic settings may be transported to and from the battle front on wheeled transports, just like tanks are.

Simple Cinematic Breakdown Rule: If there hasn't been time for maintenance, or there aren't any skilled mechanics around, the GM can have a vital component break down at a dramatic moment – possibly putting some system out of action. A few minutes and a Mechanic roll can jury-rig a spare, but if that roll fails, it may take hours (and maybe a hard-to-find replacement part) to get that particular component working again.

Repairing Mecha

Fixing damage takes half an hour and restores 1 hit point times the amount a Mechanic (Robotics) skill roll is made by. Rolls are at -2 if a location is disabled, and spare parts may be required. A disabled location starts working again when it reaches positive hit points. For much more detail on repairs, see *Making Repairs* on p. CII7 or p. VE147.

Building Mecha

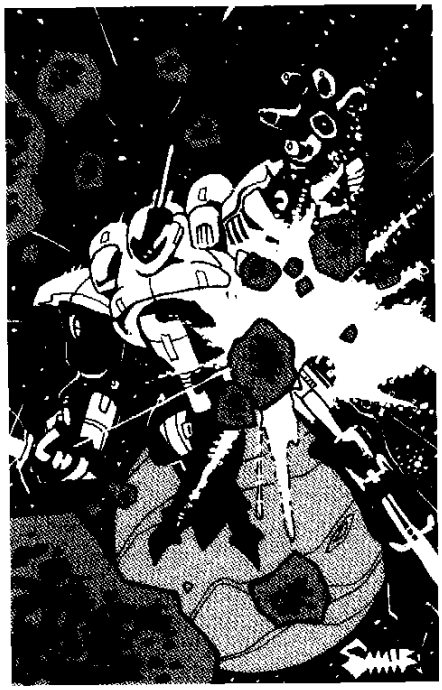
Characters may be inventors or test pilots, struggling to build and test the ultimate mecha. See pp. CI121-127 or p. VE201 for rules on gadgeteering and inventing. Roll every week to build the working model for most mecha; for mecha 6,750 cf or larger, one week is required per full 6,750 cf of size.

Power and Fuel

Powering Down: Mecha sometimes shut down to conserve power. A mecha that is shut down uses no fuel and only the tiniest trickle of power (to maintain an internal clock and any systems that use negligible power). It takes one turn for its systems come back on line.

Recharging Power Cells: Batteries and rechargeable power cells can be recharged from any power plant: every second that 1 kW is channelled into the power cell restores 1 kWs of energy. If the mecha's own power plant has excess power output, it can recharge the mecha's energy bank without turning off other systems. When this amount is small, it's simpler to multiply the excess power by 3,600 and keep track of it every hour.

Refuelling Reactors and NPUs: Fission reactors and antimatter power plants can be refuelled after their duration expires, while fusion reactors and NPUs must be replaced at full cost. Fission fuel is $80/kW at TL8, $8/kW at TL9+. Antimatter is $1/kW at TL11, $0.5/kW at TL12+. Refuelling or replacing a reactor or NPU takes about two hours.



whatever aspect of the target the firing mecha is facing, unless the target can successfully dodge.

Step 5 – Detection

If one mecha has not yet detected the other, it may now roll again for detection, as described in *Initial Contact.* Note that if one mecha is behind the other, it may be out of its pilot's or sensor's arc of vision, depending on its design.

Ending the Dogfight

This occurs when the enemy mecha are destroyed, surrender, run out of fuel, et cetera, or if both mecha decide to stop fighting or move out of maximum sensor range.

Multiple Mecha Dogfights

These rules work best as a duel between two mecha. Once the initial contact phase is over, break the mecha up into one-on-one duels. If there are leftovers, they may form into "flights," ganging up on single foes as desired. For maneuvering and range, a flight is treated as a single craft. Skill rolls are made vs. the average of all pilots' modified skills, and speed is based on the lowest of their top speeds.

Altitude

Altitude is abstracted in this system. If it is important (e.g., when ejecting or crashing), the GM can select it or assume the altitude is 2d-1 yards times the slowest mecha's top speed in mph.

Traveling Dogfights

Sometimes, one mecha is fairly close to an objective (like a base or a ground target) while the other is trying to intercept it before it can get there. The GM can rule that a certain number of rounds are needed before the dogfight reaches that destination.

If one mecha *must* go in a certain direction, it will be at -3 in the maneuvering contest, since its path is somewhat predictable. If the mecha doesn't take that penalty, assume that the round doesn't count toward reaching its objective.

Congested Areas

If the fight takes place somewhere like a city, canyon or dense asteroid belt, there is a danger of crashing into something. A mecha whose pilot gets a critical failure on a Dodge roll or in the maneuvering contest is assumed to have had a head-on collision with a solid object at half its top speed. Also, a mecha pilot can, before the Quick Contest, declare he is making a "wild maneuver" – like a surprise swing between two narrowly-spaced buildings at high speed. This adds +2 to skill for the purpose of winning the maneuvering contest, but *any* failed skill roll results in a collision as above, and a critical failure does double damage. Note that *losing* the Quick Contest doesn't count as a failure – only failing the skill roll.

At any time, the GM can rule that the fight has left the congested area, or both pilots can mutually agree to do so.

Spacecraft Dogfights

In a space dogfight, assume top speed is equal to 4,000 mph × sAccel (in g).

RANGED WEAPONS

This section describes the various ranged weapons that mecha can use.

Machine guns are bullet-firing automatic weapons.

Miniguns are machine guns that use multiple, rotating barrels (usually 3 to 6) for a higher rate of fire.

Autocannon, minicannon and *Gatling cannon* are large machine cannon that fire bursts of armor-piercing, fin-stabilized depleted-uranium shells. Armor protects at one-third normal DR, but any damage that penetrates DR is halved.

Gauss guns are electromagnetic railguns that use a magnetic impulse to accelerate saboted bullets to hypersonic velocities. Armor protects at half DR, but damage that penetrates DR is also halved.

Gauss cannon are cannon-sized railguns firing the same depleted-uranium ammunition that autocannon use. Armor protects at one-third normal DR, but damage that penetrates DR is halved.

Auto GLs are chemical-propellent grenade launchers firing shaped-charge explosive rounds. *EMGLs* are electromag grenade launchers. Both can also fire any of the TL8+ grenade types described in other ***GURPS*** books.

Mortars are large-caliber, low-velocity guns designed to lob explosive shells. They often use indirect fire.

Missile launchers fire high-speed guided missiles tipped with powerful shaped-charge explosive warheads. They use the guided missile rules on p. 53. DR protects against direct hits from shaped-charge warheads at 1/10 normal; otherwise (e.g., on a near miss), the damage is treated as explosive concussion damage.

Lasers fire bolts of coherent light. In rain or fog, they do half damage. Damage is also halved for every (1/2D range/5) hexes of smoke or hot smoke (or fraction thereof) they cross. Lasers fired at RoF 4+ use the special laser automatic fire rules described under *Damage from a Burst* on p. B120.

Rainbow lasers are lasers that can alter their frequency, from visible light (effective in atmosphere) to deep ultraviolet (giving extra range in the vacuum of space).

X-ray lasers function like lasers, except DR protects at one-half normal. Their damage is not reduced by smoke, fog or the like.

Particle beams (also called *blasters*) fire bolts of charged or neutral subatomic particles at near-light speed. The radiation produced can also zap electronics. Since mecha are packed with such systems, treat any particle beam hit on a mecha (or robot) as impaling damage, just like a hit on a person.

Flamers (also called *plasma guns*) project streams of star-hot ionized plasma. The wash of flame easily penetrates non-sealed armor, which gets only 1/2 DR against the attack. It also melts armor: for every 10 points of damage done before subtracting DR, armor loses 1 DR on the location hit. (If the armor is ablative, this is in addition to any DR lost to ablation.) A sealed suit or machine becomes unsealed after losing 20% or more of its original DR on a particular side. Paper, cloth and wood ignite automatically if hit by a flamer. Flammable plastics and such catch fire if their DR is exceeded.

A flamer can be used like a flamethrower – attacking more than one target, as long as they are in the same arc of fire – as described for area weapons (p. B121). When used this way, divide the dice of damage by the number of targets; if they are more than one hex apart, 1d damage is lost per hex between them.

Ranged Weapon Statistics

The statistics used to describe ranged weapons are the same as those in the ***Basic Set,*** with these additions:

Type: "Exp." means the attack does explosive concussion damage (see p. B121). "Spcl." means damage is special – see the weapon descriptions above.

Damage: A number in parentheses after damage – e.g., (2) – is an armor divisor; DR is divided by that number against the attack. In the case of guns (autocannon, Gauss guns, Gauss cannon, et cetera), damage is also divided by two after any DR is penetrated. A number in brackets after damage – e.g., [4d] – is the fragmentation damage (p. B121) of an explosion.

1/2D: Attacks doing Exp. damage don't have damage halved after the 1/2D range, but do lose accuracy. Missiles lack a 1/2D number.

Weight: The weapon's *empty* weight in pounds.

Vol.: The weapon's volume in cubic feet. Optionally, a weapon can be "concealed" within the mecha (so that its barrel is not visible). If so, multiply volume by 2.5.

WPS: The weight, in pounds, of a single round of ammunition (bullet, missile, et cetera).

VPS: The volume per shot, in cf.

CPS: The cost per shot, in dollars.

Power: The power requirement (in kW) required to fire the weapon at its full rate of fire. If the weapon runs off an energy bank, each second of fire drain this many kWs of energy.

Spd: For missiles only; this is the Move of the missile.

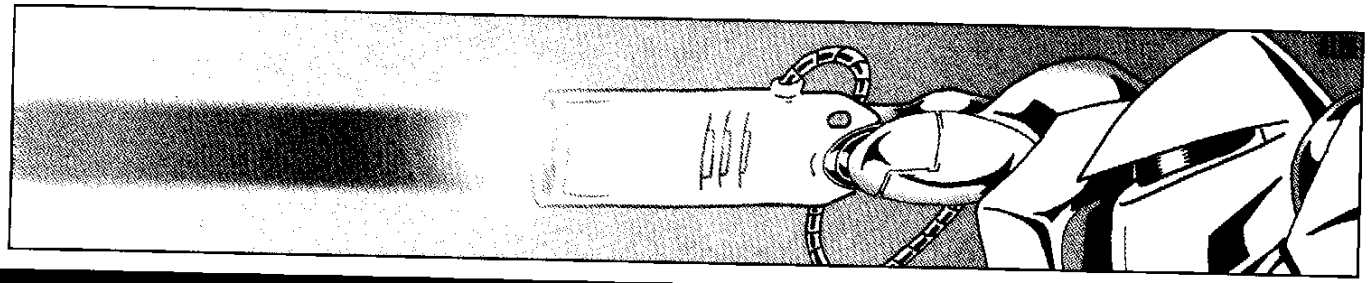
End: For missiles only; the number of seconds that the missile can fly before running out of fuel and crashing.

Skill: For missiles only; the skill of the guidance system.

Guid.: For missiles only; the type of guidance system used. "IRH" is infrared homing. "B/IRH" is *brilliant* infrared homing.

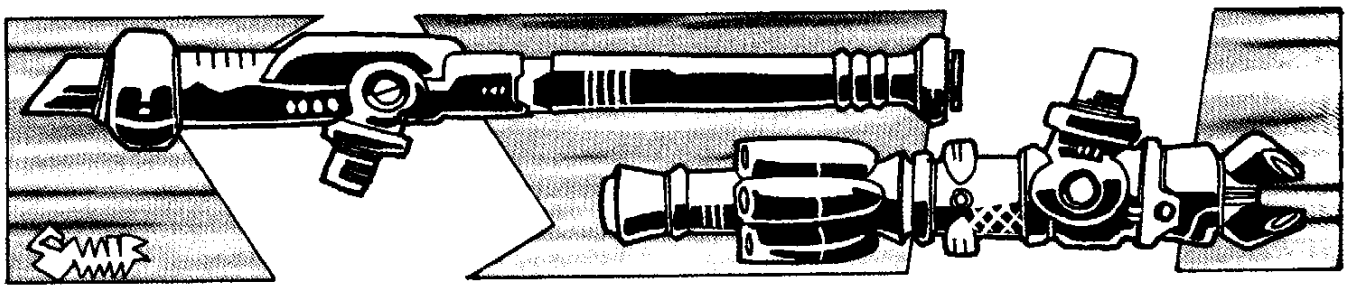
Cost: See table. If buying weaponry of lower TL, cost is halved if it's obsolete by one TL and halved again if it's two or more TLs old.

No "Shots" statistic is given, as that depends on how many rounds are carried aboard. "Rcl" and "ST" are also omitted, as they don't apply to vehicular weaponry.



BEAM WEAPONS TABLE

Weapon	Type	Damage	SS	Acc	1/2D	Max	Weight	Vol.	RoF	Cost	Power
TL8 Lasers											
Assault Laser	Imp.	5d	17	20	4,000	8,000	17	0.34	8*	$10,000	6,400
Lt. Laser Cannon	Imp.	6d×5	20	23	12,000	36,000	150	3	4*	$18,000	28,800
Md. Laser Cannon	Imp.	6d×10	25	25	24,000	72,000	1,200	24	4*	$70,000	115,200
Hv. Laser Cannon	Imp.	6d×20	30	27	48,000	144,000	7,500	150	4*	$390,000	720,000
TL9 Rainbow Lasers											
Assault Rainbow Laser	Imp.	5d	14	20	4,000	8,000	13	0.26	8*	$10,000	7,200
Gatling Laser	Imp.	20d	17	20	4,000	12,000	25	0.5	4*	$20,000	14,400
Hv. Gatling Laser	Imp.	6d×5	20	23	12,000	36,000	110	2.2	4*	$21,000	32,400
Lt. Rainbow Laser	Imp.	6d×5	20	23	12,000	36,000	230	4.6	8*	$28,000	64,800
Md. Rainbow Laser	Imp.	6d×10	25	25	24,000	72,000	1,800	36	8*	$130,000	259,200
Hv. Rainbow Laser	Imp.	6d×25	30	27	60,000	180,000	11,000	220	8*	$740,000	1,620,000
TL10 X-ray Lasers											
Assault X-Laser	Imp.	5d(2)	17	18	1,500	4,500	5.5	0.11	8*	$1,400	8,528
Gatling X-Laser	Imp.	6d×5(2)	20	21	4,500	13,500	25	0.5	4*	$4,000	38,390
Hv. Gatling X-Laser	Imp.	6d×5(2)	20	21	4,500	13,500	100	2	8*	$20,000	76,780
Lt. X-Laser Cannon	Imp.	6d×10(2)	25	22	9,000	27,000	800	16	8*	$67,000	307,120
Md. X-Laser Cannon	Imp.	6d×25(2)	30	25	23,000	69,000	5,000	100	8*	$350,000	1,919,520
Hv. X-Laser Cannon	Imp.	6d×50(2)	30	27	45,000	135,000	20,000	400	8*	$1,350,000	7,678,080
TL9 Flamers											
Assault Flamer	Spcl.	6d×5	10	20	540	1,600	38	0.76	1	$11,000	4,500
Hv. Flamer	Spcl.	8d×10	10	20	720	2,200	67	1.34	1	$20,000	8,000
Lt. Plasma Cannon	Spcl.	6d×25	10	20	1,100	3,300	230	4.6	1	$43,000	28,125
Plasma Gatling	Spcl.	6d×25	10	20	1,100	3,300	590	11.8	6*	$79,000	168,750
Md. Plasma Cannon	Spcl.	6d×50	13	20	2,700	8,100	1,900	38	1	$210,000	112,500
Hv. Plasma Cannon	Spcl.	6d×100	15	21	5,400	16,000	7,500	150	1	$770,000	450,000
Mega Plasma Cannon	Spcl.	6d×250	15	23	13,500	40,000	47,000	940	1	$4,700,000	2,812,500
TL8 Particle Beams											
Blaster Cannon	Imp.	6d×20	20	17	1,100	3,300	44	0.88	1	$13,000	11,250
Gatling Blaster	Imp.	6d×20	20	17	1,200	3,600	110	2.2	6*	$31,000	67,500
Lt. Particle Cannon	Imp.	6d×40	20	19	2,300	6,900	350	7	1	$55,000	45,000
Md. Particle Cannon	Imp.	6d×100	30	21	5,600	16,800	2,200	44	1	$240,000	281,250
Hv. Particle Cannon	Imp.	6d×200	30	23	11,300	33,900	8,800	176	1	$900,000	1,125,000
Mega Particle Cannon	Imp.	6d×400	30	25	23,000	69,000	35,000	700	1	$3,500,000	4,500,000
TL9 Particle Beams											
Assault Blaster	Imp.	6d×5	12	15	500	1,000	7	0.14	1	$1,200	1,800
Lt. Blaster	Imp.	5d×15	17	16	830	1,660	20	0.4	1	$3,000	5,000
Blaster Minicannon	Imp.	5d×30	20	17	1,200	3,600	44	0.88	1	$6,600	11,250
Gatling Blaster	Imp.	5d×30	20	17	1,200	3,600	110	2.2	6*	$16,000	67,500
Lt. Particle Cannon	Imp.	6d×50	20	19	2,500	7,500	350	7	1	$27,500	45,000
Md. Particle Cannon	Imp.	5d×150	30	21	6,200	18,600	2,200	44	1	$120,000	281,250
Hv. Particle Cannon	Imp.	6d×250	30	23	12,400	37,200	8,800	176	1	$450,000	1,125,000
Mega Particle Cannon	Imp.	6d×500	30	25	25,300	76,500	35,000	700	1	$1,750,000	4,500,000



GUNS TABLE

Weapon	Type	Damage	SS	Acc	1/2D	Max	Weight	Volume	RoF	WPS	VPS	CPS	Cost	Power
TL8+ Machine Guns														
7.5mm Machine Gun	Cr.	8d	14	13	920	4,600	13	0.26	20*	0.063	0.00042	0.13	$975	0
7.5mm Minigun	Cr.	8d	17	13	920	4,600	18	0.36	50*	0.063	0.00042	0.13	$2,000	0.315
15mm Machine Gun	Cr.	16d	20	14	1,300	5,600	51	1.02	20*	0.5	0.0033	1	$3,800	0
15mm Minigun	Cr.	16d	20	14	1,300	5,600	71	1.42	50*	0.5	0.0033	1	$8,000	2.5
TL8+ Cannon														
20mm Minicannon	Cr.	6d×4(3)	20	12	1,260	6,450	30	0.6	8*	0.34	0.0034	12.24	$1,800	0
20mm Mini-Gatling	Cr.	6d×4(3)	20	12	1,260	6,450	63	1.26	50*	0.34	0.0034	12.24	$5,700	2.55
20mm Autocannon	Cr.	6d×7(3)	20	14	2,250	9,150	90	1.8	20*	0.4	0.004	14.4	$5,400	0
20mm Gatling	Cr.	6d×7(3)	20	14	2,250	9,150	130	2.6	50*	0.4	0.004	14.4	$9,900	3
30mm Autocannon	Cr.	6d×9(3)	20	14	2,250	9,150	230	4.6	12*	1.1	0.011	41	$8,600	0
30mm Gatling	Cr.	6d×9(3)	20	14	2,250	9,150	320	6.4	30*	1.1	0.011	41	$16,000	5.1
40mm AGL	Exp.	4d×2(5)[4d]	20	7	90	1,200	27	0.54	4*	0.48	0.0048	4.2	$2,000	0
45mm Autocannon	Cr.	9d×9(3)	25	14	2,700	10,350	680	13.6	8*	3.9	0.039	70	$18,000	0
45mm Gatling	Cr.	9d×9(3)	25	14	2,700	10,350	960	19.2	20*	3.9	0.039	70	$35,000	11.6
60mm Autocannon	Cr.	6d×15(3)	25	14	2,250	9,150	1,100	22	6*	9.3	0.093	336	$26,000	0
60mm Gatling	Cr.	6d×15(3)	25	14	2,250	9,150	1,500	30	16*	9.3	0.093	336	$51,000	22.4
90mm Autocannon	Cr.	9d×15(3)	30	14	2,700	10,350	3,600	72	4*	31	0.31	1,104	$76,000	0
90mm Gatling	Cr.	9d×15(3)	30	14	2,700	10,350	5,100	102	11*	31	0.31	1,104	$160,000	50.6
120mm Autocannon	Cr.	6d×30(3)	30	15	3,150	11,400	6,500	130	3*	73	0.73	2,640	$130,000	0
200mm Autocannon	Cr.	6d×50(3)	30	15	4,050	13,350	18,000	360	2*	340	3.4	12,240	$360,000	102
TL8 Electromag Guns														
40mm EMGL	Exp.	4d×2(10)	12	11	360	2,600	6	0.12	1	0.32	0.0032	11.4	$8,800	15
2.5mm Gauss Gun	Cr.	3d×5(2)	20	16	2,850	13,350	28	0.56	20*	0.00052	0.0000052	0.02	$34,000	62.4
5mm Gauss Gun	Cr.	6d×5(2)	20	16	4,050	13,350	100	2	20*	0.0042	0.000042	0.4	$120,000	756
10mm Gauss Gun	Cr.	6d×10(2)	25	19	8,550	22,500	450	9	10*	0.033	0.00033	2	$260,000	3,000
20mm Gauss cannon	Cr.	6d×20(3)	25	18	5,100	15,600	600	12	20*	0.2	0.002	12	$320,000	18,000
25mm Gauss cannon	Cr.	6d×40(3)	25	20	13,500	30,600	3,200	64	2~	0.39	0.0039	23.6	$1.36 mil.	7,080
50mm Gauss cannon	Cr.	6d×80(3)	30	20	19,500	26,700	7,500	150	1	3.1	0.031	188	$3 mil.	28,200
100mm Gauss cannon	Cr.	6d×160(3)	30	20	27,000	51,000	30,000	600	1/3	25	0.25	1,520	$12 mil.	75,000
50mm Gauss Mortar	Exp.	6d×4(5)[4d]	20	13	880	4,400	75	1.5	1	1.5	0.015	54	$120,000	288
TL9 Electromag Guns														
2.25mm Gauss Gun	Cr.	6d×2(2)	12	15	2,250	9,150	6	0.12	3*	0.00038	0.0000038	0.015	$4,400	5.7
40mm EMGL	Exp.	6d×2(10)	12	11	360	2,600	4.8	0.096	1	0.32	0.0032	11.4	$3,900	15
5mm Gauss Gun	Cr.	8d×2(2)	20	15	2,400	9,600	16	0.32	20*	0.00093	0.0000093	0.056	$9,600	140
5mm Gauss Gun	Cr.	6d×5(2)	20	16	4,050	13,350	68	1.36	20*	0.0042	0.000042	0.4	$41,000	756
10mm Gauss Gun	Cr.	6d×10(2)	25	19	8,550	22,500	270	5.4	10*	0.033	0.00033	2	$94,000	3,000
20mm Gauss cannon	Cr.	6d×20(3)	25	18	5,100	15,600	360	7.2	20*	0.2	0.002	12	$110,000	18,000
25mm Gauss cannon	Cr.	6d×40(3)	25	20	13,500	30,600	1,900	38	2~	0.39	0.0039	23.6	$420,000	7,080
50mm Gauss cannon	Cr.	6d×80(3)	30	20	19,500	26,700	4,500	90	1	3.1	0.031	188	$940,000	28,200
100mm Gauss cannon	Cr.	6d×160(3)	30	20	27,000	51,000	18,000	360	1/3	25	0.25	1,520	$3.6 mil.	75,000
200mm Gauss cannon	Cr.	6d×200(3)	30	20	15,900	34,500	24,000	480	1/5	200	2	12,000	$4.8 mil.	180,000
50mm Gauss Mortar	Exp.	6d×6(5)[4d]	20	13	880	4,400	45	0.9	1	1.5	0.015	54	$27,000	288

Abbreviations: "EMGL" = electromag grenade launcher, "AGL" = automatic grenade launcher, "Lt." = light, "Md." = medium, "Hv." = heavy.

Optional Ammunition

Cannon 20mm or larger are assumed to be firing armor-piercing, fin-stabilized, discarding-sabot depleted uranium rounds (APFSDSDU), except for AGLs and EMGLs, which fire shaped-charge explosive warheads. Two other types of ammunition in common use are:

High Explosive Concussion (HEC): Used to blow up buildings or infantry, these rounds are usable in any gun or launcher that is 20mm or larger. They do explosive concussion damage equal to projectile diameter in mm *cubed*, ×0.00025 at TL8 or ×0.000375 at TL9+. HEC rounds have a lower velocity, and hence less range and accuracy: Acc is -1, and 1/2D and Max range are ×2/3. HEC is also cheaper: Divide CPS of HEC gun ammo by six.

Chemical (CHEM): Used to deliver gas or smoke, this ammo can be used by any 20mm or larger gun or missile. CHEM uses the rules for HEC, except that it inflicts no damage: instead, it releases a gas, smoke or hot smoke cloud over a radius of (projectile diameter squared) × 0.00375 yards. See pp. B132, UT70 or VE191 for gas effects. It disperses in 300/(wind speed in mph) seconds, maximum 300 seconds. Individuals in sealed suits will be unaffected.

LAUNCHER TABLE

Weapon	Guidance	Type	Damage	SS	Speed	Max	Skill	End	Weight	Volume	RoF	WPS	VPS	CPS	Cost
TL8 Missile Launchers															
57mm Lt. Msl. Lhr.	IRH	Exp.	6d×7(10)	14	500	1,000	13	2	12.5	0.25	1	5	0.1	1,400	$470
100mm Md. Msl. Lhr.	IRH	Exp.	6d×27(10)	20	1,200	7,200	17	6	125	2.5	1/2	50	1	10,000	$8,100
250mm Hv. Msl. Lhr.	B/IRH	Exp.	8d×50(10)	25	1,200	61,200	21	51	1,250	25	1/4	500	10	66,000	$36,000
TL9 Launchers															
45mm Mini-Msl. Lhr.	IRH	Exp.	4d×5(10)	12	700	700	14	1	5	0.1	1	2	0.04	580	$250
57mm Lt. Msl. Lhr.	IRH	Exp.	6d×10(10)	14	500	2,000	16	4	12.5	0.25	1	5	0.1	1,200	$470
100mm Md. Msl. Lhr.	IRH	Exp.	6d×40(10)	20	2,800	8,400	20	3	125	2.5	1/2	50	1	8,200	$4,100
250mm Hv. Msl. Lhr.	B/IRH	Exp.	6d×100(10)	25	1,200	122,400	24	102	1,250	25	1/4	500	10	47,000	$18,000
TL10+ Launchers															
45mm Mini-Msl. Lhr.	IRH	Exp.	4d×5(10)	12	920	920	17	1	5	0.1	1	2	0.04	580	$130
57mm Lt. Msl. Lhr.	IRH	Exp.	6d×10(10)	14	1,400	2,800	19	2	12.5	0.25	1	5	0.1	1,200	$470
100mm Md. Msl. Lhr.	IRH	Exp.	6d×40(10)	20	2,800	12,600	23	4.5	125	2.5	1/2	50	1	8,200	$2,000
250mm Hv. Msl. Lhr.	B/IRH	Exp.	6d×100(10)	25	1,200	244,800	27	204	1,250	25	1/4	500	10	47,000	$9,000

Abbreviations: "Lt." = light, "Md." = medium, "Hv." = heavy, "Lhr." = launcher, "Msl." = missile, "IRH" = infrared homing, "B/IRH" = brilliant infrared homing.

BUILT-IN CONTACT WEAPONS

These are weapons usable in hand-to-hand or close combat.

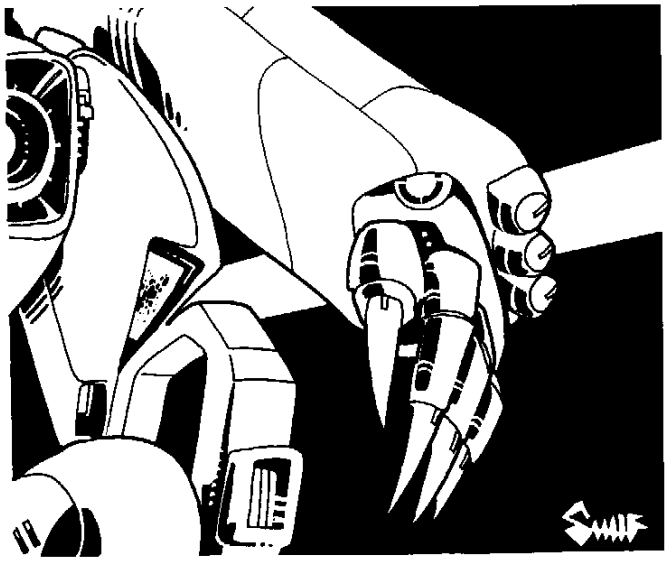
Sharp claws are built into arms or legs. They convert that limb's kicking or punching damage from crushing to *cutting*.

Talons can be built into an arm or leg. They let the limb do thrust/impaling or swing/cutting damage. The same weapon statistics also represent switchblade- or bayonet-like blades.

Cutting Jaws: One set of mechanical jaws may be placed in a turret, rated for its own jaw ST. It bites for cutting damage (p. B140).

Vibroblade: This is an option for claws, blades or talons – the weapon vibrates at supersonic speed, improving penetration and damage. The vibrations are powered by the arm or leg drivetrain, so there is no extra power requirement.

Monomolecular Edge: Claws, blades or talons (unless vibro) can be given a monomolecular edge for even greater penetration.



Limpet Mine Dispenser: This is a spring-loaded arm dispenser for sticky limpet mines. The user slaps his victim and triggers the release, attaching a mine. He then steps back and it detonates an instant later, using a shaped charge to blast a hole through armor. A dispenser includes five mines; extra 5-mine magazines have half the weight, volume and cost of the dispenser. Reloading with a ready magazine requires a free arm and takes two seconds. To attack, use DX, Brawling or Karate skill. A successful hit attaches the mine, which sticks with molecular "suction pads." Limpet mines do shaped-charge damage to the target; anyone else within 2 yards of the blast takes one-quarter damage from the concussion, though armor protects fully against this. At TL9+, add 50% to damage. This weapon can't be used to parry with.

Plasmafaust: This is a contact plasma-discharge weapon mounted in an arm. DR protects at one-tenth normal (or one-fifth normal for laminate armor). The user suffers 4d damage to his arm from the backblast of the plasma discharge; however, his own DR protects fully – it is not divided by 10. A plasmafaust has no blade and cannot be used to parry.

Electroshocker: An arm or melee weapon equipped with an electroshocker can deliver a powerful electric jolt. The victim must make a HT roll to avoid being stunned, at -3 for a light, -6 for a medium or -9 for a heavy electroshocker, but at +1 HT per 10 DR on the location struck. If stunned, the victim loses 1d fatigue and remains physically stunned for as long as the arm is in contact, plus another (20-HT) seconds before any HT rolls to recover are allowed.

Plasmablade and *Forceblade:* These are energy blades built into an arm. DR always protects at one-fifth value. Use Force Sword skill to wield them. Any weapon that successfully parries a force or plasma blade (except another energy-type blade) will be destroyed, unless the parry was a critical success. Higher-TL versions do more damage: for each TL after they first appear, add +1 damage per die, to a maximum of +3 per die.

Contact Weapon Statistics

These use the same format as the *Ancient/Medieval Hand Weapon Table* on p. B206, with these changes:

Type may also be explosive (Exp.) or special (Spcl.).

Damage, if sw (swing) or thr (thrust), is based on the ST of the arm that is being used. Otherwise, the weapon is powered and has a fixed damage. "Spcl." means the weapon does special damage – see the individual weapon descriptions above.

Volume is the volume in cubic feet.

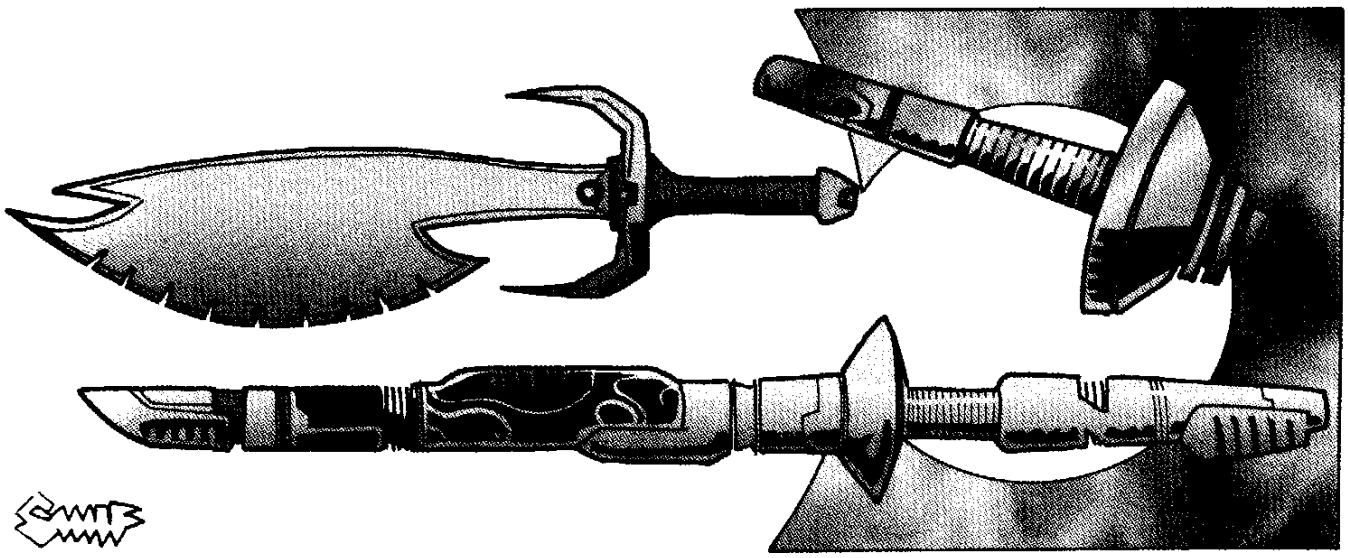
Cost: Except for claws, talons and blades, this is halved one TL after the weapon first appears and halved again two or more TLs after it appears. Cost of claws, talons and blades (and of monomolecular or vibro options for them) is *per limb* so equipped.

Power is the power requirement to use the weapon continuously. If the weapon runs off an energy bank, it drains this many kWs of stored energy each turn it is activated.

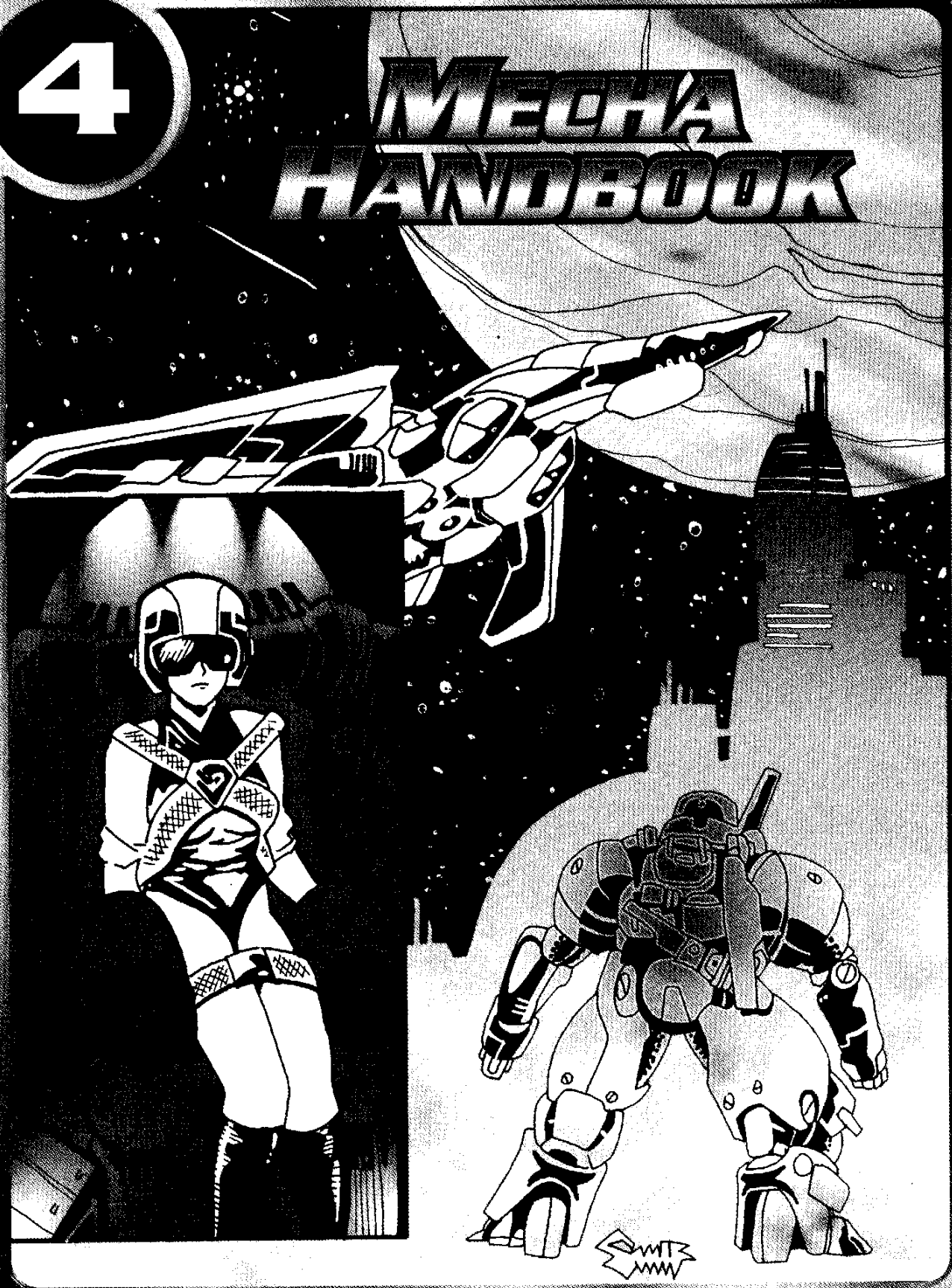
BUILT-IN CONTACT WEAPONRY TABLE

Weapon	*Type*	*Damage*	*Reach*	*Cost*	*Weight*	*Volume*	*Power*	*TL*
Sharp Claws	Cut	thr	C	$200##	0	0	0	–
Talons or Blade	Cut#	sw	C	$500##	0	0	0	–
Biting Jaws	Cut	Spcl.	C	$600†	0.1†	0.005†	0.01†	8
Lt. Electroshocker	Spcl.	Spcl.	C	$200	1	0.02	9	7
Hvy. Electroshocker	Spcl.	Spcl.	C	$2,000	10	0.2	90	7
Hvy. Electroshocker	Spcl.	Spcl.	C	$20,000	100	2	900	7
Lt. Limpet MD	Exp.	2d+4(10)	C	$800	2	0.04	0	8
Hvy. Limpet MD	Exp.	6d×5(10)	C	$2,000	20	0.4	0	8
Hvy. Limpet MD	Exp.	6d×50(10)	C	$8,000	200	4	0	8
Lt. Plasmafaust	Exp.	5d(10)	C	$2,000	2	0.04	540	9
Hvy. Plasmafaust	Exp.	3d×5(10)	C	$12,000	20	0.4	1,620	9
Hvy. Plasmafaust	Exp.	5d×10(10)	C	$20,000	200	4	5,400	9
Lt. Plasmablade	Cut*	4d(5)	C-1	$12,500	2.5	0.05	15	9
Hvy. Plasmablade	Cut*	1d×10(5)	C-4	$100,000	20	0.4	240	9
Hvy. Plasmablade	Cut*	2d×10(5)	C-9	$3.2 mil.	640	12.8	7680	9
Lt. Forceblade	Cut*	8d(5)	C-1	$3,000	2.5	0.05	15	11
Hvy. Forceblade	Cut*	2d×10(5)	C-4	$24,000	20	0.4	240	11
Hvy. Forceblade	Cut*	4d×10(5)	C-9	$768,000	640	12.8	7680	11
Add monomolecular	**	+1d(10)	**	$500	0	0	0	9
Add vibro blade	**	+1d(5)	**	$200	0	0	0	8

Talons and blades can also do thrust/impaling damage.
= Claws, blades and talons may be retractable at 1.5 times cost.
† Per point of jaw ST.
* Plasma and force blades can also thrust to impale for half their cutting damage, e.g., 4d(5) for a lt. plasmablade.
** Option for claws, talons or blades. Use the modified weapon stats, but DR protects at 1/5 normal against vibro or 1/10 normal cost monomolecular, and damage is +1d.



4 MECHA HANDBOOK



This chapter describes four mecha and three battlesuits, ready to use. These designs are compatible with the *Damocles* setting (p. 111), but can also be used in other backgrounds.

Explanations of the mecha systems and weapons can be found in Chapters 3, 5 and 6.

Seraph Delta (TL9)

The Seraph Delta is a humanoid flight- and space-capable battle mecha. In the *Damocles* setting, it is a war-surplus but highly effective battle mecha favored by elite mercenaries.

Subassemblies: Two manipulator arms, two legs, limited-rotation turret.

Drivetrain: 1,225 kW motive power leg drivetrain, in legs.

Arm Motors: ST 4,000 motor in each arm.

Thrusters: Fusion rocket thruster with 51,000 lbs. thrust, uses water (0.28 gallons per second).

Cockpit: In body, with Complexity 4 computer and ejection system.

Built-In Weapons: TL9 medium rainbow laser in each arm. Two med. msl. launchers in body with 8 shots in anti-blast magazine. Launchers are linked; lasers are linked.

Sensors: 100-mile range PESA in turret facing forward. 200-mile range AESA in turret facing forward.

Comsuite: Advanced, in body.

ECM: Decoy dispenser in turret with chaff decoy plus 3 flare and 4 hot smoke reloads.

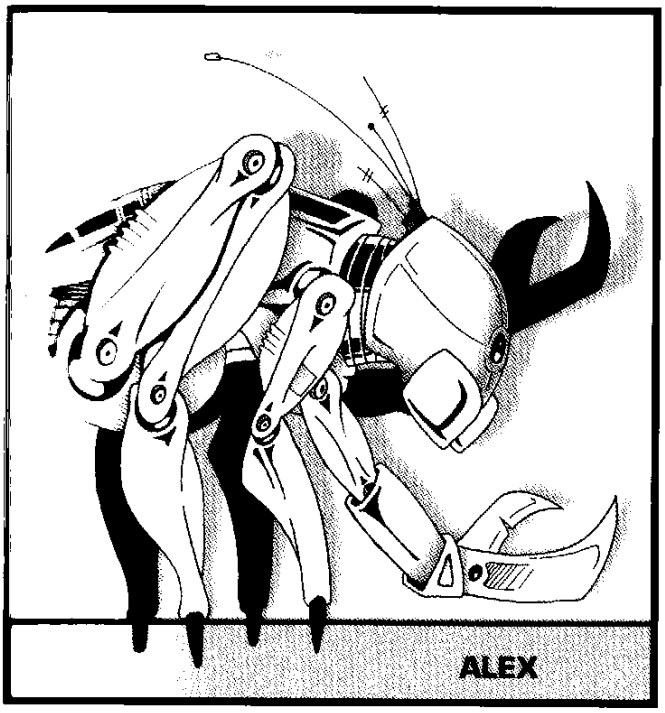
Power Plant: 1,500 kW fission reactor in body, powers all components except medium lasers with 184.36 kW excess.

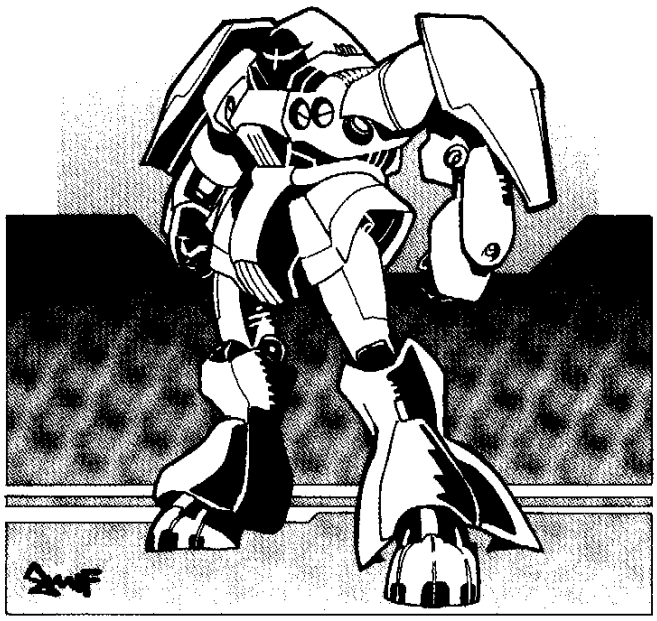
Energy Bank: 15,552,000 kWs rechargeable power cell in body, each laser fire for 30 seconds.

Fuel: Two 170-gallon light tanks filled with water (one in each leg) give 20 minutes thruster endurance.

Volumes: Each arm 60 cf, turret 20 cf, body 320 cf, legs 128 cf.

Structure and Hit Points: Heavy frame with very expensive materials. Each arm 600 HP, body 900 HP, each leg 525 HP, turret 300 HP.





Surface Features: Sealed. Basic stealth and radical infrared cloaking.

Armor: PD 4, DR 600 on body, PD 4, DR 340 elsewhere. All armor is laminate.

Statistics: Loaded weight 50,392 lbs. Empty weight 46,902. Loaded mass 25.2 tons. Mecha volume 716 cf. Size Modifier +4, arms +2, turret -1, legs +3. Price $7,907,550. HT 9.

ST and Reach: Body ST 1,800, Arm ST 2,400/4,000 (with reach 5, damage thr 241d, sw 243d).

Dimensions: 11.3 yards tall, 3.8 yards wide and long.

Ground Performance: Speed 55 mph, gMR 1.5, gSR 2, Move 15/27. Jump-capable.

Aerial Performance: Flight-capable. Can hover. Effective motive thrust 608 lbs. Lift ST 40. Aerodynamic drag 900, speed 70 mph, aMR 3, aSR 4, Move 30/35.

Space Performance: Space-capable. sAccel 1.01 g.

Deathstriker (TL9)

The Deathstriker is a light scout mecha designed to be fast and very difficult to spot. It is four-legged, with two clawed arms and a large, round, antenna-studded laser turret. In the *Damocles* setting, it is the basic Gebberoth drivable mecha.

Subassemblies: Four legs, two manipulator arms, full-rotation turret.

Drivetrain: 175 kW motive power leg drivetrain in legs.

Arm Motors: ST 200 cheap motor in each arm.

Cockpit: Basic cockpit. Complexity 4 computer.

Built-In Weapons: TL9 lt. rainbow laser cannon in turret, facing forward. Six TL9 lt. missile launchers, three in the right arm, three in the left, two shots each. Sharp claws on arms. 40mm AGL in body, facing forward, with 100 shots. All launchers are linked.

Sensors: 25-mile range PESA in turret, facing forward.

Comsuite: Advanced, in turret.

ECM: Infrared jammer (rating 8) in body.

Power Plant: 180 kW NPU in body, powers all components except laser for one year.

Energy Bank: 1,296,000 kWs rechargeable power cell in body, provides for 20 seconds of laser fire.

Cargo Space: Carries 10 cubic feet and 200 lbs. cargo.

Volumes: Turret 10 cf, arms 3 cf each, body 50 cf, legs 8.8 cf each.

Structure and Hit Points: Heavy frame, standard materials. Body 300 HP, turret 90 HP, each arm 78 HP, each leg 81 HP.

Surface Features: Sealed. Basic stealth and infrared cloaking, instant chameleon system.

Armor: Overall PD 4, DR 240 armor, except body front, right and left are PD 4, DR 480. All armor is laminate.

Statistics: Loaded weight 8,902.6 lbs. Empty weight 8,394.6 lbs. Loaded mass 4.45 tons. Volume 101.2 cf. Size Modifier +3, turret -2, arms -1, legs 0. Price $1,233,720. HT 12.

ST and Reach: Body ST 600, Arm ST 200 (reach 2, damage thr 21d, sw 23d).

Dimensions: Length 4.1 yards, height 4.3 yards, width 1.4 yards.

Ground Performance: Ground speed 75 mph, gMR 1.25, gSR 3, ground Move 12/37.

Kuonoichi 5 (TL9)

This is a four-wheeled minivan that can transform into a 25'-tall humanoid mecha equipped with fold-out missile pods and a hand-held sword or particle cannon. It can fly, but only for a few seconds. In the *Damocles* setting, it is used by UNISTAR.

Subassemblies: Two legs, two manipulator arms, limited turret, 4 wheels, two pods (on shoulders).

Drivetrains: 150 kW motive power leg drivetrain in legs. 150 kW motive power wheeled drivetrain in body.

Arm Motors: ST 480 motor in each arm.

Thrusters: Chemical rocket with 8,000 lbs. thrust in each leg, burns total of 17,600 gal. rocket fuel per hour (4.9 gal. per second).

Cockpit: Basic, in body, with extra passenger seat and Complexity 4 computer.

Built-In Weapons: Each pod has two medium missile launchers, each with two shots. 20mm minicannon with 200 shots in turret facing forward. Missiles are linked.

Sensors: 25-mile range PESA in turret, facing forward.

Comsuite: Basic, in turret.

ECM: Three dischargers in body – one with chaff, one with flares, one with hot smoke – each with four reloads.

Power Plant: 156 kW NPU in body, powers all built-in systems for one year.

Energy Bank: TL9 rechargeable power cell (in body) stores 1,350,000 kWs, used to power the hand-held beam cannon with 30 shots, or runs the mecha for 2.4 hours if NPU is non-functional.

Fuel: Two 30-gallon self-sealing tanks, one in each leg, holds total of 12 seconds rocket fuel (Fire 10) for thrusters.

Cargo Space: 25 cubic feet and 500 lbs. in body.

Volumes: Arms and turret 10 cf each, body 100 cf, legs 30 cf each, pods 9 cf each, wheels 10 cf.

Structure and Hit Points: Heavy frame strength, very expensive materials. Transformable with two configurations: "humanoid" (wheels folded), "van" (arms, pods, legs, turret folded). Body 450 HP, turret 90 HP, each arm 180 HP, each leg 180 HP, each wheel 45 HP, each pod has 81 HP.

Surface Features: Sealed. Basic stealth and infrared cloaking.

Armor: Mecha has overall PD 4, DR 750 except body front, right and left are DR 1,200. All armor is fireproof ablative.

Statistics: Loaded weight 13,939.3 lbs. Empty weight 11,971.3 lbs. Loaded mass 6.97 tons. Mecha volume 218 cf. Size Modifier +3, arms, wheels and pods 0, turret -2, legs +1. Price $1,433,015. HT 11.

ST and Reach: Body ST 900, Arm ST 480 (reach 3, damage thr 49d, sw 51d).

Dimensions: Height 7.4 yards, width and length 2.5 yards. As minivan, 5 yards long, 1.7 high and wide.

Ground Performance (humanoid): Ground speed 35 mph, gMR 2.5, gSR 2, ground Move 17. Jump-capable.

Aerial Performance (humanoid): Flight-capable. Can hover. Effective motive thrust 2060.7 lbs. Lift ST 137. Aerodynamic drag 429. Air speed 190 mph, aMR 3.5, aSR 4, Move 35/95.

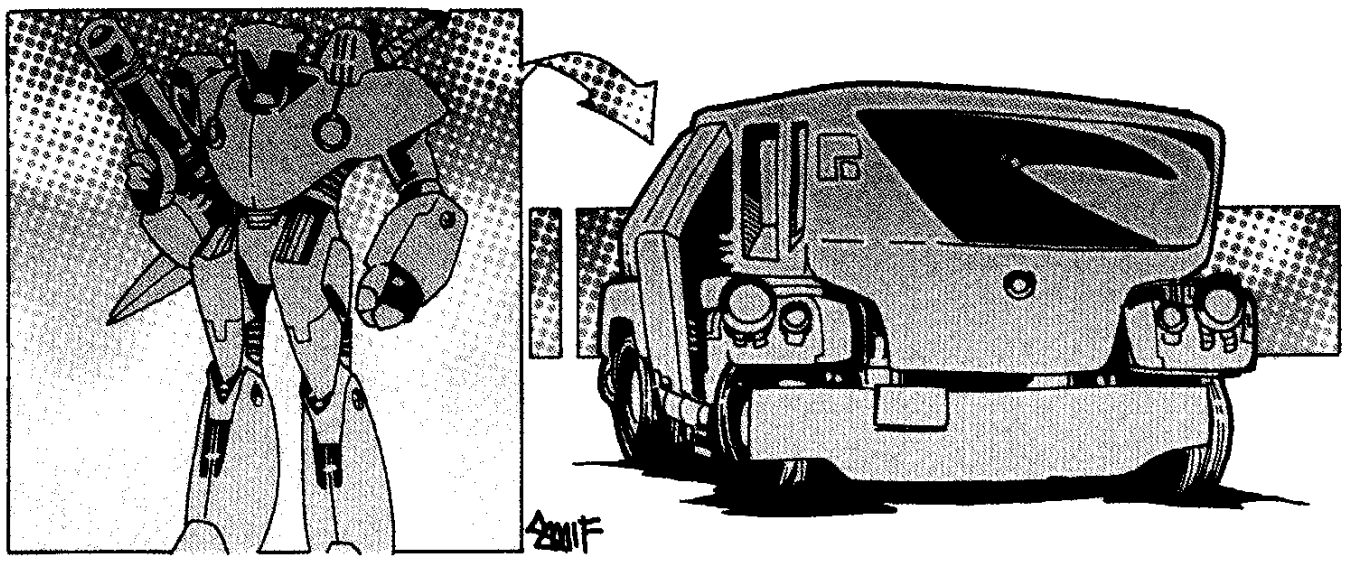
Ground Performance (van): Ground speed 75 mph, gMR 1, gSR 4, ground Move 10/37.

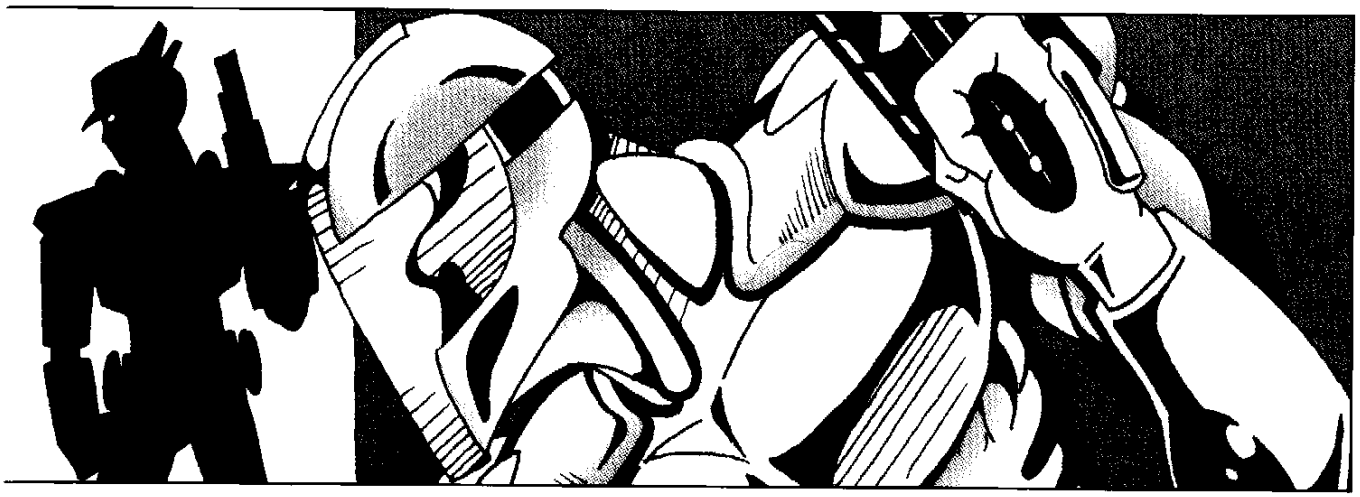
Space Performance: sAccel 1.15 g.

The mecha also carries a giant sword and a particle beam rifle, in its hand or slung on its back:

Giant Sword: 48x weight hand-held thrusting broadsword with vibroblade, Damage: thr+96 imp., sw+48 cut. reach 7, ST 480, weight 144 lbs., costs $48,000. Powered by 48 B cells for 20 minutes.

Beam Rifle: TL9 lt. particle cannon (p. 66) built as an armored rifle. Use normal stats, except Acc 18, $29,250, HP 33, Size Modifier +0, PD 3, DR 45, weight 525 lbs, ST 88. Draws power from mecha's energy bank.





Stormhawk (TL9)

This aerospace combat mecha looks like a sleek jet fighter [illegible], but it can transform into either a humanoid battle mecha armed with a hand-held cannon, or a hybrid "raptor" form that has wings, arms and legs. It is capable of flying into space. In the *Damocles* setting, it is used by UNISTAR.

Subassemblies: Two legs, two manipulator arms, limited-rotation turret, two wings. Has radical streamlining.

Drivetrain: 480 kW motive power leg drivetrain, in legs.

Arm Motors: ST 2,400 motor in each arm.

Thrusters: Fusion rocket thruster with 80,000 lbs. thrust in [illegible], consumes 1,600 gallons water per hour. Two reactionless thrusters, each with 320 lbs. thrust, one in each leg.

Cockpit: Basic, with ejection seat, genius computer (complexity 5) and 12 hours extra air upgrades, in body.

Built-In Weapons: TL9 lt. particle cannon in turret, facing forward.

Hardpoints: Three 500 lb. hardpoints under each wing.

Sensors: 50-mile range PESA in turret. 100-mile range PESA in body facing forward.

Commsuite: Advanced, in body.

ECM: Deceptive Jammer (rating 8) in body. Two decoy dispensers, one in each wing, right with 9 chaff, left with 9 flares.

Power Plant: 1,000 kW fission reactor in body powers all systems save particle cannon for two years, with 130.36 kW excess power available to recharge energy bank.

Energy Bank: 2,250,000 kWs rechargeable power cell in turret provides energy for 50 particle cannon shots.

Fuel: 500-gallon light tank in each leg and 300 gal. light tank in each wing hold 1 hour water for fusion rocket.

Cargo Space: 5 cf in right leg, 5 cf in body with load of 200 lbs.

Volumes: Turret 20 cf, arms 15 cf each, legs 155.4 cf each, body 518 cf, wings 51.8 cf each.

Structure and Hit Points: Heavy frame strength, very expensive materials. Transformable. Three configurations: "humanoid" (wings folded), "raptor" (no subassemblies folded), "plane" (arms, legs and turret folded). Turret 150 HP, arms 240 HP each, legs 525 HP each, body 1,200 HP, wings 600 HP each.

Surface Features: Sealed. Basic stealth and infrared cloaking.

Armor: PD 4, DR 100 laminate over DR 800 fireproof ablative everywhere except for front, right and left body, which have DR 100 laminate over DR 1,400 fireproof ablative.

Statistics: Loaded weight 63,895 lbs. Empty weight 49,895 lbs. Loaded mass 31.95 tons. Mecha volume 982.4 cf. Size modifier +4, arms +1, turret -1, legs +3, wings +2. Price $1,195,300. HT 9.

ST and Reach: Body ST 2,400, Arm ST 960/2,400 (reach 3, damage thr 97d, sw 99d).

Dimensions: 11.9 yards tall, 4 yards wide and long. As plane, 12.2 yards long, 3.3 yards tall, 2.7 yards wide.

Ground Performance (humanoid): Ground speed 30 mph, gMR 1.5, gSR 2, ground Move 15. Jump-capable.

Aerial Performance (humanoid): Flight-capable. Can hover. Effective motive thrust 16,745 lbs. Lift ST 1,116, aerodynamic drag 360, air speed 590 mph, aMR 3, aSR 4, flight Move 30/295.

Ground Performance (raptor): Ground speed 30 mph, gMR 0.5, gSR 2, ground Move 5/15.

Aerial Performance (raptor): Flight-capable. Can hover. Effective motive thrust 80,640 lbs. Lift ST 2,400, Aerodynamic drag 427, air speed 600 mph, aMR 5.5, aSR 5, flight Move 55/300.

Aerial Performance (plane): Flight-capable. Can hover. Effective motive thrust 80,640 lbs. Lift ST 2,400, Aerodynamic drag 26, aerial speed 4,825 mph, aMR 5.5, aSR 5, flight Move 55/2,412.

Space Performance: sAccel 1.26 g. *Note:* using only reactionless thrusters (no fuel consumption), has sAccel 0.01 g.

The Stormhawk often carries a TL8 60mm autocannon as a rifle (it is locked facing forward in plane mode) and one TL9 heavy missile on each hardpoint. As the added weight is less than light encumbrance, its Move is not reduced when doing so.

60mm Hand-Held Autocannon: TL8 60mm autocannon (p. 67) built as an armored rifle. Use normal 60mm autocannon statistics, except Acc 12, $31,500, HP 75, Size Modifier +1, PD 3, DR 60, unloaded weight 1,650 lbs., Shots 60, magazine weight 781.2 lbs., loaded weight 2,431.2 lbs., ST 463.

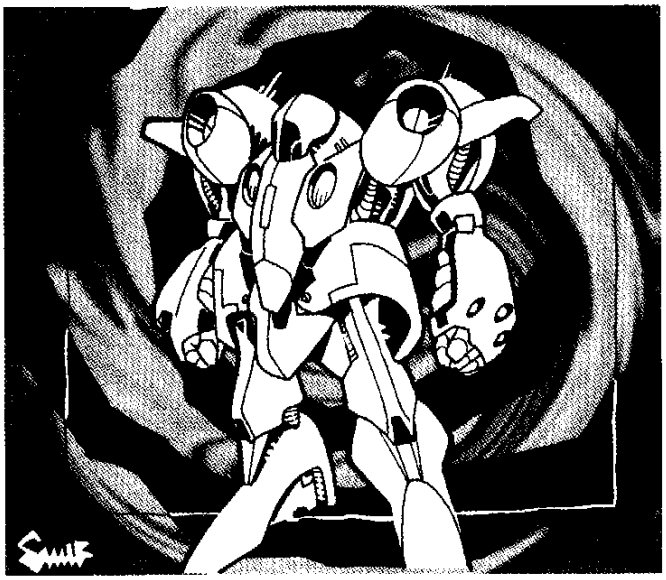
Missiles on Hardpoints: As per TL9 heavy missile launcher (p. 68); one shot allowed per hardpoint. Missiles can also be hit (Size Modifier 0) while they are on hardpoints.

Kamen Panzer (TL9)

The Kamen Panzer is a heavy battlesuit that can transform into a large motorcycle. Designed for use by Ranger or other Special Forces teams, it uses a simple but reliable gas turbine for power, allowing it to run off normal diesel fuel. In the *Damocles* setting, it is used by UNISTAR.

Subassemblies: Two manipulator arms, two legs, limited-rotation turret, pod (on back), 2 wheels.

Drivetrain: 4 kW motive power leg drivetrain in legs. 50 kW motive power wheeled drivetrain in body.



Arm Motors: ST 100 motor in each arm.

Thrusters: Chemical rocket with 2,400 lbs. thrust in pod, uses 2,640 gallons rocket fuel per hour (0.73 per second).

Battlesuit System: Pilot weight 180 pounds. Upgrades: Complexity 3 suit computer, quick access, NBC kit.

Built-in Weapons: 3mm Gauss gun in right arm with 2,000 shots. Three TL9 mini-missile launchers in left arm, with three shots total.

Sensors: 5-mile range PESA in turret facing forward.

Comsuite: Basic, in turret.

ECM: Infrared jammer (rating 2) in body.

Power Plant: 52 kW gas turbine in body, powers all systems except Gauss gun, uses 2.86 gph diesel oil.

Energy Bank: Rechargeable power cell in right arm, storing 14,000 kWs, powers Gauss gun for 2,000 shots.

Fuel: 15-gallon self-sealing fuel tank in body with 5.24 hours diesel fuel (Fire 6) for power plant. 11-gallon self-sealing fuel tank in pod with 15 seconds rocket fuel (Fire 10) for thruster.

Volumes: Right arm 0.83 cf, left arm 0.9 cf, turret 1.06 cf, body 7.8 cf, each leg 2.34 cf, pod 2.37, wheels 0.78 cf.

Structure and Hit Points: Heavy frame, very expensive material. Transformable with two configurations: "humanoid" with wheels folded, and "cycle" with arms, legs, pod and turret folded. In cycle mode, the pilot is outside the mecha, riding it as a motorbike. Each arm 36 HP, turret 18 HP, body 72 HP, each leg 33 HP, each wheel 15 HP, pod 33 HP.

Surface Features: Sealed. TL9 basic infrared cloaking.

Armor: Arms, legs, wheels and pod are PD 4, DR 200. Turret and body are PD 4, DR 300. All armor is laminate.

Statistics: Loaded weight 2,316.36 lbs. Empty weight 1,928.5 lbs. Loaded mass 1.16 tons. Mecha volume 18.42 cf. Size modifier +1, arms -2, turret -3, legs -1, wheels -2, pod -1. Price $379,263. HT 11.

ST and Reach: Body ST 144, Arm ST 100 (reach 1, damage thr 11d, sw 13d).

Dimensions: 3.1 yards tall, 1 yard wide and long.

Ground Performance (humanoid): Speed 15 mph, gMR 3, gSR 1, Move 7. Jump-capable.

Aerial Performance (humanoid): Flight-capable. Can hover. Effective motive thrust 83.64 lbs. Aerodynamic drag 77.5. Speed 90 mph, aMR 4.5, aSR 3, Move 45.

Ground Performance (cycle): Speed 105 mph, gMR 1.75, gSR 2, Move 17/52. Jump-capable.

Vandal (TL9)

A humanoid "heavy infantry battlesuit" intended for intense combat operations on terrestrial planets. It has only six hours of air (used in vacuum), but with its provisions and NBC filter, it can keep the pilot alive for days in a contaminated war zone. In the *Damocles* setting, it is used by Gebberoth mercenaries.

Subassemblies: Two manipulator arms, two legs, limited-rotation turret, one pod (on back).

Drivetrain: 3 kW motive power leg drivetrain in legs.

Arm Motors: ST 50 motor per arm.

Thrusters: Ducted fan with 1,600 lbs. thrust in pod.

Battlesuit System: Pilot weight 175 pounds, pilot occupies body, turret, arms and legs. Battlesuit upgrades: Complexity 3 suit computer (in turret), limited lifesystem with six hours air (in body), NBC kit (in turret), trauma maintenance system and five days provisions (in body). Provisions can easily stretch to 10 days if pilot goes on half-rations.

Built-In Weapons: TL9 3mm Gauss gun in right arm with 1,000 shots. Two 40mm EMGLs in body facing forward, 20 shots each.

Sensors: 5-mile range PESA in turret facing forward. 2.5-mile range PESA in turret facing backward.

Comsuite: TL9 basic comsuite in turret.

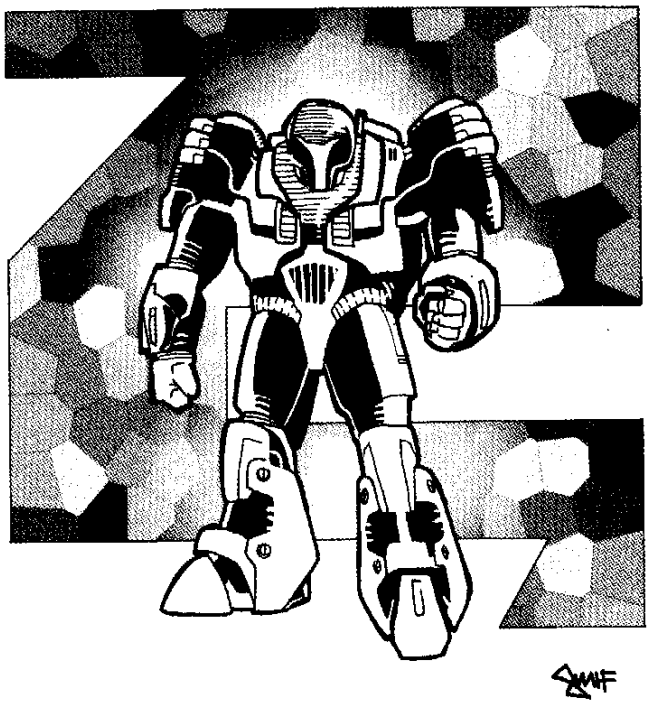
ECM: Infrared jammer (jam rating 4) in pod.

Power Plant: 5 kW NPU in body powers all systems save Gauss gun, EMGLs and ducted fans, with 0.15 kW left for recharging energy banks (at 9 kWs per minute). Lasts one year.

Energy Bank: Rechargeable power cell #1 in right arm stores 140,000 kWs for Gauss gun. Rechargeable power cell #2 in pod stores 3,240,000 kWs for ducted fan, powering it for 2.25 hours of flight. Rechargeable cell #3 in body stores 13,500 kWs and powers EMGLs for 450 shots each.

Volumes: Each arm 0.76 cf, pod 5.48 cf, turret 1.15 cf, body 5.49 cf, each leg 1.65 cf.

Structure and Hit Points: Medium frame, advanced materials. Each arm 15 HP, turret 11 HP, body 29 HP, each leg 14 HP, pod 29 HP.



Surface Features: Sealed. TL9 basic infrared cloaking.

Armor: Body and turret, PD 4, DR 100. Arms and legs PD 4, DR 75. Pod PD 4, DR 60. All armor is laminate.

Statistics: Loaded weight 1,572.48 lbs. Empty weight 1,323.33 lbs. Loaded mass 0.79 tons. Mecha volume 16.94 cf. Size Modifier +1, arms -2, pod 0, turret -3, legs -1. Price $316,245. HT 9.

ST and Reach: Body ST 58, Arm ST 50 each (reach 1, damage thr 5d+2, sw 8d-1).

Dimensions: 2.9 yards tall, 1 yard wide and long.

Ground Performance: Speed 16 mph, gMR 3, gSR 1, Move 8. Jump-capable.

Aerial Performance: Flight-capable. Can hover. Effective motive thrust 27.94 lbs. Lift ST 2. Aerodynamic drag 73. Speed 55 mph. aMR 4.5, aSR 3, Move 27.

Often carries a hand-held heavy weapon, although cannot fly when so encumbered. Two examples:

Hand-Held Hv. Flamer: Armored pistol, as TL9 hv. flamer (p. 66), except SS 8, Acc 15, PD 3, DR 26, Cost $20,335, HP 12, Size Modifier -1, unloaded weight 83.75 lbs., 540,000 kW non-rechargeable power cell gives 67 seconds fire, loaded weight 103.75 lbs., ST 39.

Hand-Held Missile Pack: Armored pistol, as TL9 light missile launcher (p. 68), except SS 12, Cost $532.5, Size Modifier -3, PD 3, DR 18, HP 4, unloaded 15.625 lbs., shots 5, magazine weight 35 lbs., magazine cost $6,000, loaded weight 50.625 lbs., ST 22.

Darkangel (TL10)

This is a sleek, form-fitting light battlesuit built for urban combat or shipboard boarding actions. The right arm is somewhat thicker, with a built-in contact energy weapon. In *Damocles*, the Star Force and Tessanak bounty hunters use it.

Subassemblies: Two manipulator arms, two legs, limited turret.

Drivetrain: 0.6 kW Leg drivetrain in legs.

Arm Motors: ST 30 arm motor in each arm.

Thrusters: Chemical rocket with 500 lbs. thrust, consumes 550 gallons per hour rocket fuel (0.15 per second).

Battlesuit System: Pilot weight 150 pounds. Upgrades: suit computer with Complexity 4, limited lifesystem, NBC Kit in body, trauma maintenance, quick access, socket neural interface.

Built-In Weapons: Md. plasmafaust in right arm, assault x-laser in left arm.

Sensors: 2-mile range PESA in turret facing forward.

Comsuite: Mini-comsuite in turret.

Power Plant: 1.65 kW NPU in body powers all systems except weaponry for 2 years.

Energy Bank: Rechargeable power cell storing 54,000 kWs (enough for 33 plasmafaust shots) in right arm. Rechargeable power cell storing 110,864 kWs (enough for 13 seconds x-laser fire) in left arm.

Fuel: Two one-gallon self-sealing tanks (in right and left leg) with a total of 13 seconds rocket fuel (Fire 10) for thruster.

Volumes: Right arm 0.64 cf, left arm 0.38 cf, turret 0.455 cf, body 2.18 cf, each leg 0.705 cf.

Structure and Hit Points: Heavy frame, advanced materials. Turret 12 HP, right arm 30 HP, left arm 18 HP, body 30 HP, each leg 15 HP.

Surface Features: Sealed. Basic infrared cloaking, intruder chameleon system.

Armor: PD 4, DR 100 on body and turret. PD 4, DR 75 arms and legs. All armor is laminate.

Statistics: Loaded weight 482.1 lbs. Empty weight 312.1 lbs. Loaded mass 0.24 tons. Mecha volume 5.065 cf. Size Modifier 0, arms -2, turret -4, legs -2. Price $117,003. HT 12.

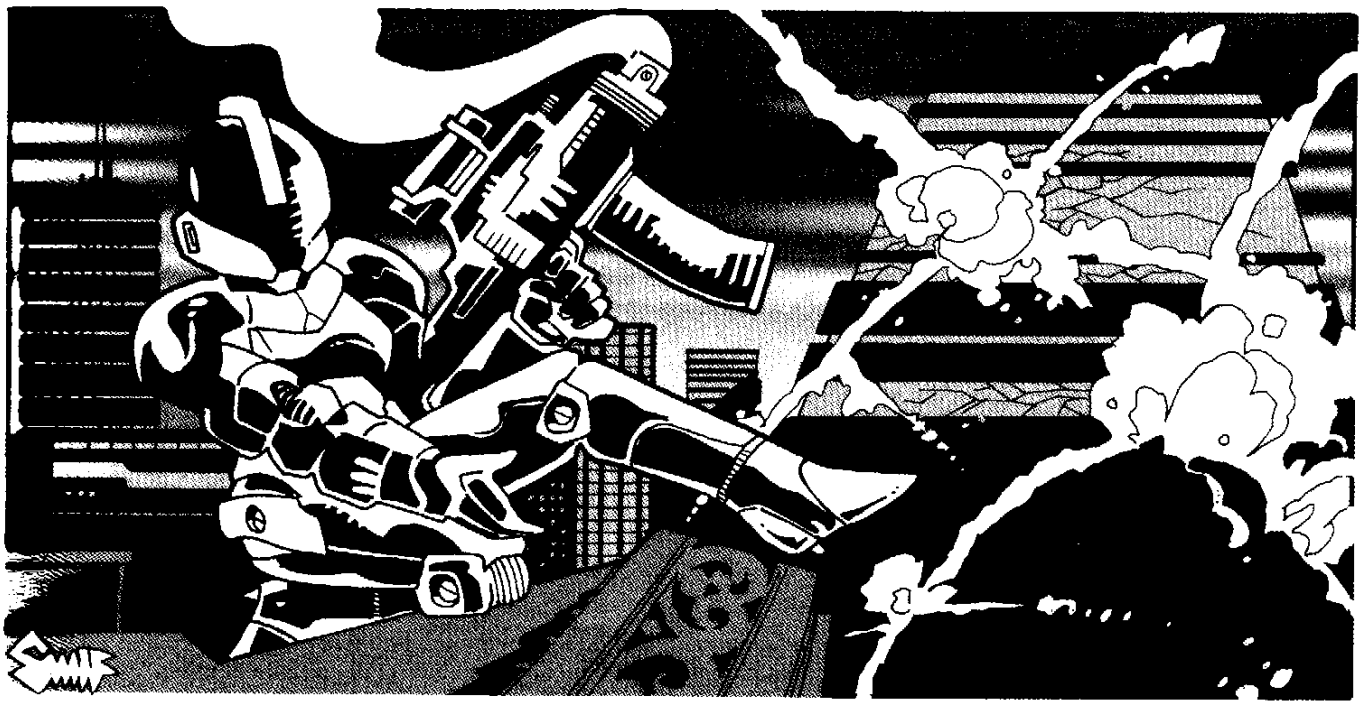
ST and Reach: Body ST 29, Arm ST 30 each (reach 1, damage thr 3d, sw 5d+2).

Dimensions: 2.1 yards tall, 0.7 yards wide and long.

Ground Performance: Speed 13 mph, gMR 3, gSR 1, Move 6. Jump-capable.

Aerial Performance: Flight-capable. Can hover. Effective motive thrust 17.9 lbs. Lift ST 1. Aerodynamic drag 32. Speed 65 mph. aMR 5.5, aSR 3. Move 32.

Space Performance: sAccel 1.04 g.



5 Basic Mecha Design

This chapter provides a step-by-step system for creating mecha. More options appear in Chapter 6, but it's best to become familiar with these rules first.

Mecha design requires some simple calculations, so you'll need a calculator with a square root key and some scratch paper.

PART I, "STEP 0" – CONCEPT

What is the mecha built to *do?* What's its role in the campaign? What's its TL (normally 8-12)? Here are several possibilities:

Military Mecha

Scout Mecha: Designed to find the enemy and return safely, it needs a high speed (often 60-120 mph), good sensors, an advanced comsuite and superior ECM and stealth. Weaponry should be sufficient to deal with enemy scouts or battlesuits, plus missiles in case a bigger foe is met. Armor rarely exceeds 25% of total weight. To make it hard to spot and cheap to lose, it should be small and light. Typical weight: 3,000-30,000 lbs.

Light Battle Mecha: The walking equivalent of a light tank, similar to a main battle mecha (below), but smaller. Its main advantage is that is easier to ship by aircraft or spaceship, which makes it useful for rapid-deployment forces like marines or space mercenaries. It is also cheap, and therefore attractive for organizations or governments on a budget, or those that value numbers above quality. Typical weight: 10,000-60,000 lbs.

Artillery Mecha: Built for indirect fire support rather than mecha vs. mecha duels, a typical artillery mecha has heavy missile launchers, mortars or big autocannon, but only minimal armor and low speed. Typical weight: 40,000-120,000 lbs.

Main Battle Mecha: A walking tank, built to fight enemy armored vehicles. It should have a speed of 40-60 mph and a main weapon powerful enough to punch through its expected opposition's armor. Secondary weapons to shoot at missiles and infantry are also important. From half to two-thirds of its total weight should be armor! Typical weight: 60,000-200,000 lbs.

Super Battle Mecha: A towering engine of destruction, standing many stories tall, this is an ultimate weapon that can single-handedly conquer or save the world! Super battle mecha are normally experimental designs or artifacts one or more TLs above the norm, and are so powerful that only another super mecha can defeat them. They are built like main battle mecha, but feature advanced options like force fields, exotic weapons, overload boosters or teleportation. Two cockpits are common, since a single pilot might be overwhelmed by the multitude of weapons and other systems. Typical weight: 200,000-20,000,000 lbs.

Space Combat Mecha: These are thruster-equipped mecha optimized for space battles. Putting legs on a space fighter is justified if huge space installations housing terrestrial environments exist, like L-5 colonies, hollow asteroids or domed cities. The mecha fights its way past defending spaceships, then battles "on foot" once inside. Space combat designs use rockets with extra thruster fuel (or rely on reactionless thrusters that don't *need* fuel). Laser and particle beam weapons are often preferred, thanks to their superior range in vacuum.

Command Mecha: A combat leader is sometimes issued an upgraded version of the mecha his subordinates use. In a realistic setting, a command mecha has superior communications and navigation gear, and sometimes a bit more speed or ECM. In a cinematic campaign, it's often bigger and better armed as well.

Police Mecha

Built to deal with criminals who use mecha, robots or super powers. Often, they have weapons that can fire non-lethal ammo; e.g., grenade launchers with tear gas. Missiles are rarely carried. To avoid straining civilian budgets, the price should be kept down, which means avoiding expensive options and minimizing ECM, stealth, et cetera. Armor shouldn't exceed DR 100. Typical weight: 2,000-20,000 lbs.

Civilian Mecha

Gladiator Mecha: In the coliseums of the future, armored machines duel for the prize! A gladiator mecha can be a custom design, but is often a surplus military or police machine. Any size is possible, but since it fights in a close-range arena duel, long-range weapons or sensors and expensive ECM systems should be avoided or stripped out. If the rules ban ranged weaponry, don't stint on adding giant swords and the like!

Labor Mecha: These are multi-purpose construction machines, strong but slow, with the simplest sensors and electronics. In some backgrounds, combat mecha will have evolved from them; in others, the reverse is true. Armor depends on the environment they are built for, but rarely exceeds DR 30. Armed and better-armored "combat engineering" mecha can also exist. Typical weight: 2,000-120,000 lbs.

Utility or Sports Mecha: A jeep or truck with legs! Most have four or more legs and no arms, and are designed to carry people and cargo over very rough terrain. They have few sensors and weapons, but add extra seats and cargo space. Armor is normally under DR 20. Suggested weight: 2,000 lbs. or more.

Other Possibilities

Don't let these examples limit what you build! How about "safari mecha" that resemble mechanical beasts, to be used by game wardens, hunters and poachers? Some additional concepts that recur in mecha design also deserve mention:

Species Compatibility: A mecha with the same number and type of limbs as its pilot (two arms and two legs for humans) is "species-compatible." A species-compatible mecha has superior performance, since it can be piloted almost instinctively.

Flight-Capable and Jump-Capable Mecha: Many mecha are strictly earthbound vehicles, but an equal number supplement their legs with thrusters, such as jets or rockets. A flight-capable mecha is one that has enough thrust to fly in earth-like gravity, or which possesses wings. At TL8-10, this is difficult to achieve without sacrificing other components (usually armor) to save weight. As a result, many mecha compromise by being only *jump-capable.* Their thrusters are not powerful enough for free flight in earth-like gravity, but they can boost the length of a normal jump. A jump-capable mecha can often fly in space, although it can't reach orbit on its own.

Battlesuits and various exotic concepts such as *Transformable Mecha* are detailed in the next chapter.

EXAMPLE: *Let's create a sample mecha. We decide it's a TL9 light battle mecha, and it's going to be flight-capable and species-compatible. We call it Seraph Delta.*

Design Tip: Target Weight

A mecha's actual weight will be determined at the end of the design process, and is the sum of the weight of all components, structures and surface features. This means that some performance figures, like speed, won't be known until the end of the design sequence.

To get an idea of how effective a mecha is *while building it,* pick a *target weight* to work toward. This makes it easy to estimate how fast the mecha will be on the ground, how much thrust it will need to fly and what kind of systems should go into it.

A target weight should be in pounds (an even number, like 20,000 lbs., is good) – use the typical weights for the various mecha concepts as guidelines. Divide target weight by 2,000 for a target mass in tons, which is needed for some decisions.

When using a target weight, keep a tally of the growing weight of the mecha as components and other systems are added to it. This allows you to ensure that the actual weight will be at least fairly close to the target weight.

Target weight *is* strictly optional. It's okay to design the mecha with no idea what the final weight will be, or to deviate from your target weight during the design process.

EXAMPLE: *Seraph Delta's target weight is 50,000 lbs. (25 tons).*

PART II – BODY AND SUBASSEMBLIES

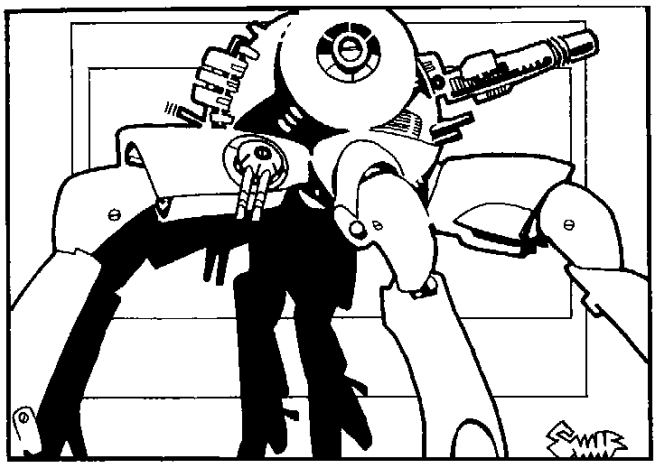
A mecha has a main *body* (the torso on a humanoid machine), with attached *subassemblies,* such as arms or legs.

Step 1 – Choose Subassemblies

Select the subassemblies that are attached to the mecha.

Legs: Decide how many legs the mecha has – at least two. Each is a separate subassembly. Three or four legs mean less maneuverability but more speed and stability. Further legs don't increase speed, but do make the mecha harder to cripple. A human-designed mecha that is species-compatible has two legs.

Arms: Decide how many arms the mecha has. Any number is possible, including none, but two are needed for a human species-compatible machine. An arm may be either a *manipulator arm* (one with a hand) or a cheaper, lighter *striker arm* (with no hand). Arms are assumed to be attached to the sides of the body, just like human arms. Other locations are possible; e.g., a tail would be an arm attached to the back of the body – it could reach into rear or side hexes, but not front hexes.



Turret: Decide whether the mecha has *no turret,* a *limited turret* (same degree of rotation as a human head), or a *full turret* (that can rotate 360°). A turret is assumed to be atop the mecha's body; on a humanoid mecha, it's a head. Multi-turret designs are possible, but are beyond the scope of this book; see ***GURPS Vehicles*** instead.

Pods: Decide whether the mecha has fixed (non-detachable) pods and if so, how many and where they are attached. A mecha can normally attach up to two pods to the back or top of the body. Pods can also go on wings, provided each wing has the same number of pods. They are generally used to house components (normally thrusters, fuel or launchers) outside the torso in order to make the mecha's body smaller or remove the risk of volatile fuel or explosive ammunition detonating inside it!

Wings and Wheels: A few mecha designs use these. See *Transformable Mecha* (p. 100-103), in the next chapter.

EXAMPLE: *We choose two legs, two manipulator arms and a limited turret.*

Step 2 – Streamlined Mecha

A mecha that will be flight-capable can benefit from streamlining, giving it a sleek body shape. Streamlining increases cost and overall volume, but improves flight speed.

Decide if a mecha will be streamlined, and if so whether it has "fair," "good," "superior" or "radical" streamlining. The better the streamlining, the greater the expense but the faster the mecha will fly. A vehicle with legs, arms, or turrets can't have superior or radical streamlining unless it is going to be transformable.

PART III – COMPONENTS

A component is an individual system – such as a cockpit, weapon or power plant – which is placed inside the body or a subassembly. The next several steps in the design sequence cover various components. As each component is selected for the mecha, record its basic description and statistics, which may be fixed or determined by a formula. The statistics are:

TL: The TL of the component. *Note:* The TLs given match the ***GURPS Space*** TL scheme. GMs should feel free to adjust the TLs of *specific* mecha components to suit the campaign setting!

Weight ("Wt."): Measured in pounds (lbs.).

Cost: In dollars ($).

Volume ("Vol.") and *Location:* Each component has its own volume in cubic feet (cf) and must be noted as occupying the body or a specific subassembly. Some components *must* go in certain locations (e.g., arm motors in arms).

Power Requirement ("Pow."): In kilowatts (kW). "Neg." means "negligible" – it requires too little power to worry about, as long as the mecha has some sort of power supply.

EXAMPLE: *"TL8 heavy laser cannon (6,000 lbs., 30 cf in body, $1,200,000, 300,000 kW)." This means a component called a "heavy laser cannon," built at TL8, weighing 6,000 lbs., occupying 30 cf in the body location, costing $1,200,000 and using 300,000 kW of power.*

Step 3 – Leg Drivetrain

A mecha with legs requires a leg drivetrain: the electric motors or mechanical transmission needed to move its legs.

Select the leg drivetrain's *motive power,* which is rated in kilowatts. Any motive power can be chosen, but the greater it is in relation to the mecha's final weight, the faster the mecha can run. Some typical ranges of motive powers:

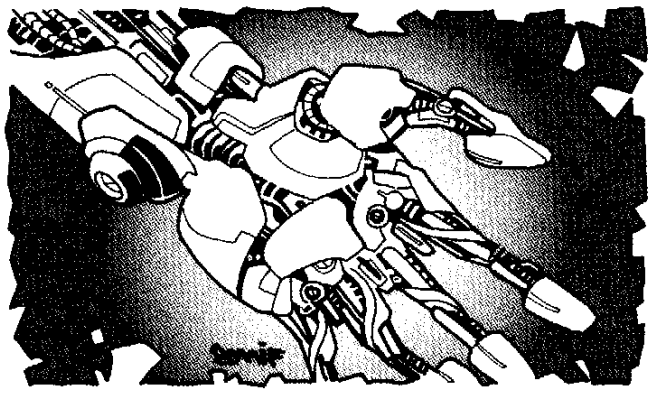
Scout or light battle mecha .....100-500 kW
Main battle mecha .....500-2,500 kW
Super mecha .....2,500-25,000 kW

If you are using a target weight and have an exact speed in mind, you can use this formula to find the motive power required:

2 legs: Power (kW) = {[speed (in mph)/8] squared} × loaded mass (tons).

3 legs: Power (kW) = {[speed (in mph)/10] squared} × loaded mass (tons).

4+ legs: Power (kW) = {[speed (in mph)/12] squared} × loaded mass (tons).



EXAMPLE: *A speed of 56 mph sounds good: with 2 legs and 25 tons, this requires (56/8) squared × 25 = 1,225 kW.*

Now determine the drivetrain's statistics using the table below:

Leg Drivetrain Weight Table

TL	*Weight in lbs. if motive power is:*	
	under 5 kW	*5 kW or more*
8	60×kW	(6×kW) + 270
9	40×kW	(4×kW) + 180
10	30×kW	(3×kW) + 135
11	20×kW	(2×kW) + 90
12+	15×kW	(1×kW) + 70

Weight: Calculate the weight of the power plant as shown on the table, based on kW of motive power. There are two columns, one for motive powers under 5 kW, the other for higher powers.

Volume and Location: A drivetrain has one leg motor located in each leg. The volume of each leg motor in cubic feet is drivetrain weight divided by 100 if two legs, by 150 if three legs, or by 200 if four legs. If more than four legs, each leg motor's volume is drivetrain weight divided by (50 × number of legs).

Cost: The cost of the entire drivetrain is $200 times drivetrain weight if two legs, $100 times weight if three legs, or $50 times weight if four or more legs. Two or three legs require more expensive gyro-stabilizing and control systems!

Power Requirement: This is identical to motive power.

EXAMPLE: *A TL9 drivetrain with 1,225 kW motive power weighs (4 × 1,225 kW) + 180 = 5,080 lbs. Since the mecha has two legs, the volume is 5,080/100 = 50.8 cf per leg. The entire drivetrain costs 5,080 × $200 = $1,016,000. It uses 1,225 kW. If we were writing this on a record sheet, we'd record:*

Leg Drivetrain: TL9 with 1,225 kW motive power (5,080 lbs., 50.8 cf in each leg, $1,016,000, 1,225 kW).

Step 4 – Arm Motors

If the mecha has no arms, go to Step 5. Otherwise, pick the strength (ST) for each arm. This is usually the same for each arm, but can vary. Some suggested strengths:

Scout mecha .....ST 50-500
Light battle mecha .....ST 100-1,000
Main battle mecha .....ST 1,000-10,000
Super battle mecha .....ST 5,000+

Target weight/25 (with a minimum ST 20) also gives good values. In supers or fantasy campaigns, a cap of ST 100-300 is a good idea, to balance mecha with supers or dragons. At ST 70+, a mecha's punch does about 1 + (ST/10) dice crushing damage.

An arm motor can have one or more of these options:

Cheap: The arm motor uses less-advanced technology, making it cheaper but heavier.

Flexible: A tentacle-like arm which can reach in any direction. Common on monstrous alien mecha!

Rocket Arm: An arm with this option can launch its fist as a ranged attack. (This option cannot be combined with a striker arm.) See *Using Arms* (p. 46).

Each arm requires an arm motor component. The arm motor's weight depends on that arm's ST and options.

Determine each individual arm motor's weight, volume and cost using this table:

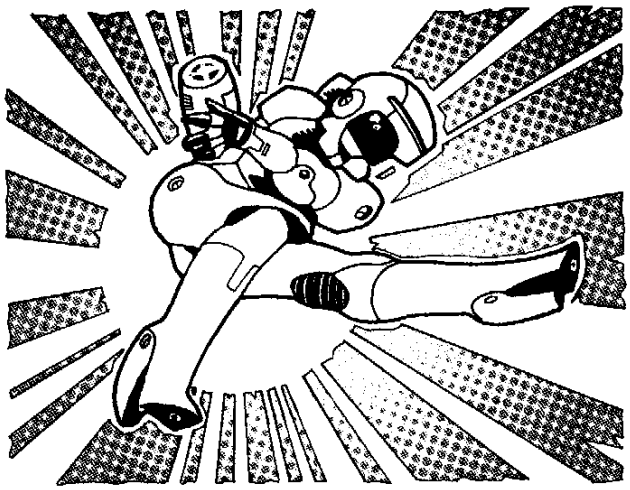
Arm Motor Table

TL of Arm	*Weight*	*Vol.*	*Cost*
TL8 Arm	0.2	0.004	$400
TL9 Arm	0.15	0.003	$300
TL10 Arm	0.1	0.002	$200
TL11 Arm	0.075	0.0015	$150
TL12+ Arm	0.05	0.001	$100
Type of Arm			
Manipulator	×1	×1	×1
Striker	×0.5	×0.5	×0.2
Options			
Cheap	×2	×2	×0.5
Flexible	×2	×2	×2
Rocket Arm	×1.5	×1.5	×4

Weight, Volume and Cost: This is per point of ST. Apply modifiers for arm type and options; all are cumulative. E.g., a TL9 striker arm motor with ST 200 and the cheap option weighs $200 \times 0.15 \times 0.5 \times 2 = 30$ lbs.

Location: An arm motor must be placed in the arm it operates.

Power: Arms require ST/200 kW of power.



EXAMPLE: *We give each of Seraph Delta's arms ST 4,000 and the cheap option. Each arm motor weighs 4,000 × 0.15 × 2 = 1,200 lbs., takes up 4,000 × 0.003 × 2 = 24 cf, costs 4,000 × $300 × 0.5 = $600,000 and uses 4,000/200 kW = 20 kW. One motor goes in the right arm, one in the left arm.*

As we are using a target weight, we'll keep a running total of accumulated weight. With the drivetrain plus the arm motors, this is now 7,480 lbs.

Step 5 – Thrusters

Jump- or flight-capable mecha have thrusters of some sort: jets, rockets, fans or reactionless thrusters. Skip this step and go on to Step 6 if the mecha isn't jump or flight capable.

Thrusters are rated for *motive thrust* in pounds. If not using a target weight, a good thrust is 20-50 lbs. per kW of leg drivetrain's motive power. To ensure a mecha is flight-capable, thrust must exceed weight; 1.1 to 1.5 times target weight is good. Jump-capable mecha, or those that can only fly in space, usually have thrusts of 50-100% of their target weight.

All thrusters incorporate thrust-vectoring systems (which is why they weigh 50% more than their ***Vehicles*** equivalents).

A mecha can have several smaller thrusters instead of one big one; this is mostly useful if the thrusters are spread around the mecha, in different locations. Their thrust is additive.

A brief description of the various types of thrusters:

Turbofans are jet engines. They are heavier than rockets and need an oxygen atmosphere to work, but use less fuel. If the mecha won't need to fly in space, they're a good choice.

Ducted fans are high-performance propellers, the blades of which are entirely shrouded within a cowling. They only work in an atmosphere. They require no fuel, only power.

Chemical Rockets are powerful but have very high fuel consumption. If the mecha is only designed to use its thrusters for a few seconds at a time, they are a good choice.

Fusion Rockets (TL9+) have an integral micro-fusion reactor that heats reaction mass and expels it to produce thrust. They work anywhere and don't use too much fuel. At TL9, they are probably the best choice, but they're very expensive!

Fusion Air-Rams (TL9+) use a fan to suck air into the rocket, which is heated by a fusion reaction and expelled to generate thrust. They require no fuel at all, but only function in an atmosphere – although it does not have to be a *breathable* one!

Reactionless Thrusters (TL9+) transform energy into thrust by means unknown to 20th-century science. They don't use fuel, only power. In some settings, they may not exist!

Fusion Ram-Rockets (TL10+) are fusion air-rams that can also function as fusion rockets in airless environments.

To install a thruster, select the type and motive thrust. Then calculate its statistics using the table below:

Thruster Table

TL and Type	*Weight (lbs.)*	*Cost*	*Fuel*
TL8+ Turbofan	(0.15×thrust) + 150	$50	0.015J gph
TL8+ Ducted Fan	(0.15×thrust) + 6.75*	$40	none
TL8+ Chemical Rocket	0.015×thrust	$25	1.1R gph
TL9+ Super Turbofan	(0.12×thrust) + 5	$50	0.03J gph
TL9 Fusion Rocket	(0.075×thrust) + 75	$100	0.02W gph
TL9 Fusion Air-Ram	(0.15×thrust) + 150	$100	1 yr.
TL9 Reactionless	1.5× thrust	$25	none
TL10+ Fusion Rocket	(0.0375×thrust) + 37.5	$100	0.02W gph
TL10+ Fusion Air-Ram	(0.075×thrust) + 75	$100	2.5 yr.
TL10 Reactionless	0.75×thrust	$20	none
TL10 Super Reactionless	0.3×thrust	$100	none
TL10+ Fusion Ram-Rocket	(0.09×thrust) + 90	$200	2.5 yr.#
TL11+ Reactionless	0.075×thrust	$20	none
TL11+ Super Reactionless	0.03×thrust	$100	none
TL13+ Mega Reactionless	0.0015×thrust	$4,000	none

* 1.5 × thrust if under 20 lbs. thrust.

0.02W when operating in an airless environment.

Weight: Calculate the weight (in lbs.) of the thruster as shown on the table, based on its thrust.

Volume and Location: This is weight/50 cf for most systems, or weight/100 for ducted fans. Thrusters may go in a body, leg, pod or wing.

Cost: Multiply the thruster's *weight* as found above by the "cost" number on the table to get its cost. For reactionless thrusters only, treat costs less than $500 as $500.

Fuel: "None" means the thruster requires no fuel (although it will require *power* – see below). "1 yr." or "2.5 yr." means the thruster can operate for that many years on its reactor. A number followed by "gph" is the *gallons per hour* of liquid fuel or reaction mass consumed per pound of thrust; multiply gph by thrust to find it. J indicates jet fuel is consumed, R is chemical rocket

fuel, W is water reaction mass. (Recording a consumption in *gallons per second* is a good idea, if the mecha only uses the thrusters occasionally. To find gallons per second, divide gph by 3,600; round to two places.)

Power: The only thrusters that need power are ducted fans and reactionless thrusters. Ducted fans need 0.25 kW per pound of thrust. TL9 or TL10 reactionless thrusters need 0.5 kW per pound of thrust; TL11+ need 0.05 kW per pound of thrust.

EXAMPLE: *Seraph Delta is to be flight-capable. With a 50,000-lb. target weight, it needs over 50,000 lbs. thrust. We choose 51,000 lbs. and produce it with a TL9 fusion rocket. It weighs (0.075 × 51,000) + 75 = 3,900 lbs., takes up 3,900/50 = 78 cf and costs 3,900 × $100 = $390,000. It uses 0.02 × 51,000 = 1,020 gallons per hour water. We put it in the body. Total weight is now 11,380 lbs.*

Step 6 – Cockpit

Every drivable mecha requires a cockpit. Most mecha have only one cockpit, but multi-cockpit designs are possible – they allow the crew to do several things at once, like engage several targets with different weapons. Computerized controls allow command of individual systems to be redistributed each turn.

Standard Features

A basic cockpit includes these standard features:

Compact Fire Suppression System: This is an automatic chemical fire extinguisher with outlets throughout the mecha.

Computer: A minicomputer and terminal, with fiber-optic hardening to protect against radiation and electromagnetic pulse. Its Complexity equals the mecha's TL-5.

Crew Station and Controls: A padded pilot seat surrounded by a bank of computerized controls.

Head-Up Display (HUD): A holographic data display with a pupil scanner that tracks the pilot's eye movements and trains weapons and sensors wherever he looks. At TL9+, the pilot is usually surrounded by a 3-D display – if desired, this display can even "edit out" the surrounding cockpit walls so that the pilot and his controls seem to be floating in space.

Lifesystem: At TL8-10, this is a limited-duration life support system that performs climate control and waste relief functions, and has a 24 man-hour supply of air. At TL11+, it is replaced by a system with indefinite duration. This system is only viable for *sealed* mecha (see p. 89); unsealed mecha should take the "No Lifesystem" downgrade (below).

The weight of a cockpit also includes 200 lbs. per occupant. The actual weight may differ, of course, but this is a playable average that takes into account personal armor or clothing.

Upgrades

A cockpit can be further customized by adding various upgrades. Unless noted, an option can only be taken once per cockpit. The upgrades are:

Ejection Seat: A rocket escape system that blasts the occupant out of the mecha, then deploys a parachute to land him safely. See *Ejecting* (p. 58).

Extra Air: This option adds 12 man-hours of air. It can be taken several times, if desired.

Extra Passenger Seat: A mecha cockpit can be fitted with one or more extra seats for passengers. At TL8-10, remember to divide the man-hours of air by the number of occupants! For extra *crew,* add another cockpit.

Genius Computer: This upgrades computer Complexity by 1, but *greatly* increases cost.

Womb Tank: This is a gel-filled fluid bath that provides superior protection against shocks and acceleration.

Downgrades

A cockpit can also have downgrades, which will reduce weight, volume and cost, but eliminate certain capabilities:

Dumb Computer: A cheaper but less effective computer. Reduce computer Complexity by 1. This may not be taken if the cockpit has the "genius computer" upgrade.

No Extinguisher: The mecha lacks an automatic fire suppression system. A good option for cannon-fodder mecha!

No Lifesystem: Removing the lifesystem saves quite a bit of weight and space, but it means that the occupants can only breath if there is a breathable atmosphere outside, or if they wear their own air supply, such as a vacc suit and air tank.

Cockpit Statistics

The weight, volume, cost and power requirements of a cockpit depend on its TL and the upgrades or downgrades it has. A cockpit may be located in the mecha's body or turret.

Cockpit Table

Type	*TL*	*Weight*	*Volume*	*Cost*	*Power*
Basic Cockpit	8	590	24.7	$80,100	0.5
Basic Cockpit	9	460	22.4	$41,100	0.5
Basic Cockpit	10	370	21.2	$21,850	0.5
Basic Cockpit	11+	340	21.2	$21,850	0.1
Upgrades					
Ejection Seat	–	100*	5*	$50,000*	0
Extra Air	8	75	1.5	$250	0
Extra Air	9	50	1	$250	0
Extra Air	10	25	0.5	$250	0
Extra Seat	8-10	220	20	$100	0.5
Extra Seat	11+	250	31	$600	0.1
Genius Computer	8	–	–	$450,000	neg.
Genius Computer	9	–	–	$225,000	neg.
Genius Computer	10+	–	–	$112,500	neg.
Womb Tank	8	200*	4*	$10,000*	neg.
Downgrades					
Dumb Computer	8	–	–	-$60,000	–
Dumb Computer	9	–	–	-$30,000	–
Dumb Computer	10+	–	–	-$15,000	–
No Extinguisher	–	-50	-1	-$500	–
No lifesystem	8	-150	-3	-$500	-0.5*
No lifesystem	9	-100	-2	-$500	-0.5*
No lifesystem	10	-50	-1	-$500	-0.5*
No lifesystem	11+	-20*	-1*	-$500*	-0.1*

* If mecha has extra seats, this is *per occupant.*

EXAMPLE: *Seraph Delta has a TL9 cockpit in the body (460 lbs., 22.4 cf, $41,100, 0.5 kW). We add an ejection seat option for an extra 100 lbs., 5 cf and $50,000. Total weight is now 11,940 lbs.*

Step 7 – Built-In Weapons

Combat mecha usually devote up to 10% of target weight to built-in weaponry, but any size arsenal is possible.

Mecha, especially those with manipulator arms, may supplement any built-in weapons with external armament: giant hand-held guns or modular weapon pods bolted onto hardpoints. This way, a weapon load can be tailored for the mission and takes up no internal space, allowing a smaller, lighter machine. However, external weapons are also vulnerable to damage, less accurate and compromise any stealth systems while attached.

Some mecha rely mostly on their built-in weaponry, while others rely on external weapons or a mix of both. Decide if the mecha will have any built-in weapons. If so, add them now, as described below. If not, go on to Step 9. (External weapons aren't part of the mecha design – they are covered after the mecha is built.)

A wide variety of built-in weaponry is available. For ranged weapons, refer to *Ranged Weapons* (p. 65). For melee weapons, refer to *Built-in Contact Weapons* (p. 68). Decide what weapons the mecha will have, and record each one's statistics:

Weight, Volume, Cost and Power are shown on the appropriate weapon tables.

Location: A ranged weapon can be located in the body or in an arm, turret, pod, wing or leg – although firing leg-mounted weapons is awkward. In general, putting weapons in arms or turrets gives a better arc of fire, while putting them in the body means they are less likely to be knocked out of action.

If a ranged weapon goes in the body or a turret, decide which way it faces: forward (F), right (R), left (L), up (U), down (D) or backward (B). Weapons in arms and legs face the way the limb points.

A built-in contact weapon can normally only go in an arm. However, claws and talons may go on legs, and jaws in a turret.

Note: Weapons in an arm can't be used if the pilot is using a hand-held weapon at the same time. Mecha that rely on external hand-held weapons often have no weapons in manipulator arms.

Ammunition is required for built-in guns and launchers. See the weapon tables on pp. 67-68 to find the weight per shot (WPS), volume per shot (VPS) and cost per shot (CPS). Multiply this by the desired number of shots carried to find ammunition weight, volume and cost. Ammunition must go in the same location as the weapon that uses it. If multiple, identical weapons are in the same location, they can share ammunition.

EXAMPLE: *We give Seraph Delta about 1/10 its target weight in weapons: four TL9 med. missile launchers (total 500 lbs., 10 cf in F Body, $16,400) for punch, and a TL9 md. rainbow laser in each arm (each is 1,800 lbs., 36 cf, $130,000, 259,200 kW). The launchers require ammunition. We choose 2 shots each: 8 med. missiles (total 400 lbs., 8 cf in body, $65,600). This is 4,500 lbs. of armament. Total weight is now 16,440 lbs.*

Step 8 – Weapon Accessories

Built-in weapons can be modified with various accessories. Decide if the mecha has any of them, and work out their statistics.

Links: A group of ranged weapons can be electronically linked together, enabling one person to aim and fire some or all weapons in the group at a single target in a single turn. Weapons can only be linked if they face in the same direction. Launchers can only be linked with other launchers. Weapons may be cross-linked to allow different combinations of weapons to be fired. Links cost $50 per set of weapons in the link. Links don't have a "location," since they have no volume.

Casemate Mount: This is a swivel system that can be added to any weapon built into the *body*. It gives that weapon a much wider arc of fire (45° to either side). It weighs 0.5 lbs. per pound of empty weapon weight, takes up 0.5 cf per cf of weapon volume, and costs $1 per pound of empty weapon weight. A casemate must be located in the body with the weapon it upgrades.

Anti-Blast Magazine: A useful option for ammunition that can do explosive damage, such as missiles, grenades or exploding cannon shells. It encloses the ammunition in a specially-built ammo box, designed to prevent damage from an ammo explosion by vectoring the blast harmlessly out of the mecha. It is 25 lbs. and $250 per cf (or fraction thereof) of ammo protected. It has no volume.

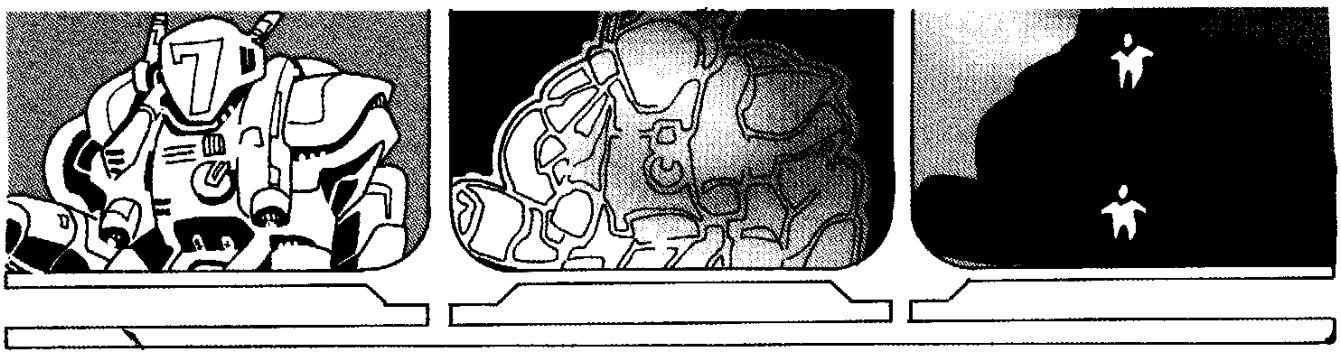
EXAMPLE: *We decide the launchers are linked together (for $50) as are the lasers ($50). The 8 cf of ammo has an anti-blast magazine: 200 lbs. and $2,000. Total weight: 16,640 lbs.*

Step 9 – Sensors

On the futuristic battlefield, a mecha's electronic sensors are nearly as important as its weaponry! Almost all mecha have sensors, though if they are lost (or not installed), the pilot can still see out through a vision slit, canopy or faceplate.

There are two types of sensor array:

Passive Electromagnetic Sensor Array (PESA): This is the mecha pilot's electronic "eyes." It can switch between telescopic day or night vision and high-resolution infrared thermograph



mode. Telescopic vision can be blocked by smoke, and thermographs by special "hot smoke" or infrared cloaking. So mecha often have an . . .

Active Electromagnetic Sensor Array (AESA): This is a multimode active sensor array that can switch between radar and laser imaging (ladar) functions. It gives more precise ranging information than a PESA, and when used for targeting adds a +2 bonus to hit in combat. There are ways of jamming or fooling an AESA using stealth or ECM, but its big disadvantage is that its use can be detected – this can be crucial in a hide-and-seek battle!

Most mecha designs have PESAs alone, or both AESA and PESA systems. To determine a sensor's statistics, decide on its type (PESA or AESA) and range in miles. Civilian and police mecha usually mount sensors with ranges of 1-5 miles, while ranges of 5-50 miles are typical of military mecha. Mecha built for air and space combat often have even longer ranges!

Use the table below to find each system's statistics:

Sensor Table

Type	*Weight*	*Volume*	*Cost*	*Power*
TL8 AESA	3	0.06	$5,000	0.25
TL9 AESA	1.5	0.03	$2,500	0.25
TL10 AESA	0.75	0.015	$1,250	0.25
TL11+ AESA	0.375	0.0075	$625	0.25
TL8 PESA	4	0.08	$16,000	neg.
TL9 PESA	2	0.04	$8,000	neg.
TL10 PESA	1	0.02	$4,000	neg.
TL11+ PESA	0.5	0.01	$2,000	neg.

Multiply the range of the sensor in miles by the numbers shown on the table. This gives the weight, volume, cost and (if AESA) power requirement. *Exception:* If a sensor has over 125 miles range, multiply its cost by only 100 + (range/5).

Location: A sensor is usually located in a turret, but can go in any body or subassembly except wheels. When it is installed, decide which direction it is facing, just like a weapon.

Sensors can only look in one direction, so it is useful to either place sensors in a rotating turret or install multiple sensors of the same type facing in different directions. A turret with one sensor facing forward and one facing backward gives effective 360° coverage. (Multiple sensors of the same type facing the *same* direction give no extra benefit, but are useful as backups.)

Magnification: PESAs are also rated for their power of telescopic magnification; e.g., 20× is a 20-power scope. This equals their range in miles or 1×, whichever is better.

EXAMPLE: *We decide Seraph Delta will have a 100-mile range PESA (which is 200 lbs., 4 cf, $800,000, 100× magnification) and a 200-mile range AESA (300 lbs., 6 cf, $350,000, 50 kW). Both systems are in the turret facing forward. Total weight is now 17,140 lbs.*

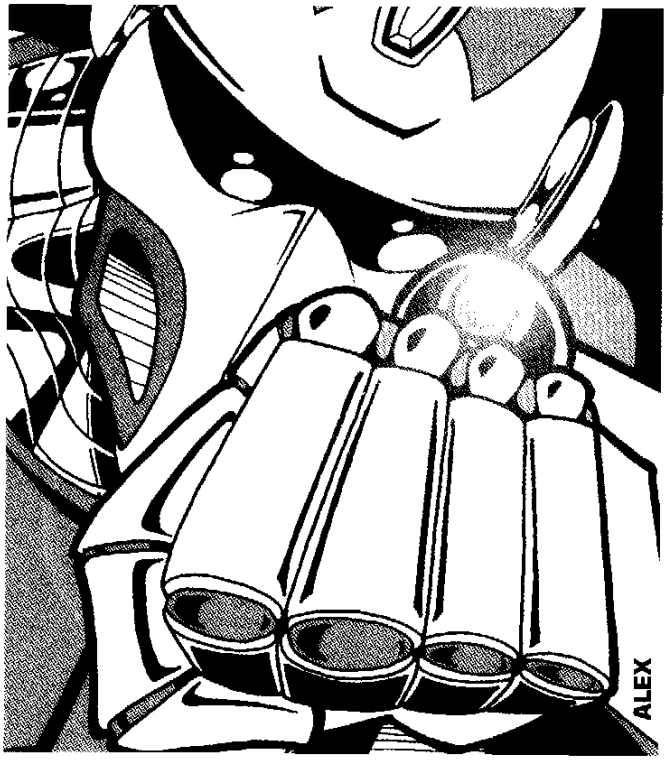
Step 10 – Comsuites

Almost all mecha have comsuites, which incorporate communication and navigation systems as well as sensors that detect radar and laser emissions. There are three main types. For rules, see *Using Comsuites* (p. 47).

Mini Comsuite (TL8+): This is a scrambled, medium-range radio, a military GPS system for satellite-aided navigation, and a radar/laser detector. Used by small or cheap mecha.

Basic Comsuite (TL8+): A mini-comsuite plus a laser communicator and "IFF" (Identify Friend or Foe) transponder. This is the standard type of mecha comsuite.

Advanced Comsuite (TL8+): A scrambled, long-range radio, laser communicator, IFF, military GPS system, inertial navigation system and advanced radar/laser detector. Mostly used by command, scout, ranger, air or space combat designs.



A mecha will normally only have one comsuite. Decide what type of comsuite – if any – a mecha has, and record its statistics:

Comsuite Table

Type	*TL*	*Wt.*	*Volume*	*Cost*	*Power*
Mini Comsuite	8	3.75	0.075	$2,275	neg.
Mini Comsuite	9	2.25	0.045	$1,175	neg.
Mini Comsuite	10+	2	0.04	$1,000	neg.
Basic Comsuite	8	19	0.38	$5,775	0.1
Basic Comsuite	9	12.5	0.25	$3,425	0.1
Basic Comsuite	10+	9.5	0.19	$2,625	0.1
Advanced Comsuite	8	62	1.24	$32,600	0.14
Advanced Comsuite	9	41	0.82	$17,550	0.14
Advanced Comsuite	10+	36	0.72	$17,275	0.14

The table shows the weight, volume, cost and power requirement of comsuites at various tech levels. They can be located in any body or subassembly except wheels.

EXAMPLE: *We give Seraph Delta a TL9 advanced comsuite (41 lbs., 0.82 cf, $17,550, 0.14 kW) and place it in the body. Total weight is now 17,181 lbs.*

Step 11 – Electronic Countermeasures (ECM)

These systems are designed primarily to decoy enemy homing missiles. For detailed rules, see *Homing Missiles* (p. 53).

Infrared Jammer (IRJ): This system emits thermal radiation to distract and confuse infrared homing missiles of the same or lower TL. It has no effect on sensors. Its "jam" rating is subtracted from the chance of these missiles hitting the mecha. At TL10+, a deceptive jammer (see below) can also jam homing missiles, so IRJs are generally no longer used.

Deceptive Jammer (DJ): A deceptive jammer detects an incoming sensor pulse, then fools the sensor by mimicking the signal and sending it back in an altered form. They make the mecha harder to track using radar (at TL8-9); those built at TL10+ use "distortion field" technology which works vs. any sensors and against infrared homing missiles.

Area Jammer (AJ): Broadcasts static that interferes with all radar scans and radio use (friend or foe), over a radius of five miles times its jamming bonus. However, the jamming field itself can be detected by an AESA (using its radar) or a comsuite that is in line of sight of it.

Dischargers: A launcher box for various decoy or concealment munitions. It is used to fire smoke, flares (to confuse infrared homing missiles), chaff (to confuse radars) and hot smoke (to block a PESA's infrared sensors). A decoy discharger can fire one shot per turn; mecha sometimes mount several dischargers. Decide what each discharger is loaded with and how many reloads, if any, it has.

ECM Table

Type	*TL*	*Weight*	*Volume*	*Cost*	*Power*
Infrared Jammer	8	20#	0.4#	$40,000#	0.25#
Infrared Jammer	9+	10#	0.2#	$20,000#	0.25#
Deceptive Jammer	8	40#	0.8#	$40,000#	4#
Deceptive Jammer	9	20#	0.4#	$20,000#	2#
Distortion Jammer	10	10#	0.2#	$10,000#	1#
Distortion Jammer	11+	5#	0.1#	$5,000#	0.5#
Area Jammer	8	20#	0.4#	$4,000#	100#
Area Jammer	9	10#	0.2#	$2,000#	50#
Area Jammer	10+	5#	0.1#	$1,000#	25#
Decoy Discharger (loaded)	8+	20	1	$100	0
each reload	8+	10	0.5	$20*	0

For a jam rating of 2. For a more potent jammer, multiply wt., vol., cost and power by ×2 (jam 4), ×5 (jam 6), ×10 (jam 8), ×20 (jam 10), ×50 (jam 12), ×100 (jam 14) or ×200 (jam 16).

* Reloads available are smoke, hot smoke, chaff or flare. Smoke is only $10; all others are $20.

ECM can go in any location except wheels.

EXAMPLE: *We give Seraph Delta a decoy discharger with a chaff decoy plus 3 chaff, 8 flare and 4 hot smoke reloads (170 lbs., 8.5 cf in turret, $400). Total weight is now 17,351 lbs.*

Step 12 – Power Systems

Any mecha whose components have a power requirement requires a *power system:* a power plant or energy bank.

A *power plant,* like a reactor, produces power constantly. It has a power output in kilowatts (kW), and may require fuel.

An *energy bank,* such as a battery or power cell, stores a finite amount of energy, which is drained as it is used. It is rated for the number of kilowatt-seconds (kWs) of energy it stores. One kWs provides one kW of power for one second.

Power plants are better for the long haul, while energy banks permit greater outputs for shorter periods. A mecha will usually have both, combining the benefits.

Examine the power requirements of all components on the mecha that require more than negligible power, then decide which will be met by power plants and which by energy banks. Most mecha designs will run any beam or electromag weapons (which require huge amounts of power) off of energy banks and everything else off of a power plant. However, it *is* possible to run a mecha entirely off one or the other system.

EXAMPLE: *Seraph Delta's power requirement is 1,225 kW for the drivetrain, 40 kW for the arm motors, 518,400 kW for the lasers, 50 kW for the AESA, 0.14 kW for the comsuite and 0.5 kW for the cockpit for 519,715.64 kW.*

We decide the 518,400 kW for the lasers is be met by an energy bank; the other 1,315.64 kW will be met by a power plant.

Power Plants

If the mecha has a power plant, decide on its output in kilowatts (kW) – the amount of power it produces. The output should equal or exceed the power requirements of all systems it powers. If it exceeds their power requirements, the excess energy can be used to recharge the energy bank or to power any external gear, such as hand-held or hardpoint-mounted weapons.

A mecha will sometimes have multiple power plants (possibly of different types). These can either add their output together or be designated as backup systems that only work when the main system goes down. A backup system will not use up fuel or deplete its endurance when it is not in use.

Several different types of power plant are available. Decide which type the mecha will use. In some settings, only certain types may be available – this is up to the GM.

Steam (TL5-6) – See p. 109.

Ceramic Internal Combustion Engines (TL8) are advanced versions of modern-day, high-performance diesel, Sterling or Wankel rotary engines. They are cheap and low-tech, but require a lot of fuel. They only function in an oxygen atmosphere, making them useless in space, underwater or on some alien worlds.

Gas Turbines (TL8) are the same as the turbine engines that are used on helicopters and some tanks today. They are lighter but more expensive than ceramic engines. They also only work in an oxygen atmosphere.

Nuclear Power Units (NPUs) (TL8) are compact but expensive, high-performance "radiothermal generators" that convert the heat produced by a decaying radioisotope into energy. They operate for months or years. At TL9+, an NPU can also represent a micro-fusion unit, such as a hydrogen-injection fission/fusion torch being used to drive a high-tech steam engine, or even a "cold-fusion" device, depending on the background technology.

Fission Reactors (TL8) produce power by splitting atoms. The fuel rods in the reactor will last for years.

Fusion Reactors (TL9) generate energy by hot thermonuclear fusion. They are more efficient than NPUs, and their internal hydrogen fuel supply lasts for centuries.

Antimatter Reactors (TL11) produce energy through the mutual annihilation of matter and antimatter. Again, an internal fuel supply provides power for years.

Total Conversion Power Plants (TL14) produce power by directly converting matter into energy. They use trivial amounts of normal matter for fuel, which provides power indefinitely.

The most efficient (if not cheapest) choice for a power plant varies with TL and output, depending on what is available:

TL8: A gas turbine – if being limited to working in an oxygen atmosphere and the high fuel consumption are acceptable. Otherwise, use an NPU to 950 kW, then pick a fission reactor.

TL9: As above, but after 23,750 kW, a fusion reactor is the optimum choice.

TL10: An NPU is best up to 2,468 kW, then fusion.

TL11: An NPU is best up to 9,910 kW, fusion to 20,000 kW, then an antimatter reactor.

TL12: An NPU is best to 13,273 kW, then antimatter.

TL13: An NPU up to 5 kW, then antimatter.

TL14+: An NPU up to 5 kW, then total conversion.

Select the type of power plant and its output, and work out its weight, volume, cost and fuel usage, as shown below:

Power Plant Table

Type	Weight if output is: under 5kW	5kW or more	Cost	Fuel
TL5+ Ceramic Engine	4×kW	(2×kW) + 10	$12	0.03 gph
TL5+ Gas Turbine	4×kW	(1×kW) + 15	$30	0.055 gph
TL8 Nuclear Power Unit	no	(8×kW) + 200	$200	0.5 yr
TL9 Nuclear Power Unit	12×kW	(2×kW) + 50	$200	1 yr
TL10 Nuclear Power Unit	6×kW	(1×kW) + 25	$200	2 yr
TL11 Nuclear Power Unit	4×kW	(0.4×kW)+18	$200	5 yr
TL12+ Nuclear Power Unit	2×kW	(0.2×kW)+9	$200	10 yr
TL8 Fission Reactor	no	(4×kW) + 4,000	$100	2 yr
TL9 Fission Reactor	no	(1×kW) + 1,000	$40	2 yr
TL10+ Fission Reactor	no	(1×kW) + 1,000	$20	2 yr
TL9 Fusion Reactor	no	(1×kW) + 20,000	$200	200 yr
TL10 Fusion Reactor	no	(0.2×kW) + 2,000	$50	200 yr
TL11+ Fusion Reactor	no	(0.2×kW) + 2,000	$25	200 yr
TL11 Antimatter Reactor	no	(0.1×kW) + 4,000	$20	2.5 yr
TL12 Antimatter Reactor	no	(0.05×kW) + 2,000	$20	5 yr
TL13+ Antimatter Reactor	no	0.05×kW	$20	30 yr
TL14+ Total Conversion	no	0.02×kW	$30	Infinite

Weight: Calculate the weight of the power plant as shown on the table, based on output. There are two columns, one for power plants with outputs under 5 kW, the other for larger power plants. A "no" in the "under 5 kW" column means a power plant of that type cannot be built with less than 5 kW output.

Volume and Location: Divide weight by 50 to find volume in cf, except for NPUs. For these denser power plants, divide by 100. The power plant goes in the mecha's body.

Cost: This is the cost per pound of power plant weight. There is an extra added cost for the reactor core of fission, fusion and some antimatter plants:

TL8 fission $200,000
TL9 fission $40,000
TL9 fusion $1,000,000
TL10 fusion or TL11 antimatter $200,000
TL11 fusion or TL12 antimatter $100,000

All power plants except gas turbines and ceramic engines have a minimum cost of $20,000. If the cost works out less than this minimum, raise it to the minimum cost.

Fuel: This determines how long the power plant can operate for. If a number followed by "gph" is given, operating the power plant requires that number of gallons per hour of diesel fuel per kW of output. If a number followed by "yr" is given, the power plant does not require a fuel tank. Instead, it operates for that number of *years,* using an internal isotope, hydrogen or antimatter fuel supply, after which a major overhaul is required. "Infinite" means the power plant can operate indefinitely.

EXAMPLE: *We need a 1,315.64 kW power plant. We decide upon an even 1,500 kW; the rest can recharge our energy bank. The lightest weight for a 1,500 kW output plant up to TL9 would be a gas turbine, but that requires fuel and air. We decide to choose the next-lightest option, a TL9 fission reactor.*

It weighs (1 lb. × 1,500 kW) + 1,000 = 2,500 lbs., takes up 2,500/50 = 50 cf in the body and costs $40 × weight = $100,000, plus $40,000 for the reactor core = $140,000. It lasts 2 years. Total weight is now 19,851 lbs.

Energy Banks

An energy bank stores electrical energy. A mecha may have one instead of a power plant – or it may have both. If the power plant output fails to equal or exceed the total power requirement of all systems, the mecha *must* have an energy bank.

An energy bank stores energy, measured in kilowatt-seconds (kWs) – one kilowatt of power for one second. A kWs of stored energy provides the same power as a 1 kW power plant – but only for a second. Thus, if a mecha had an energy bank holding 360,000 kWs, and it had systems that required 10,000 kW, the energy bank could power those systems for 360,000/10,000 = 36 seconds.

To design an energy bank, decide how many kWs of energy it will store. The best way to do this is to multiply the power requirements of the systems the energy bank powers by the seconds it is intended to power them for (1 hour = 3,600 seconds).

Decide what kind of energy bank is used:

Advanced Batteries represent various contemporary and projected battery technologies. In some early- to mid-TL8 campaigns, power cells may not be available, only batteries.

Rechargeable Power Cells are either sophisticated superconductor loops or highly-advanced flywheel designs. They can be recharged. A power cell storing 90,000 kWs × (TL-6) is the equivalent of a rechargeable "E cell" from ***GURPS Space.***

Non-rechargeable Power Cells are volatile electrochemical, nuclear-thermal or exotic-fuel batteries. They can't be reused once drained – remove the cells and install new ones at full cost. A power cell storing 180,000 kWs × (TL-6) is the same as an "E cell" from ***GURPS Space.***

Find the weight, volume and cost using the following table:

Energy Bank Design Table

Type	Weight
TL8+ Advanced Battery	0.001
TL8 Rechargeable Power Cell	0.00011
TL9 Rechargeable Power Cell	0.000074
TL10 Rechargeable Power Cell	0.000056
TL11 Rechargeable Power Cell	0.000044
TL12 Rechargeable Power Cell	0.000037
TL13 Rechargeable Power Cell	0.000032
TL14 Rechargeable Power Cell	0.000028
TL15 Rechargeable Power Cell	0.000025
TL16 Rechargeable Power Cell	0.000022

Non-rechargeable power cells have exactly *half* the weight of rechargeable cells.

Weight: Multiply the weight given on the table by the energy stored (in kWs) to find the weight (lbs.). If the weight is over 1 lb., round fractions up to the nearest whole number.

Volume and Location: To find volume, divide weight by 100 if a power cell or by 50 if a TL8+ battery. Energy banks can go in the body or any subassembly except wheels.

Cost: Multiply weight by $30 if an advanced battery or $100 if a power cell to find the actual cost.

EXAMPLE: *Seraph Delta's energy bank is designed to power its lasers, which require 259,200 kW each. We decide we want to be able to each laser for 30 seconds before draining the energy bank. This requires 2 × 30 s. × 259,200 kW = 15,552,000 kWs. A 15,552,000 kWs energy bank using TL9 rechargeable power cells weighs 0.000074 × 15,552,000 = 1,150.848 lbs., rounded to 1,151 lbs. It takes 1,151/100 cf = 11.51 cf, and costs 1,151 × $100 = $115,100. We put it in the body. Total weight is now 21,002 lbs.*

Step 13 – Fuel and Fuel Tanks

Mecha with fuel consumptions (in gallons) for power plants or thrusters must install a fuel tank.

To design a fuel tank, decide on its capacity in gallons, what type of fuel it holds and its location. A mecha can draw upon fuel from tanks in different locations, if desired.

The best way to select capacity is to multiply the gallons per hour of fuel the power plant or thruster consumes by the desired endurance in hours. Six or more hours is a typical endurance for a power plant, but fuel-thirsty thrusters are sometimes only given a few hours (or even minutes) of fuel.

There are four types of fuel tank; decide which is used:

Standard tanks are the cheapest kind.

Light tanks have reduced weight but greater risk of fire if they carry flammable fuel.

Self-sealing tanks prevent leakage and reduce risk of fire, but are heavier and more expensive.

Light self-sealing tanks combine the virtues and flaws of light and self-sealing tanks.

If the mecha uses different kinds of fuel (e.g., one for thrusters and one for a power plant), install separate tanks. They can be in different locations in the mecha. In game terms, a mecha cannot have more than one fuel tank that uses the same fuel in a given location (it might have more in reality, but they are treated in play as if they were a single tank).

Work out each tank's statistics using the table below, and also determine the weight and cost of the fuel itself (there's no extra volume, since the fuel is in the tank).

Fuel Tank and Fuel Table

Type	*Weight*	*Vol.*	*Cost*	*Fire*
Standard Tank	0.5	0.15	$5	-2
Light Tank	0.25	0.15	$10	-1
Self-sealing Tank	1	0.15	$10	-3
Light Self-sealing Tank	0.5	0.15	$20	-2
Fuels				
Diesel fuel	6	–	$1.2	9
Jet Fuel	6.5	–	$3	13
Rocket Fuel	10	–	$2	13
Water	8.5	–	–	–

Weight: The table shows the weight per gallon.

Volume and Location: The table shows the volume per gallon. Fuel tanks can be located in any body or subassembly except wheels, but usually only go in the body, pods, legs or wings.

Cost: The table shows the cost per gallon. Note that water is free on an Earth-like planet. In space – or in a desert civilization – it may be more expensive, perhaps $1 a gallon.

Fire: Some fuel types have a "Fire" number. This is the chance on 3d that the fuel will catch fire if the tank is badly damaged. It is modified by the type of tank used.

Endurance: Record how many hours the fuel will power the power plant or thrusters for. This is the gallons of fuel carried divided by the consumption in gallons per hour.

EXAMPLE: *Seraph Delta requires fuel (water) for its fusion rocket, which uses 1,020 gph of water. Its power plant does not require fuel. We decide that Seraph Delta is designed only for fairly short "hops" rather than long-range flight – and we don't want to have too much weight. We give it 20 minutes of fuel, or 340 gallons. We use two light, 170-gallon tanks, putting one in each leg. Each is 42.5 lbs., 25.5 cf, and $1,700. 340 gallons of water is 8.5 × 340 = 2,890 lbs. and is free. Total weight is now 23,977 lbs.*

Step 14 – Cargo Space

Mecha may have cargo storage space. Most mecha (and almost all battlesuits) *don't* have cargo space, but some have space for extra ammunition, provisions or the like. A few mecha types have large cargo bays – a mining mecha might have space for ore, or an assault transport may carry troops and cargo.

Each space is rated for its location in the vehicle and its volume in cubic feet. Cargo spaces can be located in the body or any subassembly except wheels, and can be in different locations.

Cargo spaces have no weight in and of themselves, but their cargo will weigh something; decide on a *usual payload* of between 20 and 50 lbs. per cf of cargo carried.

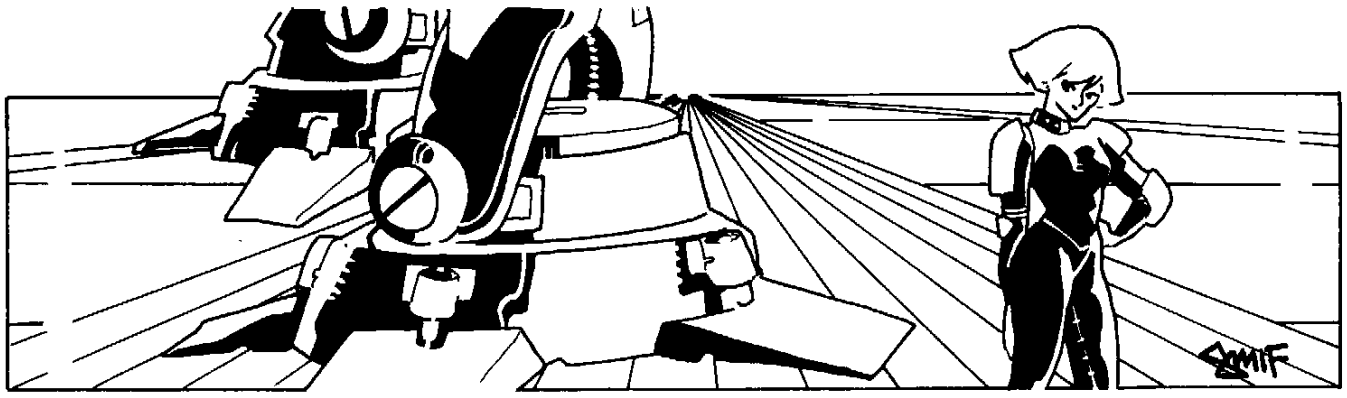
EXAMPLE: *Seraph Delta has no cargo space.*

Step 15 – Access Space

Mecha (except those with battlesuit systems) are designed with extra access space to allow mechanics to maintain their power plants, drivetrains and thrusters.

For each drivetrain, thruster or power plant that occupies a location (but *not* for energy banks), add extra cf of *access space* equal to its volume. This is effectively a component with volume but no cost or weight. *Exception:* Thrusters in pods do not require access space.

EXAMPLE: *Seraph Delta requires 50.8 cf access space in each leg (for its leg drivetrain) and 128 cf in the body (for its fusion rocket and fission reactor).*



PART IV – VOLUME AND STRUCTURE

The components are now selected, so now the mecha's internal structure can be designed and the components installed within it.

Step 16 – Body and Subassembly Volumes

Find the volume of the body and each individual subassembly, in the order listed; skip subassemblies the mecha doesn't have.

A note on body proportions: a humanoid shape that matches human proportions should have a body about 5 to 20 times the volume of its arms or head-turret, and legs that are each about one-third the body's volume. However, many mecha do not have humanoid proportions – anime-inspired designs often have small arms and head, but oversized legs.

Arm, Pod and Turret Volume

Add up the volume of all components located in each individual turret, pod or arm. For example, if a turret has a 0.2 cf AESA and a 5 cf laser cannon, it has volume of 5.2 cf.

Extra empty space can be added to an arm, pod or turret to "even out" the volume. For example, if one arm has less volume than the other, but you want the arms to be identical in size, a few cf of space could be added to the smaller arm so they match.

Empty space also allows for later modifications and, more importantly, can be used to make the subassembly larger and thus heavier and tougher. Arms often have very low volumes if weapons aren't installed in them; adding lots of "empty space" to the arms is common.

EXAMPLE: *Seraph Delta's turret houses the AESA, PESA and decoy discharger, for 18.5 cf. We add 1.5 cf empty space for an even 20 cf. The right arm houses its arm motor (24 cf) and a laser (36 cf) for 60 cf. The left arm is the same.*

Body Volume

Calculate the total volume of all components located in the body, in the same way as for a turret, pod or arm.

If a turret is attached, one extra component will take up space in the body: the *turret rotation space*. This space, for the turret's socket, is 0.1 cf times a limited-rotation turret's volume, or 0.2 cf times a full-rotation turret's volume.

As with arms or turrets, empty space can also be added to a body. This may be required: the body *must* have a volume greater than that of any single arm, pod or turret directly attached to it. If necessary, add empty space to the body to meet this minimum volume requirement!

If the body is streamlined, its final volume will be increased. Multiply the combined volume of all its components (including turret rotation and empty space) by 1.1 if the streamlining is "fair," by 1.2 if it is "good," by 1.3 if it is "superior" or by 1.4 if it is "radical."

EXAMPLE: *Seraph Delta's body houses the fusion rocket (78 cf), four medium launchers (10 cf), eight medium missiles (8 cf), the comsuite (0.82 cf), cockpit (27.4 cf), fission reactor (50 cf), energy bank (11.51 cf) and access space for the rocket and reactor (128 cf). The turret rotation space for a 20 cf limited turret is 2 cf. Adding everything up gives us a volume of 315.73 cf. We add 4.27 cf of empty space to make the body an even 320 cf. Seraph Delta isn't streamlined. Had it been given "fair" streamlining, for example, its "body volume" of 320 cf would be been multiplied by 1.1 to become 352 cf.*

Leg Volume

Add up the total volume of all components located in each individual leg subassembly, in the same way as was done for arms, to get the volume of each leg.

Extra empty space can also be added to legs. This may be required: all legs must have the *same* volume. In addition, to support the mecha, the combined volume of all its legs must be *at least* 0.6 × body volume. Since all legs must be the same volume, this means a two-legged mecha needs legs whose volume equals 0.3 × body volume. If volume is less than this, add more space to the legs to make up the difference.

Note that legs do not take up space within the body – the reference to body volume only refers to the size of the leg.

EXAMPLE: *Seraph Delta's right leg houses its leg motor (50.8 cf), fuel tank (25.5 cf) and access space (50.8 cf), for a total of 127.1 cf. We add 0.9 cf to even it out to 128 cf. Its left leg is the same. With two legs, each leg must be at least 96 cf in volume (0.3 × body volume); this is no problem.*

Wheel and Wing Volume

This only applies if the mecha has wheels or wings – see p. 101, in Chapter 6.

Step 17 – Surface Area

Each body or subassembly is rated for its surface area ("area"). Area is an approximation of the body's or subassembly's area in square feet, and is used to calculate the mecha's structural weight, cost, hit points and other attributes.

Calculate the surface area individually for the body and for each subassembly by looking up the body or subassembly's volume in the "volume" column and reading the surface area from the "area" column directly to the right of it. If a value falls between two numbers, use the lower.

Area Table

Volume	*Area*	*Volume*	*Area*	*Volume*	*Area*	*Volume*	*Area*
To 0.029	0.5	3.3-3.5	14	25-31	60	3,376-6,080	2,000
0.03-0.06	1	3.6-3.9	15	32-44	75	6,081-8,495	2,500
0.07-0.12	1.5	4.0-4.3	16	45-68	100	8,496-11,180	3,000
0.13-0.19	2	4.4-4.7	17	69-95	125	11,181-17,185	4,000
0.2-0.26	2.5	4.8-5.1	18	96-125	150	17,186-24,110	5,000
0.27-0.3	3	5.2-5.6	19	126-157	175	24,111-35,650	6,500
0.4-0.5	4	5.7-6.0	20	158-188	200	35,651-48,650	8,000
0.6-0.75	5	6.1-6.5	21	189-268	250	48,651-68,025	10,000
0.8-1.0	6	6.6-7.0	22	269-353	300	68,026-89,440	12,000
1.1-1.25	7	7.1-7.4	23	354-543	400	89,441-125,000	15,000
1.3-1.5	8	7.5-8.0	24	544-759	500	125,001-192,420	20,000
1.6-1.8	9	8.1-8.4	25	760-1,000	600	192,421-268,960	25,000
1.9-2.2	10	8.5-9.5	27	1,001-1,540	800	268,961-353,450	30,000
2.3-2.5	11	9.6-11	30	1,541-2,150	1,000	353,451-544,335	40,000
2.6-2.8	12	12-17	40	2,151-2,830	1,200	544,336-760,610	50,000
2.9-3.2	13	18-24	50	2,831-3,375	1,500	760,611-1,000,000	60,000

Note on Wings: As these are wider than usual, their surface area is doubled after it is calculated.

For larger surface areas use this formula:

Surface area = [(cube root of volume) squared] × 6.

Round to nearest 10,000 sf.

(If desired, the formula can be used for *all* volumes, replacing the "rounded off" surface areas given above.)

Total Surface Area: Once the surface area of the body and each subassembly is known, find the *total area* by summing these areas.

EXAMPLE: *We use the table above to calculate surface areas based on volumes, then add them together to get the total area. We record turret 50, each arm 100, body 300, each leg 175. Total area 900.*

Step 18 – Structure

After surface area is calculated, the mecha's internal skeleton and frame – its structure – must be designed.

Choose the mecha's *frame strength* and *materials:*

Frame Strength: The heavier the frame, the stronger and tougher the mecha, but the more its structure weighs and costs. Choose either a light, medium, heavy or extra-heavy frame.

Materials: This determines the quality of materials used: choose either cheap, standard, expensive, very expensive or advanced. Better materials mean less weight but much higher cost.

Some other design decisions also affect the mecha's structural cost, as shown under *Other Modifiers.* Some of these are only available in Chapter 6, *Advanced Mecha Design.*

Refer to the table below to find the structural weight and cost of the mecha:

Mecha Structure Table

Feature	*Weight*	*Cost*
TL8 structure	4	$50
TL9 structure	3	$50
TL10 structure	2	$50
TL11 structure	1.5	$50
TL12+ structure	1	$50
Frame Strength		
Light	×0.5	×0.5
Medium	×1	×1
Heavy	×1.5	×2
Extra-Heavy	×2	×5
Materials		
Cheap	×1.5	×0.5
Standard	×1	×1
Expensive	×0.75	×2
Very Expensive	×0.5	×5
Advanced	×0.375	×10
Other Modifiers		
If streamlined:		
Fair streamlining	×1	×1.2
Good streamlining	×1	×1.5
Superior streamlining	×1	×3
Radical streamlining	×1	×10
If mecha has wings	×1	×10
If biomechanical	×1	×1.5
If living metal	×1	×2
If transformable:		
with two configurations	×1.2	×2
with three configurations	×1.4	×3
with four configurations	×1.6	×4

Weight: Determine the structural weight as follows: Multiply the mecha's total surface area by the basic weight shown for its TL and then by every applicable multiplier in the *Weight* column.

Cost: Determine the structural cost as follows: Multiply the mecha's total surface area by the basic cost shown for the mecha's TL and then by every applicable multiplier in the *Cost* column.

EXAMPLE: *We choose a heavy frame strength, then reduce weight but increase cost by using very expensive materials. The structural weight is 900 (total area) × 3 (TL9 structure) × 1.5 (heavy) × 0.5 (very expensive) = 2,025 lbs. The structural cost is 900 (total area) × $50 × 2 (heavy) × 5 (very expensive) = $450,000. Total weight is now 26,002 lbs.*

Step 19 – Hit Points (HP)

Once the mecha's structure has been determined, find the hit points for the mecha's body and for each subassembly as follows:

Body ..... the body's area × 1.5.
Each Turret, Pod, Leg or Wing ..... its area × 1.5.
Each Arm ..... its area × 3.
Wheels ..... each wheel position on the subassembly has its own hit points equal to the area × 3 / number of wheel positions.

Divide HP by 2 for a light frame; multiply by 2 for a heavy frame or 4 for an extra-heavy frame. Round HP up to the nearest whole number, with a minimum of one hit point.

EXAMPLE: *The body has 300 × 1.5 × 2 (heavy frame) = 900 hit points. The turret 50 × 1.5 × 2 = 150 hit points. Each arm has 100 × 3 × 2 = 600 hit points. Each leg has 175 × 1.5 × 2 = 525 hit points.*

PART V – SURFACE FEATURES

Surface features are layered atop the mecha's structure, and include things like armor, environmental protection and stealth coatings. Surface features have a weight and cost, but not a volume or power consumption.

Step 20 – Environmental Protection

A mecha whose cockpit or battlesuit system has a lifesystem or NBC filter must be sealed. A mecha without a lifesystem may be waterproofed or it can be given no environmental protection.

Waterproof: Waterproofing a mecha insures that it will not risk of floating or suffer corrosion from salt water, but does not protect it from the effects of corrosive atmospheres or extreme pressures. A mecha that is sealed is automatically waterproof.

Sealed: The mecha's body is totally sealed and its components are protected against corrosion, the effects of sudden pressure changes and high or low temperatures.

Self-Sealing: As sealed, except the mecha's interior has a layer of plasteel, armor gel, micromachines, et cetera which automatically seals any puncture within a second. Mecha with advanced biomechanical or living metal structures (see p. 103) are self-sealing for free.

Sealing and Waterproofing Table

Type	TL	Weight	Cost
Waterproof	0	–	$2
Sealed	8	–	$20
Sealed	9+	–	$10
Self-Sealing	9+	0.1	$50

Multiply weight and cost by the mecha's total surface area.

EXAMPLE: *We decide Seraph Delta is sealed, which costs area 900 × $10 = $9,000.*

Step 21 – Defensive Surface Features

These protect the mecha from detection or various threats. Unless noted otherwise, they can be combined. Sensor, vision and attack roll modifiers for infrared cloaking, stealth and chameleon systems can be found in the *Sensor Modifiers* sidebar on p. 49.

Infrared Cloaking: This disguises the mecha's heat profile and engine emissions, making it harder to spot with infrared sensors (e.g., a PESA using thermograph mode) or to attack using homing missiles. Two levels of infrared cloaking exist: "basic" and the superior "radical" (which can't be combined).

Stealth: A mecha with a stealth surface is covered with radar-absorbent materials and has a shape that is designed to make it harder to detect with radar or AESA. As with IR cloaking, it comes in "basic" and "radical" versions that can't be combined.

Chameleon Systems: These systems give the mecha sensor-equipped skin that automatically alters its appearance to blend with any background (instant chameleon) or to make the mecha virtually invisible (intruder chameleon). The automatic camouflage feature can also be manually controlled, allowing the pilot to electronically "paint" the mecha with whatever color scheme or markings are desired, or to give the mecha a mirrored skin with PD 6 vs. laser (but not x-laser) fire.

Thermal Superconductor Armor: This superconducting layer doubles any armor DR the mecha has vs. shaped-charge explosive warheads, lasers, x-ray lasers, disruptors, flamers or any heat-based attack.

Defensive Surface Features Table

Type	TL	Weight	Cost	Power
Basic Stealth or IR Cloaking	8	1	$150	0
Basic Stealth or IR Cloaking	9+	0.5	$75	0
Radical Stealth or IR Cloaking	8	2	$1,500	0
Radical Stealth or IR Cloaking	9+	1	$750	0
Instant Chameleon	9	0.5	$100	neg.
Instant Chameleon	10	0.25	$50	neg.
Instant Chameleon	11+	0.125	$25	neg.
Intruder Chameleon	10	0.6	$400	neg.
Intruder Chameleon	11	0.3	$200	neg.
Intruder Chameleon	12+	0.15	$100	neg.
Thermal Superconductor Armor	11	0.25	$250	0
Thermal Superconductor Armor	12	0.125	$125	0
Thermal Superconductor Armor	13+	0.0625	$62.5	0

Multiply weight and cost by the mecha's total surface area.

EXAMPLE: *We decide Seraph Delta has basic stealth and radical IR cloaking. Basic stealth is 0.5 × 900 = 450 lbs. and costs $75 × 900 = $67,500. Radical IR cloaking is 1 × 900 = 900 lbs. and costs 900 × $750 = $675,000. Total weight is now 27,352 lbs.*

Step 22 – Armor

This is a mecha's armored skin or hull. It's the last thing that needs to go on the mecha. Armor is rated for its Damage Resistance (DR), the location it covers and the armor material.

If using a target weight, it's a good idea to subtract the total weight of components, features and structures installed so far to find out how much weight is available for armor, then use most or all of the entire remaining target weight for armor. *Exception:* If the mecha is going to carry external hardpoints onto which modular weapons or other equipment can be hung, leave some weight for whatever hardpoint load is desired!

There are several types of armor:

Metal represents steel or other alloys, with more exotic materials (e.g., "durasteel") coming into use at higher TLs. No special rules apply to its DR.

Laminate is similar to the "chobham" armor developed for modern main battle tanks: it is a sandwich of metal, synthetic and ceramic materials. While expensive, it gives greater DR for its weight than equivalent-quality metal armor. Its effective DR is also doubled against the deadly shaped-charge ("HEAT") warheads used by the missiles in ***GURPS Mecha.***

Ablative armor is ultra-light, plastic-ceramic composite armor designed to chip or be melted away ("ablate") in a manner that carries away part of the energy of the attack. While very light, even low-powered weapons like infantry small arms can peel away ablative armor: every 10 points of damage the attack causes (*before* DR) blows away 1 point of DR.

Fireproof Ablative armor is also available, since ordinary ablative armor is flammable.

For the body and each subassembly, decide what type of armor is going to cover it: metal, laminate, ablative or fireproof ablative. Then calculate its statistics as follows:

Weight and DR of Armor: Multiply the body or subassembly's area by the number shown on the *Armor Table* for that type and TL to find the weight per point of DR. Then multiply by desired DR to find the armor's actual weight. Do the same for each location armored. To give the entire mecha the same DR, simply use its total surface area.

An alternative way to install armor is to decide how many pounds of armor a location is going to have. Then find the DR it has by dividing the armor's weight by the surface area of the armored location(s) and again by the number shown on the table below for that TL and type of armor. Whatever works best!

If building a battle mecha, it's a good idea to make sure the body's armor is capable of *almost* stopping an average-damage hit from the mecha's own main beam or gun!

Armor Table

Type	*TL8*	*TL9*	*TL10*	*TL11*	*TL12*	*TL13+*
Metal	0.15	0.1	0.06	0.04	0.025	0.015
Laminate	0.1	0.06	0.04	0.025	0.015	0.01
Ablative	0.03	0.02	0.012	0.008	0.005	0.003

Cost: An armor's cost is its weight multiplied by $20 if metal, $100 if laminate, $8 if ablative or $16 if fireproof ablative.

EXAMPLE: *So far we have used up 27,352 lbs., so we have 22,648 lbs. before hitting our target weight of 50,000 lbs. We aren't going to give Seraph Delta hardpoints, so we allot it all to armor. We decide that the body should have the best armor, to protect the vital power plant and cockpit. We armor the body with DR 600 laminate, which weighs 0.06 × 300 (its area) × DR 600 = 10,800 lbs. It costs $100 × 10,800 = $1,080,000. We armor the rest of the mecha (total area 600) with only DR 340 laminate. This weighs 0.06 × 600 (area) × DR 340 = 12,240 lbs., and costs $1,224,000. Total weight is now 50,392 lbs., a bit over target weight, but not enough to matter.*

Passive Defense

PD is determined by the DR of the outer layer of armor: PD 1 if DR 1, PD 2 if DR 2-4, PD 3 if DR 5-15, PD 4 if DR 16+.

EXAMPLE: *All locations are PD 4.*

Step 23 – Hardpoints (Optional)

Some mecha are built with *hardpoints:* reinforced points on their exterior to which missiles or modular equipment pods containing weapons, fuel or electronics can be bolted.

Decide if the mecha has hardpoints and if so, how many and where they are placed. Mecha with arms can mount one hardpoint on each arm (on the shoulder). Mecha with wings can also mount hardpoints under the wings, usually no more than three per wing. Mecha may also mount one or two hardpoints on their back.

Since hardpoints add weight, mecha designs often include only a single hardpoint, often on the back or shoulder.

Each hardpoint is rated for its individual *load capacity* in lbs. This is the maximum weight of equipment it can carry. Within these limits, a hardpoint can be loaded with *one* equipment pod or from 1 to 10 missiles (see p. 94).

Select the load capacity of each hardpoint, subject to this limit: the *combined* load capacity of *all* hardpoints placed on a specific location (wing, arm, body, et cetera) may not exceed 20 lbs. per hit point that location has. *Each* hardpoint weighs 0.05 lbs. and costs $0.1 *per pound of load capacity*. If the mecha is designed to be flight-capable while carrying its full hardpoint load, and doesn't have wings, the target weight of the mecha plus the combined load capacity of all hardpoints should be *less* than the mecha's thrust.

Rules for equipment pods and missiles on hardpoints are found in *Appendix 2* (p. 94).

PART VI – STATISTICS

At this point, everything that the mecha needs has been installed. Now we find out what it can do!

Loaded Weight: This is the "combat-ready weight" of the mecha. Add up the total weight of everything that went into the mecha, including cargo load. If weight was kept track of to meet a target weight, this has already been done. If it isn't close enough to the target weight, add or remove some armor.

Empty Weight: This is mainly used when transporting the mecha. To get empty weight, take the loaded weight and subtract the weight of the mecha's ammunition, fuel (but not fuel tanks) and the usual cargo load. If the mecha has a cockpit, also subtract 200 lbs. (plus 200 lbs. per extra seat) for occupants. If it has a battlesuit system, subtract the pilot weight.

Loaded Mass in Tons: This is used in some performance calculations. Divide loaded weight by 2,000 to get it. Round decimals to two places. (You can also do this for empty weight.)

EXAMPLE: *Seraph Delta's Loaded Weight totals 50,392 lbs. For Empty Weight, we take the loaded weight and subtract 400 lbs. of ammunition, 2,890 lbs. of water and 200 lbs. for the occupant, which leaves a 46,902 lbs. empty weight. For Loaded Mass in Tons, we divide the loaded weight by 2,000 and get 25.196, rounded to 25.20 tons.*

Mecha Volume: Add up the volumes of the body and all subassemblies. This is the mecha volume. (If the mecha is to be carried in a ***GURPS Space*** starship, divide volume by 27 to find the volume in cubic yards.)

EXAMPLE: *The body and subassemblies total 716 cf.*

Size Modifiers: Compare the mecha volume to the table below to find the Size Modifier. The mecha's volume will probably fall between two entries on the table; use the higher one to find the Size Modifier.

Size Modifier

Volume	*Modifier*	*Volume*	*Modifier*
0.1	-4	3,000	+5
0.3	-3	10,000	+6
1	-2	30,000	+7
3	-1	100,000	+8
10	+0	300,000	+9
30	+1	1,000,000	+10
100	+2	3,000,000	+11
300	+3	10,000,000	+12
1,000	+4	etc.	etc.

Do the same for each subassembly, but using its own volume. A subassembly's Size Modifiers are used if it is specifically targeted. Subtract 2 from the Size Modifier of any turret atop the body.

EXAMPLE: *A volume of 716 cf gives it a +4 Size Modifier. The 60 cf arms are each +2, the 20 cf turret is -1 (thanks to the modifier) and the 128 cf legs are each +3.*

Price: Add up the cost of everything except fuel and ammunition to find out how much the mecha costs. This is its price when purchased new.

EXAMPLE: *Total cost is $7,907,550. To bring this into perspective, a modern (late-TL7) main battle tank averages about $1-2 million, while a modern jet fighter is about $20,000,000.*

Health: This measures structural robustness. The heavier a mecha is compared to its structural strength, the more strain it puts on its systems and the lower its HT will be. A mecha can have a low Health but many hit points. Structural HT is calculated as follows:

Structural HT = (200 × Body HP/Lwt.) + 5.

Where *Body HP* are the mecha's body hit points and *Lwt.* is its loaded weight.

The maximum allowed structural HT is 12 or the mecha's TL, whichever is greater. Round HT to the nearest whole number.

EXAMPLE: *Seraph Delta's HT is [(200 × 900 body hit points) / 50,392] + 5 = 8.57, rounded to HT 9.*

Dimensions (Optional)

These formulae give a rough idea of how big the mecha is. These are approximations, and can be fudged considerably if desired!

Height: For a two-legged mecha, its *height* can be found as follows: find the square roots of the body area, the turret area and the area of each leg, add them all together and then divide this sum by 4.5. For a mecha with three or more legs, use the same formula, but only count the first two legs and divide the sum by 6, not 4.5.

Length: If the mecha has two legs, this is about 1/3 its height. If three or more legs, it is the square root of (body area/6).

Width: This is about 1/3 its length if 3+ legs, or equal to length if two legs – although with arms and legs spread out, it can take up a much larger area.

If a two-legged transformable mecha folds its legs, it swaps height and length. If a mecha has streamlining, it will be 50% longer but about 2/3 as wide.

EXAMPLE: *Seraph Delta's body area is 300, its legs are 175 each and turret area is 50. The square roots are 17.3, 13.2, 13.2 and 7.1, for a total of 50.8. Dividing by 4.5, we get a height of 11.3 yards. Its length and width are 3.8 yards.*

Strength and Reach

Mecha with arms or drivetrains have a ST attribute. This is split into two categories: Body ST and Arm ST.

Body ST is used when the mecha is pulling or kicking, for calculating encumbrance when moving on foot, or when the mecha slams into someone. It is normally twice body hit points, but it can't exceed (leg drivetrain motive power in kW - mecha weight in tons) × 80, nor can it be less than half body HP.

Arm ST is the ST of each individual arm. It is based on the arm motor's ST, but may not safely exceed four times the arm's hit points. If it *does*, the mecha has a "split arm ST," with a safe and a maximum ST value. If the mecha exceeds it safe ST (while punching, lifting, striking, et cetera), a HT+2 roll is required each second, with failure causing the loss of half the arm's current hit points and critical failure disabling the arm (it drops to 0 hit points).

Arm Reach in yards equals *half* the square root of the arm's surface area, rounding to nearest whole number. This may differ from arm to arm.

Thrust/Swing Damage may also vary if arms have different ST. See p. CI10 for ST over 20. A handy formula that works for ST 100+: thrust damage (dice) = (ST/10) + 1; swing damage (dice) = (ST/10) + 3; round fractions down. If the mecha has a split arm ST, calculate damage for the safe ST.

EXAMPLE: *Seraph Delta's body ST is twice its body hit points, or ST 1,800, well under the maximum for motive power. Its arm motors are ST 4,000, but safe ST is only 4 × 600 (arm HP) = ST 2,400. With surface area 100, each arm has reach 5 and does 241d thr and 243d sw damage.*

PART VII – PERFORMANCE

Mecha performance statistics are divided into ground, air and space performances. Advanced-design mecha with multiple configurations or which can combine or split up may have several sets of performance statistics.

A mecha whose power system doesn't require air and which is sealed can also walk along the bottom of a body of water.

Ground Performance

A mecha with legs and a leg drivetrain has a ground performance.

Ground Speed

This is the top speed the mecha can reach, measured in mph. Take the motive power of the drivetrain in kW, divide this by design mass in tons and find the square root of the quotient. Multiply the result by the motive system *speed factor* (see below) to get ground speed.

Speed Factor Table

Motive System	*Speed Factor*
Two legs	8
Three legs	10
Four or more legs	12

If speed works out to 50 mph or more, add an extra 5% to top speed if "fair" streamlining or 10% if "good" or better streamlining.

Round all speeds to the nearest 5 mph, unless they are below 20 mph; then round to the nearest mph.

EXAMPLE: *To find Seraph Delta's ground speed, we start with its leg drivetrain's 1,225 kW motive power and divide by 25.20 tons to get 48.61, the square root of which is 6.972. We then multiply by speed factor 8 (two legs) for 55.78 mph, which rounds to 55 mph.*

Ground Maneuver Rating and Stability Rating

Ground Maneuver Rating (gMR) is the maximum *safe* "g" (gravities) the mecha can pull while maneuvering on the ground. *Ground Stability Rating* (gSR) is a measure of how stable the mecha is. Both are determined using the table below:

gMR/gSR Table

Type of Motive System	*Mecha's Body Volume (cf)*									
	30 or less		*31 to 100*		*101 to 300*		*301 to 3,000*		*3001 or more*	
	gMR	*gSR*	*gMR*	*gSR*	*gMR*	*gSR*	*gMR*	*gSR*	*gMR*	*gSR*
2 Legs	2.75	1	2.25	1	1.75	2	1.25	2	0.75	2
3 Legs	2.25	2	1.75	2	1.25	3	1	3	0.75	3
4+ Legs	1.5	3	1.25	3	1	4	0.75	4	0.75	4

Add 0.25 to leg gMR for species-compatible mecha (one with the same number and type of limbs as the pilot).

EXAMPLE: *Seraph Delta's 320 cf body volume is 301-3,000 cf, so with 2 legs it has gMR 1.25. With a human pilot, this is increased for being species-compatible to gMR 1.5. It has gSR 2.*

Ground Move and Enhanced Move

A mecha's ground Move is the number of yards it can move per turn, exactly the same as a character's Move score. It is normally half its ground speed in mph, rounding fractions down. However, if this would give a Move greater than 10 × gMR, the mecha has a split Move. Its normal Move is 10 × gMR, rounding fractions down; its *enhanced Move* is equal to half ground speed. The mecha can only use the higher "enhanced Move" when sprinting in a relatively straight line.

EXAMPLE: *Seraph Delta's ground speed is 55 mph, which would give it Move 27. However, it has gMR 1.5. Since 10 × 1.5 = 15, Seraph Delta has a split ground Move of 15/27.*

Boosted Jumps

Mecha with thrusters or contragravity may use them to boost their jumping distance, even if they lack sufficient lift to fly. Record the mecha as "jump-capable." See *Jumping Mecha*, p. 43).

EXAMPLE: *Seraph Delta is jump-capable.*

Aerial Performance

A mecha with an aerial performance is flight-capable. To be flight-capable, the mecha requires both thrusters and a lift *in excess of its weight.* A mecha's lift is the thrust of all its thrusters in pounds, plus any lift from contragravity.

When a mecha's lift exceeds its weight, it can *hover.* This means it can take off or land vertically and fly sideways or backwards!

EXAMPLE: *Seraph Delta's thrust of 51,000 lbs. gives 51,000 lbs. lift. As this is greater than its loaded weight of 50,392 lbs., it is capable of flight and can hover.*

Effective Motive Thrust and Lift ST

Effective motive thrust is the amount of thrust the mecha can use to propel itself while flying. It is equal to the total thrust from all thrusters *minus* the mecha's *effective weight.* Effective weight is the mecha's loaded weight minus any contragravity lift; treat negative weight as zero.

Lift ST: This is equal to the mecha's effective motive thrust/15 or twice body HP, whichever is *less.* Use it instead of Body ST when calculating the encumbrance of flying mecha.

EXAMPLE: *Seraph Delta's effective thrust is its rocket's 51,000 lbs. minus its loaded weight of 50,392 lbs. = 608 lbs. It has lift ST 40.*

Aerodynamic Drag and Air Speed

Aerodynamic drag is used to determine a mecha's top air speed. Use this formula:

Aerodynamic Drag = Sa/Sl.

Sa is the total surface area of the vehicle.

Sl depends on streamlining: 1 if no streamlining, 2 if fair, 3 if good, 10 if superior or 40 if radical streamlining.

Note: Superior or radical streamlining only counts if a mecha either lacks arms, turrets, wheels and legs, or has transformed into a configuration in which they are folded. Otherwise, downgrade effective streamlining to "good."

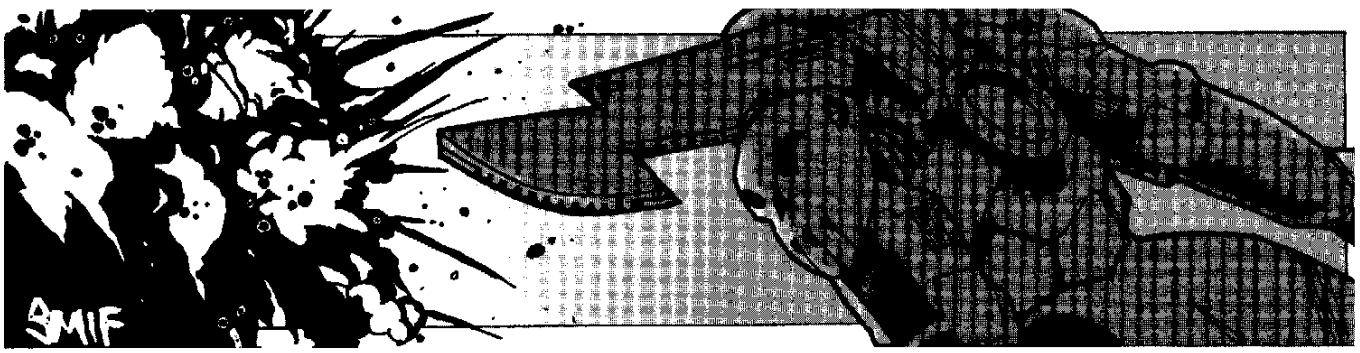
Air Speed is the mecha's maximum atmospheric flight speed in mph. To find it use the following formula:

Top speed = Square root of [(Emt/Adr) × 7,500].

Emt is effective motive thrust.

Adr is aerodynamic drag.

Round the result to the nearest 5 mph if over 20 mph, otherwise to the nearest mph. If the vehicle does not have effective superior or radical streamlining (see note for aerodynamic drag) and speed exceeds 600 mph, treat it as 600 mph.



EXAMPLE: *Seraph Delta's Emt. is 608 lbs. Its aerodynamic drag (Adr) is its total surface area of 900. So its top air speed is the square root of [(608/900) × 7,500] = 71.2 mph, rounded to 70 mph.*

Aerial Maneuver Rating

Aerial maneuver rating (aMR) is the maximum safe g (gravities) the mecha can pull while maneuvering in flight. Use this formula:

aMR = (TL + 1 - Size Modifier)/2.

Minimum aMR is 0.125.

EXAMPLE: *Seraph Delta can hover. As it is TL9 with a +4 Size Modifier, its aMR is (9 + 1 - 4)/2 = aMR 3.*

Aerial Stability Rating

This depends on total volume: 3 if under 100 cf, 4 if 100-999 cf, 5 if 1,000-9,999 cf, and so on.

EXAMPLE: *Seraph Delta's aSR is 4.*

Flying Move and Enhanced Move

This is the number of yards the mecha can move per turn when flying. It is exactly the same as a character's Move score. Flying Move is half air speed in mph, rounding down. However, if this would give a Move greater than 10 × aMR, the mecha has a split Move. Its normal Move is 10 × aMR; its *enhanced Move* is equal to half air speed. The mecha can only use the higher Move when flying in a relatively straight line.

EXAMPLE: *An air speed of 70 mph gives a flying move of 35. Since Seraph Delta has aMR 3 and 35 is more than 10 × aMR, the mecha has a split flying Move of 30/35.*

Space Performance

A mecha with a rocket, ram-rocket or reactionless thruster may maneuver in space, but its crew requires some means of breathing, like vacc suits or a lifesystem. Its power system can only function in space if it does not require air. If a mecha meets both requirements, it is "space-capable" and has a space performance, with one statistic: space acceleration.

EXAMPLE: *Seraph Delta is space-capable.*

Space Acceleration

Space acceleration (sAccel) is measured in gravities (*g*). Total the motive thrust of all rockets, ram-rockets or reactionless thrusters used together and divide by loaded weight to find the sAccel in *g*. Round to two decimal places.

(To find acceleration in yards per second per second, multiply sAccel by 10.)

sAccel also doubles as *space maneuver rating* (sMR).

EXAMPLE: *Seraph Delta has a motive thrust of 51,000 lbs. / 50,392 lbs. = sAccel 1.01 g.*

APPENDICES

These appendices describe additional equipment that can be added to a mecha after it is designed: hand-held weapons, equipment pods for hardpoints and computer software, as well as notes on using ***Mecha*** with ***GURPS Space.***

Hand-held weapons and equipment pods or missiles on hardpoints count as encumbrance (see p. 42); if the total weight of hand-held weapons and hardpoint loads exceeds twice the mecha's Body or Lift ST, it will reduce the mecha's performance. Note that a mecha cannot fly if its encumbrance exceeds 15×Lift ST.

Appendix 1: Hand-Held Ranged Weapons

Mecha with manipulator arms often carry giant-sized rifles, bazookas or pistols. These are slung on the back when not in use. To design a hand-held ranged weapon, follow these steps:

Decide if the weapon is a *pistol* which can be used by one manipulator arm or a *rifle* that needs two manipulator arms to use.

Pick a ranged weapon from the weapon tables on pp. 66-68.

Decide if the weapon will be armored or not. Most mecha weapons are armored pistols or rifles, which are heavier but more robust. Some police mecha or battlesuits carry unarmored weapons, though, when weight is more important than survival.

A hand-held weapon has the same statistics as a built-in version, except its Cost, Weight, Acc and SS are modified, and it has Hit Points, PD, DR, loaded weight, shots, magazine weight and ST.

SS and Acc: Pistols are -2 to SS and -5 to Acc. Rifles are -2 to Acc if guns or launchers, -1 if beams.

Cost: If the weapon is armored, add $5 times the *original* empty weight to the cost to cover the armor.

HP: Find the surface area of the weapon based on its volume, using the *Area Table* (p. 87). Its hit points equal 1.5 times its area. Also calculate its Size Modifier (see p. 90), in case it is shot at.

PD and DR: All weapons have PD 3. If the weapon is armored, its DR is 5 + [(Wt./Area)/A], where *Wt.* is the weight from the weapon table, *Area* is its surface area and *A* is 0.6 at TL8, 0.4 at TL9, 0.24 at TL10, 0.16 at TL11, 0.1 at TL12, or 0.06 at TL13+. Unarmored weapons are DR 5.

Unloaded Weight: If weapon is armored, multiply weight on the weapon table by 1.25 if a pistol or 1.5 if a rifle. If the weapon is unarmored, multiply rifle weight (only) by 1.2.

Shots: Decide how many shots a magazine holds.

Magazine Weight (MWt.): Find the weight of a loaded magazine by multiplying WPS by number of shots and then by 1.4 (for the magazine itself). Except for launchers, MWt. should not exceed the empty weight of the weapon, and is usually much less. Find Magazine Cost (MCost) by multiplying CPS by number of shots. Magazines can be stowed as cargo: volume is MWt./50.

Energy Cells: If the weapon has a Pow. requirement, it will need energy. If the mecha has a power plant with unused output

equal to or less than the Pow. requirement, or has an energy bank, the Pow. can be met by plugging it into the mecha – a cable connection is assumed to come with the weapon. Alternatively, the weapon can be given integral power cells:

Required # of C cells = [(Pow./RoF) × Shots]/P

where *Pow.* and *RoF* are taken from the weapon tables, *Shots* is the number of shots the weapon is to have and *P* is the kWs of energy stored in a C cell: 3,600 at TL8, 5,400 at TL9, 7,200 at TL10, 9,000 at TL11, 10,800 at TL12, 12,600 at TL13, 14,400 at TL14, 16,200 at TL15 and 18,000 at TL16.

It can be more efficient to use larger or smaller cells. If the number of cells is 0.1 or less, use a single B cell. Likewise, one D cell can replace 10 C cells; one E cell can replace 100.

Record energy cells after the number of shots, e.g., if the weapon has 20 shots on an E cell, this is written 20/E.

Loaded Weight (LWt.): Add the MWt. to the new unloaded weight of the weapon, plus 0.05 lbs. per B cell, 0.5 lbs. per C cell, 5 lbs. per D cell or 20 lbs. per E cell. This is the LWt.

Recoil and ST: Recoil is ignored for mecha, whose stabilized arms act as shock absorbers. ST requirement is (LWt./8)+5 if a rifle or (LWt./4)+5 if a pistol, multiplied as stated.

The weapon is now complete. It can be used by any mecha.

Appendix 2: Equipment Pods

Here's how to design equipment pods for a mecha's hardpoints. (An equipment pod is *not* the same as a pod subassembly!) As with mecha, it's useful to design with a target weight in mind – in this case, the load capacity of the hardpoint the equipment pod is being built for.

1. Select the components to be installed in it. These may be ranged weapons, ammunition, sensors, ECM, comsuites, fuel tanks, energy banks, cargo or empty space. Fuel and energy can be transferred through the hardpoint to and from the mecha, so equipment pods with extra fuel or power are common.

If components in the pod require power, this can be provided by the mecha (if it has excess power plant output or an energy bank) or by building an energy bank (p. 85) into the equipment pod.

2. Add up the volume of all components in the pod. Use the *Surface Area Table* (p. 87) to find the pod's area. Refer to the *Structure Table* (p. 88), select a frame strength and material cost, then find the pod's structural weight and cost.

3. Go to the *Armor Table* on p. 90 and add whatever armor is deemed necessary for the pod. Find the pod's hit points using the table on p. 88, treating it as a body.

4. Record the pod's total weight, cost, PD, DR, HP and volume. Calculate its Size Modifier (see p. 90) in case it is shot at.

Equipment pods housing sensors or weapons always face forward. Hardpoint loads can be jettisoned by the mecha pilot at any time (as a Ready maneuver). Bolting on a new equipment pod (or missile) takes about five minutes and a Mechanic roll.

Missiles on Hardpoints

A hardpoint can also mount loose missiles. It may be loaded with one or more identical missiles whose combined weight is no greater than its load capacity and whose individual WPS is no less than 1/10 capacity. Treat this as a missile launcher with RoF 1, but it takes about 5 minutes to reload. It's possible to shoot at a missile while it's sitting on a hardpoint – use the rules for *Shooting at Missiles* (p. 54).

Appendix 3: Software

Computers generally run programs. Like a computer, software is rated for its Complexity. This is usually abbreviated "C" – e.g., a C2 program is Complexity 2. See *Using Computers* (p. 46) for how many programs can be run at once.

A computer can only run a program if the software's Complexity and TL are equal to or less than its own. While a mecha's computer can run the entire gamut of software (e.g., see p. VE62 or p. CII17ff), a mecha will usually just run the most complex Targeting program it can install, plus a Datalink to keep it in touch with any allies.

Datalink: This program enables a computer to link (via communicator) with external computer networks or with another electronic device – such as a computer in another mecha, vehicle, or building – and share information. Using a Datalink also permits communicators to send text and images as well as voice. C1, $400 at TL8, $200 at TL9, $100 at TL10+.

Targeting: Each Targeting program adds to a Gunner skill – e.g., Gunner (Machine Gun) – for a single weapon or set of linked weapons. If more than one gunner is firing at a time, multiple programs must be run. A Complexity 1 program gives a +2 to skill and costs $1,000. Each time an additional +1 to skill is added, increase Complexity by one and double the cost. Halve the cost at TL9 and again at TL10+.

EXAMPLE: *Seraph Delta's computer has Complexity 4. We install a +5 Targeting program (C4, $4,000) and Datalink (C1, $200).*

Appendix 4: Mecha and GURPS Space

GMs with ***GURPS Space*** may wish use the abstract combat system presented there to resolve battles between mecha and spaceships. See p. CII100 for firepower (FP) and defense factor (DF) conversions.

6

ADVANCED MECHA CONSTRUCTION

This chapter is a grab-bag of optional rules for mecha design. It's up to the GM which, if any, are available.

BATTLESUITS

A battlesuit is a mecha that has a *battlesuit system* instead of a cockpit. The pilot's arms and legs extend into the suit's limbs (see *Wearing Battlesuits,* below).

A battlesuit is designed to carry only a single person, and must have the same basic shape as the intended wearer.

Most battlesuits are fairly light-weight, with a suggested target weight under 4,000 lbs. This is more a matter of practicality than a general rule. Where small size is not critical, it is better to build a mecha with a cockpit.

There are many possible types of battlesuits, including:

Infantry Battlesuit: Built to enable one trooper to carry the same heavy weapons as an infantry squad, while protecting him with armor and ECM against small-arms fire, radiation, chemicals and artillery barrages. The suit usually has DR 100 to 200. Typical weight: 500-2,000 lbs., including wearer.

Ranger, Scout and Command Battlesuits: These are specialized infantry suits. Ranger suits emphasize speed, electronic countermeasures and stealth. Scout suits have superior sensors, more speed and often extra thruster fuel. Command suits have better comsuites and often superior speed.

Light Battlesuit: A suit specialized for close-range combat, small enough to easily move within buildings, vehicles and spaceships. They are used by shipboard marines, commandoes, SWAT teams, superheroes and pirates, and are usually DR 70-150. Typical weight: 400 to 500 lbs.

Super Battlesuit: One worn by a superhero or villain. Super battlesuits are usually light-weight, but use very high technology – often two or more TLs above the norm. Some are totally unarmed, relying only on high-strength arm motors, while others bristle with exotic weaponry; most fly.

Powered Exoskeleton: A non-combat battlesuit, also called an "exosuit" or "power loader." They perform manual labor, exploration, rescue and construction tasks. The bare-bones design consists of leg and arm motors, battlesuit system, power supply and the suit's structure. The suit often has no armor or open-frame armor, but some "armored exosuits" are built for operations in very hostile environments. Typical weight: 200-2,000 lbs.

Battlesuit Design

A battlesuit is built like any mecha, with these exceptions:

Target Weight: It's a good idea to aim for a weight between 250 and 5,000 lbs. (including the pilot). Heavier designs should generally be built as cockpit-equipped mecha.

Step 1 – Choose Subassemblies: Battlesuits must be species-compatible, with the same number of arm or leg subassemblies as the intended wearer.

Step 6 – Cockpit: Instead of installing a cockpit, give the mecha a *battlesuit system* and, possibly, battlesuit upgrades. It can only have one battlesuit system.

Step 16 – Volumes: Unless you are designing a *master-slave battlesuit*, the volume of the suit's body cannot exceed the *pilot weight*/10.

Step 20 – Environmental Protection: A battlesuit can only be sealed if it either has a turret or is a master-slave design (p. 96) with the pilot in the body.

Battlesuit System

A *battlesuit system* consists of space for the suit's operator, plus the suit's control system. Decide on the suit's "pilot weight." This is the maximum weight of the wearer of the suit; with minor adjustments, a pilot with as little as 80% of that weight can also use it.

Weight: The system, including pilot, weighs 1.2 × pilot weight (in lbs.).

Volume and Location: The system must occupy certain locations, where it takes up volume. It requires pilot weight/100 cf in the body, pilot weight/1,000 cf in each arm, pilot weight/400 in each leg. If a turret is installed, the battlesuit system requires pilot weight/400 in the turret.

Cost: The battlesuit system costs $3,000 + (pilot weight × $20) at TL8. This drops to $1,500 + (pilot weight × $10) at TL9, or $750 + (pilot weight × $5) at TL10+.

Power: Negligible.

A Normal battlesuit torso should be small enough that its pilot's limbs will extend into the suit's limbs. Unless it's a master-slave model, design the suit so that the volume of the mecha's *body* doesn't exceed pilot weight/10 cf.

Master-Slave Battlesuits

Instead of occupying the turret, body, arms and legs of the suit, the pilot may be placed entirely inside its body or turret. He controls the suit using small, interior "master" arms or legs which sense the user's attempted movement and transmit signals that control the external "slave" limbs.

This system has the same weight and cost as above, but takes up pilot weight/50 cf in either the body or the turret.

Battlesuit Upgrades

Unlike a mecha cockpit, the basic battlesuit system does not come with anything except basic controls, padding and a head-up display. Life support and other features are entirely optional. For more details, see Chapter 3, *Mecha in Action.*

The following upgrades can be added to a battlesuit:

No Faceplate: The mecha has no vulnerable visor. The pilot relies on sensors (usually a PESA, p. 47) to see out.

Suit Computer: A battlesuit system includes built-in dedicated computers for feedback control, but the suit may also be given a general-purpose computer to run software (such as a Targeting program). This upgrade gives the suit a voice-controlled personal computer with a Complexity of TL-6, but hardened to resist radiation and electromagnetic pulse.

NBC Kit: This allows the battlesuit to filter out air pollution and *n*uclear, *b*iological and *c*hemical (whence NBC) contaminants from otherwise breathable air. It also contains sensors that automatically detect radiation or known forms of contamination. Only usable on suits that will be sealed.

Limited Lifesystem: Taking this upgrade adds a life support system equivalent to that in a mecha cockpit. A standard suit limited lifesystem has six hours of air, but extra air can be added. Only usable on suits that will be sealed.

Full Lifesystem: Available at TL11+, this provides *indefinite* air via a small molecular recycling plant.

Extra Air: This option adds 6 extra man-hours of air.

Provisions: A suit can be equipped with a concentrated food and water supply in a handy helmet-mounted dispenser. The provisions can be consumed "hands-free" without taking off the helmet. The suit must have a turret or be a master-slave design.

Quick Access: This allows a battlesuit to be removed or put on in seconds rather than minutes; see *Suiting Up*, p. 41.

Trauma Maintenance: This adds a medical system to the suit. It uses a biomedical sensor to monitor the wearer's vital signs, and transmits that data to a superior officer on request, via comsuite. The user can also call it up on a HUD. The data adds +2 to Diagnosis rolls made for the wearer. The system also includes an auto-injector and 10 doses of drugs. The user can manually trigger it, or it can be preset to inject a specific drug if vital signs warrant it; e.g., a painkiller if injured or a stimulant if fatigued. This might also be remotely controlled by a superior officer. It could also be loaded with non-medical drugs; e.g., to trigger berserker rage. It has its own power supply (works for a year on an A cell) to make it independent of suit power loss. See ***GURPS Ultra-Tech*** for drugs.

Battlesuit Upgrades

Description	*TL*	*Wt.*	*Volume*	*Cost*	*Pow.*
No Faceplate	8+	–	–	–	–
Suit Computer	8	6	0.12	$5,000	neg.
Suit Computer	9	3	0.06	$2,500	neg.
Suit Computer	10+	1.5	0.03	$1,250	neg.
NBC Kit	8	10	0.2	$2,000	0.25
NBC Kit	9+	5	0.1	$1,000	0.25
Limited Lifesystem	8	37.5	0.75	$125	0.5
Limited Lifesystem	9	25	0.5	$125	0.5
Limited Lifesystem	10+	12.5	0.25	$125	0.5
Full Lifesystem	11+	20	1	$500	0.1
Extra Air	8	37.5	0.75	$125	–
Extra Air	9	25	0.5	$125	–
Extra Air	10+	12.5	0.25	$125	–
Provisions	8+	12	0.24	$6	–
if full lifesystem:	11+	2	0.04	$6	–
Quick Access	8+	–	–	$500	–
Trauma Maintenance	8	–	–	$2,000	–
Trauma Maintenance	9	–	–	$1,000	–
Trauma Maintenance	10+	–	–	$500	–

Weight, *Volume*, *Location*, *Cost* and *Power* are shown on the table above. Extra air is per *six hours* of air it provides; extra provisions are per day's food and drink.

Upgrades must be located in the body, except for computers, provisions and NBC Kits, which may go in the body or turret.

Battlesuit Performance

These differences apply to battlesuits:

Skill Required: A battlesuit over 50 cf in size uses Driving (Mecha). If 50 cf or below in size, it uses Battlesuit skill *unless* it meets the criteria for Exoskeleton skill: this means it must have no built-in weapons *and* any body armor must be either entirely open-frame or less than DR 30.

Handling Modifier: A battlesuit much larger than its operator is harder to control, due to the difference in size between the user's limbs and those of the suit. If the suit's Size Modifier is 3 or more greater than its pilot's, subtract (difference-2) from the wearer's effective Battlesuit skill. This is one reason why large mecha use cockpits and not battlesuit systems.

NEURAL INTERFACES

In some backgrounds, mecha may use a *neural interface* that links the pilot's nervous system with the mecha controls. This lets the user control the mecha or any of its systems mentally, as if it were part of his body. Neural interfaces often figure as an important part of a mecha story – for instance, they can explain why a 14-year-old can climb into a mecha cockpit and pilot it with little or no training.

An interface adds +4 to the user's skill when maneuvering the mecha, firing its weapons or using its electronic systems. A neural interface in a "species compatible" mecha gives a *further* +1 bonus to Driving and Piloting (but not Battlesuit) skill. There are several types of interface systems, differing in detail:

Surgical Neural Interface (TL8): The user's body is surgically linked to the mecha's controls. He can't come out! Installing a pilot takes surgery which requires a week's recovery. It takes half as long (and costs half as much) to remove a user.

Interface Web (TL9): Using this system requires the user to remove clothing, attach interface wires with electrode disks to all areas of the body and don a special crown or helmet. This takes 15 seconds. The user's body is then "put to sleep" and his nervous system synchronized with the mecha, taking three more seconds. He is then ready to control it. To leave the web takes the same amount of time: three seconds to shut down the interface and wake up, and 15 seconds to remove the connections (in an emergency, they can be ripped out in two seconds, but the interface can't be used again until repaired).

Auto-Interface Web (TL9): As above, but automated, cybernetic cables whip about the user like snakes, removing clothing and attaching themselves, which takes only three seconds, plus another three seconds to synchronize. The detachment procedure is just as swift.

Socket Interface (TL10): The mecha comes with a cable jack that plugs into the skull socket of anyone with an implanted neural interface (see *Interface Jack*, p. CI26). It takes two seconds to connect or disconnect the jack.

Neural Interface Helmet (TL10): A compact neural interface helmet is built into the mecha's cockpit or into the turret of a battlesuit. The user is connected when he puts the helmet on,

which takes two seconds. In a battlesuit, the helmet is part of the suit's helmet and connection occurs after a second of disorientation.

Induction Field (TL10): The user simply enters the mecha, turns on the system and is interfaced. No surgery, implants or helmets are required.

A neural interface is added immediately after the cockpit or battlesuit system is installed.

Neural Interface Table

Type	*TL*	*Wt.*	*Vol.*	*Cost*	*Power*
Surgical Interface	8	20	0.4	$10,000	neg.
Interface Web	9	25	0.5	$20,000	neg.
Auto-Interface Web	9	50	1	$40,000	neg.
Socket Interface	10	0	0	$500*	neg.
Neural Interface Helmet	10	3	0.06	$10,500	neg.
Induction Field	10	25	0.5	$50,000	neg.

* User needs an interface jack implant; the operation is $50,000, and it takes two weeks to recover (see p. CI26).

Weight, Volume, Cost and *Power* are per cockpit or battlesuit system. Halve cost one TL after the system appears and halve it again two or more TLs after it appears. The system must be located in the same location as the cockpit. In a battlesuit, it *must* go in the body if a surgical interface, interface web or auto-interface web, or in the turret if a neural interface helmet.

The TL shown is only a guideline: the GM can rule that interface systems appear at higher or lower TLs than those listed.

Interface Options

Any interface type can be built with one or more of these options. In some backgrounds, *all* neural interfaces will automatically have one or more of these options. For instance, if the GM wants interfaces to be rare and dangerous, they can all have feedback loops. Unless noted, these options don't affect cost, weight or volume. However, the GM may rule that hostile, weaker or feedback loop interfaces are half cost, or available a TL or two earlier.

Interface-Only: The mecha cannot be turned on and operated *except* by a neural interface – it lacks physical controls, or they must be used in conjunction with the 'face.

Interface Lock: This an interface that is programmed to only accept a user who has a specific genetic (or maybe personality or brainwave) pattern, or which requires a specific advantage (e.g., Intuition or Magery) to use. Some locks are attuned to one or more individuals (e.g., the mecha's creator), while others recognize family gene-lines. The "user list" can be hard-wired into the system (making it impossible to change); otherwise, any interfaced user can alter the lock's parameters. An interface lock is usually combined with "interface-only."

Hostile Interface: Using the interface to control this particular mecha is a disturbing or insanity-inducing experience. Make a Fright Check at -5 when the interface is first activated, and roll again every minute it is used. Users with the Interface Talent advantage (p. 34) need only make a Fright Check once, at no penalty, the first time they interface with that particular mecha.

Feedback Loop: The interface bonds the user so tightly with the mecha that he suffers injury if the mecha is damaged. For every full (mecha body HP/10) hit points the mecha loses, the user also loses 1 hit. If the interface is telepathic (see below), this occurs even if he's interfaced but *outside* the mecha! However, the interface is more sensitive: the user gets an extra +1 bonus to skill.

Weaker Interface: Instead of +4 to skill, it gives only +1, +2 or +3 to skill. If you like neural interfaces but want them to be less of a factor in the game, use this option.

Telepathic Interface: This device fits the mecha with psychotronic circuits that enable a telepath to control it. It is also typically fitted with interface lock. When inside the mecha and interfaced, the telepath gains the same effect as a neural interface, except that instead of a +4 skill bonus, the bonus is his Telecontrol skill/4, rounded down. Moreover, when outside the mecha, the psi can remotely operate the mecha at up to his normal Telepathy range! Doing so requires total concentration. Treat the psi as if he were on board, piloting the mecha through a neural interface, except that he gains no skill bonus from the interface and any skill he is using via the mecha (Pilot, Gunner, et cetera) cannot exceed his Telecontrol skill. A telepathic interface is 5× more expensive (100× if a socket interface).

EXOTIC WEAPONS

Nuclear Missiles (TL8)

Nukes are the ultimate weapon that a realistic mecha can carry. In some armies, even battlesuit troopers may be issued them. In others, they are "doomsday" devices, under strict control.

A medium or heavy missile (at TL8+) or light missile (at TL10+) may have a tactical nuclear warhead. A one-kiloton yield warhead does 12d×2,000,000 damage. For every 128 yards from the impact site, divide concussion damage by 4. Add $36,000 to CPS.

A heavy missile (at TL8+) or medium missile (at TL11+) may have a strategic nuclear warhead. A 100-kiloton nuke does 12d×200,000,000 concussion damage. For every 512 yards from the impact point, divide the damage by 4. Add $48,000 to CPS.

The additional ammo cost is halved at TL9-14 and halved again at TL15+.

Nuclear warheads produce radiation and (if the fireball touches the ground) radioactive fallout; see p. CI1145 for details, or improvise the effects! Anyone in a sealed vehicle or suit will be fairly safe, but the GM can impose lingering deaths on unprotected victims.

Omni-Beam Projector (TL9)

This is a weapon that combines multiple beam weapons into one unit. It can only use one beam type at a time, but its user can decide which to fire before attacking. An omni-beam is lighter than buying multiple individual weapons, but more expensive.

To build an omni-beam, select at least two specific beam weapons; e.g., heavy x-ray laser and light flamer. Plasmablades, forceblades and plasmafausts can also be chosen. Each is a "subcomponent weapon." The omni-beam's weight is the weight of the heaviest subcomponent weapon (or one of them, if all are equal weight) plus 20% the weight of the other subcomponent weapons. The same applies to volume. The cost is *twice* the *combined cost* of all weapons! The power consumption and combat statistics are based on the weapon mode being used.

In combat, the user can decide which beam to use before attacking. Switching doesn't require a maneuver unless a plasma or force blade is chosen, in which case a Ready maneuver is required to turn it on, though no time is needed to deactivate it. While a forceblade is on, it can be used to parry, but using a different beam deactivates it; another Ready maneuver is required before it can be used to attack or parry again.

Combiner Beams (TL9)

A beam weapon can be built whose components are split evenly between two (or more) mecha. It can only be used when the mecha are in physical contact to establish a power connection. The advantage is that mecha can carry weapons too large for them to handle individually. The pilots of mecha with combiner beam weapons are often siblings, perhaps twins; the weapon symbolizes their fraternal bonds.

A power connection is achieved by physical contact between the mecha – usually by linking hands. The beam forms as a power discharge from both mecha and combines into a single beam. Only aimed attacks can be made with a combiner beam, and neither mecha may move on the turn they attack.

To make an attack, each gunner must roll to hit. Use the *least* successful roll to determine whether the beam hits. Results of critical failures apply to both mecha. The energy drain from firing the weapon is split evenly between the mecha.

Combiner beams can also be used if the mecha are designed to *combine* together (p. 106). In that case, it is simply treated as an ordinary weapon, without the restrictions given above, and only one attack roll is made, by the combined mecha's gunner.

To build a combiner beam weapon, decide what beam weapon will be installed. Choose how many parts, usually two, the weapon will have. The weight, volume, cost and power of each component is equal to that of the original divided by the number of parts. One component is installed in each mecha. There is no extra cost.

Wave Projector (TL9)

This option modifies a beam weapon to generate a fan-shaped wave of energy. In realistic campaigns, only flamer or plasma beams can be so modified. In cinematic games, any beam can be.

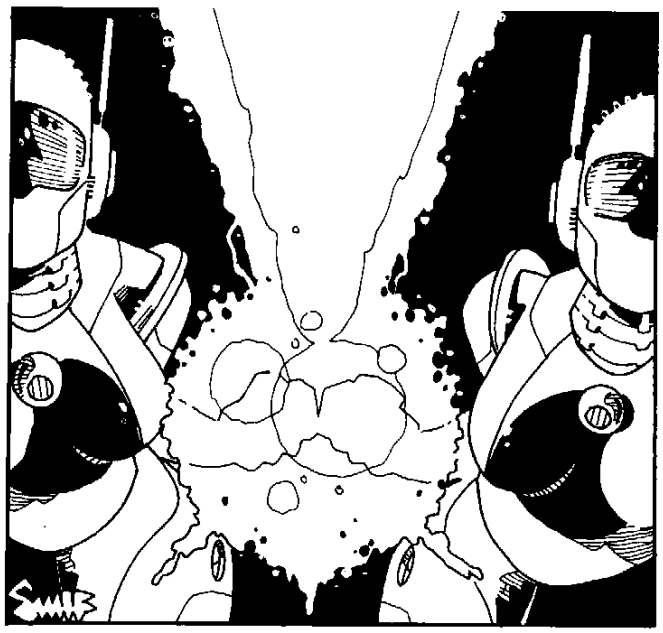
The area of effect starts out one hex wide, and its width increases by one hex to the right and left for each hex of distance until it reaches the fan's maximum width. Targets within the fan-shaped area are not hit automatically; the attacker must roll to hit (or miss) each individual target in the area. If the weapon has RoF 2+, it can fire multiple energy waves in a turn.

The weapon has a fan with a maximum width of one yard per +10% to weight, volume, cost and power. However, the energy wave projector has one-quarter the weapon's normal range.

This option is recommended for creating cinematic "main guns" for colossal super-mecha. Just take a big particle beam or flamer and augment it with a 100-hex-wide energy wave; the weapon will be about 10 times larger than normal, but will be very effective against massed enemies . . . or cities!

Baroque Weapons (TL9)

These are science-fantasy weapons that super mecha might use in over-the-top campaigns, or in fantasy or steampunk settings. The TL is arbitrary – feel free to adjust it up or down to fit the campaign.



Lightning Cannon: This weapon flings lightning bolts! Metal armor provides only PD 0, DR 1. If any damage penetrates the DR of a machine (like a mecha, robot or vehicle), it must roll 3d vs. its HT. Failure means its electrical systems short out, instantly disabling it for minutes equal to the amount failed by.

Wind Cannon: Fires a blast of air with the concentrated force of a hurricane! No attack roll is needed. It covers a cone-shaped area of effect, starting one hex in front of the weapon and extending out one hex in either direction for each hex of range. The attack *automatically* hits everyone in that cone unless they can use a retreating dodge to escape the area of effect. A wind cannon's damage counts as a hand-to-hand crushing blow for causing knockback. Even though full damage is counted for knockback purposes, the actual damage inflicted is only 1 point for every yard the subject is knocked back.

Power Lens: This device acts as an amplifier for the power of a mecha pilot who can use jet or missile spells or super powers. To design it, choose *one* spell or super power it can magnify (e.g., Fireball spell) and the amplification (e.g., ×10). If the pilot uses that spell or ability from within the mecha, damage and range are multiplied by the amplification.

Vibro-Cannon: This hideous weapon causes the target to vibrate rapidly! Neither PD nor DR of armor protects against it. Instead, subtract 1 from the damage for every full 1,000 lbs. the target weighs, as larger things are harder to vibrate. Deflectors and force shields protect fully, and force screens protect at one-tenth their normal DR. Optionally, a vibro-cannon may rely on sonic vibrations or musical notes; such weapons will not work in vacuum.

Flamers (p. 66) also make good baroque weapons.

Creating Baroque Weapons

Lightning Cannon: Use any TL9+ blaster or particle beam, but change Type to Cr. and give it half damage and range.

Wind Cannon: Use any flamer or plasma weapon with RoF 1, but change Type to Cr. and divide range by 10.

Power Lenses: These are 2.5 lbs., take up 0.05 cf, cost $1,000 and require 1 kW, all multiplied by the *square* of the amplification.

Vibro-Cannon: Use any flamer or plasma weapon, but change Type to Cr., and give it 1/5 normal damage and range.

OTHER ADVANCED COMPONENTS

Contragravity (TL12)

Contragravity (CG) is a means of artificially "screening" a mecha against a planet's gravity field, negating some or all of its weight. Not all backgrounds will have CG, since if it exists, there is little justification for giving a vehicle legs. However, many cinematic mecha designs use CG anyway!

If the mecha has contragravity, decide how many pounds of lift the CG generator provides. In order to fly, the lift should exceed the mecha's expected final weight. This lift is cumulative with the vectored thrust of a thruster – e.g., a 10,000-lb. mecha could fly with 4,000 lbs. of CG lift and 6,000 lbs. of thrust.

Note that CG cannot *propel* the mecha, only lift it, but a CG generator is more efficient than thrusters for this purpose. A mix of CG and thrusters is a very cost-effective design option. A CG mecha usually uses TL11+ reactionless thrusters (p. 80), but other types are fine. It's also possible to use *no* thrusters – the mecha would be able to jump long distances, or drift in the wind. Weight, volume and cost of a CG generator depend on TL:

Contragravity Table

TL	*Weight*	*Cost*	*Power*
12	(Lift/1,000) + 20	$(Lift/40) + $2,500	Lift/1,000 kW
13+	(Lift/2,000) + 10	$(Lift/200) + $500	Lift/1,000 kW

Weight, Cost and *Power* are based on the generator's pounds of lift. *Volume* is weight/50 cf.

Location: Contragrav generators may go in the body or in pods.

Personal Teleporter (TL16)

Some ultra-tech mecha are equipped with devices that allow them to teleport! These warp space around the mecha: it can vanish and reappear instantly at its destination, without crossing the intervening space. In some settings, these devices are TL12-15.

A personal teleporter is a component, rated for its jump capacity. The jump capacity must be equal to or greater than the mecha's loaded weight for it to function. It's a good idea to keep to a target weight when designing teleporting mecha!

Choose the jump capacity (minimum is 2,000 lbs.) and then determine the teleporter's statistics as follows:

Weight is 0.008 lbs. per *pound* of jump capacity.

Volume and Location: Volume is weight/50 cf. It can be located in the body or in any subassembly except wheels.

Cost is $7 per pound of jump capacity.

Power is 18,000 kW per pound of jump capacity, required for 1 second (i.e., 18,000 kWs of energy).

Making a teleport uses the same amount of energy regardless of the distance traveled, which can be almost infinite; however, the greater the distance, the more difficult the navigational problem. Roll vs. Piloting (Teleportation) to teleport without a problem. Some teleporters require a simple skill-10 roll without any other modifiers, regardless of distance; an alternative is to base the penalty on range:

Personal Teleporter Modifiers Table

Range	*Modifier*	*Range*	*Modifier*
1 mile	+2	1,000 miles	-1
10 miles	+1	10,000 miles	-2
100 miles	0	100,000 miles	-3

. . . and so on. If a range is between two numbers, use the higher to determine the modifier. If under one mile, treat as one mile.

Failure means the mecha misses its destination (by at least 100 yards or 10% of the distance teleported, whichever is greater) *and* the teleporter burns out. It will take a few hours of tinkering and an Electronics Operation roll to get it working again. Critical failure causes total destruction of the teleporter as well as stranding the mecha somewhere very far away – maybe in an entirely different dimension!

The teleporter circuits must always cool down after a jump, requiring at least one hour before further jumps are possible.

Space-Fold Drive (TL10?): More common in anime than hyperdrive, treat this as a teleporter, except it is used at -10 unless both the starting point and destination are in space.

TRANSFORMABLE MECHA

A transformable mecha mechanically alters its shape, shifting subassemblies and components like a Chinese puzzle.

Mecha usually transform for one of three reasons: to optimize their mobility for a specific environment (for instance, retracting legs and extending wheels while on smooth ground), to disguise the mecha as something it isn't, or to fold into a compact shape that is more easily stowed as cargo.

While at first glance this seems implausible, a lot of real-world vehicles "transform." As an airplane leaves the hangar of an aircraft carrier, for instance, it unfolds its wings, cruises down the runway and then, after leaping into the air, retracts its undercarriage – having completed a "transformation" from a wheeled ground vehicle into a streamlined aircraft. Some combat aircraft can further "transform" themselves by using variable-geometry wings, folding them back to reduce drag for high-speed flight, or forward for low-speed maneuvering.

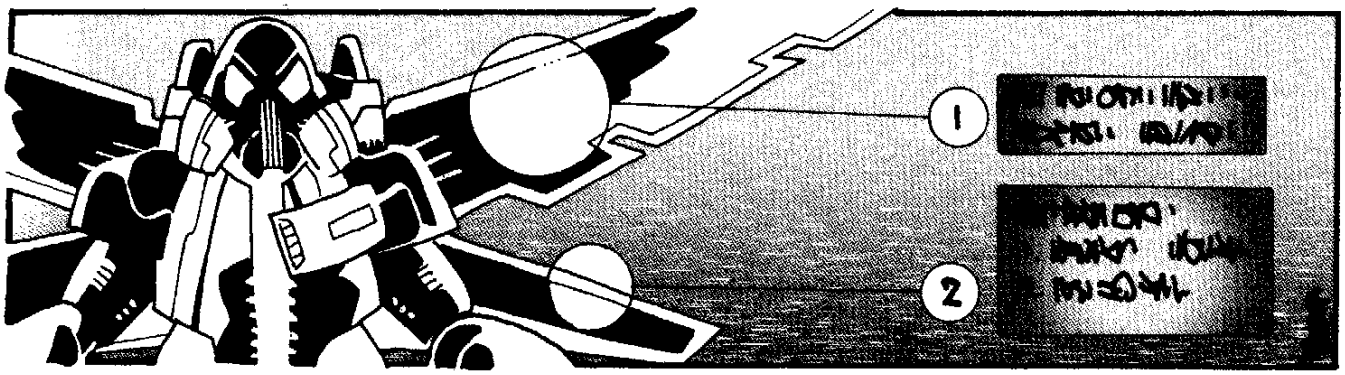
In a sense, mecha transformations are just wilder extrapolations of this: folding arms, turret and legs flush with the body during flight for better streamlining, or shifting wings or wheels out of the way when the mecha needs to fight on the ground.

Designing Transformable Mecha

A transformable mecha is built just like any other mecha, except for these additions to the design process:

At Step 1 – Wheel and Wing Subassemblies

A transformable mecha can be built with wings, wheels or both – subassemblies that would be awkward on an ordinary walking vehicle, but which can be folded out for use when they become necessary.



Wheels: Decide if the mecha has wheels. A transformable wheeled mecha can fold up its legs and unfold its wheels to go faster over smooth terrain like a paved road. If a mecha has wheels, decide how many wheel positions the subassembly has: two, three, or any even number over three. Unlike arms or legs, wheels are considered part of a *single* subassembly.

Wings: Decide if the mecha has wings. A winged mecha can fly faster (and with less thrust) than a wingless design. However, wings severely hamper a mecha's ground maneuverability until folded away. A winged mecha needs *two* wing subassemblies.

At Step 3 – Wheeled Drivetrain

If a mecha has a wheeled subassembly, it should be built with a wheeled drivetrain: a transmission or electric motor that transmits power to turn the wheels.

Select the wheeled drivetrain's motive power in kW. A mecha that can race along at about the same speed as a car or motorbike needs 30-40 kW per ton of target weight. If you have an exact speed in mind, the motive power needed to reach it, *per ton of target weight,* is kW = (speed in mph/16) squared.

A wheeled drivetrain's statistics are calculated as follows:

Weight: If the motive power is less than 5 kW, the drivetrain weighs 7.5 lbs. per kW. If the motive power is 5 kW or more, the drivetrain weighs 30 lbs. + (1.5 lbs. per kW).

Volume and Location: Volume is weight/50 cf, located in the body.

Cost: Cost is $20 × weight.

Power requirement is zero if the leg drivetrain's motive power is higher, as the wheels aren't used when the legs are. Otherwise, use the difference between the wheeled and leg drivetrain's motive power to find the additional power requirement.

Note that mecha drivetrains are assumed to use all-wheel drive.

At Step 5 – Thrusters

A mecha that has wings can fly with *considerably* less thrust than its weight, as long as its wings are unfolded. However, if thrust doesn't exceed its weight, it will behave like an ordinary plane, unable to hover in mid-air or make vertical landings or takeoffs.

At Step 16 – Volume of Wings and Wheels

Determine the volume of any wings or wheels the mecha has before determining body volume.

Wings: Each wing has the volume of any components placed in it. However, minimum wing volume is 0.1 × body volume. Both wings must have the same volume. Add empty space as necessary to fill out the required minimum volume or even-out the wings.

Wheels: If the mecha has wheels, the entire wheeled subassembly has a volume of 0.1 × body volume. This contains no components; the entire volume is filled with the wheels and suspension.

At Step 17 – Area of Wings and Wheels

If the mecha has wings or wheels, their area must also be calculated. Because wings are wider and flatter than other subassemblies, their surface area is doubled after it is calculated. Thus, a 20 cf wing would have area 100, not 50.

Wings and wheels add to total and structural surface area.

At Step 18 – Structure

In addition to choosing frame strength and materials, decide how many *configurations* the mecha has, and what they are. A mecha may have two, three or four configurations. The more it has, the more versatile, expensive and massive the mecha will be – see the *Mecha Structure Table,* p. 88.

Each configuration consists of a name (make this up!) and a list of which subassemblies are *folded.* A folded subassembly is one that is folded flush against the body.

Example: We decide a mecha with a turret, two arms, two legs and two wings has two configurations: "walker," in which its two wings are folded, and "flyer," in which its arms and legs are folded.

Some special considerations apply to what combinations of subassemblies can be folded in a configuration:

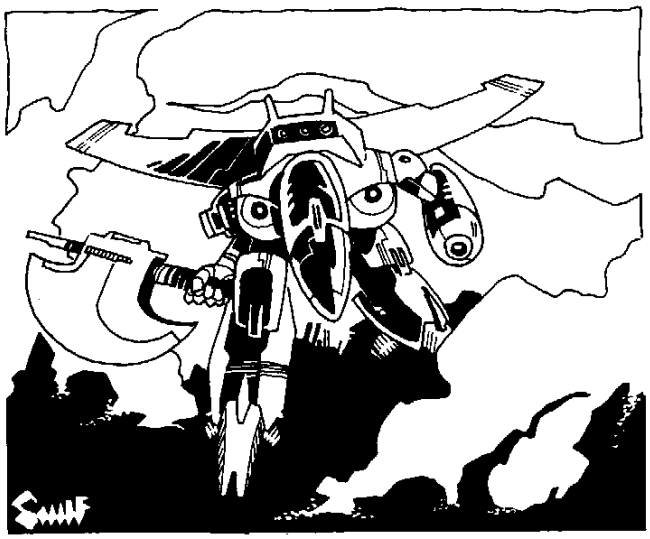
Legs: A configuration can fold some, none or all legs, but configurations with only one unfolded leg are not allowed.

Wheels and Legs: A configuration with unfolded wheels *must* fold all legs, and vice versa. A configuration with all subassemblies but wheels folded can be disguised as a car, truck or cycle, depending on its size and number of wheels.

Wings: Both wings must be folded at once. A mecha moving on the ground in a configuration that has unfolded wings suffers a severe MR penalty. If arms and legs are folded, a mecha with unfolded wings can pass as an ordinary airplane. If folding wings have pods attached to them, the pods must also fold.

Transformable Battlesuits: The wearer of a battlesuit occupies the arms, legs and turret as well as the body. For this reason, a battlesuit's configuration must have all of its limbs and turret folded or unfolded at once. (This rule does not apply to master-slave suit designs, where the wearer is in the body.)

Other Considerations: The more subassemblies that are folded, the more compact the mecha will be. In addition, folding subassemblies reduces aerodynamic drag; this means the more



subassemblies (other than wings) that a flight-capable configuration folds, the faster it will be able to fly! On the other hand, a folded arm, leg or turret housing weapons or sensors is less effective, as its arc of fire or vision becomes fixed.

Example 1: The Stormhawk (p. 73) has two arms, a turret, two wings and two legs. We decide it has three configurations, which we label "raptor," "plane" and "humanoid."

"Raptor" – No subassemblies folded. Lets the mecha switch quickly between moving on the ground and in the air without having to take time to transform; useful for combat near the ground.

"Plane" – Legs, arms and turret folded. This greatly reduces drag, allowing high-speed flight, but it can't move on the ground. The mecha can also disguise itself as an airplane.

"Humanoid" – Wings folded. With them out of the way, the mecha can't fly like an airplane, but it can maneuver properly on the ground and takes up less space in a hangar.

Example 2: The Kamen Panzer battlesuit (p. 73) has a turret, two arms, two legs and wheels. We decide it has two configurations, "cycle" and "humanoid."

"Humanoid" – Wheels folded, to make it species-compatible.

"Cycle" – Turret, arms and legs folded. The mecha can now race along on wheels and disguise itself as a cycle.

Performance

A different set of performance figures must be worked out for each configuration. Space performance will not change, but air and ground performance can vary greatly depending on which subassemblies are folded. The normal performance rules are modified by the effects of configuration as follows:

Ground Performance for Transformable Mecha

A configuration that has folded all ground motive subassemblies (i.e., legs or wheels) has no ground performance.

Ground Speed: Use the normal rules if the configuration has unfolded legs, basing speed factor on the number of legs unfolded. If the configuration has unfolded wheels, use the usual formula but substitute the wheeled drivetrain's motive power for the leg drivetrain's and use a speed factor of 16.

gMR and gSR: A configuration with unfolded legs uses the table on p. 92 based on its number of unfolded legs. However, if it has *unfolded wings,* its gMR cannot exceed 0.5. Also, a folded limb doesn't count toward species compatibility – e.g., a human-piloted mecha must have exactly two unfolded arms and two unfolded legs to get that gMR bonus.

A configuration with unfolded wheels uses a completely different table to find gMR and gSR:

Wheeled gMR/gSR Table

Type of Motive System	*Mecha's Body Volume (cf)*									
	30 or less		*31 to 100*		*101 to 300*		*301 to 3,000*		*3001 or more*	
	gMR	*gSR*	*gMR*	*gSR*	*gMR*	*gSR*	*gMR*	*gSR*	*gMR*	*gSR*
2 wheels	1.75	2	1.5	2	0.75	2	0.5	2	0.25	2
3 wheels	1.5	2	1.25	3	1	3	0.5	4	0.25	4
4-6 wheels	1.25	3	1	4	1	4	0.75	4	0.25	4
8+ wheels	1	3	0.75	3	0.5	4	0.5	5	0.25	5

There is no species compatibility bonus if moving on wheels. If the mecha has unfolded wings, gMR cannot exceed 0.5.

Ground Move: This is found normally, based on the configuration's top speed and gMR.

Air Performance for Transformable Mecha

A configuration with both unfolded wings and thrusters may be able to fly even if its lift does not exceed its weight.

Effective Motive Thrust: If the configuration has unfolded wings, effective motive thrust now equals the combined thrust of all thrusters. (That is, effective weight is no longer subtracted from motive thrust.)

Aerodynamic Drag and Aerial Top Speed: If the configuration has *any* folded subassemblies subtract *half their area* from surface area before calculating the configuration's aerodynamic drag. Then calculate top speed normally, based on the configuration's effective motive thrust and aerodynamic drag.

Aerial Maneuver Rating: If the configuration has unfolded wings, a different formula is used to determine its aMR:

aMR = (Whp/Lwt.) × (TL+1) × 30.

Where *Whp* is the sum of both wings' hit points, *Lwt.* is loaded weight in pounds and *TL* is the tech level of the wings. Round to the nearest half or whole number.

Aerial Stability Rating: Calculate aSR normally, but add +1 if the mecha has unfolded wings (unless it also has radical stealth).

Flight Move: Calculate Move normally, based on the configuration's top speed and aMR.

Stall Speed: A configuration with unfolded wings will have a *stall speed* if the sum of its thrust and contragrav lift is less than its weight. The configuration must be able to reach stall speed in order for its wings to provide enough lift to fly. Once it is airborne, it cannot fly slower than this stall speed without stalling, which means it will lose control and start to fall out of the air.

Stall speed depends on the configuration's *lift area.* This is found by adding the entire combined surface area of both its wings to 10% of the area of the body. Use lift area and the formula below to calculate stall speed:

Stall Speed = [(Lwt. - Lift)/Lift Area] × Sl × 2 mph.

Where *Lwt.* is loaded weight in pounds, *Lift* is equal to the sum of contragravity lift and vectored thrust and *Sl* is 1 if no or "fair" streamlining, 1.05 if "good" streamlining, 1.15 if "superior" or 1.3 if "radical." Round stall speed to the nearest 5 mph.

Other Configuration Effects

In addition to altering performance, the new configuration may restrict how certain subassemblies or components function:

Using Arms, Turret and Legs: When folded away, these subassemblies can't move or rotate. Each folded subassembly – including the turret – is locked into *one* facing, which must be chosen when the mecha is designed. Any ranged sensors or weapons that are mounted in a folded subassembly still work, but they can now only fire or look in the direction the subassembly is pointed. Melee weapons in folded subassemblies cannot be used at all.

Using Hand-Held Weapons: A hand-held ranged weapon that was held by an arm that was folded during the transformation is still held, but is locked into the same facing as the arm, and may only fire in that direction. A hand-held melee weapon held by a folded arm cannot be used.

Auto Disguise: A mecha with wheels unfolded and all other subassemblies folded can be mistaken for a wheeled vehicle: a dirt bike (two wheels), powered trike (three wheels), car or van (four wheels) or truck (six or more wheels). A folded turret forms part of a cab. A mecha whose wheels and turret were unfolded might be mistaken for an armored car.

Battlesuit Systems: When a battlesuit (except a master-slave design) folds arms, legs and turret, the suit's body opens up to form a cycle seat and the wearer find himself riding it. He is completely outside its structure and armor. When it transforms back into a species-compatible configuration, the mecha instantly enfolds the rider in the process, who is now wearing the battlesuit again.

Activating a Transformation

Transformation between configurations can be initiated by the mecha pilot at the start of any turn, and takes two seconds to complete. On the first turn, the mecha is assumed to be in the configuration it was in before transforming; on the second, it is in the configuration it is transforming into. At the start of its third turn, it has fully transformed.

In the two seconds a mecha is transforming, it can move, but cannot jump, attack or change facing or direction. A transformation can't be aborted once started! A transforming mecha can use active defenses normally, but some configurations will prevent some defenses; e.g., a configuration with an MR under 1 cannot dodge, and one with no arms can't parry.

EXOTIC STRUCTURAL OPTIONS

These options can be added in *Step 18 – Structure.*

Biomechanical Structure (TL9): A mecha with this option is a living (though non-intelligent) entity, although it may also have non-living components grafted onto it. The mecha is self-maintaining and heals 1 hit point per day for its body and each subassembly on a successful HT roll. However, it can also become infected with diseases (GM's option). This option multiplies the *structural cost* of the mecha by 1.5.

Living Metal Structure (TL13): This gives the mecha a structure built of living metal, a nanotech material that is capable of regeneration. The tiny "nanobots" contained within the living metal structure repair damage to the mecha at 1 hit point per hour (as long as it isn't utterly destroyed). They also perform routine maintenance and repair other components. If the mecha has ablated or damaged armor, this also regenerates at the same rate. A living metal structure enables the mecha to dispense with regular internal and external doors – it "opens" a hole to allow access, then seals it afterwards. A living metal structure cannot be combined with a biomechanical structure. Double the *structural cost* of the mecha.

Foot Rollers (TL8)

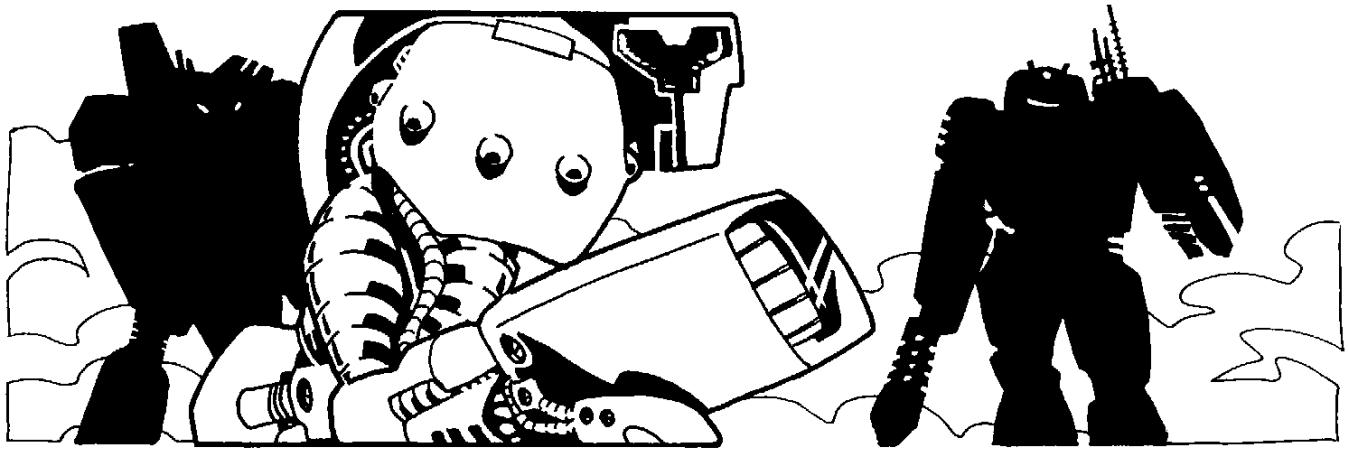
Legs can be fitted with small, semi-retractable rollers in their feet, allowing the mecha to move swiftly over smooth ground as if on roller skates. Foot rollers are added after Step 18, once the mecha's structural weight and cost have been calculated.

Weight: 0.05 × (combined leg area of mecha/total area of mecha) × mecha structural weight.

Cost: $100 times their weight.

Weight and cost are for *all* the mecha's rollers; there is no significant increase in volume.

Using Foot Rollers: A mecha pilot can decide to extend and use them at the start of any turn that the mecha is walking on flat, hard-surfaced ground, such as a floor or paved road. Using foot rollers modifies ground performance with legs: +20 mph ground speed, +10 to enhanced Move, -1 gSR. A mecha's Dodge when using foot rollers drops to Battlesuit/3 or Driving (Mecha)/3.



ARMOR OPTIONS

Armor and Facing

On some mecha designs, extra DR is added that protects a particular face of a body or turret, rather than the entire location. The faces are front, back, right, left, top and (except on a turret) the underside. Use only one-sixth the normal surface area of the location to calculate such armor's weight and cost. The armor will only protect against attacks from that direction.

Open-Frame Armor

Any kind of armor can be an open framework, much like a roll cage. This is common on labor mecha and exosuits. It protects normally vs. collisions, falls, rolls or swinging melee attacks, but has only a 2-in-6 chance of protecting vs. thrusting attacks, beams, arrows, bullets or other small missiles. It has no effect at all against flamer or flamethrower attacks or explosive concussion damage. Open-frame armor has 1/5 normal weight; as cost is based on weight, this will make it cheaper.

A mecha with open-frame armor cannot also be streamlined, waterproof or sealed.

Cheesecake Armor

Battlesuits may be built with "cutaway panels" on the arms, legs and torso. Ostensibly, this is to reduce the weight of the suit. Actually, it is used in gladiator or superhero battlesuits to provide a better view of the wearer's physique!

Cheesecake armor on body, arm or leg subassemblies weighs half as much. Its PD is -1 and its DR has only a 50% chance of protecting vs. an attack. Cheesecake armor on the arms or legs always protect against damage to hands or feet.

A suit using cheesecake armor cannot be sealed or waterproof, and may not have life support unless it has a deflector screen.

Compound Armor

It is possible to layer a body or subassembly with different types of armor: for example, metal armor with an additional layer of ablative armor underneath. Layered armor DR is added together, but keep track of the individual DRs of the layers because of their special characteristics. E.g., if DR 25 laminate armor is layered over DR 20 metal armor, the laminate DR is doubled against shaped-charge attacks, but the metal armor's DR is not.

If ablative armor is layered under other armor and is destroyed, the armor atop it will also be destroyed!

Exo-Armor Husk

An exo-armor husk is a second, outer layer of armor that is attached to the mecha by explosive bolts. In an emergency, it can be blasted off to reduce weight. This is useful for situations where speed is more important than protection – e.g., racing to the rescue, pursuing an arch-enemy or making a quick getaway.

Buy it exactly like a second layer of armor covering the entire mecha, but add 10% to its weight (which will increase its cost by 10% as well).

Calculate two sets of DR and PD: one with and one without exo-armor. When the mecha is complete, calculate two sets of weight and mass figures: one with the exo-armor husk's weight included and one excluding it. Do the same for any performance calculation in which the mecha's weight or mass is important.

Using Exo-Armor Husks: Normally, the mecha functions using the "with exo-armor" statistics. However, at the start of any turn, the pilot can jettison the exo-armor. Switch to the "without exo-armor" sets of statistics for PD, DR and performance. An exo-armor husk that has been ejected is considered destroyed. A new husk can be added at 50% of the cost of the original, since the connections, et cetera are still there.

Defensive surface features like stealth do not function until the exo-armor is ejected. (Optionally, the mecha's defensive surface features may be attached to the exo-armor husk. Add their weight to the husk; this weight will be shed when the husk is ejected, but the defensive features will be gone too.)

EXOTIC SURFACE FEATURES

Psibernetic Web (TL9)

A mecha can only be given this option if it has a neural interface system. A psibernetic web covers the mecha with a surface web of psi-reactive material, enabling it to function as an extension of the user's body with respect to psionic powers.

Design: This is a surface feature, like a stealth system. It consists of two parts. First, the neural interface system of the mecha is 5 times more expensive (100 times more if a socket interface), unless the mecha already has a telepathic interface. Second, the psibernetic web itself weighs one pound per sf of the mecha's surface area and costs $1,000 times the mecha's area. These costs halve at TL10 and again at TL11+.

Use: For purpose of psionic abilities, the mecha's body is treated as the pilot's; so if a psi power requires a touch, contact with the mecha is enough for it to work. It also means (for instance) that a Mind Sword blow that hits a psibernetic mecha's leg effectively strikes the pilot's leg. (Areas that don't match the pilot's body, like wings, are treated as touching his torso.) This can also extend to magical attacks hitting the mecha, if they affect the mind or soul.

Some psi skills that normally affect only the user's body now affect the mecha. This is the result of the self-image of the wearer and mecha becoming one. Only a few skills are affected, but the results are dramatic!

Energy and PK Shield: The shield covers the entire mecha. Also, if the mecha has 10 or more body hit points, the shield is stronger: it provides DR equal to the mecha's (body hit points/10) rounded down *per level of Power!*

Levitation: The entire mecha levitates. Instead of getting an ordinary +10 bonus to PK Power for purposes of levitation, add a bonus (p-5), where *p* is the minimum PK Power needed to levitate the mecha's weight. Thus, Power 5 or more can levitate the mecha. Higher Power allows faster flight.

Healing: The user can heal the mecha as if it were his own body. Another psionic healer touching the mecha can heal the mecha or the user as desired.

Surge and Dampen: The psibernetic web makes the mecha immune to these two psionic attacks.

Photokinesis: If the pilot uses this to blur himself or turn invisible, it affects the entire mecha.

Aspect: The entire mecha radiates the Aspect.

Mind Sword: This ability can only be used from within the mecha if it has a manipulator arm, but the mind sword's reach is now twice the reach of the mecha's arm. Damage is the same, but since it can reach through DR, this isn't much of a problem – the reach should allow the mecha-piloting psi to slice into a non-psibernetic mecha's cockpit to affect the enemy pilot (whose Mind Shield will protect normally).

Autoteleport and Combat Teleport: The entire mecha teleports with the pilot!

Skills listed here that are not in the ***Basic Set*** are described in ***GURPS Psionics.*** *Note:* Astral Projection is *not* affected – the mecha always remains behind!

Force Fields

These systems allow the mecha to generate one or more types of protective force field around it. Force field grids are added as part of a mecha's surface features, just before armor is installed. The mecha *must* have a power plant with enough excess power left over to run the screen, or have an energy bank the field can drain energy from. Since the power requirement of a force field is based on surface area, which won't be known until *after* power systems are installed, it is a good idea to run the force field off an energy bank rather than a power plant.

Deflector Screen (TL11): This adds to a mecha's passive defense, warping space to deflect energy beams and physical projectiles. It is visible as a faint shimmer around the mecha. It can also keep out rain, wind and atmospheric contaminants. It gives PD 8 (not cumulative with other PD).

Force Shield (TL11): Only available if the mecha has arms, this is a deflector field in the shape of a shield. It has PD 6 (cumulative with other PD, to a maximum of PD 8) and only protects the front of the mecha. It also be allows a Block defense at Force Shield skill/2.

Force Screen (TL12): Surrounds the mecha with a barrier that provides damage resistance (DR). It does not increase PD, but may be used with deflectors. Its DR is always applied before armor DR. Force screens don't hamper the mecha's own fire.

A force screen can be overloaded by a powerful attack. If the damage from a single hit (or total burst damage from an automatic-fire laser) exceeds *half* the screen's DR, the force screen *gains* an "energy level"; if the damage *exceeds* the force screen's DR, it gains two energy levels. The screen will often glow, climbing up the spectrum from red to violet as it gains energy levels. Upon gaining eight levels, it overloads, and the generator melts and is destroyed.

A force screen sheds one energy level every 10 seconds, radiating energy in the form of neutrinos and visible light. It cannot be turned off safely until it has shed all accumulated energy levels. If turned off prematurely, the shield generator overloads and is destroyed.

Force screens do not block slow-moving objects (under a few yards per second), so one *can* (slowly) walk through a screen. They can't be penetrated by active sensors (such as radar or ladar), although the presence of the field can be detected.

Force Field Grid Table

Type	*TL*	*Weight*	*Cost*	*Power*
Deflector	11	0.1	$250	3.6
Deflector	12	0.05	$125	3.6
Deflector	13+	0.025	$112.5	1.8
Force Screen	12	0.004	$5	0.01
Force Screen	13	0.002	$2.5	0.01
Force Screen	14	0.001	$1.25	0.01
Force Screen	15+	0.0005	$0.625	0.01

Multiply weight, cost and power requirement by the mecha's total surface area. For force screens, also multiply weight, cost and power by the desired *damage resistance* of the screen. Thus, a screen with DR 1,000 has 1,000 times the listed weight, cost and power requirement per sf. Minimum force screen DR is 100.

Force shields have half the weight, cost and power of deflectors. They must be designated as built into an arm.

OVERLOAD BOOSTERS (TL10)

An *overload booster* is a system that allows all propulsion, energy weapon and force field systems to perform at far greater than normal efficiency for a brief period of time – at the cost of eventually burning them out!

Design: Add this system after the mecha has been totally designed but before price has been calculated. Its cost equals the combined cost of all leg drivetrains, arm motors, thrusters, beam weapons, built-in contact *energy* weapons (plasmafausts, forceblades, et cetera), power plants, energy banks and force fields. The system has no weight, volume or power consumption, nor does it have an actual "location."

Use: The overload booster can be activated at the start of any turn, with the following effects:

1. The mecha's Arm ST is doubled.
2. The mecha's MR, speed, Move and (if using ***GURPS Vehicles***) acceleration scores are increased by 50%.
3. The damage of all built-in beam and contact energy weapons (plasmafausts, plasmablades, forceblades, et cetera) doubles!
4. The DR of any force screens the mecha has doubles. Deflector or force shield PD is +1.
5. The mecha begins to hum with power. In over-the-top style games, it may glow with energy.

The overload booster can be operated for as long as desired. However, each turn it is in use, roll 1d. On a 6, total overload occurs. Circuit breakers pop, sparks fly and the mecha loses its

bonuses. Worse, until the mecha has been repaired, it takes these penalties:

1. The mecha's Arm ST is 2/3 normal.

2. The mecha's MR, speed, Move and acceleration scores are decreased to 2/3 normal.

3. All beam weapons and contact energy weapons cease to function.

4. All force screens and deflectors cease to function.

5. The overload booster will not work.

The damage can be repaired by shutting down the mecha and replacing blown circuits, black boxes, et cetera. No actual physical damage was taken, so this requires Electronics Operation skill; roll every 4 hours to get things working properly again.

Empathic Overload Booster (TL11)

This is a specialized version of the overload booster, designed to convert emotional energy into raw power. The mecha psychically synchronizes with its crew and temporarily exceeds its normal operating parameters in extreme circumstances. It is only suitable for over-the-top campaigns! A good, cinematic example of this kind of booster can be seen in the anime *Iczer One*.

Design: An empathic overload booster can be added to any mecha with a neural interface system. It costs the same as an *overload booster* (above), plus an extra $1,000,000. A mecha can have both empathic and regular overload boosters – their effects, if used together, are *cumulative*.

Use: The device can be triggered if any of the mecha's crew can couple a powerful emotion, like love, with a burning need for more power. Simple fear of one's own death is not enough to trigger it – what is required is something like an urgent desire to protect or avenge a loved one. The GM decides whether a character's feelings are strong enough to trigger it. If so, roll vs. the user's Will-4 see if it is triggered, with a +2 bonus for characters with Empathy and a +2 if Dependents or a Sense of Duty are involved.

Success: If the Will roll succeeds, the user successfully synchronizes with the empathic booster. The mecha glows with power as the booster channels and amplifies the pilot's emotional energy, supercharging the mecha's energy systems exactly like an overload booster (p. 105). Unlike an overload booster, the effects endure for the length of the crisis and there is no damage to the mecha afterward!

Failure: If the Will roll fails, the character can't try again until the situation produces even *more* emotional angst (which is at the GM's discretion).

Example: Akiko, pilot of the empathic booster-equipped Zephyr Knight, is fighting her way into an enemy fortress when a half-dozen foes arrive and bar the way! Only two minutes remain before her lover, Sho, is due to be executed by the renegade mercenary, Colonel Vulture. Akiko's player tells the GM she thinks the Zephyr Knight's empathic booster will trigger, due to her fear Sho will die if she doesn't trash these new foes quickly. The GM agrees and allows Akiko a Will roll.

Akiko has a Will of 13, which would give her a 9 or less. Her Sense of Duty to Sho adds +2, for an 11. Unfortunately, she rolls a 12! Her mecha gets no boost. She fights on anyway, but arrives a few seconds too late, and Sho is dead! Sobbing over his broken body, Akiko spots Colonel Vulture trying to slink away in his own mecha. She wipes her eyes and cries out that Sho will be avenged! The GM allows another Will roll – this time Akiko succeeds. The vengeful Zephyr Knight glows with power and Akiko accelerates at super-boosted speed toward her prey.

COMBINING MECHA

It's possible for two or more mecha to combine to form a single machine. Such designs are complex, since multiple sets of performance statistics are required for them when they are separated, plus an additional set when they are combined.

Core/Shell Mecha

This is the simplest type of combining mecha, and the only one recommended for realistic campaigns. A smaller "core" mecha is built *within* a larger mecha "shell." The core contains the mecha pilot, enabling him to escape or fight on in a smaller mecha after the outer shell has been crippled or destroyed.

The Core

Build the core first as either a battlesuit or a drivable mecha, using the normal design rules. Some core designs omit arms and legs, and propel themselves entirely through thrusters. These flying "escape pods" can be armed, and will have an aerial performance but no ground performance.

The Shell

After the core is finished, build the larger shell. It is built like a normal mecha with several exceptions:

1. The shell may not have a battlesuit system and does not *require* a cockpit, since the core mecha's cockpit or battlesuit system controls the shell.

2. The shell may omit power systems if desired, using the core mecha's power system. Alternatively, the power produced by the core mecha can be used *as well as* any power system in the shell. While the core is inside the shell, its power need only be used to provide the core's cockpit power requirement – all other power can be diverted to the shell's systems.

3. The shell mecha requires weight and volume in its *body* for the core mecha and connections. The "core system" (with mecha) is 1.2 lbs. per pound of core mecha loaded weight, takes up volume equal to the core mecha's volume and costs $3,000 + ($20×core mecha loaded weight). Cost halves at TL9 and again at TL10+.

4. When the core mecha is inside the shell mecha, the combination is referred to as the "combined mecha." The combined mecha is controlled by the core's pilot (and any other core mecha crew). The only systems the core can use while inside the shell are its power systems and controls. If the core and shell separate, the shell can function on its own if it has a power system and has a manned cockpit or is remotely piloted by the core mecha (see below).

If the shell can function independently of the core, it will also need a second set of performance statistics, minus the weight of the core and with any changes that might be required due to the loss of the core systems.

Core/Shell Mecha in Play

Damage to the combined mecha affects only the shell, not the core, with one exception: if an explosion or fire does damage that penetrates the DR of the shell's body, one-quarter of

that penetrating damage is also inflicted on the body of the core mecha. The core's DR protects against this damage, however.

The core can separate from the shell (or its wreck) at any time. This takes two seconds and splits the mecha into independent shell and core; a hatch slides open, magnetic bolts are released and out pops the core. Once independent, the core's statistics are those of the original core mecha design. The core and shell may rejoin into a combined mecha. This requires contact and takes two seconds.

Remote Control: The shell can be remotely operated if the core remains in communicator contact with it and runs a Datalink program. As the systems for controlling the shell are already in place, no other hardware or software is required. However, if the pilot wishes to control *both* core and shell at once, all of his mecha-related skills will be at a -2 penalty.

Super Combining Mecha

A group of mecha (called "sub-mecha") can be designed to combine into a single, larger mecha (called the "combined mecha). To design such a mecha, follow the steps below:

First, choose the combined mecha's subassemblies as if you were designing a normal mecha. Next, design each of the sub-mecha using the standard rules, but observing the following restrictions:

1. Each sub-mecha will be assigned either to one of the combined mecha's subassemblies or to its body. Any number of mecha can be assigned to a given limb, but at least one must be assigned to the body, and none can be assigned to wheels or wings.

2. Any subassembly that does not have at least one mecha assigned to it (*including* wheels and wings) must have a subassembly of the appropriate type assigned to it from one of the sub-mecha that forms the *body;* e.g., if the combined mecha has a turret and no sub-mecha are assigned to it, the turret of one of the mecha forming the body must be assigned as the combined mecha's turret.

3. Each sub-mecha must have a transformable structure (see p. 88), and one of its configurations must be set aside as its "combiner configuration." This configuration must have *all* of its subassemblies folded, unless that subassembly has been assigned as one of the combined mecha's subassemblies. The system necessary to combine the mecha is integral to the mecha's transforming structure.

Find the volume of each of the combined mecha's subassemblies by adding together the total volumes of all sub-mecha assigned to that subassembly. If a sub-mecha's subassembly is assigned as one of the combined mecha's subassemblies, use its volume instead. All of the mecha's legs must have the same volume, and their total volume must be at least 60% of the body's. Likewise, its wheeled subassembly and each of its wings must have at least 10% of the body's volume. If these conditions aren't met, redesign the sub-mecha which make up the legs or provide the wings and wheels.

Combined Performance

Use these rules when the mecha have combined:

Combined Statistics: The *combined* mecha's empty and loaded weight and mass are equal to the sum of the respective statistics of *all* sub-mecha. The same is true of combined volume, which is used to find a combined Size Modifier. *Don't* work out a combined HT, however. Calculate dimensions by plugging the volumes of the combined mecha into the applicable formulae on p. 91. The combined mecha's Arm ST is found by adding together the ST of every body and arm of the sub-mecha assigned to the arm in question.

Combined Ground Performance: The combined mecha's effective motive power is found by adding together the motive powers of every drivetrain found in the mecha's legs, plus 0.002 kW × the total ST of every arm motor found in the leg. Calculate ground performance using this motive power and the combined mass. Streamlining is the *lowest* among all the sub-mecha forming the combined mecha. gMR and gSR are based on the *combined* body volume.

Combined Aerial Performance: This is also based on the new combined statistics. Motive thrust and contragrav lift from *all* the combined mecha are additive. Aerodynamic drag is calculated individually for each of the sub-mecha, then added together.

Combined Space Performance: This is based on the combined weight of the mecha and the total thrust of all space propulsion systems.

Stealth, IR Cloaking and Chameleon Systems: If the mecha in the combination have different levels of any of these systems, the *least* effective system is used; e.g., if one sub-mecha has basic stealth, one has radical stealth and one has none, the combined mecha has no stealth.

Transforming: The sub-mecha cannot transform once combined.

Super Combining Mecha in Play

Combining: All the mecha in a combination must move into contact to combine. If flying, the GM can require skill rolls to avoid collisions! Combining requires activating various physical, magnetic or nano-locking systems and takes two turns, during which the mecha can do nothing else. Combining is impossible if any of the sub-mecha has a disabled body. A core/shell mecha must be joined together before it can form its part in a combination.

Control: The combined mecha is piloted by *one* of the sub-mecha, designed when the mecha is built. The other crews, if any, may operate ranged weapons, communications, ECM or sensors allocated to them by the command pilot. Note that it is possible for some mecha in the combination to be unmanned: they simply become non-functional when they are not combined.

Combat: The attacker decides which combined mecha location to target. If a location contains multiple sub-mecha, determine randomly which sub-mecha is hit; damage is resisted by that sub-mecha's body DR and is applied to its body hit points. If the *body* of any sub-mecha is disabled, the combination breaks up.

Separating: Any of the involved mecha pilots can choose to break up the combination. This takes one turn. After separation, the mecha end up adjacent one another.

Energy and Fuel: These can be transferred between mecha while connected (fuel is limited to 190 gallons/minute).

These rules drastically modify the way mecha are built. Decide whether they will be used before the design is started.

Energy Exosuits (TL12+)

At very high tech levels, a battlesuit can be made largely of energy fields rather than matter. A suit like this has a small physical connection to the wearer – a belt or harness – while its remaining components are composed entirely of energy and remain insubstantial when not in use.

Energy exosuits appear in several comics and novels. The most detailed descriptions are in Fred Saberhagen's *Berserker Man* and Greg Bear's *Hardfought.*

An energy exosuit is built exactly like a normal battlesuit except:

1. It cannot have any weapon that requires ammunition.
2. It cannot have any thruster or power plant that requires fuel or reaction mass.
3. It cannot have any cargo.
4. It has an "energy structure." There is no extra cost (but see below), but divide structural weight by 10.
5. It cannot have any armor, which is why it is an "energy exosuit" rather than a battlesuit!
6. It *must* have a deflector field generator (p. 105), which provides the "web" that holds the suit together. It usually has a force screen as well, to protect the wearer.

The energy exosuit is generated by a "harness." The harness is built after the mecha has been built and its weight and price statistics determined. Decide which of two styles the mecha uses:

Basic Harness: This consists of bands round the chest, ankles, neck and wrists that generate the field. Each band is packed with sophisticated circuitry. If the suit has a neural interface system, it may have no controls. Otherwise, it has an on/off control on the belt. The harness weighs 2% of the loaded weight of the mecha, with most of the weight in the belt. It costs 10 times the battlesuit's cost.

Compact Harness: As above, but requires only one set of connection points – e.g., pair of wrist bracers or a belt – to generate the field. Harness weight is 1% of the battlesuit's weight, harness cost is 20 times the battlesuit's cost.

The harness' weight does not add to the suit's weight; the harness *becomes* the suit when it is activated.

Only light clothing like swimwear, a body stocking or a superhero costume can be worn under the harness. (This also includes skintight armor, like the biosuit on p. UT26.)

Using Energy Exosuits

Activating an energy suit involves putting on the harness and turning on the deflector field. After this is done, the suit forms around the user. It looks just like a battlesuit of whatever size was constructed, except that it is made of shimmering fields of gauzy, not-quite-solid energy. To remove the suit, reverse the process.

Putting on or removing a harness takes one-quarter the time normally required to do the same with a battlesuit. The harness does nothing when not activated. It has DR 5, and damage suffered by it is doubled and applied to the body hit points of the suit.

Anachronistic Mecha

What if Victorian inventors had developed mecha? They're just the thing for fighting Little Wars in the Colonies, don't you know? Or perhaps these Land Juggernauts could be the answer to H.G. Wells' Martians, created with salvaged Tripod technology. For a step even farther into the past, wizard-gadgeteers in a medieval realm might also build their own mecha!

TL: Assume the mecha has TL8 components, unless noted below.

Advanced Mecha: All advanced components and rules are "in genre" except socket interfaces, nukes and perhaps force fields. Redefine the TL to match that of the campaign.

Enchantments on Mecha: The GM must arbitrate the effects. If the energy cost is based on size in hexes, multiply cost by (mecha volume/85), with a minimum of 1. When energy depends on weight, use loaded weight. For armor enchantments, multiply energy cost by (area being armored/25). When *Fortify* is cast on a location with DR 20+, each +1 to DR instead adds 5% to DR. See also ***GURPS Grimoire*** for useful "technomagic" spells!

Drivetrains: Use rules for TL9 drivetrains, but quadruple the weight and divide cost by 5.

Arm Motors: Use rules for TL8 arm motors, but double the weight, volume and cost.

Thrusters: Either these aren't available at all, or assume that TL10 reactionless thrusters are invented at a much lower TL . . .

Cockpits: The mecha is controlled by levers, pedals, et cetera. The cockpit has no HUD, computer or fire extinguisher. It weighs 370 lbs., takes up 23 cf, costs $150 and requires 0.5 kW.

In a Victorian setting, life support lasts only half as long (12 hours, plus 6 hours per extra air upgrade). In a medieval setting, always take the "no lifesystem" downgrade. The only other upgrade or downgrade that can be taken is "extra seats." Lifesystem and extra air upgrades or downgrades cost $50.

Battlesuits can't have *any* upgrades except for provisions or (in Victorian settings) a half-duration lifesystem.

Weaponry: Medieval mecha may have built-in claws or talons (but not monomolecular versions), the baroque weapons on p. 99, or carry giant medieval weapons (p. 110). Victorian mecha can also use TL5 weaponry. The rotary cannon is a Gatling-style gun operated by a hand crank. The 12-pounder is an antique smoothbore firing cannon balls; it may be possible to find one in a junkyard. The 105mm and 254mm are "modern" shell-firing cannon of the sort used by the Royal Navy.

Victorian Cannon Table

Name	*Damage*	*SS*	*Acc*	*1/2D*	*Max*	*Weight*	*Volume*	*RoF*	*WPS*	*VPS*	*CPS*	*Loaders*	*Cost*
12-pounder	Cr. 6d×6	30	6	550	2,400	2,500	50	1/60	19	0.13	$3.8	5	$9,200
37mm Rotary	Cr. 6d×3	20	12	560	3,400	350	7	var*	2.8	0.019	$0.56	0	$1,400
105mm Naval	Cr. 6d×8(0.5)	30	13	950	4,600	3,000	60	1/9	43	0.43	$26	2	$8,000
254mm Naval	Cr. 6d×19(0.5)	30	15	1,500	6,100	12,000	240	1/42	610	6.1	$180	6	$31,000

* RoF for the 37mm rotary cannon depends on the skill of the gunner turning the crank: it is (DX+Skill)/4.

The 105mm and 254mm guns fire shells that do crushing damage (but armor protects at *double* DR against them) and then explode for 6d×5[10d] if 105mm or 6d×64[12d] if 254mm. If the crushing damage penetrates armor, DR does not protect vs. the explosion!

Loaders: Some weapons require *loaders.* These don't require cockpit seats – instead, they must be given *standing room* in the same location as the weapon. Allow 20 cf and 200 lbs. (including the occupant) per loader.

Sensors, Comsuites, ECM: Skip these systems – the crew look out portholes, use hand-held telescopes, wave flags, et cetera. PESAs (at TL8) are optionally available as improved telescopes; they have only a DLTV setting, and are 1/10 cost.

Power Plants: These use magic or, in Victorian campaigns, steam power!

Steam Engines can be TL5 steam engines or experimental, early-TL6 steam turbines. Either works only in a breathable atmosphere. A steam engine can be shut down to conserve fuel, but starting it again requires five minutes plus one minute per 10 kW of power to "build up a head of steam."

Mana engines transform local mana (magical energy) into electrical power. They do not require fuel, but do not function in no-mana areas. Their creation requires a variant of the Powerstone spell (prerequisite: Power spell) and costs 100 energy per kW of power output.

The statistics are shown on the table below:

Anachronistic Engine Table

Type	*Weight if output is*		*Cost*	*Fuel*
	under 5kW	*5kW or more*		
TL1-4 Mana Engine	50×kW	(25×kW) + 125	$20*	none
TL5-7 Mana Engine	10×kW	(5×kW) + 25	$50*	none
TL8+ Mana Engine	2×kW	(1×kW) + 5	$50*	none
TL5 Steam Engine	100×kW	(50×kW)+250	$0.8	0.05C
TL6 Steam Turbine	125×kW	(25×kW)+500	$1	0.04C

* Minimum cost is $1,000, regardless of weight. This *doesn't* include the cost of the enchantment. In a "common magic" setting, add an additional $25 per energy point to cost.

Weight: Calculate the weight of the power plant as shown on the table above, based on output.

Cost: This is the cost per pound of power plant weight.

Fuel: "C" indicates the engine runs on coal; this is the amount of coal burned per hour, in cubic feet.

Volume and Location: Volume is weight/50 cf. It can be located in the body, a pod or wings.

Energy Banks: Use clockwork (weight is 0.25 lbs. per kWs, volume is wt./50 cf, cost is $20 per lb.) or, if Victorian, early batteries (weight is 0.03 lbs. per kWs, volume is wt./200 cf, cost is $0.25 per lb.).

Fuel Tanks: Steam power needs a coal bunker rated for the cubic feet of coal it can store. Its empty weight, volume and cost are 6 lbs., 1.2 cf, and $1 per cf of storage. It should go in the body. The coal itself is 50 lbs. and $1 per cf.

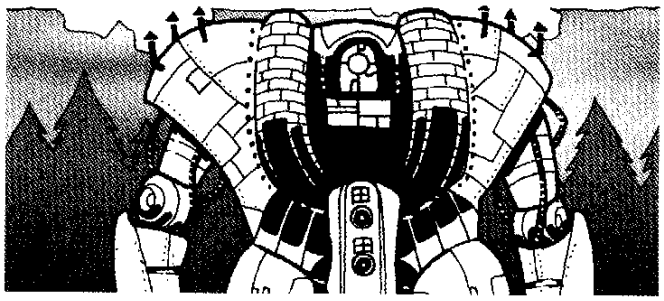
Structure: Multiply the *weight* of a TL8 structure by 3 if Victorian or 4.5 if medieval, but divide its *cost* by five.

Defensive Surface Features: These are unavailable.

Armor: Only metal armor, and this is riveted iron or steel. Use the normal metal armor rules (p. 89), but with a weight of 0.7 if medieval or 0.6 if Victorian, and a cost of $6 per lb.

Some cheap mecha may use wooden armor instead of metal! Wooden armor has a weight of 1 lb. but costs only $0.25 per pound. It is flammable and its PD cannot exceed 3.

Performance: This is calculated normally, but there is a penalty of -0.25 to gMR and -0.5 to aMR due to the mecha's lack of computerized controls.



NON-MECHA

A mecha campaign can simply involve walking machines slugging it out with each other, but it may also feature other types of vehicles. ***GURPS Mecha*** *can* be used to build non-mecha vehicles. For example, a fighter can be easily built: design a mecha with thrusters but no arms and legs, or a winged mecha that isn't transformable. For a "drop ship" or "assault boat," do the same but add enough cargo space to carry several mecha or battlesuits. For a full treatment of vehicles like cars, tanks and starships, see ***GURPS Vehicles,*** *Second Edition.*

Drop Capsules

A drop capsule is a reentry capsule protected by an ablative heat shield, allowing a single mecha to be dropped from a ship in low orbit. Reentry is automatic: after a series of braking parachutes have reduced descent speed, it breaks up a mile or so above the surface and the mecha is landed via parachute or jump jets. Assume that a capsule is 100 lbs. 1.6 cf and $1,250 per cubic foot of cargo it can carry. Determine its Size Modifier based on its volume. The capsule has DR 100 fireproof ablative armor.

Stealth Capsule: This is a drop capsule equipped with extra decoys and stealth systems, giving a -5 penalty on any roll to detect it and PD 5 vs. any incoming homing missiles. It is 150 lbs., 2.5 cf and $5,000 per cubic foot of cargo it can carry.

These can be used by any mecha with manipulator arms. As with hand-held ranged weapons, these are not "part" of the mecha, and when carried count toward encumbrance, not loaded weight.

Mecha-Sized Medieval Weapons

Wielded by a mecha's powerful arm motors, even ancient melee or thrown weapons can be devastatingly effective. Better still, they don't use up great amounts of power or require ammunition.

To build a mecha-sized medieval weapon, refer to the *Ancient/Medieval Hand Weapon Table* on p. B206 and select a weapon. Decide on the *Weight Multiple* (WM) of the weapon; i.e., how many times heavier than a human-sized weapon the mecha-sized weapon will be (e.g., a "20× broadsword"). The suggested WM is (Arm ST of the mecha arm that will use the weapon/normal Min ST of the weapon). See p. B206 for Min ST; if no Min ST is listed, treat Min ST as 5.

Modify the weapon's statistics as follows:

Type: This remains the same.

Damage: Multiply any damage bonus (e.g., sw+2) shown under *Damage* by the WM. If there is no damage bonus, then *add* a damage bonus equal to WM/2. If there is a damage *penalty*, like sw-2, add WM/(2 + absolute value of damage penalty) to it. The absolute value of a damage penalty is that number with its minus sign removed. Round fractions down.

For instance, suppose a weapon had a WM of 120×. If it did sw+2 damage, like a bastard sword, its giant form would do sw+240 damage! If it did sw damage, like a shortsword, it would swing+60 damage. If it did sw-2 damage, like a large knife, its damage would be sw-2 + [120/(2+2)] = sw+28.

Reach: Multiply the Reach by the *square root* of the WM, rounding to the nearest whole number.

Cost, Weight and Min ST: Multiply these by the WM.

Note: These rules can also be used to create hand weapons for giant-sized races. Simply substitute racial average ST for Arm ST.

Ultra-Tech Edged Weapons

Giant Vibroblades (TL8): Any edged hand weapon may have a vibroblade. This adds +1d damage and, more importantly, an armor divisor of (5). It costs an extra $200 (if knife), $400 (if sword) or $1,000 (if other weapon), *multiplied by the weapon's Weight Multiple.* It is powered by a number of B cells equal to its WM, for (60 minutes/original unmultiplied weight). In some anime, vibroblades are called "heat blades" – the vibrations may make the blade glow red hot, hence the name.

Giant Monomolecular Blades (TL9): This is an edged weapon with a monomolecular wire along its edge, giving +1d additional cutting damage and an armor divisor of (10). Any swung cutting weapon (but not thrusting or impaling weapons) can be made in a monowire version. It increases cost by the Weight Multiplier × $500 for knives, × $1,000 for one-handed swords or × $1,500 for larger cutting weapons, including two-handed swords. Monowire weapons cannot be vibroblades.

Giant Force Swords (TL11): These energy blades are described on p. B50; use Force Sword skill. A force sword does 4d(5) impaling or 8d(5) cutting damage. It is $3,000 and 2 lbs. for a normal-size sword with Reach 1-2. Larger versions for big mecha are possible: doubling the weight and cost adds +1 reach, +2d(5) impaling damage and +4d(5) cutting damage. In some cinematic settings, earlier types of energy swords may be built at TL9 or TL10. They are identical, except these "plasma swords" or "beam sabers" do only 3/4 damage at TL10 or 1/2 damage if built at TL9.

Shields

Mecha often carry large shields, especially in cinematic campaigns. A *mecha shield* is customized to the individual mecha. A mecha can only carry a single shield. Only an arm whose strength is at least equal to the *body's* surface area can carry a shield big enough to provide a PD bonus for a mecha.

Designing a Shield

Decide whether the shield is going to be a buckler or a small, medium or large shield. A shield's surface area is 10% of the body area of the mecha it is intended for if a buckler, 20% if a small shield, 30% if a medium shield or 40% if a large shield.

Calculate the shield's hit points as its surface area × 15, then go to *Step 22 – Armor* and give the shield its DR as if it were a subassembly. Add 20% to the armor's weight and cost to find the shield's total weight and cost. The shield's final weight should always be less than three times the ST of the mecha arm intended to carry the shield.

The shield's Passive Defense is not based on its DR. Instead, it is 1 if a buckler, 2 if small, 3 if medium or 4 if large.

A shield's *damage* score is equal to its DR and its hit points, in that order, separated by a slash; see sidebar, p. B120. Thus, a shield with DR 50 and 120 hit points would be rated as "50/120." After you have recorded the shield's damage score, ignore its DR and hit points – the damage score subsumes both of these functions.

A shield may be given a single hardpoint (treated as an arm hardpoint); its capacity can't exceed 20 lbs. × the shield's hits (i.e., the second number in its damage score).

Using a Shield

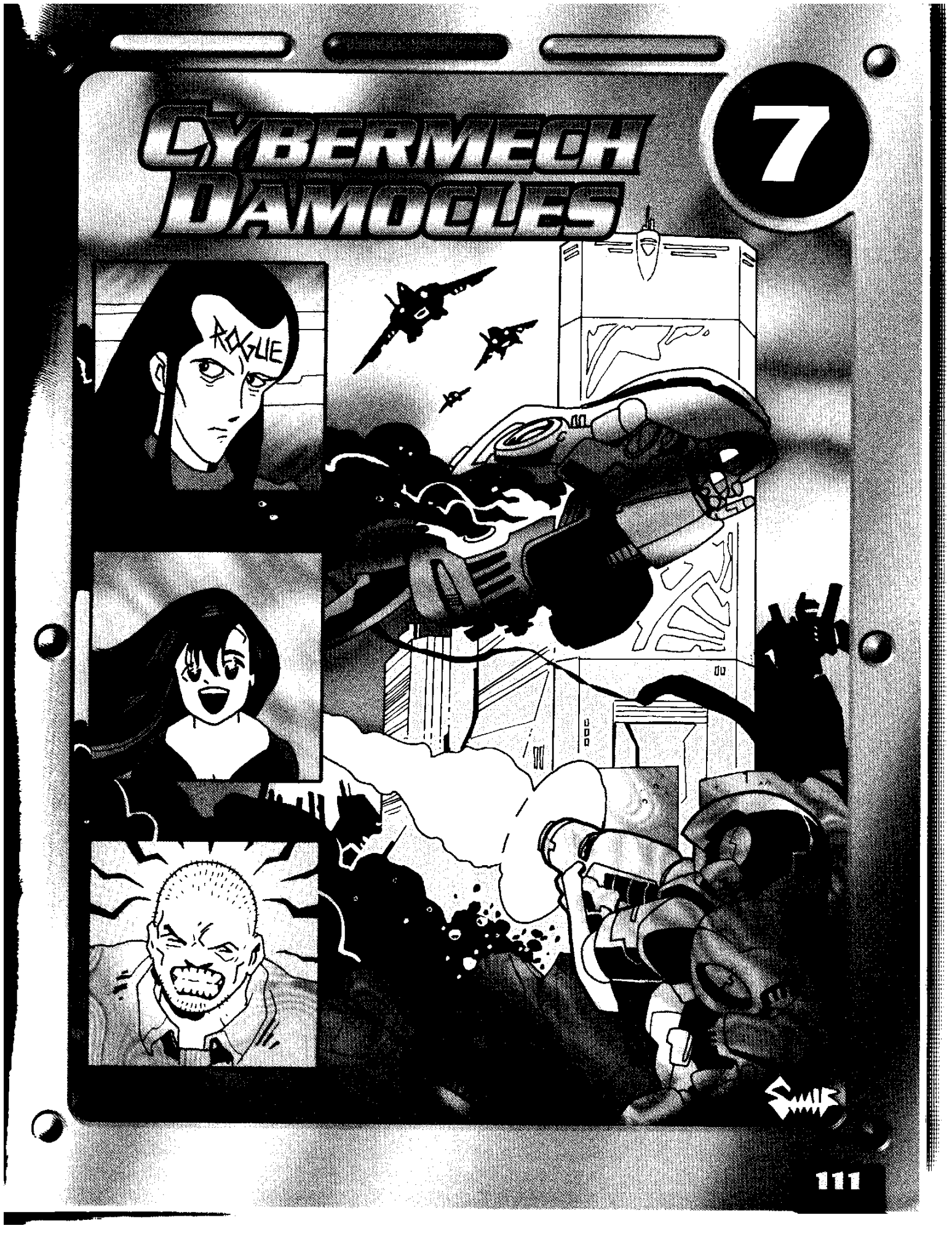
A mecha shield is used exactly like a normal shield. It can be ready or stowed on the back. It is suggested that the *Damage to Shields* optional rule always be used, to reflect the fact that firepower can easily tear a light shield to bits.

An arm that has folded away (see *Transformable Mecha*, p.100-103) cannot have a ready shield – before folding, the shield should be stowed on the back or it will be dropped.

The cost of repairing one point of damage to a mecha shield is equal to (shield's cost/shield's original hit points).

Using Other Mecha's Shields: A mecha's shield is customized to the mecha it is built for. If a mecha's shield is used by a different mecha than the one it is designed for, its relative size may provide more or less PD. Divide the surface area of the shield by the surface area of the new mecha's body and multiply by ten. This is the PD the shield provides, up to a maximum of PD 4. Round fractions down! If PD works out to 0, the shield is too small to adequately protect the mecha. If the shield's PD is 4, the shield is treated as a "large shield" for purposes of skill penalties while using it. Otherwise there is no skill penalty, regardless of its size.

Shields Designed For Humans: A battlesuit may use a shield built for humans, but the shield may not be large enough to do much good. Subtract the Size Modifier of the battlesuit from the shield's PD! If this results in a PD of 0 or less, the shield is useless.


CYBERMECH
DAMOCLES
7
ROGUE
SMIF

We drove down the muddy dirt road in the fading light, Mara in the van, myself on the cycle. We'd stopped a mile back to let the air out of a tire. It was an excuse to knock on their door.

We're so secret we can't get search warrants.

I called Mara through my helmet radio. "What's the census data say about them?"

"The Wiley farm," Mara said. "Two adults, a kid and a dog. Nearest neighbor's a klick and a half down the road. I think they use some immigrant labor come picking season."

"Great." The property looked normal enough: a wooden farmhouse with peeling red paint beside a fenced-off field, rusty but serviceable tractor sitting idle amidst the corn.

We still had six farms in the area to search. No reason to believe this was it. I saw a kid's red-painted tricycle in front.

Every reason to hope it wasn't.

We pulled into the gravel driveway, Mara's van lurching a little because of the fake flat. She leaned on the horn, and we waited. A minute passed.

"Something's not right," Mara said.

"Hey, no one's working in the field, but it's just finished raining," I told her. "Maybe they're asleep or something. They turn in early in these parts."

Just then a farmhouse door opened and a man stepped out. He looked human – he was wearing a checkered work shirt and jeans. He was holding a shotgun, but it was evening and in this part of the country, I'd have been suspicious if he wasn't armed.

He paused, taking in the brightly-painted cycle and Mara's red, white and blue van, the large, red eagle on the side, the flat tire.

"American Eagle Stunt Racers?" he said slowly. "Is that a fact?"

"Sure 'nuff," I told him, relaxing a bit. He sounded human. "We'll be at the state fair. Thing is, Mara got a flat and the spare's a dud. We can't raise the AAA."

"A flat, huh?" he said. He glanced at the van, stared back. "Missus and the kid is in bed. I can get you a tire from the pickup. Nice bike." He stepped forward, hand extended. "What's its make?"

Mara's voice suddenly cut in, loud and urgent:

*"Ken – **where's their dog?**"*

The farmer's grin widened, and his entire face just split. A wet tentacle emerged and I saw three eyes.

"Human, you are meat," he hissed.

A Gyre! No time to draw the gun! I slammed down the accelerator and hit the supercharger. The Kamen Panzer leapt forward as I crashed into his body with a wet squishing sound. Then the windows of the farm house shattered and a dozen leaping shapes emerged. They looked like humanoid panthers and they carried alien weapons. Good thing none were in battlesuits.

I hit the lever marked "Transform." The cycle bucked up and folded like steel origami, enshrouding me in laminated armor, and suddenly I was wearing a battlesuit. Targeting displays popped into life in front of my eyes.

I staggered as an energy beam from the house glanced off my armor. I raised my arm, centered the HUD's deathdot and walked a burst along the building, saw alien shapes fall and lie still. "That's for the Wileys."

I heard a noise behind me, whirled around. The tractor in the corn field shimmered like heat lightning and I knew we were in trouble. In its place squatted a bulbous, insectoid machine, bristling with weapons.

An alien Deathstriker!

"Mara, watch out!"

"Let's do it!" Mara shouted. With a grinding of hydraulics, her own van

transformed. A moment later, a humanoid giant stood beside me: the Kuonoichi 5 cybermech, latest product of UNISTAR's labs.

The Deathstriker swivelled to face us, its sensors glowing like red eyes, beams pulsing from the cannon on its head. I threw myself flat as the pickup truck next to me exploded.

Mara yelled like a banshee and triggered the Kuonoichi's jump jets. As she flew, she readied the sword on her back. Iaijutsu, the lightning draw! Her heat blade hummed into life as the two machines crashed together with a noise like colliding locomotives. The alien was larger, but Mara's blade was faster: the Deathstriker's head was severed, bouncing into the corn.

The headless torso stood, gun pod wavering. The pilot was in the body, but he'd lost his main sensors. Now! I triggered my own jets and leaped behind it, where I hoped its armor would be thinner. I fired my missile pods, the missiles leaving smoky trails as they spiralled toward the Deathstriker. Three slammed into its upper body just as Mara jumped backward, firing her beam cannon from only ten meters away, and suddenly the alien mecha exploded. When the dust cleared, only debris remained amid the lazily burning corn field.

"And that was for their dog," Mara said. "Let's go find their lander."

Damocles

It began in U.S. Space Command, a quiet reopening of Project Blue Book. Some of us knew there were alien ships, but they wouldn't show up on radar; often, they were invisible.

Then we found one that wasn't. We detected it coming in at Mach 5 over Greenland, gliding down from orbit. It was no meteor or satellite. We scrambled from Thule AFB. This was it.

It crash-landed in the ice and we knew it wasn't one of ours. Major Mackenzie's special team went in. They expected aliens, robots, just about anything – except a teenage girl with zebra-striped hair and two Earth kids, one of them dead.

We cut her and the two children out of the wreckage, loaded everything else into choppers and flew them to Groom Lake. A Norwegian icebreaker, the *Polar Glory*, had seen the flash, heard a bang. Space Command made sure the media knew that a big meteor had burned up over Greenland.

The alien girl didn't speak any language we knew, and the surviving boy was confused. His name was Pepe, he was from Spain, and the girl had rescued him from bad people who had come down from the sky and kidnapped him. His parents were dead.

We put 'em in quarantine till we were sure they didn't have the Andromeda Strain. Some bastards back in Washington wanted to dissect the girl. We settled for a thorough study. She had two hearts, different cellular structure, but she liked hamburgers and hated Coke. She was fascinated by our machines. In a month she learned English. Her name was Moth, and she was an alien, a Del Karva . . . and Gebberoth.

The Gebberoth

Earth is on the fringes of a multi-species Galactic Hegemony. We're off limits; a "protected world" with a primitive culture. The only visitors allowed were to be infrequent Hegemony Science Institute covert survey teams, who would monitor our progress toward civilization. Trouble is, we're also an exploitable resource.

See, the Hegemony is at least a century more advanced than us. They've got a faster-than-light hyperdrive, fusion power and pseudo-sentient *biocomputers*. These biocomputers are the heart of Hegemonic information technology, but they require organic brain tissue. However, cloned brains proved to have poor myeliza-

Campaign Setting and Characters

This background is intended for a cinematic campaign with 150-point characters. The setting is contemporary Earth, with PCs as members of UNISTAR, most likely serving in Section Six — Mobile Assault. However, with GM approval, players could also take Hegemony bounty hunters or even Gebberoth as characters.

Except for some newly-designed mecha, humans are generally late TL7, while the alien tech level is TL9-10. However, human characters may have TL8 or TL9 skills relating to alien technology.

The Galactic Hegemony

The Hegemony is the super-government that is supposed to enforce "protected world" status on Earth. It is dominated by the Del Karva race (p. 114). The Hegemony ranges from TL10 in the inner worlds to TL8 on the frontier. It has hyperspace-based faster-than-light travel (at 0.2 parsecs a day).

The Dictat: The Hegemony governing senate, an aristocratic body elected from the wealthy of member worlds.

The Magistratum: The Hegemony's interstellar court of justice. It can (try to) sentence criminals, and also posts rewards. It has no police force of its own, but relies on local planetary forces, the Star Force and bounty hunters.

Hegemony Star Force: A combination interstellar navy, patrol and marine force. It is well-trained and well-equipped, with TL10 ships and mecha, but is also somewhat thinly spread.

Hegemony Science Institute: A galactic survey service that also runs major universities. Its covert Survey Teams consist of xenologists, surgically altered to blend with natives. They are the only Hegemony citizens permitted to visit Earth. The Institute sends such a mission to Earth every twelve years or so, which stays for a year before departing; there's one due soon.

The nearest Hegemony outpost is Sothis, three parsecs away in the binary system Sirius. It is a space habitat whose 500,000 inhabitants mine the mineral-rich Sirius B asteroid belt. Beyond the main colony station, competing mining corporations and mecha-equipped claim jumpers struggle for the mineral-rich areas. Both Gebberoth gangs have agents and hired mercenaries there. The presence of a rather overworked Star Force base has limited conflict to a few assassinations.

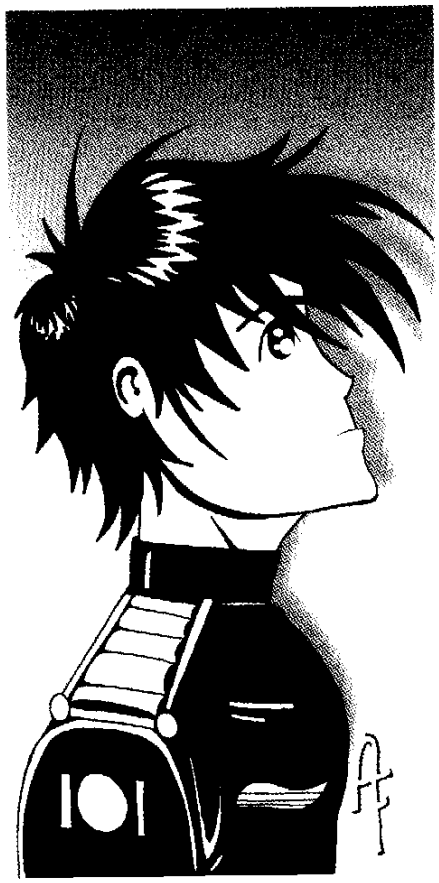
Del Karva 50 points

Thanks to parallel evolution on their Earth-like homeworld of Karva, this race looks nearly identical to humanity. The only differences are a wide variety of exotic eye and hair colors, and – internally – paired hearts and no appendix. Their blood is red, but a microscope would show some cellular differences.

Society: Nuclear families exist within a caste system in which people are born into a profession, such as magistrate or genetic engineer. New castes form when an existing caste is too large (e.g., the genetic engineers formed from the biochemists, who formed from the physicians). The Gebberoth ("outcastes") are a criminal syndicate that accepts anyone. Most Gebberoth are deserters from the Star Force, Hireguard (mercenary) or Voidskipper (space merchant) castes, although some were born into the Gebberoth or came from other backgrounds.

Racial Advantages and Disadvantages: Hard to Kill +1 (5 points), High Technology +2 (50 points) and Unusual Biochemistry (-5 points).

Characters: Del Karva in our solar system are almost certainly either Gebberoth or bounty hunters.



tion of the nerve fibers, making them less than efficient without expensive control processes. To undercut their competitors, some unscrupulous Hegemony computer cartels take a short cut: the use of the brains of sentient beings.

That's where the Gebberoth come in. They're criminals, pure and simple. These "mindslavers" raid primitive worlds whose natives have brain tissue compatible with the biocomputers. They kidnap and brainstrip the victims, then sell the parts to the cartels. The Gebberoth began operations on Earth nine years ago.

Tostag

Overboss Tostag was the first Gebberoth to claim Earth as his territory. He established a base on the far side of the moon. Stealthed "wingships" inserted Gebberoth enforcers into rural areas at night. They set up bases and took their time kidnapping people. When they had a full load, the wingship would take the captives to Farside. There, they were brainstripped and frozen. Every few months, renegade star traders would pop out of hyperspace to haggle for the goods and resupply the Gebberoth.

Tostag was content. He was making vast sums of money, and while lacking a mate, he had created two children, clones of himself. His son Linat was training to succeed him as gang boss. His daughter Moth, a cross-sex genesplice, was attending a prestigious business academy. She was being groomed to establish a "legitimate" corporation to launder the proceeds of his empire.

This plan was shattered a year after Tostag arrived on the moon, when Linat died in a space suit accident.

Busy with operations on Earth, Tostag didn't have time to create another clone. He needed an heir he could trust. He summoned his daughter. Moth was glad to come. She'd been playing truant anyway, cutting business classes to practice piloting or play mechanic. She dreamed of becoming a dashing smuggler, dodging the Hegemony laws in a fast ship.

Moth found Farside base fascinating. She poked into all the nooks and crannies and tried out the controls of the sleek wingships. Then the first consignment of mindslaves arrived for processing. Moth had thought Earth humans were primitives, little more than animals. When she watched her first brainstrip, she was sickened.

That dark shift, Moth didn't sleep. Her father was a monster. Farside was suffocating. She had to act. An hour before dark shift ended, she sneaked into the control room and carefully sabotaged the sensor and alarm systems. Then she broke into the mindslave holding pen. There were only two humans left – both children. Murmuring alien reassurances, Moth led the confused orphans to the hangar bay and stole a wingship.

Moth's sabotage delayed pursuit, but her ambitions outweighed her skill. Her reentry into Earth's atmosphere was clumsy, and she lost control. Beneath her was ice and water. The planet's surface rose up to meet her like a giant fist.

The wingship hit the ice, skimmed, bounced. Moth blacked out. When she recovered, she was in the hands of Americans.

Project Damocles

I was Moth's bodyguard when Major Mackenzie addressed the Senate Subcommittee on Alien Affairs. "An alien sword of Damocles hangs over us by a slender thread," he said. "Fate and compassion may let us turn it upon our foe. Fund UNISTAR, and we can kick these brain-stealing pirates off of Earth, take back the moon and drive them from the solar system."

Beside me, Moth smiled sadly. "Sjas a'mal," she said. But I had been studying her language and understood: "Sorry, father."

The Damocles Project was as big as the Manhattan Project and twice as

secret. We had special labs, top men. UNISTAR was the military branch. United Nations Intruder Space Tracking and Response. US command, of course, or Congress wouldn't fund it. But we've got Brits, Japanese, Russians, Germans – the Gebberoth raided everyone.

Tostag Gebberoth are kidnapping and murdering human beings. Our mission is to stop them. With Moth's help, the labs are working on spacecraft to take the fight to the moon. So far, we don't have enough to risk it. So we try to stop them on Earth.

UNISTAR

The first stage was CATSPAWS, the Covert Alien Tracking Space Passive Array Warning System. It used what we got from analysis of the Wingship's stealth and sensor systems to let us spot them coming. Problem is, we don't have an aircraft or a missile good enough to catch them in the air. So we beat them on the ground.

That's what Mara and I are for. Section Six – Mobile Assault. Most of us are ex-special forces, from different nations: I'm ex-Delta Force, I've a buddy who's British SAS, another who's Russian *Spetsnaz*. There are a few exceptions like Mara – she was a Honolulu cop who stumbled onto the aliens herself, found herself in the middle of a UNISTAR op and got recruited afterward.

We didn't always have fancy toys. My first time, we tracked a landing right down to a junk yard off New Jersey. We sent in six choppers and still got our behinds handed to us. We'd expected aliens on foot. Huh. They had *armor*. "Cybermechs," the labs called them – some of the Japanese techs just said "mecha." They were death machines, spitting lasers and particle beams, and they clawed the choppers right out of the air. Their ship got away with no casualties. We had 30 dead. The headlines screamed "SWAT team battles Russian mafia." Right.

It was a disaster, and we were angry. See, the tech boys at Winterbloom House (our headquarters) *knew* the Gebberoth had mecha. Moth had told them, but no one briefed us grunts in the field. We didn't "need to know." Tech division had been working on prototypes themselves, but they were still Top Secret.

Colonel Mackenzie changed that: threatened to resign if we didn't get the stuff *pronto*. Six weeks later, I was modelling 2,000 pounds of alien technology powered by an all-American gas turbine. The XM-12 Covert Transformable Battle Mover. Brutally mixing Japanese and German, Mara dubbed it Kamen Panzer: "masked armor." We got others as well. Section Six had a chance.

The aliens are criminals. So I guess we're police.

The mecha and CATSPAWS make the difference. We started winning some. A few months back we even tracked them to a hidden base and took it out, caught some prisoners for interrogation. We learned we were only nailing maybe one in six landings, but had put a dent in their profit margin. If we kept it up, maybe Tostag might seek easier pickings.

Heh. We forgot that Tostag was only part of the Gebberoth.

Asog Gebberoth Arrives

Tostag started the morning as he always did, drinking the bitter earth stimulant called coffee and staring at his smiling daughter's hologram on the wall. He had removed it many times, to replace it a shift or two later. As she had blinded Farside's sensors, he had not witnessed her death, but the Earth media had reported it: a fiery meteor breaking up over Greenland. Her ship must have burned up in atmosphere.

An Earth expression came to him: Moth to a flame.

Gyre 100 points

The Gyre are human-sized beings with rippling skin and a nightmarish, three-eyed face surrounded by waving tendrils. However, their bodies are protoplasmic and they can alter their shape to mimic any humanoid form. In the distant past, they used this ability to hunt other humanoid races on their homeworld. Today, while they can live on meat animals and processed foods, they enjoy Del Karva and humans, though Tivaak make them ill. They reproduce by fission every 15 years or so, and exchange genetic material with other Gyre by eating their dead bodies.

About 20 years ago, the Gyre lost a bitter war with the Hegemony. Most of the Gyre were wiped out when the Hegemony Star Force bombarded their homeworlds in retaliation for the destruction of the Del Karva space colony of Bezuga Green.

The few hundred Gyre survivors are the feared "Confusion Masters" (Gyre special forces) who were operating behind Hegemony lines. Today, some of them work as enforcers and assassins, ostensibly to get paid for killing other species. Gyre are cooly polite, however, and rarely do their true feelings show through.

Racial Advantages and Disadvantages: ST +3 (30 points), High Technology +2 (50 points), Morph (40 points) and Invertebrate (-20 points). In their natural form, humans and Del Karva find them hideous, but since they can shapeshift, and since they find other races just as ugly to them, that isn't worth points. Common non-racial disadvantages are Intolerance (Humanoid Races) and Social Stigma (Hostile Alien).

Characters: Few Gebberoth syndicates employ the Gyre, since they don't trust them. One exception is Asog, which has a contingent of Gyre "mercenaries" working for it. Gyre conform to the *Special Operative* character type.

Tivaak 55 points

Descended from nocturnal predators on a chilly desert world, Tivaak look like slim, humanoid panthers, with long head hair as well as fur. Humans find them attractive. They are very polite to each other, due to their hair-trigger tempers, and expect similar respect from others. Tivaak tend to be determined but not especially original, and prefer to find variations on old solutions rather than totally new ones. Their speech is a mixture of soft hisses and clicks.

Society: Their homeworld, Hrushvaak, has a techno-feudal culture, dominated by feuding industrial barons who are also military mecha commanders. Tivaak are status-conscious and religious: every Tivaak has a small shrine containing icons of famous ancestors, whose spirits they venerate and seek advice from. Tivaak who leave Hrushvaak are younger children of the aristocracy (the Vykos) who failed to inherit wealth beyond a spaceship or mecha, and who left to seek their fortune by joining the Hegemony Star Force or a Hireguard (mercenary) company. The latter are often served by commonfolk retainers (Osservek), who act as crew and battlesuit troopers. Tivaak are superstitious, and ascribe things like malfunctions or illness to spirits or evil witches.

Racial Advantages and Disadvantages: Alertness +2 (10 points), Extra Fatigue +2 (6 points), Fur (4 points), High Technology +2 (50 points), Night Vision (10 points), Sharp Teeth (5 points), Bad Temper (-10 points), Color Blindness (-10 points), Gluttony (-5 points) and Phobia (Manaphobia, -5 points).

Characters: Vykos are *Techno-Knight* characters with a Chivalric or Samurai Code of Honor and often an Ally Group. Aristocrats who have lost their mecha and wealth tend to be On the Edge, since this leaves them no better than an Osservek. The latter are *Armored Trooper* or *Base Personnel* types.

Tostag threw himself into his work, redoubled his operations. The demand for mindslaves had continued, and his profits mounted up. He had ***bought*** *one of the biocomputer syndicates – a legitimate business front at last. For five years after Moth's death, everything had gone well. Then, the humans became a nuisance.*

At first, that was all they were. Being discovered was annoying, but inevitable. Then came a shock: they attacked with mecha, and an entire base was lost! How did they get them? They hadn't captured any in the earlier skirmishes. Were humans more advanced than the Hegemony had thought? They had reached the moon once. It might be prudent to move his base. Or perhaps what they needed was a lesson. What if . . . ?

There was a beep on his intercom. He frowned. No one was to disturb him in the morning. But it was Kaze Sekbet, his lieutenant. Her fur was stiff, her tail up. A bad sign.

"What is it, Sekbet?" he asked. "The human mecha? Have they attacked us again?"

"Worse, my lord," Sekbet said. "It's the competition. Another syndicate is poaching on our territory."

UNISTAR knew things had changed when we hit the temple in Hokkaido, Japan. We'd tracked a few landings in the area, and figured that was their base. We were about to move in when the scouts reported a fire fight: mecha versus mecha.

We waited for the battle to end and hit the weakened victors. They weren't Tostag Gebberoth – they used different mecha. We called them Deathstrikers. After the fight, there wasn't much left, but we took two wounded prisoners. They looked like, well, nightmares. They didn't live long. Before one died, it said two words.

"Asog Gebberoth."

The Asog-Tostag War

The Asog are a rival crime syndicate within the Gebberoth. They also saw profits on Earth. Asog smugglers set up a secret base in Antarctica and began their own mindslaving, until a Tostag wingship detected an Asog lander and tracked it to its base. Tostag's lieutenant, Sekbet, raided the installation. It went badly: the Asog had been ready. Sekbet's enforcers were forced to withdraw, though not before killing two mecha and a lander.

Tostag didn't want a war, but this couldn't be tolerated. Tostag called a meeting. The two bosses met face to face nine light years from Earth, in a gentlebeing's club at Sirius Station.

Asog's overboss was a gross monstrosity named Balzoa. She oozed politeness, apologizing for the misunderstanding, but suggesting Earth was big enough for both of them. Perhaps they could split it by hemisphere?

Tostag smiled and agreed, all the while seething. Earth was his territory! He had lost his daughter and his son to that blue planet, but the Dark Bird damn him if he would lose his respect! If the Asog thought he would roll over meekly, they'd get a surprise. Before he left Sirius, he was hiring mercenaries.

Balzoa wasn't surprised. The meeting was to distract Tostag. While the gang bosses dined on crottled greeps, Balzoa's lieutenant Shalloth-Jault struck at the moon. A hired starship emerged from hyperspace and launched a squad of Deathstriker mecha against Farside base. Before Sekbet could beat them back, they caused major damage. Similar attacks were launched at ongoing mindslaving operations on Earth. The Asog raiders were successful – except at Hokkaido, where they ran into UNISTAR.

Tostag forces retaliated, but the Asog moved their Antarctica base and Sekbet couldn't find them. She hissed nastily. She'd track their landers. They wanted hide and seek? Fine. She hoped Tostag got back soon. It would be nice to have the new mercenaries . . .

UNISTAR

UNISTAR is a secret, multi-national agency which defends Earth from the Gebberoth. CATSPAWS tracks alien landings while Section Six's mobile units deploy mecha to investigate alien activity.

Organization

UNISTAR is small, for security reasons and because no nation trusts a world army. It has about 1,000 personnel. UNISTAR is commanded by Colonel Robert Mackenzie (rank 5). Under him are six majors (rank 4). Lesser ranks are captain (rank 4), lieutenant (rank 3), sub-lieutenant (rank 2), sergeant (rank 1) and specialist (rank 0). Outside the agency, about 5,000 scientists, soldiers and politicians know of UNISTAR and Project Damocles.

UNISTAR has six sections: Headquarters, Cosmos, Research and Development, Intelligence, Security and Mobile Assault. Its small size means it is sometimes short-handed. As a result, people may be attached to other sections for a temporary assignment. For instance, if a Cosmos section pilot is sick or injured, a mecha pilot from Mobile Assault may be asked to fill her cockpit. UNISTAR encourages cross-training, as well as permitting transfers between the different sections.

Section One – UNISTAR Headquarters

Section One keeps UNISTAR's bases and equipment running. It includes clerical and administrative staff, technicians and medics, as well as the Hermes Global (p. 121) crews. The Section's head offices ("UNISTAR HQ") are in the United Nations building in New York City, but Section One personnel make up the majority of staff at all UNISTAR bases. Use the *Mecha Base Personnel* or *Mascot* character types.

Section Two – Cosmos Squadron

This section operates UNISTAR's small squadron of ultra-tech spacecraft: two wingships and a half-dozen prototype transformable fighters, the *Lockheed-Sukhoi YF/SU-122 Stormhawk.* They also test-pilot new spaceship designs, and consider themselves UNISTAR's elite. The Section has a dozen astronauts (mostly Russians and Americans) supported by Headquarters techs and R&D scientists. It operates out of Stark Field in Australia, with extra facilities at Kennedy Space Center, Edwards Air Force Base and Baikonar.

Snatches

These are quick ways to grab lots of humans. They are rare because they are flashy and risk human media attention, which might in turn be noticed by the periodic Hegemony surveys. However, they may be attempted when either Gebberoth needs a sudden influx of brains to boost its profit margin. Two examples:

Piracy: At night, a wingship hovers over a passenger ship and battlesuited Gebberoth leap aboard to capture the occupants. If the weather is bad, they can cover it up by radioing a fake S.O.S. and then opening the hatches. Otherwise, they may blow it up and release a statement that "claims responsibility" in the name of a human terrorist group.

Busses: A Gyre replaces a bus driver on an all-night coach route. After it leaves the city, he turns off the main route to a deserted side road. The bus is surrounded by Gebberoth enforcers, who herd the passengers into a wingship.

A snatch is only likely to fail to come off if UNISTAR is already shadowing the Gebberoth involved, or has some sort of tip off (e.g., from an inside source like Snarkhunter).

UNISTAR Equipment

UNISTAR can get any TL7 equipment its budget permits. Typical gear issued includes:

Uniform: Worn by base personnel. This is a military-cut uniform in dark blue, with a light-blue, UN-style beret.

Badge: A photo ID and bar-coded identity card for the UNISTAR agency, also including medical information (blood type, retina print, et cetera). Duplicating it requires a Forgery-6 roll.

Headset Communicator: Range 1/4 mile. 1/2 pound.

Ops Bag: Swiss army knife, pair of handcuffs, good lockpicks, flashlight, first aid kit — see p. B213. 4 lbs.

Night Vision Goggles: "Light amplification" goggles that give the wearer the Night Vision advantage while worn. 2 lbs.

Armor: Base Security wear the Gentex vest and PASGT helmet (p. B211). Battlesuit troopers wear no armor under their suits, just a thin, body stocking-like undergarment that can pass as racing leathers. Undercover agents wear normal clothing or a concealed Kevlar vest like the Second Chance Standard (p. B211).

Tactical Armor: UNISTAR has developed advanced prototype body armor for issue to Section Six. This "UNISTAR Tactical Armor" is TL8 Medium Body Armor (see p. B72).

Section Three – R&D

This section is charged with learning more about the aliens and adapting their technology to human needs. Sometimes Section Three agents are assigned to Mobile Assault teams to help them salvage and deal with new alien technology. Section Three is the least militarized of UNISTAR's branches, with many "civilian consultant" scientists. Moth spends most of her time here.

Section Four – Intelligence

This section is responsible for learning about alien operations, predicting their next moves and locating hidden Gebberoth bases. It does this by comparing missing persons and UFO reports with what is known of alien landings and takeoffs. It also studies alien psychology and culture. Moth was helpful to them on Del Karva life and the Tostag Gebberoth, but knew little about Asog Gebberoth, or about the politics and military strength of the Hegemony – something UNISTAR is very interested in!

Section Four also interrogates alien prisoners. A dozen have been taken alive so far, mostly low-ranking mercenaries. UNISTAR does not torture, while drugs are unreliable due to alien biochemistry. Psychological pressure and promises of better quarters, perks, et cetera are used. Captives often agree to reveal information about their Asog or Tostag enemies even if they won't spill their own secrets. A few Intelligence members have learned the Del Karva language, but no one has learned Gyre or Tivaak yet.

Section Five – Security

This section is divided into the Base Security Unit and the Counterintelligence Unit.

Base Security (called "the thugs" by other sections) guards UNISTAR bases. It has a 40-man platoon of soldiers stationed at each main UNISTAR base. Base security platoons have TL7 infantry weapons and Kevlar body armor, plus a four-man squad of battlesuit troopers. As well as guard duty, Base Security provides muscle for Counterintelligence operations, sending detachments to secure captured alien bases or battlefields until all evidence can be removed by R&D and Counterintelligence.

Counterintelligence ("the spooks") consists of specialists from agencies like the FBI, RCMP or KGB, along with at least one reporter so good at digging out the truth that she was hired.

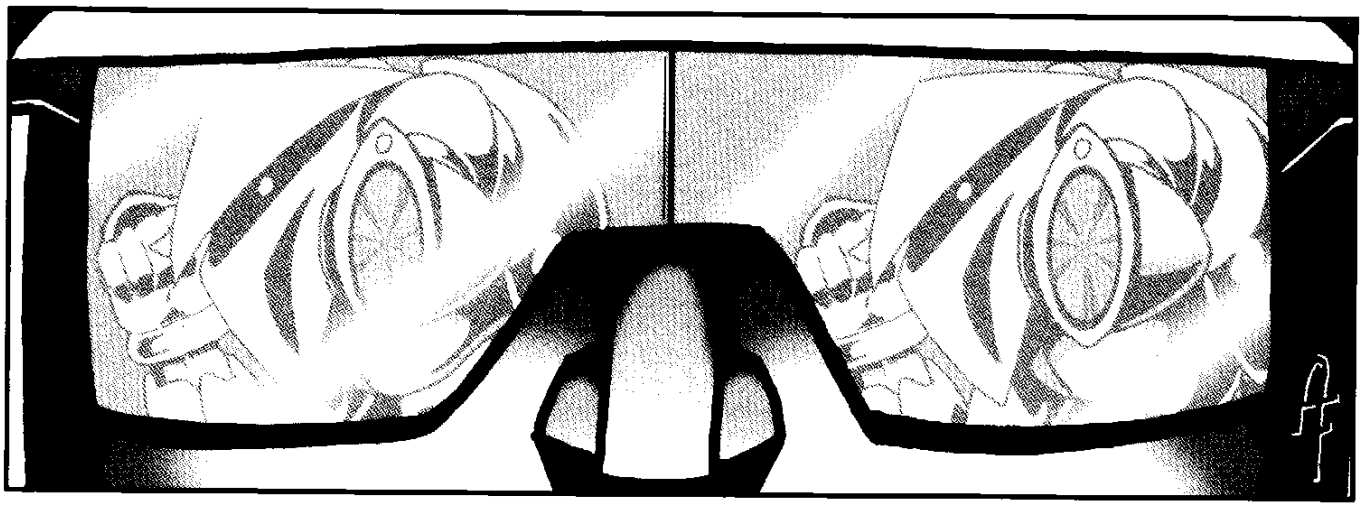
Counterintelligence performs background checks on UNISTAR recruits and roots out any spies within the agency. They also keep Moth under discreet surveillance. So far, there have been no traitors or alien infiltrators, but some people have been caught leaking information to journalists, and one was arrested trying to sell UNISTAR technology to a French company.

The Unit's most sinister role is as "Men in Black." If people discover UNISTAR's existence or proof of the aliens, it may seek to recruit them as UNISTAR agents, steal or tamper with the evidence to discredit them, or – perhaps – swear them to secrecy. As a threat and a final option, UNISTAR has "The Colony" (p. 119). The Unit's spooks retain contacts with their old agencies, so if (for instance) an FBI agent stumbles onto a case dealing with aliens, the Section can try to have him taken off the case and UNISTAR operatives assigned to deal with it.

Section Five's agents have the latest surveillance and security equipment.

Section Six – Mobile Assault

This section is intended to rapidly deploy anywhere in the world to find and deal with alien intruders. It is divided into three Mobile Units – Alpha, Delta and



Omega – each headed by a captain. Each consists of 5 to 10 agents (rank 1-3). Each member has his own mecha or battlesuit. The types used are the XM-12 Kamen Panzer (p. 73) and the XM-13 Kuonoichi (p. 72). The R&D labs are tinkering with other designs and variants as they come to understand the alien technology. These may also be issued for operational testing.

Mobile Units may deploy together or be split up into smaller teams to handle multiple missions. All members must be able to pilot a mecha or battlesuit and have personal combat skills. The team is expected to have a mix of investigative, combat, stealth, medical, technical and scientific skills.

UNISTAR plans to expand Section Six, but deployment of new units has been slowed by limited numbers of mecha, budgetary constraints, a desire for secrecy and operational losses.

UNISTAR Installations

The United Nations Building in New York City contains the offices of UNISTAR. The cover is a "United Nations Intruder Space Tracking And Research" agency, which monitors asteroids or comets that might endanger Earth.

Winterbloom House is an elegant former school atop a hill in Peekskill, New York. Owned by Damocles Research, an ecological crisis management company, it is the headquarters of Section Three and Four. The hill is honeycombed with labs.

The Parish is a Georgian manor house in England. It does contain a small chapel used for services, but most of it is taken up by the offices of UNISTAR's Section Five.

Ruskograd is a ghost town in the Siberia tundra, evacuated after nuclear waste contaminated its water table. Section Three uses the town for testing new mecha with the help of Section Two and Six pilots. Section Six use it for urban combat training. There are rumors about the rats of Ruskograd, but HQ says they aren't true.

Stark Field in Australia, at a weapons test range near Woomera, is the headquarters of Cosmos Squadron. Signs marked "Restricted Area" and "Danger: Unexploded Ordnance" discourage casual visitors. A road runs through the winding sand dunes to a small complex of concrete runways, a control tower and beat-up hangars that look left over from World War II. The real base is underground, the fighters deploying from retractable launch pads.

The Colony is a camp on a small, chilly, South Atlantic island. It is used as a prison and exile for individuals classed as "security risks" by Section Five.

UNISTAR Personal Weapons and Accessories

Almost any TL7 weapon is available. Standard-issue items include:

Pistol: Issued to officers, pilots and covert operatives. Glock 17 (p. B208, Holdout -1) or personal choice.

Submachine Gun: Section Six mecha pilots are issued the H&K MP5K, a very short machine pistol that can easily fit in a mecha's cockpit or under a trench coat. Treat as the MP5 on p. B209 except Damage is 2d+2, Wt. is 5 lbs., Rcl is -3, Shots is 15 and Holdout is -2.

Rifle: Base Security carry Steyr AUGs (p. B209).

Ammunition: UNISTAR issues armor-piercing ammo. While less lethal against people, it can penetrate alien body armor!

Laser Sight: Gives +2 Accuracy and reduces SS penalty from the usual -4 to -1 at up to 50 yards or -2 at 50 to 100 yards. Neg. weight.

Sound Suppressor: Reduces gunshot noise to a loud cough, but damage is -1 per die. Attaching or detaching it takes two seconds. Models exist for the Glock 17 and the H&K MP5. 1 lb.

Anti-tank Weapon: If a full-scale attack is expected, Base Security each carry an M72 LAW rocket. Use Guns (Light Anti-tank Weapon) skill. Statistics are: Type Exp., Damage 6d×4(10), SS 14, Acc 9, 1/2D 200, Max 300, Weight 5 lbs. The weapon is not reloadable; throw it away after one shot.

Limpet Charge: A small block of explosive with a peel-away adhesive backing for attachment to a mecha, door, et cetera, plus a detonator that can be set for any desired time delay. Damage is 6d×6 concussion. 2 lbs.

CATSPAWS

The Covert Alien Tracking Space Passive Array Warning System was created using alien technology. It still isn't complete, due to its high cost, but at present consists of three satellites and four modified AWACS (converted airliners with huge radars).

CATSPAWS' satellites are disguised as comsats. They do not use active sensors, to avoid giving away their location. Their passive sensor arrays can track an alien vessel in Earth-Lunar space for 2-3 hours before it reaches the atmosphere, and follow it as it enters the atmosphere. The satellites' effectiveness degrades as the target slows to aircraft speed and ducks under cloud cover. To continue tracking the target, CATSPAWS "hands off" the track to its AWACS aircraft.

CATSPAWS' AWACS aircraft are mobile, and thus can risk using active sensors. However, radar, even augmented by alien technology, is more easily spoofed by stealth and countermeasures. As well, sometimes the AWACS cannot get into range in time — the aliens may enter the atmosphere over the South Pacific, and if UNISTAR's aircraft can't get to within 300-400 miles in time, it's out of luck.

On a clear day or night, the satellites may be able to track an alien vessel right down to its landing, but otherwise the AWACS-satellite combination may lose the target part of the way down. Thus, UNISTAR may know that a landing took place, but may have a ten-mile, hundred-mile or thousand-mile radius to search. The GM can decide on the result to suit the scenario ("We know it landed within 50 miles, southeast of Chicago.") or based on what he knows of the skill and disposition of the forces involved.

When alien craft are taking off or making long flights in atmosphere, CATSPAWS' AWACS *may* be able to pick them up as they lift off, but generally only if the lift-off occurred in an area that UNISTAR had under surveillance (e.g., one they suspect or know a landing occurred in). Depending on how soon after lift-off it was spotted, UNISTAR may only have a general idea where the vessel lifted off from, or no idea at all.

UNISTAR can receive data from other Earth tracking stations, but these usually lack the range or ultra-tech sensors to be much help. The problem is that if the alien vessels are going at hypersonic speeds at the edge of space, there is a large area to track, and while their stealth systems won't work very well, the vessels are too fast and high to intercept. On the other hand, at lower speeds and altitudes, their TL9-10 stealth makes them very hard to spot.

Field Depots

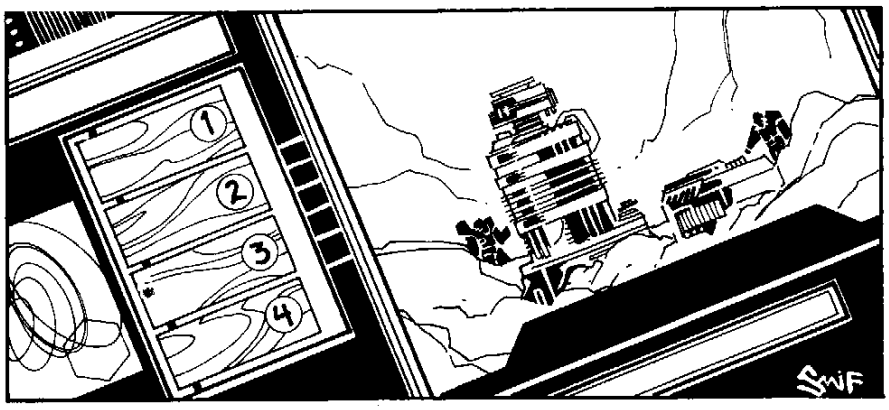
UNISTAR has 30 to 50 secret field depots around the world. They are placed in cities or towns, often disguised as service stations or car washes. Each has a machine shop with the TL8 tools, fuel and ammunition to resupply the mecha of a mobile unit, plus a modern comsuite and a small armory and infirmary. Field depots are manned by a couple of skilled mechanics from Headquarters section, operating under deep cover. Their purpose is to assist Mobile Assault and Counterintelligence operations.

Facing the Threat

Once or twice a week, an alien vessel visits Earth. Usually, it is met by Gebberoth ground agents, who deliver a cargo of humans and retrieve new supplies and personnel. Sometimes, there is no welcoming party; instead, a lander will be dropping off mecha and enforcers to establish a base or to raid rivals.

Alien ships are almost unstoppable by Earth's air defense system, even when CATSPAWS can track them. They are vulnerable on the ground, but usually take off within a few minutes of landing. UNISTAR is rarely able to get forces there in time to catch the lander, but sometimes they arrive in time to track down Gebberoth agents leaving the scene. More often, though, UNISTAR must use detective work to locate the permanent Gebberoth ground bases the agents operate from. If a base is located, it may be attacked immediately or placed under surveillance in the hope that its agents can be followed to landing sites or other bases.

UNISTAR looks for certain clues to lead it to alien bases:



Missing Persons: UNISTAR taps police department databases looking for strings of unsolved missing persons cases.

Strange Occurrences: The Gebberoth are fighting each other. Unexplained fires and explosions, or sightings of "giant robots" or "monsters," can point to alien activity!

Unexplained Deaths: If a facility like a prison, hospital or nursing home reports an unusual number of deaths, hidden Gebberoth agents may have converted it into a nest.

UFO Reports: UNISTAR carefully analyzes UFO encounters described by the media and ufologists.

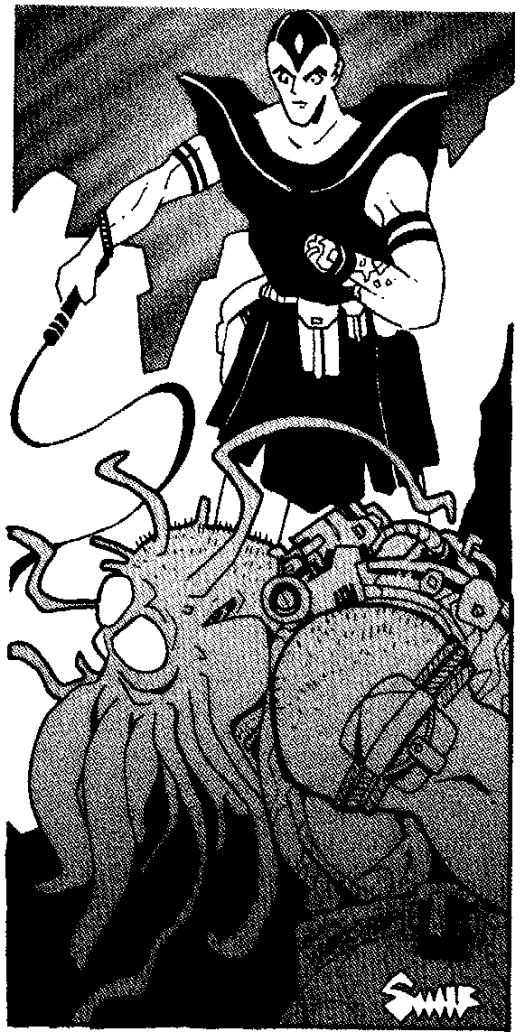
Landings and Takeoffs: If UNISTAR has tracked landings or takeoffs to a region, but has yet to find a base, any other clues in that area – like missing persons or UFO sightings – will be taken much more seriously and used to narrow the search.

Snarkhunter: Twice, UNISTAR's UN offices have received untraceable, anonymous email signed "Snarkhunter." These pinpointed Asog Gebberoth covert bases on Earth. Section Four suspects the messages may come from Tostag Gebberoth agents.

THE GEBBEROTH

The Gebberoth are the largest crime syndicate in the Hegemony, with interests in everything from smuggling to protection rackets. They are divided into various gangs, each run by an "overboss" who claims a particular set of territories.

The organization is headed by a Directorate of senior bosses, who accept a percentage of the take. Part of this income lines the Directors' pockets, while part goes to activities like bribing Hegemony politicians to take a soft stance on crime.



Tostag Gebberoth

This gang was involved with piracy and smuggling before their mindslaving racket. Their main base is Farside, on the moon, but smaller bases are hidden on Earth. Their goals are to keep the brainstrip operation profitable, eliminate Asog and avoid UNISTAR. Personalities include:

Overboss Tostag: This aging Del Karva pirate has settled down as kingpin of Tostag Gebberoth. He has a Pirate's Code of Honor and cares for the welfare of his people but no one else. Tostag is determined to establish Tostag Gebberoth as an enduring power. He is a classic *Criminal* character.

Lady Kaze Sekbet: The chief enforcer and tactician of Tostag, this youthful Tivaak woman is a cashiered Hegemony Star Force squadron leader who was jailed for using nuclear weapons as a "demonstration" against guerillas who captured and threatened to execute some of her men. When Tostag pirates captured her prison ship, she joined them. Sekbet is an *Enemy Ace,* professionally Unfazeable, with a Samurai Code of Honor and the quirk "You can't use too much firepower." She is attractive, in a pantherish sort of way; because she is an obvious alien, she does not perform covert operations. She once had a Del Karva pilot as a lover, but he betrayed her by dating another mecha pilot and she had to kill him. She still misses him, though.

gen Jothmeg: A Hegemony doctor, a Del Karva, caught doing unauthorized drug experiments on his patients. He escaped the law and fled to the Gebberoth. Disguised as a human, he is the director of a private mental clinic set up six years ago as a Gebberoth nest. He also performs experiments on some inmates, aimed at creating psionic warriors which Tostag can market. He is not sadistic, merely totally obsessed with science, and actually feels a fatherly sort of affection toward his creations.

Here's a rundown of Tostag Gebberoth resources:

Enforcers: Three or four dozen Del Karva and Tivaak thugs. These serve at Tostag's bases. Tostag is hiring more to replace losses. About half of them possess TL9 battlesuits.

Terramorphs: A couple of dozen Del Karva agents disguised as and trained to pose as humans, led by gen Jothmeg. They run various operations on Earth.

Human Agents: The Terramorphs have recruited several dozen human criminals. Almost all of them think they are working for human slavers or people smugglers, not aliens.

Nightstalkers: Two-dozen surplus Hegemony light battle and scout mecha. The pilots are Del Karva pirates or Tivaak mercenaries organized into six teams of 3-5 mecha, each led by a Del Karva or Tivaak sub-lieutenant. Two will normally protect Farside, while the rest are on Earth guarding operations or hunting the Asog. Tostag can afford to add one or two mecha a month to this force, to replace losses or build up strength.

Hermes Global

This is a Canadian-Swiss cargo airline that ships priority packages for small, regional courier firms — although some flights carry charter passengers, and it has worked for UN relief agencies. Its fleet of 10-15 aircraft is a mix of Boeing 707 freight transports and rugged, twin-engined, short take-off and landing propeller planes, plus a couple of executive jets and a few helicopters. It rents hangar space in a surprising number of airports worldwide, though its main offices are in Edmonton.

The company is a UNISTAR front designed to support teams whenever covert flying is necessary. Within 1d+3 hours of a call, a Hermes Global aircraft can arrive at almost any airport or airstrip in the world, ready to pick up a team and fly them off to an airport or a drop zone.

Hermes Global mainly supports Sections Five and Six.

UNISTAR Characters

Some UNISTAR personalities include . . .

Colonel Robert Mackenzie: This charismatic, middle-aged ex-Green Beret was the driving force behind UNISTAR. A specialist in unconventional warfare, his strongest trait is an intense curiosity for anything alien, but he is very loyal to his troops and will buck authority to help them. He usually has a quiet style of command and a secret smile on his lips, and comes off as more of an intellectual than a warrior. He is fond of speculating on the meaning of the human and alien condition, and is widely-read, with one doctorate in philosophy and another in physics.

Bobbi Greenland: This is the alias taken by Moth. The runaway daughter of Overboss Tostag is now 21 and working for UNISTAR as a "special science advisor." She is most comfortable wearing greasy coveralls and crawling around inside a new hybrid mecha, or trying to understand how those weird Rube Goldberg human machines work. She is still shy in personal relationships with humans, wondering if deep down they really hate her. Bobbi thinks of Colonel Mackenzie as a surrogate uncle. She has recently met Sergeant Seito, and has discovered a shared interest in disassembling motorbikes. She dyes her striped hair, switching between ice-blond and pure black, depending on her mood.

Captain Ken Diomedes: U.S. Army Delta Force commando-turned-mecha pilot, on detached duty to Section Six. His hobby is motorcycle racing. He is fascinated by the aliens. He was formerly Moth's bodyguard, and has a big brother relationship with her.

Sergeant Mara Seito: Japanese-American cop from Hawaii who stumbled upon a Tostag nest. She was recruited into Section Six after helping UNISTAR destroy it. Mara's police partner was killed and she is still looking for the alien who was responsible. She has recently become close to Moth.

Otto Reinhart: Formerly of GSG-9, this slender, soft-spoken bishonen is the ruthless commander of Section 5. He is strangely obsessed with finding out everything he can about Shalloth-Jault, and has a picture of his enemy on his wall.

Captain Yuri Zhukov: Former cosmonaut, now a Cosmos Squadron Stormhawk fighter pilot. He is thrilled to be (for once) flying something more advanced than the USAF! He has allegedly attempted to date every attractive female in UNISTAR.

Pepe: The boy that Moth rescued is now 12 years old and living on his grandparents' farm in Spain. Moth visits him occasionally; he wants to be a pilot like her.

Technicals: Some 100 Del Karva and low-status Tivaak man Tostag's various bases. These are trained technicians and medical people (for brainstrips), not warriors.

Tostag "Wingships:" These manta-shaped craft are Del Karva commercial shuttlecraft (TL10), modified for smuggling. They are propelled by a reactionless thruster capable of 3 g acceleration, carry four people in the cockpit and have a 1,000 cf cargo bay that will hold 50 people, a pair of big mecha or a score of battlesuits. They have TL10 stealth, emission cloaking and chameleon systems, 4,000 hit points and PD 4, DR 200. Top air speed 4,700 mph, Move 50/2,350, aMR 5, aSR 5.

Income: In a good month, Tostag will brainstrip around 500 humans. Each brain sells for $10,000, generating some $5 million gross profit. The base, enforcers and technicians cost about $1 million to maintain, leaving about $4 million for profit or new purchases. Tostag also has savings of about $100 million. With the loss of bases, ships and mecha, the war is rapidly draining these funds, but Tostag hopes that crushing Asog will be a worthwhile investment – provided, of course, it can win.

Asog Gebberoth

An older Gebberoth gang, their strategy is similar to Tostag's, but they do not use human agents. Asog Gebberoth evacuated their first Antarctica base and moved to a larger one elsewhere on the icy continent. They also have other bases on Earth and a secret supply depot in the asteroid belt.

Overboss Balzoa: This ancient Del Karva woman is a cunning schemer addicted to power and personal pleasure. Her indoor pleasure garden has alien and human slaves who fulfil her every whim . . . or suffer brainstrip. Balzoa likes stuffed animals, including humans. She is never without two Gyre bodyguards.

Sofenkak: The leader of the sinister Gyre (p. 115) and Balzoa's second in command. Always polite and deferential to her, his voice is tinged with mockery when talking to other non-Gyre. He is a skilled manipulator, trained in psychological warfare.

Shalloth-Jault: Balzoa's third in command, this Del Karva is one of the few to show no fear around the Gyre. His languid manner and androgynous bishonen beauty disguise a heart steeped in treachery. While a good mecha pilot, he prefers traps and ambushes. Sometimes he walks in disguise on Earth, seeking diversions among the "barbarians," amused by the primitive sights and smells. Jault has taken human lovers, only to lure them into a Gebberoth nest after tiring of them. His brother was lost on a mission on Earth, and he would like to find whoever was responsible – UNISTAR or Tostag – and get revenge.

Other Resources: Asog's strength is similar to Tostag's. Its mecha squadron (under Jault) is less well trained than Sekbet's Nightstalkers, although just as numerous.

Gyre "Confusion Masters": This band of twenty flesh-morphing aliens is personally loyal to Sofenkak. They lead infiltration missions, but Gyre are usually spread among Asog forces rather than operating together. Each has a "Deathstalker" mecha.

Gebberoth Nests

Sending a ship down to pick up only a few mindslaves is expensive and dangerous. Profit is maximized by waiting until a full consignment of 20-50 human mindslaves can be carried off.

A nest is a base where humans can be quietly held and mecha and agents concealed. A nest should also have landing sites (an isolated clearing, field, lake, et cetera) within a few hours' drive.

A remote farmhouse is perfect, since it has lots of hiding places for vehicles and captives (barns, silos, root cellars). Small motels (not part of a chain) or even large houses are also good, particularly if the owner is reclusive and won't be missed. Warehouses on the edge of town and junkyards are other favorites.

The rival gangs use different methods to acquire nests:

Tostag have been on Earth for a while, so they have more human contacts. They use disguised Del Karva and human collaborators (blackmailed or bribed into working for them) to purchase properties. Large nests may have a half-dozen or so disguised Del Karva and possibly several enforcers hidden in the background as security against enemy raids. If there is a brainstrip facility (see below), there are probably one or two mecha there for protection. A few small nests have no aliens at all; instead, human collaborators take and hold captives until a Tostag agent appears to transport them to a larger nest.

Asog are newcomers to Earth. They have not had time to set up legal nests, so they prefer to steal them. They replace human owners with Gyre metamorphs. As the Gyre do not steal memories, some humans may be kept alive while the Gyre pump them for information needed to further the masquerade. This cannot be maintained indefinitely, so if people become suspicious, the Gyre will often move to another target. As the Asog have only a few dozen Gyre, they spread them thinly and avoid taking over nests that require replacing multiple people. A nest is often garrisoned with one or two mecha and several Asog enforcers, who may or may not have battlesuits.

Mindslaving

Various means are used to lure humans into a nest without attracting attention. The more common "people traps" include:

Help Wanted: An agent poses as a foreman recruiting illegal immigrants to work as farm labor or domestic servants. The farm or house is actually a Gebberoth nest.

The Hooker: An agent poses as a prostitute who lures customers to a cheap motel – a Gebberoth nest. As few people tell their friends or family they are going to visit a hooker, the disappearance is mysterious.

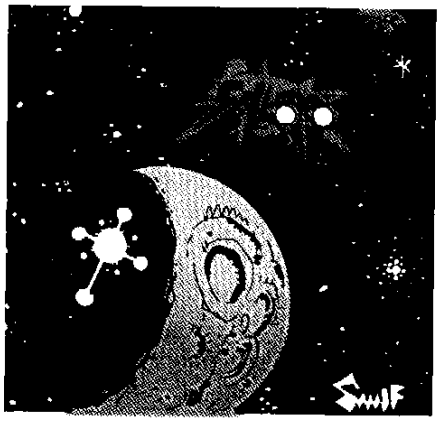
The Hospital: The nest is a private clinic or mental hospital. When a patient dies, the Gebberoth make sure no one realizes he made an involuntary organ donation first: his brain. In a mental hospital, patients may lapse into a catatonic state. Their brains have been removed and they are on TL9 life support.

Any number of other ploys may be used. All of these methods require some time to set up, though, so sometimes more direct means are used – see *Snatches*, p. 117.

Brainstrip Labs

Larger nests are often equipped to perform brainstrip operations. A brainstrip lab has one or two automedics, each of which can remove a human brain in two hours. Brains are stored in brainpods (small life support units, about 100 lbs. and 4 cf) for easier transport and storage (no need to feed prisoners!). A wingship can carry as many as 250 brainpods. The Farside and Antarctica bases can also perform brainstrips. Brainstripped bodies are normally disposed of (the Gyre eat them!); Tostag agents have sometimes sold the bodies to humans for the organs.

Removing the brain kills a body. Hegemony science can transplant a brain back into a living body (2 months to recover), but facilities to do that do not exist within the solar system.



Farside

This is the major Tostag Gebberoth base, located on the far side of Luna. It was assembled over two years using mecha labor and prefab materials. It is a cross-shaped formation of domes connected by corridors to a central, flat-topped building. Each structure counts as a fortified building, and has its own life support system plus a radiothermal generator for power.

Spacedock is the flat building. It is topped by a retractable elevator that leads to a hangar facility capable of housing 25,000 cubic feet of mecha, several fuel storage tanks and a workshop. A third of Tostag's mecha and shuttles are here at any one time, half either damaged or undergoing major maintenance.

Surgical Dome houses six automedics. Each sinister, coffin-like device can act as a doctor with skill 14 in First Aid and skill 13 in Physician, Diagnosis and Surgery. They are used to treat Gebberoth wounds, perform brainstrips and create terramorphs. Also in the Surgical Dome is a large, cryogenic meat locker with space for up to 100 frozen brains.

Residence Green and Residence Blue contain the individual living, eating and recreational quarters for the base personnel (Moth's empty room is in Blue). Also in Green are cramped cells that can hold up to 50 prisoners.

Garden Dome houses a lush, alien garden, complete with a small pool, strangely beautiful pastel flowers and giant fungi. It is used for recreation by off-duty mecha troopers.

Command Dome contains Tostag's own luxurious apartments plus a control room, comsuite, organic megacomputer and a 10,000-mile range PESA.

Defense Perimeter: A dozen rotating turrets surround the base. Each is manned, with an additional remote control for Command Dome. Each has PD 4, DR 500 ablative armor and 200 hit points, and mounts either a heavy particle beam cannon or two linked heavy missile launchers with eight heavy missiles.

Antarctica Base

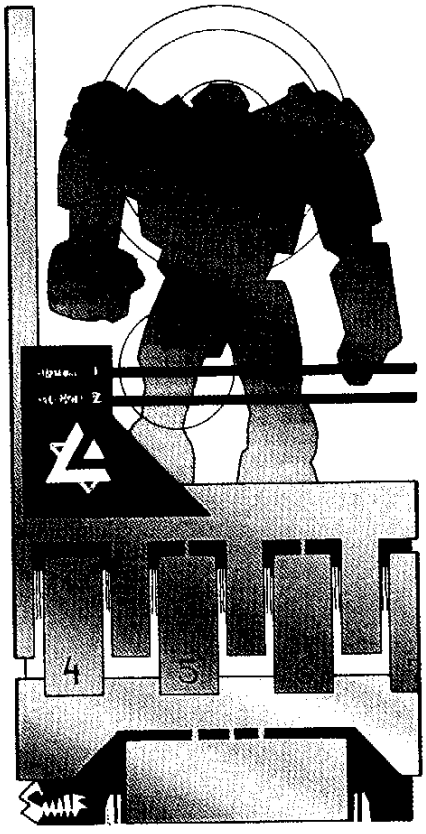
The Asog base is hidden somewhere in Antarctica. Its exact design is a mystery, but it is probably similar to Farside.

Gebberoth Mecha

The standard mecha used are the Deathstriker and Seraph Delta drivable mecha and the Vandal battlesuit (see Chapter 4). Both are "military surplus" Galactic Hegemony designs acquired on the black market – more modern Hegemony mecha are TL10. As the war escalates, it is possible that other mecha will become available.

Defensively, mecha protect the nests and personnel. The original idea was to wipe out human police or soldiers who stumbled onto an operation so fast and thoroughly that there wouldn't be any witnesses. Since UNISTAR has appeared, this hasn't always worked out. Now the mecha provide security against UNISTAR and rival Gebberoth, usually fighting an action to buy time for an orderly evacuation if a base or lander is discovered.

Offensively, mecha are used to take out rival Gebberoth bases. These strikes usually occur at night or in bad weather, to avoid witnesses. Often, mecha are landed miles from the target and travel cross-country, or are carried inside a large semi truck.



STRANGE ALLIES

The Gebberoth were inside the old hotel's ballroom, now turned into a brain-strip lab. They had a Deathstriker and two Vandals . . . and we'd been caught napping. My Kamen Panzer's gun arm was shattered. My own left leg felt wet and sticky, but there was no pain yet; maybe I was in shock. Mara was in worse shape – trapped unconscious inside her own mecha's wreckage.

We'd gotten the Vandals but now the Deathstriker loomed over me, gun muzzle raised for the kill. I braced myself – and then its canopy slid open and the pilot stared out, the better to gloat. He had yellow cat's eyes in his handsome face. Otherwise, he looked like a youthful human. He brushed a lock of copper-gold hair aside, where it always fell into his eyes, and smiled wickedly. It was Tethrag-Jault, Shalloth-Jault's younger brother.

"So, Captain Ken Diomedes, we meet again," he hissed. "We were warned your organization might interfere. Well, after I've dealt with you, I will see whether your female friend lives. I need a new brain for my wingship computer. As for her body . . ."

"Save it, Jault," I told him. "I'd rather die now than listen to your filth."

"So be it. May the Dark Bird enjoy your soul. My master Sofenkak will reward me well." His mecha raised its weapon.

And suddenly the skylight shattered inward.

A slim silver figure somersaulted in mid air. Shalloth-Jault raised his gun and fired, but the battlesuit dodged and landed on top of the Deathstriker. It brought its arm down, there was a flash of light and the Deathstriker collapsed on the ground like a squashed crab.

The battlesuit bounced off the wreckage and landed next to my shattered Kamen Panzer. My savior wasn't a UNISTAR design. It was slim, graceful . . .

"Nice mecha," said a soft female voice. The helmet turned to me, and she lifted the visor. Wild purple-blue hair framed an angel's face. Her large eyes were an inhuman, beautiful violet.

"So you're the local law?" She glanced at my mecha. "Didn't think you had these things yet."

"Uh, yeah," I managed. "We're kind of secret."

"Kawaii." She shook her head, closed the helmet, triggered the jump jets and vanished, up through the hole into the night.

Somehow, I knew we would meet again.

Although the Hegemony's Non-Interference Directive prevents Star Force operating on Earth, the Gebberoth are not safe from Galactic justice. The syndicate member's nightmare is the Tessanak. It's an archaic Del Karva word meaning "one who takes government coinage to wash a public sewer." A more idiomatic translation is "bounty killer." These private agents go after wanted criminals for the reward money that the Hegemonic Magistratum offers for those on its "Unlimited Wanted" list.

That the Gebberoth *are* operating on Earth is known to some bounty hunters with good contacts. As long as they send back proof they got their target, the Magistratum won't inquire where the kill was made. Of course, because Earth *is* a protected world, only the wilder Tessanak dare to operate here. There are probably no more than a half-dozen Tessanak on the planet, operating alone or in small teams. They are careful not to reveal themselves publicly, or do too much collateral damage; otherwise, if word got back to the Magistratum, they would go on the wanted list too!

Tessanak characters are Del Karva *Cop* or *Special Operative* characters equipped with TL9-10 gear. The Tessanak in the vignette used the Darkangel battlesuit (p. 75).

BIBLIOGRAPHY

Hundreds of different mecha-related books, videos and comics exist. The titles below only scrape the surface, but are a representative sampling of the best sources available in English.

Novels

Bear, Greg. *Hardfought* (1983). Cloned, energy-exosuited soldiers fight aliens, but human identity is the main casualty.

Benford, Gregory. *Great Sky River* (1987). Post-apocalypse nomads in battlesuits fight to survive against alien robots.

Cherryh, C. J. *Rimrunners* (1989). After the Company War ends, a battlesuit trooper finds herself trapped, incognito, among civilians on the other side.

Haldeman, Joe. *The Forever War* (1974). Battlesuit troopers fight a never-ending war as society changes around them.

Heinlein, Robert A. *Starship Troopers* (1959). Mobile infantry fight the alien, pseudo-arachnid "bugs." Contains the best description of battlesuits and their use in print.

Keith, William H. *Battletech: Decision at Thunder Rift* (1986). The first of many *Battletech* novels by various authors. A good source for a military mecha campaign.

Keith, William H. *Warstrider* series (1994). Exotic aliens and "realistic" mecha that transform via nanotechnology.

McKinney, Jack. *Robotech* series (1987). Novelization of TV series. Good inspiration for a cinematic military campaign.

Rowley, Chris. *The War for Eternity* (1983). Ursoid aliens and their human allies fight power-armored space marines.

Saberhagen, Fred. *Berserker Man* (1979). An unusual boy uses an energy exosuit with incredible powers to take on robots.

Smith, E. E. "Doc." *Lensmen* series (1948). Some of the first-ever powered armor suits are worn by the Galactic Patrol.

Steakley, John. *Armor* (1987). Battlesuited marines versus alien monsters.

Tomino, Yoshiyuki. *Mobile Suit Gundam* (1990). Novelization of the anime series.

Wells, H. G. *War of the Worlds* (1898). The original invasion of Earth, spearheaded by Martian battle mecha.

White, Steve. *Legacy* (1995). Human marines in well-described powered armor fight to liberate an alien world.

Mecha Anime and Cartoons

Anime is available in video and comic book stores. A few of the *many* mecha anime shows that exist include . . .

Appleseed (Manga Video). Battlesuited cops, cyborgs and terrorists clash in a realistic cyberpunk future.

Armored Trooper Votoms (US Manga). After the war, an ex-commando seeks a cause. Very realistic mecha designs.

Aura Battler Dunbine (Sunrise). Humans are transported to a magical world to serve as combat pilots. The first show to combine mecha with epic fantasy. Wonderful biomechanical tech.

Battletech. American animated series based on the FASA board game. Features extensive use of computer graphics.

Bubblegum Crisis (Animeigo). Female, powered-armor vigilantes fight a ruthless megacorp in cyberpunk Tokyo.

Dangaio (US Manga). An over-the-top anime featuring space pirates, combining mecha and super "esper weapon" heroes.

The Five Star Stories. In an exotic techno-feudal society, female androids are raised as co-pilots for super mecha.

Gall Force (US Manga). A space war between an all-female culture and exotic aliens lurches toward apocalypse.

Genocyber (US Manga). Bloody tale of teenage espers, megacorps and mad scientists features a psi-enhancing battlesuit.

Gunbuster (US Manga). Over-the-top series starts out as a cute girl "mecha academy" show, but later turns into a hard-hitting war story with a focus on relativistic time dilation.

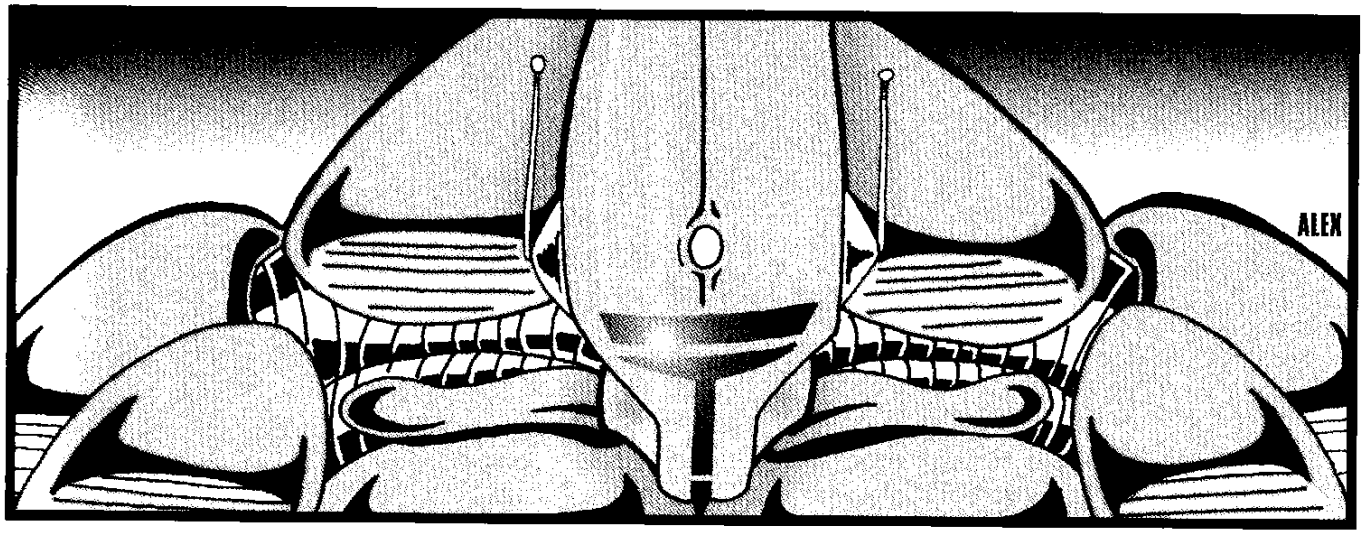
The Guyver (US Manga). A schoolboy who bonds with an alien biomechanical battlesuit is hunted by a megacorporation.

Hades Project Zeorymer (US Manga). Battling secret organizations, with super mecha and angst-ridden cloned pilots.

Fight! Iczer One (US Manga). She may look like a elf, but she's a super-powered android come to save Earth from the invading Cthuwolf (say "Cthulhu"). An ultra-cinematic blend of Lovecraft and the mecha genre. Weird and wonderful.

Kishin Corps (Pioneer). Pulp action in the 1930s, as the Japanese and Germans develop mecha and fight aliens.

Macross Plus (Manga Video). Best of the many *Macross* sequels, this one focuses on rival mecha test pilots and the creation of a computerized rock star.



Madox 01 (Animeigo). An ordinary joe finds a secret battlesuit – now the military wants it back.

Magic Knight Rayearth. Schoolgirls are transported to a fantasy world, becoming mecha pilots and mages.

Mazinger Z. The first show to feature a *piloted* giant robot, and the originator of most of the genre cliches!

Megazone 23 (Streamline). The archetype of all mecha conspiracies, featuring a cycle that turns into a battlesuit.

Metal Fighters Miku (Software Sculptors). Cute girl battlesuit wrestlers.

Mobile Suit Gundam (Sunrise). A civil war between space colonists and Earth is fought by mecha. Many sequels; favorites include *Gundam 0080* and *Char's Counterattack.*

Neon Genesis Evangelion (AD Vision). A secret agency battles invading alien "angels" using its neural-interfaced mecha, but the teen-aged pilots suffer severe mental trauma.

Orguss 02 (Manga Video). Battle mecha from an ancient civilization are discovered by a culture that resembles Eastern Europe circa 1914. Espionage, palace intrigue and mecha battles!

Patlabor (Manga Video). Nicely done mecha cop series set in near-future Tokyo. The *Patlabor 2* movie even features combat mecha in a U.N. peacekeeping operation!

Project A-Ko (US Manga). Comedy about two rival high-school girls: the super-powered girl next door, A-Ko, and the filthy-rich mecha inventor, B-Ko. Very, very weird.

Robot Carnival (Streamline). Anthology featuring various robot stories plus a battle between steam-age mecha.

Robotech (Streamline). Classic soap opera and alien invasion TV series featuring transforming mecha. The English version is a compilation of three different Japanese series: *Macross, Southern Cross* and *Mospeada.*

Solar Fang Dougram (Sunrise). Rebels vs. the Earth government. Its mecha designs were reused in *Battletech.*

Vision of Escaflowne (Sunrise). A school girl is transported into a world of dragons, warriors, and mecha.

Live Action Movies and Television

Aliens. Marines vs. hungry aliens. In the climax, Ripley uses a power-loader exoskeleton to fight the queen alien.

Captain Power and the Soldiers of the Future (TV). Battlesuit team fights robot overlord.

The Empire Strikes Back and *Return of the Jedi.* The Empire employs combat walkers to assault rebel bases.

Gunhed. A US-Japanese attempt to bring anime-style giant robot action to the big screen.

The Guyver: Dark Hero. Movie version of the anime.

Mantis. A battlesuited TV superhero fights crime.

Mighty Morphin Power Rangers (TV). When the going gets tough, the Power Rangers summon their giant mecha! This show and others like it are part of a large genre of Japanese super-team shows.

Robo Jox. Giant drivable robots fight gladiatorial duels. There's also a sequel.

Magazines, Comics and Manga

Animerica (Viz). Anime news and articles.

Appleseed (Dark Horse). Masamune Shirow's complex and ongoing cyberpunk mecha cop series.

Bubblegum Crisis (Dark Horse). Adapts the anime.

Dirty Pair (Dark Horse). A pair of sexy but destructive female agents wreak havoc, often while using mecha.

Ghost in the Shell (Dark Horse). More cyberpunk counter-terrorist action from the author of *Appleseed.*

Gremlin Trouble (ABP). Manga-style comedy with gremlins, pixies and mecha.

Iron Man (Marvel). The classic battlesuit hero!

Mangazine (Antarctic). Anime news and articles.

Mecha Press (Ianus). Anime and gaming articles.

Numerous mecha-oriented, Japanese-language magazines and imported *Art of –* (your favorite anime show) books, model kits and video games are available from specialty stores.

Games

Battletech (FASA). Classic mecha boardgame.

The Forever War (Mayfair). Boardgame of the novel.

Heavy Gear (Dream Pod 9). Original mecha RPG and card game.

Legions of Steel (Global). Excellent miniatures game featuring human and alien battlesuit troops fighting robots.

Mekton and *Mekton Zeta* (R. Talsorian). Anime-oriented mecha RPG.

Ogre Miniatures and *Battlesuit* (Steve Jackson Games). Miniatures and board games of armored warfare in the 21st century.

Project A-Ko (Ianus). RPG based on the anime.

Robotech and *Macross II* (Palladium). RPGs based on the anime shows.

Starship Troopers (Avalon Hill). Boardgame of the novel.

Non-Fiction

Ledoux, Trish and Ranney, Doug. *The Complete Anime Guide* (Tiger Mountain, 1995).

McCarthy, Helen. *The Anime Movie Guide* (Titan, 1996).

Schodt, Frederik L. *Manga! Manga! The World of Japanese Comics* (Kodansha, 1987).

Shaker, Stephen, and Wise, Alan: *War Without Men* (Pergamon-Brasseys, 1988). Describes real-life mecha technology!

Shirow, Masamune. *Intron Depot* (Dark Horse, 1992). Color art from *Appleseed* and other work, with English and Japanese text, plus Shirow's discussions of mecha technology.