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MILITARY SCI-FI



TACTICAL SHOOTING: TOMORROW

by Hans-Christian Vortisch

CHROME COMMANDOS

by W.A. Frick

MOBILE WORMHOLE LOGISTICS

by Adrian Tymes

THE VREE

by David L. Pulver

FUTURE SOLDIER

by Kenneth Peters

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With the decisive slap of a big, illuminated red button, a commo center corporal put the space station on war footing, and warned Earth to follow suit.

*– Jack McKinney, **Robotech: The Southern Cross***

Article Colors

Each article is color-coded to help you find your favorite sections.

- Pale Blue:* In This Issue
- Brown:* In Every Issue (letters, humor, editorial, etc.)
- Dark Blue:* GURPS Features
- Purple:* Systemless Features

COVER ART

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INTERIOR ART

Greg Hyland

IN THIS ISSUE

The universe is a big, scary place. Fortunately, we can be bigger and scarier when we need to be. This month, we look at the martial side of science fiction.

Learn about the ultra-tech tools and realistic techniques that a futuristic gun-wielder has at his disposal in *Tactical Shooting: Tomorrow*. Hans-Christian Vortisch, author of *GURPS Tactical Shooting*, presents a futuristic expansion for that supplement, drawing on rules and equipment from *GURPS Ultra-Tech*, *GURPS High-Tech*, and other sources. This meaty guide includes stats for equipment, two new *GURPS* techniques, and two new gun-fighting styles.

Turn your TL9 infantrymen into *Chrome Commandos* with the best equipment available. Check out new and revised basic gear, computers, software, and defenses, along with an overview of a basic command vehicle. You'll also get some new options for existing materiel.

Future fighting isn't just about gear; it's also about the enemy! Firmly believing they have the most perfect religion in existence, *The Vree* want to share it with the rest of the universe – whether other species like it or not! David L. Pulver, author of the *GURPS Spaceships* series, tells all about this religious warrior race with a gift for song in this month's Eidetic Memory – including a racial template, info on two of their craft (with *Spaceships* stats), and more.

Moving supplies and troops in far-future settings just got easier with *Mobile Wormhole Logistics*. Find out about this spacefaring troop transport ship that shuttles troop deployment vessels through micro-jump gates, along with *Spaceships* stats for this superscience vessel.

Building off this issue's material for tactical shootists, now you can outfit your *Future Soldier* with what he needs – thanks to *Ultra-Tech* co-author Kenneth Peters. Learn about issues to consider, new and revised software, typical weapon add-ons, and power- and system-integration options, plus a *GURPS* loadout for the typical TL9 rifleman.

This issue's Random Thought Table looks at the human side of our future fighting forces, while Odds and Ends considers at a limitless supply of futuristic inspiration, plus a Murphy's Rule that makes a fashion statement. This issue is lock and loaded, and ready to kick E.T.'s butt!

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FROM THE EDITOR

“TARGET THAT EXPLOSION AND FIRE!”

Military and science fiction go together like peanut butter and jelly. From the (one-sided) military operations of *The War of the Worlds* to the Honor Harrington series to the *Aliens* universe to *Halo* and countless other video games, the clashes of futuristic forces have been a staple of speculative fiction from darn near the beginning straight through tomorrow and beyond.

What was particularly interesting when assembling this issue – which seems obvious, in hindsight – is how much military science-fiction gaming builds off the foundation of modern-day military knowledge. This issue would've been vastly different if it came out a few years ago, because *GURPS Tactical Shooting* didn't exist at that time. It's an invaluable supplement for anyone looking for futuristic realism; the tactics that space marines rely on will certainly build off the modern-day shootist skill set. Likewise the new loadout on pp. 32-34

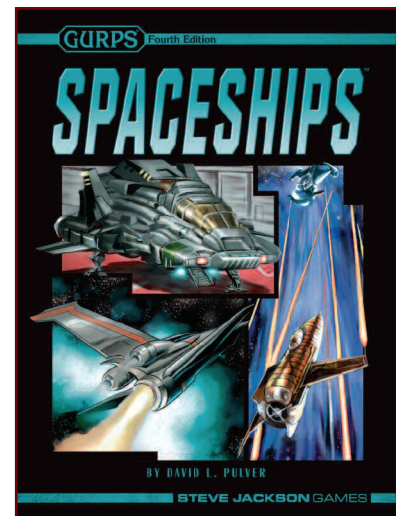
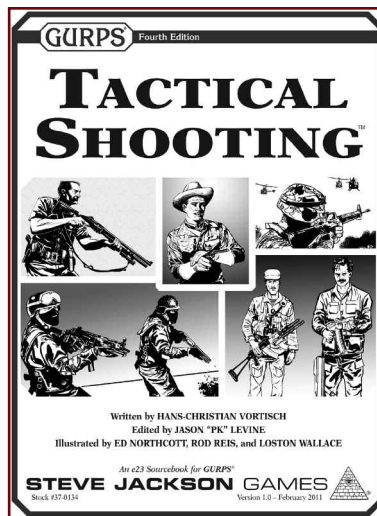
uses the format developed in *GURPS Loadouts: Monster Hunters* and *GURPS Dungeon Fantasy 13: Loadouts* – only now, for the first time, we have a science-fiction loadout.

The realism of *GURPS* and the rigor of its science-fiction offerings meld perfectly with this issue, pulling together *Ultra-Tech*, *High-Tech*, *Spaceships*, and more. (There's even a bit of tangential information for those using *GURPS Mass Combat* for larger-scale tactical excitement.)

The future of *GURPS* is brewing here, in *Pyramid* . . . and it looks as impressive as a battalion of ready-to-roll space marines.

WRITE HERE, WRITE NOW

Speaking of impressive brewing, how well did we do this month? Was your sense of excitement on the receiving end of an orbital bombardment of awesome? Or was it a bug hunt, *game over*? We'd love a post-mission debriefing, either privately at pyramid@sjgames.com, or amid the like-minded heroes of forums.sjgames.com.



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TACTICAL SHOOTING: TOMORROW

BY HANS-CHRISTIAN VORTISCH

She's chipped in with [the Heckler & Koch] now, having fired 200 rounds two days before. She's been hardwired with the generic chips for this type of weapon, but now she's got specific data in her ROM: when fired from the hip, the burst climbs this much, pulls so much to the right; when shoulder-fired, it behaves thus. Adding the suppressor does so. All worked into her reflexes. Ready, if the time should come.

– Walter Williams, *Hardwired*

GURPS Tactical Shooting was written to model realistic use of guns at TL5-8. Naturally, the TL9 technology of *GURPS Ultra-Tech* will impact realistic tactics and techniques. This optional extension of *Tactical Shooting* pulls together rules from a number of sources, including *Ultra-Tech*, *GURPS High-Tech*, and *Tactical Shooting*. This information can apply in near-future or low-TL science-fiction campaigns such as those described in *GURPS Autoduel*, *GURPS Cyberpunk*, *Transhuman Space*, or *GURPS Traveller*.

INFANTRY GUNS

*I wanna introduce you to a personal friend of mine. This is an M41A pulse rifle, 10mm with over-and-under 30mm pump-action grenade launcher . . . Lean into it . . . All right, it **will** kick some. All right, when the counter reads zero here . . .*

– Corporal Dwayne Hicks, in *Aliens*

At TL9, infantry – and to a lesser extent, police – small arms include the personal defense weapon, urban assault weapon, assault carbine, Gatling carbine, storm carbine, storm rifle, close assault shotgun, tangler, and gyrocarbine (*Ultra-Tech*, pp. 135-140, 144-145).

A BETTER KIND OF GUN

Ellen Ripley: Lieutenant, what do those pulse rifles fire?

Lieutenant William Gorman: 10mm explosive tip caseless. Standard light armor-piercing round.

– *Aliens*

At TL9, most small arms fire conventional projectile ammunition (*Ultra-Tech*, pp. 135, 148), propelled through the barrel by means of a self-contained cartridge that includes the projectile, propellant, and primer. Ammunition is electrically ignited (*Ultra-Tech*, p. 135) rather than hammer- or striker-fired. Introduced at TL7 for cased ammunition and at TL8 for caseless ammo, this improves precision, lock time, and reliability, and reduces moving parts and internal strain. Electrical ignition also reduces the mechanical noise of firing – treat the basic

weapon sound (*High-Tech*, p. 158) as one step quieter. The requirement for a power cell is not a disadvantage, as numerous other components of TL9 guns are powered anyway (*Ultra-Tech*, p. 149).

Standard at TL9, caseless cartridges and even more advanced ammunition types (*High-Tech*, pp. 164-165, and *Ultra-Tech*, pp. 135, 139) are lighter and often more compact, allowing larger magazine capacities for less frequent reloading (*Tactical Shooting*, p. 20) as well as larger basic loads (*Tactical Shooting*, pp. 79-80). Many magazines feature high-density layouts (*High-Tech*, p. 155) like quadruple-stack designs to room more cartridges without increasing magazine length. While this results in wider and heavier magazines, the weight problem is mitigated by improved materials and the lower weight per shot of caseless ammo. Advanced springs make these as reliable and easy to fill as TL8 double-stack magazines. Detachable magazines have finally become true throw-away items, their empty cost and weight having been reduced considerably. However, magazines continue to be the primary source of jams, despite low-friction and anti-tilt followers, improved springs, and being sealed after filling.

Electrothermal chemical (ETC) or “plasma pulse” technology improves both damage and range (*Ultra-Tech*, p. 139) of caseless ammunition, allowing for enhanced armor penetration, improved cover penetration (*Tactical Shooting*, pp. 28-31), and longer precision shots (*Tactical Shooting*, pp. 26-27) with reduced flight time (*Tactical Shooting*, p. 32);

divide bullet travel time by 1.5. The improved performance of ETC ammunition is the result of higher muzzle energy – which realistically also causes higher felt recoil. Multiply ST by 1.2.

Liquid-propellant “binary fuel-injection” guns can boost damage and range (*Ultra-Tech*, p. 139), and divide bullet travel time by 1.3. Multiply ST by 1.1. Alternatively, they can be set to *reduce* damage, range, and firing signature. This means they are more difficult to hear and easier to suppress (*High-Tech*, pp. 158-159, and *Tactical Shooting*, pp. 70-71) – treat as “very light pistol” (*High-Tech*, p. 158). Multiply ST by 0.8. The low power setting is also useful to adjust for overpenetration risks (*Tactical Shooting*, pp. 28-31) or reduced engagement ranges, such as on spacecraft or in urban combat.

Projectiles at TL9 are little different from those at TL8 – hollow-points (*Ultra-Tech*, p. 154) for unarmored targets and armor-piercing rounds (*Ultra-Tech*, pp. 152-153) for lightly armored opponents. Large-bore guns can fire advanced explosive projectiles (*Ultra-Tech*, pp. 153-155).

Projectiles and propellants can be embedded with taggants (*Ultra-Tech*, p. 89) to aid forensic investigation. In societies with high CR or a litigation-prone citizenry, every shot will deliberately scatter tiny ID tags from the muzzle (*High-Tech*, p. 90). Some projectiles could even be tagged with an active emitter (*Transhuman Space*, p. 158), making it easier to locate any bullets fired – both those that missed and those that are inside a fleeing target . . .

Malfunctions and Other Issues

Due to the use of caseless or liquid-propellant ammunition, improved magazines, and advanced mechanisms like rising or rotating chambers with few moving parts and linear feeding, all TL9 guns are very reliable and won't malfunction unless lack of maintenance lowers Malf. (p. B407). Basic maintenance is no longer required – like TL8 ovens, TL9 guns are self-cleaning and self-lubricating. Typical malfunctions concern the electronics (leading to misfires and malfunctions of built-in features like the HUD link or laser sight). This makes drilled responses like Armorer's Gift (*Tactical Shooting*, p. 37) and Tap-Rack-Bang (*Tactical Shooting*, p. 41) less essential for the TL9 shooter.

Without the requirement to eject spent cases (other than for manual unloading), guns are not only less vulnerable to environmental influences and therefore more reliable, they can also be made fully ambidextrous – lefties are no longer penalized by awkward safeties or handles, annoyed by ejectors that flip hot brass into their faces, etc. Shooting around cover (*Tactical Shooting*, p. 28) is also no longer an issue.

Caseless guns leave fewer clues at a shooting site and deposit no cases on which to slip or that can damage the engines of aircraft or grav vehicles (*Tactical Shooting*, p. 35). This is also an advantage aboard spacecraft, especially in zero-G, where cases floating around would be a considerable bother.

Lacking a cartridge case that takes much of the firing heat with it when it's ejected, caseless guns and especially high-powered ETC and liquid-propellant weapons require special considerations to cool the action and barrel. Many methods already introduced at TL6 will see a renaissance, including high-surface radiator fins around the barrel (now made out of lightweight new alloys) and forced-draft systems that use the movement of the action or a muzzle device to draw cooler air

into the gun. Some gun designs may solve the issue by restricting fire modes to single shots or limited bursts (*High-Tech*, p. 83). Others may have a theoretical full-auto capability, but troops are drilled not to use it – not only because of the thermo-mechanical problems, but also because bursts are seldom useful (*Tactical Shooting*, p. 16), and continue to be so in tomorrow's firefights.

All TL9 guns can be fired underwater (*High-Tech*, p. 85), with no Malf. penalty for all but automatic guns, which get -1. The TL8 supercavitation projectile option (double CPS) is available in combination with solid, all variants of AP that don't use sabots, and all variants of SAP. This has much improved performance – the underwater distance multiplier is 50 rather than 1,000. Gyroc guns can fire ammunition with the TL9 gyrtorp upgrade (double CPS), which is not only supercavitating but has a thrust unit for underwater use. This has its normal range, but only works underwater!

Hands-Free Operation

Guns and gadgets at TL9 offer many modes of operations. Switching from one to another generally requires a Ready maneuver – taking off the safety, switching from single shot to rock 'n' roll, adjusting the power level on a liquid-propellant gun, changing the setting on a smartchoke, switching a laser sight on or off or changing its mode, etc. It's a free action for a familiar user (*High-Tech*, p. 80) or a shooter with the Lightning Fingers perk (*Tactical Shooting*, p. 39). It's also a free action if the shooter has a neural link to the gun via a neural input receiver (*Ultra-Tech*, p. 48) or neural interface implant (*Ultra-Tech*, pp. 48-49). A neural link even allows the gun to be fired *without* trigger manipulation, which gives +2 in *Who Draws First?* situations (*Tactical Shooting*, p. 10).

Accessing the menu offered by a HUD, such as initiating Targeting software, requires either a manual system, or a neural input receiver or neural interface implant. The manual system is usually a rugged datapad (*Ultra-Tech*, pp. 23, 15) worn on the wrist or in another easily accessible location.

Air-Powered Guns

Other guns such as the needle rifle or tangler are air-powered (*Ultra-Tech*, p. 139). Comparatively high-powered air guns use super-critical, highly compressed liquid gas like CO₂. These have virtually no firing signature (*Ultra-Tech*, p. 139) – no muzzle flash, no smell, no infrared signature, and no ejected cartridge case (*Tactical Shooting*, pp. 34-35). They also make little sound (*High-Tech*, p. 158). Another advantage is that air guns can be made of light, non-metallic materials (*Ultra-Tech*, p. 140). If the projectiles also aren't made of metal – which is feasible for needlers and tanglers – the loaded guns can pass metal detectors.

However, the potential power of air guns is technically already maxed out at TL8, so the TL9 equivalents don't provide substantial improvements – their main use is for sport and less-than-lethal applications. They have favorable LC; thus, in some societies, they may be the only guns that are readily available to civilians. With suitable ammunition and taking advantage of their low firing signature, some air guns are useful for close-range assassination.

Camouflage

Instead of being painted with weapon camouflage (*Tactical Shooting*, p. 76), military and hunting guns can be fitted with programmable camouflage (*Ultra-Tech*, p. 99). At SM -2 for the average infantry small arm, this adds \$250 and 0.5 lb. A full thermo-optic chameleon surface (*Ultra-Tech*, pp. 99-100) is probably not only too expensive, but too heavy for use on small arms.

Personal Sidearms

The streamlined plastic butt of an H&K didn't exactly hurt, either, and Rydell could see one pecking out of Svobodov's open flak vest. Couldn't remember the model number, but it looked like the one with the magazine down the top of the barrel. Shot that caseless ammo looked like wax crayons, plastic propellant molded around alloy flechettes like big nails.

– William Gibson, *Virtual Light*

The points made under *Infantry Guns* (pp. 4-10) also apply to handguns like the heavy pistol, holdout pistol, magnum pistol, medium pistol, machine pistol, needler, tangler pistol, wrist needler, gyro launch pistol, gyro pistol, or holdout gyro (*Ultra-Tech*, pp. 135, 139-140, 144).

In particular, just like their larger counterparts, TL9 sidearms feature a HUD link, laser sight, recognition grip, and diagnostic computer for free (*Ultra-Tech*, p. 149).

Cheap (*Ultra-Tech*, p. 15) handguns can dispense with one or several of these features to reduce cost. Many will still *have* the features, but at lower quality; at TL8, some manufacturers make zinc-alloy .25-caliber holdout pistols – with tiny integral targeting lasers – that retail for less than a good flashlight (and are perhaps less useful, as well). On a cheap gun, the laser could be permanently out of zero, negating the +1 skill bonus, the diagnostic computer could raise an erroneous malfunction alert every half hour, etc.

Perhaps even more so than military weapons, handguns will generally come with a D-tag (*Ultra-Tech*, p. 151). Many societies like to keep tight control over concealable weapons.

The often unexpected and social (that is, *very* short-ranged) nature of handgun-use means that they are frequently employed in situations in which the shooter has no access to a HUD because he isn't wearing a helmet or headset or doesn't have time to plug the cable into his neural interface. Shooters will then use the standard handgun shooting stances and sighting methods (*Tactical Shooting*, pp. 11-12, 13-14) employed at lower TLs.

In settings that still use TL8 cased ammunition, revolvers like the snub pistol (*Traveller*, p. 110) are popular aboard spacecraft since they don't automatically eject cases that float around in zero-G situations. These use light polymer cases (*High-Tech*, p. 164, and *Ultra-Tech*, p. 135).

Smartchoke Options

All multiple-projectile guns – like the close assault shotgun and underbarrel shotgun, but also the shotgun pistol (*Ultra-Tech*, p. 136) – are fitted with an auto-adjustable smartchoke for free. Developed from manually adjusted TL8 variable chokes, this opens up the muzzle to the standard “no choke” for close shots, and restricts it to “full choke”

for longer distances. The latter changes “extremely close range” (p. B409) to 20% of 1/2D Range rather than 10%. Beyond this range, subtract 1 from effective Guns skill, but multiply the number of hits scored by 1.5 (*GURPS High-Tech: Pulp Guns 1*, p. 24).

Alternatively, a smartchoke can change the shot pattern from a circle to an oval. The oval can “lie” horizontally, which gives +1 to hit human-sized targets (SM 0), but also effective Rcl 2; this means hitting is easier, but the number of hits is reduced.

The oval can also “stand” vertically, which gives -1 to hit, but the number of hits scored is doubled. This means hitting is harder, but the entire load will be concentrated on one target, doing more damage and preventing hits on innocent bystanders.

Lockouts and Tags

Every TL9 gun is fitted with a recognition grip for free (*Ultra-Tech*, pp. 149, 150), which prevents firing by shutting down the electrical ignition and/or engaging a mechanical safety. This makes weapon retention (*Tactical Shooting*, p. 25) less of an issue, as the gun will simply not function if wrested from the owner. Retain Weapon (*Tactical Shooting*, p. 45) is still a useful technique, not the least so that you can continue fighting with your own weapon. Biometric sensors in the grip may be useless with gloves, although this can be avoided by a transponder ring (*Ultra-Tech*, p. 150) or by having the shooter's gloves synchronize with the weapon. This is most practical with gloves that are part of the uniform, including a flexible sealed combat suit (*Ultra-Tech*, p. 178). Alternatively, TL9 biometric sensors may be able to work *through* gloves.

Recognition grips that use acoustic recognition of voice prints (*Ultra-Tech*, p. 150) are less useful for reasons of operational security. However, in some societies, it might be deliberately included in police weapons to insert an additional step into a police officer's force escalation, much like the requirement to identify himself as “Police!” before shooting. Cops would no doubt hate it, for all the right *and* wrong reasons . . .

Recognition grips can be set to accept more than one shooter, to allow a space marine's gunnery sergeant or platoon mates, a cop's partner, or a man's family members to use the gun in an emergency. The data storage capacities of TL9 put few limits on the number of potential users, but 50 biometric datasets is a practical maximum (*Transhuman Space*, p. 157).

Instead of just shutting down in the wrong hands, the more safety-concerned (or paranoid) owners could also include other lockouts related to targets or the environment to prevent accidents, crimes, or “friendly fire.” Some of these might be programmed in by the user, but most would be legally mandated and either factory- or armory-installed. The gun might not be able to fire in a school or government building; aboard a spacecraft; at a policeman or at troops from your own army; etc. In order to “know” where it is or at whom it is pointed, the gun requires data input – it must be linked to the GPS and the radio communicator of the HUD link and/or the IFF system linked to the laser sight.

Guns in Space

In those TL9 societies that feature frequent space travel, guns may be space-proofed. *Any* firearm can be fired in space – even TL5-8 metallic cartridges contain their own oxidizers. One issue is lubrication – ordinary lubricants quickly vaporize in vacuum (*High-Tech*, p. 85). The firearm must be designed to need little or no lubrication, or to be used with special vacuum-proof lubricants. Either has no effect on cost or weight, but *must* be in the design from the start. A gun that is not lubricated properly has its Malf. worsened by -1 or more (*High-Tech*, p. 80).

The chief issue in firing a gun in vacuum is the extreme temperature change. Space can be extremely cold *or* hot (p. B437). As soon as the gun is fired, even for a few shots, the action and barrel will heat up considerably and expand. Extreme temperature fluctuations negatively impact precision (reduce Acc by -1), lead to jams (worsen Malf. by -2), and can ultimately result in a catastrophic explosion (p. B407) due to material fatigue. Space-proof guns need especially efficient ways to dissipate heat (p. 5). They also need to be built from materials that can take the temperature fluctuations. Multiply cost and weight of the gun by 1.2.

Guns designed to be used in space require an oversized trigger and trigger guard to accommodate the gloves used with vacc suits, space armor, and battlesuits. Otherwise the trigger can't be pulled at all. Even with an appropriate trigger, all Guns rolls are at -2 due to the

reduced manual dexterity of the gloves. A neural link (p. 5) may be more practical.

The lack of air pressure in space has *no* significant effect on muzzle energy and thus Damage. It does theoretically increase Range to infinite, however.

Gravity and Shooting

Microgravity affects shooting skills (p. B350). The Zero-G Shooting technique (p. 11) is useful to avoid any penalties. Furthermore, unless the shooter is fully braced against an immobile object, guns fired in microgravity are more affected by recoil; increase minimum ST by +5 and add +1 to Rcl. Firearms designed for use in microgravity are fitted with special zero-G compensators at the muzzle, which direct the firing gases in a way that these effects are negated. These don't provide the advantages of ordinary compensators (*Tactical Shooting*, p. 76), and aren't compatible with either them or flash hiders. Zero-G compensators cost \$250 and weigh 0.5 lb.

Guns fired in high gravity suffer Range loss and have their minimum ST increased. Neither gun nor shooter can counter this, and the shooter has to understand the phenomena to deal with them. Even medium-distance shots can require extreme compensation. This is a -2 familiarity issue (p. B169).

The Precision Aiming technique (*Tactical Shooting*, p. 45) has to be learned for every 0.2G step of gravity.

Of course, either the recognition grip itself or the data input could be meddled with. The safety can be disabled with an Electronics Operation (Security)-4 roll or the data input can be hacked (*Ultra-Tech*, p. 47). The data sets could be extracted and misappropriated to point the finger at an innocent user.

The optional D-tag (*Ultra-Tech*, p. 151) will be a universal feature of at least of military and police weapons, since accountability of materiel is always an issue, and likely even more so in TL9 societies that are more "civilized." In fact, the D-tag will probably be included for free in *all* guns, just like TL8 cell phones have a GPS locator. Criminals, guerrillas, and similar users should always disable it . . . On standard-issue guns, the location of the D-tags will be known by all but the most naive thugs and revolutionaries, but deactivating them – using Electronics Operation (Security)-2 – is still an issue.

Handgrips and Stocks

Handgrips and shoulder stocks are fully adjustable. Instead of the interchangeable grip panels and multi-position stocks of TL8 guns, TL9 weapons use auto-adjusting memory materials (*Ultra-Tech*, p. 90) for a perfect fit to each shooter's hand size, length of pull, etc. This prevents problems with shooting in armor or bulky clothes (*Tactical Shooting*, p. 12). Together with other adjustable features, this option makes the Weapon Bond perk (*Tactical Shooting*, p. 41) likely for a majority of shooters. It also allows guns to be used by humanoid alien races. Many long arms can be reduced in size by one Bulk step, by virtue of a retractable or folding stock (*High-Tech*, p. 160).

Accessory Rails

Most guns will be covered with integral accessory rails (*Ultra-Tech*, p. 150), a trend that started at TL8. These are generally free if part of the original design. The GM decides which specific weapons have rails and where. Handguns have at least one below the barrel, long arms typically four – one on top, three below and on the sides of the handguard.

Diagnostic Computers

All TL9 guns feature a diagnostic computer for free (*Ultra-Tech*, pp. 149, 151). This has a shot counter function (*Ultra-Tech*, p. 149) that allows the shooter to always know the exact number of shots remaining (*Tactical Shooting*, p. 20), preventing nasty surprises like *unexpectedly* running out of ammo. The gun has a digital display for the rounds remaining, but can also send this information via the HUD link to a HUD or neural interface. Keeping track of the shot counter via HUD link is a free action, while checking the display on the gun takes a Ready maneuver.

The diagnostic computer can keep track of the type of round(s) loaded, which can be useful, especially if the gun has two different magazines or belts. Mixing ammunition in the same magazine is generally still stupid (*Tactical Shooting*, p. 31). This information also can be gleaned from the display or the HUD.

The diagnostic computer gives +1 to fix malfunctions via Immediate Action (*High-Tech*, p. 81, and *Tactical Shooting*, p. 17).

It keeps track of the gun's service life and overall shot count, allowing the unit armorer (or even the shooter himself) to regularly replace worn parts or perform necessary repairs, at +1 to Armoury (Small Arms). This is another reason for the low malfunction rates of TL9 guns. Whenever the gun is used without HUD link, the data from the diagnostic computer can be downloaded to an external computer using a cable jack (*Ultra-Tech*, p. 42) or wireless transmitter. Basic problems and solutions – “Change barrel!”, “Send to your nearest service provider!” – can be shown on the digital display.

The diagnostic computer can make a shooter's life much easier, but can also suffer from all the annoying quirks common to TL8 electronics, from garbled translations (“Flüid Friction Mitigator Insert!”) to plain errors (displaying the dreaded “00” in the shot counter when the magazine is in fact still half full) to diagnostics that involuntarily shut down all functions until the gun has been taken apart by a certified armorer on Alpha Centauri IV . . .

Specific Military and Police Options

Many military guns are selective-fire regardless of ammunition type, offering semiautomatic and full-automatic fire (*High-Tech*, pp. 82-83). Some may also be able to fire high-cyclic controlled bursts (*High-Tech*, p. 83) instead of or in addition to full-auto. Compensators (*Tactical Shooting*, p. 76) are a likely option.

Many military and/or police long arms feature an underbarrel support weapon, such as the underbarrel shotgun, underbarrel grenade launcher, or underbarrel gyroc (*Ultra-Tech*, pp. 136, 144). Depending on design, this can be on a quick-detach rail mount (*Ultra-Tech*, p. 150) or integral for free.

See also *Camouflage* (p. 6) and *Lockouts and Tags* (pp. 6-7) for additional options.

Powering Guns

All the minor electronics, from the electrical ignition to the diagnostic computer and the laser sight, are powered by a B cell (*Ultra-Tech*, p. 149). Similar to some TL8 rifle optics that use light-gathering technologies to prolong battery life, a tiny solar panel (*Ultra-Tech*, p. 20) might be integrated into the top of a gun receiver to recharge the power cell. Guns might even have tiny built-in dynamos or thermoelectric systems to generate power – firing a gun produces a lot of kinetic energy and heat as byproducts. Weapon racks in military armories, police stations, and ship's lockers include automatic recharging stations for free.

Manufacturing Guns

Many gun components can already be made using 3-D printer systems at TL8. A fabricator (*Ultra-Tech*, p. 90) allows production of TL9 guns and most of their accessories as well as their ammunition if the blueprints (*Ultra-Tech*, p. 91) are available.

EASY HITTING

This system monitors a 30° cone in front of the gun, and transmits high-resolution thermal images in the 8-10 m range to a miniature video display in the operator's eyepiece. If a target is

detected, the tracker will overlay a lighted box or rectangle on the screen over the target's center of mass.

– Lee Brimmicombe-Wood,

Aliens: Colonial Marines Technical Manual

Every TL9 gun is fitted with a HUD link and laser sight for free (*Ultra-Tech*, p. 149). Setting conventions may disagree – in a *Traveller* campaign, only the ACR is so equipped (*Traveller*, p. 111), while in *Cyberpunk*, these features need to be bought extra for all guns (*Cyberpunk*, p. 47). Guns without HUD link cost \$250 less (*Transhuman Space*, p. 156).

The HUD link (*Ultra-Tech*, p. 149) connects a digital camera in the gun (*Transhuman Space*, p. 156) with a head-up display (*Ultra-Tech*, p. 24) integrated into a helmet visor or worn as glasses or as a monocle – or alternatively, into a neural interface implant (*Ultra-Tech*, pp. 48-49).

Per the standard rules, this gives +1 Acc within 300 yards. To bring this in line both with a HUD's bonus to other skill uses (*Ultra-Tech*, p. 24) and the effects of TL8 reflex sights, which use similar but less sophisticated technology (*High-Tech*, p. 156), this should instead be +1 to Guns (or other relevant weapon skill). The 300-yard range limitation of TL8 reflex sights is mainly a result of the size and definition of the targeting marker. The higher resolution, decreased pixel size, and fully automated adjustability of TL9 HUD technology should increase the effective range substantially, at least to line of sight (up to 5,000 yards).

Like a reflex sight, the illuminated targeting marker displayed in the HUD makes it easier to aim in low-light conditions, negating up to -3 in darkness penalties.

Probably the biggest advantage of a HUD is that shooting is always sighted (*Tactical Shooting*, p. 13). However, since the shooter can keep both eyes open and does not need to concentrate on the sights *on his gun*, it also provides all the advantages of unsighted shooting (*Tactical Shooting*, p. 13). This means that a HUD-linked shooter gets +1 to Fast-Draw under the listed conditions; can use any shooting stance; can employ the Attack, Move and Attack, All-Out Attack (Determined), and Aim maneuvers; and can dodge.

The HUD link's video output offers a corner-shot option (*Ultra-Tech*, p. 149) as a new tool in addition to old-school tactics like “slicing the pie” (*Tactical Shooting*, pp. 23-24). Since the gun can't be properly held and rested against the torso this way, corner-shots are at -2 to Guns (*Tactical Shooting*, p. 75) and treated like shooting without stock, with -1 Acc, ST×1.2, and +1 Rcl (*Tactical Shooting*, p. 12). The Corner-Shot technique (p. 12) is useful. A shooter using the corner-shot option only exposes part of his shooting arm(s), for heavy cover (*Tactical Shooting*, p. 28). This reduces the need to learn the Barricade Tactics perk (*Tactical Shooting*, p. 37), although serious shooters will still want it.

The video footage from the HUD link not only provides closed-circuit images to the shooter's HUD link, but can also be used together with a TacNet system (*Ultra-Tech*, p. 149) to monitor troops in real-time. It includes a datachip (*Ultra-Tech*, p. 51) to record “muzzle” footage whenever the gun is fired or put off safe, for use in after-action reports . . . or in court.

Early TL9 HUDs could have a similar problem as TL8 night vision goggles and sights – back glow (“green eyes”). The illuminated display is reflected on the face and a slight shine can be seen. This allows others to spot the HUD wearer in low-light using a Vision+1 roll.

Entirely enclosed HUDs, such as those installed in the combat infantry helmet (*Ultra-Tech*, p. 180), as well as a HUD integrated into a neural interface, don't have this problem.

The Masked Shooting technique (*Tactical Shooting*, p. 44) is designed to cope with TL6-8 face masks that have limited field of vision and prevent cheek weld. At TL9, all relevant masks, including the air mask (*Ultra-Tech*, pp. 176-177) and combat infantry helmet, are set up for a HUD, meaning that shooters no longer need the technique.

The link itself can either be hardwired – with a cable running from the gun to the HUD system or neural interface implant – or use wireless technology with a communicator (*Ultra-Tech*, p. 24). A micro radio communicator (*Ultra-Tech*, p. 44) is standard, but can be replaced by a cable for free. All TL9 communicators include basic encryption for free; secure encryption is considerably more expensive at \$500 (*Ultra-Tech*, p. 47). Wireless communicators are easier to use and prevent mishaps such as the cable getting caught or cut, but are susceptible to being jammed (*High-Tech*, pp. 212-213) or cracked and hacked (*Ultra-Tech*, p. 47). For these reasons, hardwired systems are still more popular with military and police users. Instead of an actual cable, the connection could also be *through* the shooting hand – induction wires in the uniform gloves or a neural interface in the palm, rather than the traditional temple slot. However, an interface in the palm means that the off-hand shooting won't be supported unless that palm has an interface, too . . .

Many shooters will want to augment the HUD link with Targeting software (*Ultra-Tech*, pp. 149-150) that gives a *further* bonus to Guns skill. This is cumulative with the basic +1 from the HUD link, for a maximum Guns bonus of +3 with a Complexity 4 Targeting software costing \$1,500. (Whether a military or police organization is willing to spend the money on this is another question . . .)

The software needs a computer to run on, as well! Typically, the program will be installed on a shooter's personal computer – it's nearly inconceivable that every TL9 soldier or policeman will *not* always have a computer on his person or even integrated into his uniform. Even so, not all personal computers will be able to run a Complexity 4 application, especially in addition to other programs like TacNet and various software tools. A Complexity 3 Targeting software, but not a Complexity 4 app, could alternatively run on a rugged tiny computer (*Ultra-Tech*, pp. 22, 23) *in the gun*, but that is optional (*Ultra-Tech*, p. 149).

Iron Sights

TL9 guns still come with conventional iron sights for backup, in case the HUD link breaks down. However, some designs might lack them, as do a number of optically sighted TL8 guns. A military user might have spec'ed a gun without backup sights for cost reasons (both for the hardware and to train the soldiers in using them). Leaving off the iron sights saves \$100 and 0.2 lb. for a long arm, half that for a handgun.

Laser Sights

All TL9 guns are equipped with an adjustable multispectral laser sight (*Ultra-Tech*, p. 149) that projects a low-powered laser beam like a TL8 targeting laser (*High-Tech*, pp. 156-157). This gives +1 to Guns if used without the HUD link. If the laser is used with the HUD link, the bonus remains at +1 (not +2!), but

Augmented Reality

Instead of the standard HUD, shooters might use augmented reality (AR) technology (*Ultra-Tech*, pp. 56-57). This requires a HUD and HUD link to a gun camera, vid glasses (*Ultra-Tech*, p. 60), or a computer implant (*Ultra-Tech*, pp. 215-216). Linked to the gun's IFF system and a memory augmentation database, AR allows every object in the shooter's field of view to be tagged with specific target information, such as friend-or-foe (even name, age, rank, etc., if the person is in the system's memory database), estimated DR according to the type of body armor worn or vehicle used, etc. If linked to a multispectral laser sight, as is normally the case, the AR will display the exact range to the target, for the usual +3 Acc.

the HUD can calculate and display the exact range to the target as a free action, and the shooter can claim the +3 Acc for knowing the range (*Tactical Shooting*, p. 27) for all *aimed* shots. This doesn't work without HUD. The effective range of a multispectral laser sight is given as the weapon's 1/2D Range, which is both imprecise (as 1/2D Ranges differ considerably) and rather short considering the performance of TL8 laser equipment. This should be amended to line of sight on planetary battlefields, meaning the laser can determine the range to anything from 5,000 yards (distance to the horizon at sea level on Earth) to something like 20,000 yards.

The laser beam can be easily detected by opponents even in "invisible" IR mode, provided they have the most basic TL7 night vision equipment (*High-Tech*, p. 156). In the "invisible" UV mode, a TL9 hyperspectral vision system (*Ultra-Tech*, p. 61) is required, making it only slightly safer. Once an opponent can see the beam, he can "track it back" to the shooter's position, so that he "knows your location to within one yard" (p. B548), for a maximum visibility penalty of only -4.

Like advanced TL8 targeting lasers, the multispectral laser beam has a "flood" setting for illumination like a flashlight (*Ultra-Tech*, p. 74). It can emit white light, IR light, or UV light. In "flood" mode, it will negate all darkness penalties out to the beam's range (*Tactical Shooting*, p. 19, and *Ultra-Tech*, p. 74). The beam ranges given are low even for TL8 flashlights; at TL9, an effective range of at least 100 yards is more realistic. Shone into the eyes of an opponent, it can also dazzle (*Tactical Shooting*, p. 18, and *Ultra-Tech*, p. 113), at HT-7.

Shooters still need to practice laser/light discipline and only switch it on momentarily (*Tactical Shooting*, p. 19). Prominent use of laser sights on the battlefield makes identifying "your" laser dot difficult. Targeting lasers can be set to pulse at different frequencies and to switch the appearance of the dot from circle to cross, triangle, square, etc. (*Tactical Shooting*, p. 20), but mix-ups can still happen.

A personal radar/laser detector (*Ultra-Tech*, p. 188) can alert the wearer to a laser aimed at him, saving him from being ambushed (*Tactical Shooting*, p. 21). This also not only allows him to dodge at all (*Tactical Shooting*, p. 17), but gives +1 to Dodge (*High-Tech*, p. 157). Linked to a rugged tiny computer (*Ultra-Tech*, pp. 22, 23), the detector should be able to track back the location of a laser aimed at it within one second, not unlike a TL8 acoustic countersniper system (*High-Tech*, p. 207).

The shooter's own laser might even be used by an opponent's semi-active laser homing missile (p. B412) to home in on!

IFF Interrogators

IFF interrogators (*Ultra-Tech*, p. 151) are likely to be standard for all TL9 military and police guns. In military and police weapons, the laser will typically also function as an IFF interrogator (*Ultra-Tech*, p. 151). Troops no longer need to wear treacherous cat's eyes on their helmet bands or have "Police" stenciled in high-visibility paint on their backs to avoid friendly fire (although the latter identification mark probably can't be avoided, as it's at least as much for the benefit of the citizens as for the officer in non-totalitarian societies). Effective but training-intensive standard operating procedures like everyone stepping in the same direction in case of ambush (*GURPS SEALs in Vietnam*, p. 50) are likewise not necessarily needed any longer. It may make *Hitting the Wrong Target* (pp. 389-390) next to impossible. Special ops units may nevertheless stick to such old-but-true tactics, as IFF interrogators can be spoofed or tricked, and the laser beams can be detected.

An IFF interrogator gives a +2 bonus to Situational Awareness rolls (*Tactical Shooting*, p. 11). Running the TacNet program (*Ultra-Tech*, p. 149) provides a bonus equal to its Complexity, while the Target Tracking application (*Ultra-Tech*, p. 150) gives a bonus twice its complexity. The bonuses from TacNet and Target Tracking aren't compatible.

Targeting Scope

An optional compact targeting scope (*Ultra-Tech*, p. 149) is common for all but the tiniest holdout guns despite its high additional cost. Optronics are already widespread on TL8 military and hunting long arms, and are even mounted on some TL8 pistols. The advantages of magnification and night-vision are simply too large to ignore them. The gun's HUD link channels the scope's video output to the shooter's HUD or neural interface, meaning actually looking *through* the scope (*Tactical Shooting*, p. 20) is no longer mandatory.

The magnification will be variable (*High-Tech*, p. 155) at least from 1-4x, to give +0, +1, or +2 to Acc; the non-magnifying setting is important for close-range shots. However, at TL8, the cost, weight, size, and performance of scopes hinges on lens quality – at TL9, digital video comes without most of those downsides. Better magnification is not actually TL-dependant, and could easily be as high as 32x (+5 Acc) even at TL9.

Like advanced TL8 night-vision sights, the compact targeting scope will not be a pure thermal-imaging device providing Infravision (*Ultra-Tech*, p. 149), but rather an image-intensifying sight with optional thermal overlay that provides either Night Vision 9 or Infravision – or both together! This is included in the cost. Using the sight, the shooter suffers from Tunnel Vision (*Ultra-Tech*, p. 149) and – if used in any of the night-vision modes – also from Colorblindness (*High-Tech*, pp. 156, 157).

If installed, a compact targeting scope can be used conventionally as backup sight.

MILITARY SUPPORT GUNS

Everything explained under *Infantry Guns* (pp. 4-10) also applies to heavy guns like the anti-materiel rifle, payload rifle, light support weapon, minigun, storm chaingun, splat gun, or gyro light support weapon (*Ultra-Tech*, pp. 135-139, 144-145).

An articulated weapon harness (*Ultra-Tech*, pp. 150-151) or gyro-stabilized weapon harness (*Ultra-Tech*, p. 150) allows a single gunner to carry a heavy support gun and fire it from

(almost) any position, including on the move and lying down. Although firing the gun from a weapon harness means technically you are always shooting from the hip (*Tactical Shooting*, pp. 12-13), it comes with neither the advantages nor disadvantages of that stance. This is because the mounted guns are always so bulky that they can't profit from the position. Conversely, the fact that normal weapon sights can't be used this way is negated by the use of a HUD link.

Tomorrow's Beam Weapons

At TL9, few beam weapons are effective enough for combat service. The various electrolasers (*Ultra-Tech*, p. 119) occupy a niche for less-than-lethal operations, especially with police and security services, but also for personal defense. They take the place of TL8 TASER guns, boasting all their tactical advantages without their operational limitations.

The assault laser and laser sniper rifle (*Ultra-Tech*, p. 115) are the only lethal beam weapons available at TL9. Both suffer from requiring a bulky and vulnerable chemical tank (*Ultra-Tech*, p. 115), and from emitting toxic fumes upon firing (*Ultra-Tech*, p. 114).

Their awesome Acc makes them especially useful for sniping (*Tactical Shooting*, pp. 26-27). For all effects and purposes, laser beams *do* impact instantly, meaning that bullet travel (*Tactical Shooting*, p. 32) doesn't need to be

accounted for, and neither does the wind or other parameters that can disturb a projectile. Many shooters will prefer the assault laser over the laser sniper rifle in this role, since it's much lighter, more compact, and just as accurate. Instead of their inefficient integral scopes, either weapon typically mounts at least a compact targeting scope, if not an enhanced targeting scope (*Ultra-Tech*, p. 149).

Laser weapons have other operational advantages, such as little sound and a limited visual signature. While a high-energy laser beam is completely silent (*Ultra-Tech*, p. 114), the weapons' mechanical components, such as the chemical pump, reaction chamber, and exhaust are not – and neither will be the impact! Treat as "shouting" (*High-Tech*, p. 158). The beam is difficult to see with the naked eye, but is very hot and consequently easy to spot with any kind of night vision equipment.

For all practical purposes, shooting from a weapon harness is treated exactly like shooting a handheld gun, except that the gunner needs only to match a reduced minimum ST and is always braced for +1 Acc: The gunner can use the Attack, Move and Attack, All-Out Attack (Determined), and Aim maneuvers, and can dodge. The gyro-stabilized weapon harness also cancels the Guns or Gunner penalty imposed by Move and Attack, making the Close-Quarters Battle technique (*Tactical Shooting*, p. 43) superfluous.

Such a harness can make the *gunner* too bulky to fit through doorways, vehicle hatches, etc., although improved designs could have the articulated weapon arm fold onto the gunman's back, like a bird's wing.

The main problem is that the harness doesn't help with encumbrance (pp. B17-18), meaning the weight of the gun, the harness, and the ammunition is likely to be a considerable burden on the gunner. This means gunners need to bulk up with additional ST or use an exoskeleton (*Ultra-Tech*, p. 181).

RELATED GUNFIGHTER ISSUES

If military virtuality really works, everyone's gonna want it. Now imagine two armies, two strategically assisted, cyber-space-trained, post-industrial, panoptic ninja armies, going head-to-head. What on earth would that look like? A "conventional" war, a "non-nuclear" war, but a true War in the Age of Intelligent Machines, analyzed by nanoseconds to the last square micron. Who would survive? And what would be left of them?

– Bruce Sterling, "War is Hell"

Virtual reality simulation training (*Ultra-Tech*, p. 55) can be used to make the shooter familiar (pp. B169, 199) with practically every gun available, although it can't reduce the time required – eight hours per distinctive model. This would make the Cross-Trained perk (*Tactical Shooting*, p. 38) superfluous. Of course, there are always guns of the opposing forces that could not yet be included in the latest sensies.

Shooters will universally use active hearing protection (*Ultra-Tech*, p. 171), either in the shape of small electronic earplugs (*High-Tech*, p. 70) – these cost \$25 at TL9 – or integrated into a combat infantry helmet (*Ultra-Tech*, p. 180). This protects a shooter's hearing from the noise of the battlefield (*Tactical Shooting*, pp. 34-35). Active hearing protection not only cuts out specific noise levels such as gunshots and explosions, it actually *magnifies* many other sounds, especially conversations, giving +2 to Hearing rolls.

Sound suppressors work like their predecessors (*High-Tech*, pp. 158-159, and *Tactical Shooting*, pp. 70-71), but offer improved performance. Most TL9 designs are baffle suppressors, with perfected gas and blast diffusion panels and integral cooling. They automatically vent themselves of oxygen to avoid the first-shot pop (*Tactical Shooting*, p. 71). This allows -4 to -8 Hearing, with -6 being standard. -1 Bulk. \$100 per -1 Hearing. 0.5 lb. for pistol, 1 lb. for rifles, and 2 lbs. for oversized guns.

SHOOTING STYLES OF TOMORROW

The panzer's cargo doors are down, and men are rushing out and fanning over the surface, men in desert camouflage and black helmets. They seem to move in synch, their heads turning to scan the ground around them, one of them always looking in every direction so the unit has an ever-present 360-degree awareness, their arms and legs moving with alarming speed and efficiency. Hardwired, with crystal for small-unit combat, way out of Sarah's league.

– Walter Williams, *Hardwired*

All the shooting styles in *Tactical Shooting* can still be used at TL9. However, new guns, gadgets, and operational realities will also lead to new styles.

BATTLESUIT SHOOTER

7 points

Our suits give us better eyes, better ears, stronger backs (to carry heavier weapons and more ammo), better legs, more intelligence ("intelligence" in the military meaning; a man in a suit can be just as stupid as anybody else only he had better not be), more firepower, greater endurance, less vulnerability.

– Robert Heinlein, *Starship Troopers*

This style is optimized for shooters wearing powered armor. Its shooting skills favor heavier weapons, to effectively

combat similarly armored opponents and to make the most of a battlesuit's increased ST.

Close-Quarters Battle is essential for fire on the move. Comms Multitasking (*Transhuman Space: Martial Arts 2100*, p. 15) is useful especially for officers and NCOs to monitor communications with their units. Targeted Attack is particularly effective to deal with weak points (p. B400) in the battlesuits of the opposition.

Equipment Bond is a common perk to model a suit being perfectly adjusted to the wearer. Military-trained shooters often have Battle Drills and Standard Operating Procedure.

For a more cinematic style, see Battledress Training (*Martial Arts 2100*, p. 23).

Skills: Four of Artillery (Guided Missile), Gunner (any), or Guns (LAW, LMG, Rifle, or SMG); Battlesuit; Electronics Operations (Comm).

Techniques: Close-Quarters Battle (any); Comms Multitasking; Corner-Shot (any; p. 11); Fast-Firing (any); Immediate Action (any); Quick-Shot (any); Targeted Attack (any); Zero-G Shooting (p. 11).

Perks: Battle Drills; Cool Under Fire; Equipment Bond; Off-Hand Weapon Training (any); Quick Reload (any); Standard Operating Procedure (any); Trademark Move; Weapon Bond.

New Techniques

The following new shooting techniques are useful on tomorrow's battlefield.

Corner-Shot

Average

Default: prerequisite skill-2.

Prerequisites: Any Beam Weapons or Guns specialty; cannot exceed prerequisite skill.

This technique enables you to buy off the -2 to Guns when firing around a corner (p. 8) at a target *that you can see* by way of an optical, electronic, or other aiming aid. Long arms, but not handguns, suffer *additional* penalties due to the awkward unsupported stance (*Tactical Shooting*, p. 12); these can't be bought off.

Zero-G Shooting

Hard

Default: Free Fall.

Prerequisites: Free Fall and either Beam Weapons or Guns; cannot exceed Free Fall+4.

This technique represents training at shooting in low-to-no gravity (p. B350). It doesn't cover the actual shooting – for that, improve Guns – but where the rules limit Guns skill to Free Fall (p. B197), your limit is Zero-G Shooting instead. Zero-G Shooting never aids ordinary Free Fall rolls, but you may use it instead of Free Fall if the GM requires a roll against that skill to handle the effects of discharging a firearm.

Optional Traits

Secondary Characteristics: Improved Basic Speed.

Advantages: Combat Reflexes; Fearlessness; Signature Gear.

Disadvantages: Overconfidence.

Skills: Armoury (Battlesuits, Heavy Weapons, or Small Arms); Beam Weapons (Rifle); Connoisseur (Guns); Electronics Operation (Sensors); Fast-Draw (any); Forced Entry; Forward Observer; Free Fall; Guns (any); Liquid Projector (Flamethrower); Soldier; Spacer; Tactics; Throwing; any primary skill not learned initially.

Techniques: Corner-Shot (any).

Perks: Armorer's Gift (any); Cross-Trained (any); Early Adopter (any); Tap-Rack-Bang (any).

SPACE MARINE

8 points

Me and my squad of ultimate badasses will protect you! Check it out! Independently targeting particle beam phalanx. Vwap! Fry half a city with this puppy. We got tactical smart missiles, phase-plasma pulse rifles, RPGs, we got sonic electronic ball breakers! We got nukes, we got knives, sharp sticks . . .

– Private First Class William Hudson, in *Aliens*

The Space Marine shooting style is a TL9 equivalent of the Assaulter style (*Tactical Shooting*, pp. 47-48), modified for the many operation scenarios that tomorrow's spaceborne naval

assault forces face. In addition to a variety of gun-related skills, the style emphasizes combat and survival in and around spacecraft, requiring Free Fall and Vacc Suit.

Boarding operations require fire on the move at close distance, making the Close-Quarters Battle technique especially important. Zero-G Shooting allows effective combat in low gravity. Targeted Attack is common – the skull hit location is typical, but depending on the opponents it may also include specific body parts of xenomorphs or known weak spots in body armor or battlesuits (p. B400). Comms Multitasking is common with officers and NCOs.

Battle Drills and Standard Operating Procedure are standard perks for military shooters. Off-Hand Weapon Training and Quick Reload are popular secondary choices. Barricade Tactics may be less common due to technical advances (p. 8), while Weapon Bond will be more common (p. 7).

Most marine units still teach bayonet fighting (*Martial Arts*, p. 197); boarding units may even use cutlasses or similar fighting blades. In addition to this shooting style, space marines also train in unarmed combat, such as MCMAP (*Martial Arts*, pp. 183-184) or Freefighting (*Martial Arts*, p. 210), if mainly to stay physically fit.

Skills: Four of Fast-Draw (Ammo), Gunner (MG), or Guns (LAW, LMG, Pistol, Rifle, Shotgun, or SMG); Electronics Operation (Comm); Free Fall; Vacc Suit.

Techniques: Close-Quarters Battle (any); Comms Multitasking; Corner-Shot (any); Fast-Firing (any); Immediate Action (any); Quick-Shot (any); Precision Aiming (any); Targeted Attack (any); Zero-G Shooting.

Perks: Barricade Tactics; Battle Drills; Cool Under Fire; Grip Mastery (any); Lightning Fingers (any); Motorized Training (any); Off-Hand Weapon Training (any); Quick Reload (any); Standard Operating Procedure (any); Sure-Footed (any); Trademark Move; Weapon Bond.

Optional Traits

Secondary Characteristics: Improved Basic Speed and Per.

Advantages: Acute Vision; Combat Reflexes; Danger Sense; Fearlessness; Fit; Signature Gear.

Disadvantages: Hard of Hearing; Overconfidence.

Skills: Armoury (Body Armor or Small Arms); Artillery (Guided Missile); Beam Weapons (Rifle); Carousing; Connoisseur (Guns); Electronics Operation (Security or Sensor); Forced Entry; Forward Observer; Gunner (any); Guns (any); Liquid Projector (Flamethrower); Soldier; Spacer; Spear; Stealth; Sword; Tactics; Throwing; any primary skill not learned initially.

Techniques: Work by Touch (Armoury).

Perks: Armorer's Gift (any); Cross-Trained (any); Early Adopter (any); Green Eyes; Tap-Rack-Bang (any); Tracer Eyes.

ABOUT THE AUTHOR

Hans-Christian "Grey Tiger" Vortisch is the author or coauthor of *GURPS High-Tech*, Fourth Edition, *GURPS Modern Firepower*, and *GURPS Tactical Shooting*, among other books. He watches *Aliens* regularly.

Special thanks to the Hellions.

CHROME COMMANDOS

TL9 ELITE TACTICAL GEAR

BY W.A. FRICK

With a vast catalog of options for enhancing military hardware, from advanced optics and stealth electronics to tactical software and interconnected smart devices, a TL9 infantry squad can be a force to be reckoned with – *if* they have the budget to gear up right. But the fanciest hardware gets expensive quickly, and even in the armies of technologically advanced societies, only the most elite units are likely to be equipped with the full range of state-of-the-art combat gear.

This article is about those elite units, or – more specifically – some of the state-of-the-art gear they use. The equipment here is intended for TL9 special forces and covert ops, but might also be employed by corporate strike teams, well-funded mercenaries, paramilitary monster-hunting squads, or even SWAT teams in exceptionally violent cities.

Equipment costs are given for reference and entertainment value, but most heroes who have access to the gear presented here get it through a Patron. Unless they have the full +100% version of Equipment on that Patron, however, they can't use this gear *except* when on assignment!

Equipment Modifiers

The devices here come with the following options available as “extras,” as noted in the descriptions. Adjustments to cost and weight for each type of modification are listed with the device.

Cutting-Edge: Made of advanced composite and/or nano-fabricated materials, reducing weight.

Hardened/Super-Hardened Electronics: Electronics designed to resist surges, EMPs, etc., providing +3 to HT on rolls to avoid

such effects for hardened, or +8 for super-hardened. See also *GURPS Ultra-Tech* (p. 23).

Rugged: Built to last – armored and environmentally sealed, providing +2 to HT rolls to avoid breakage, water damage, etc.,. See also *Ultra-Tech* (p. 15).

BASIC GEAR

The following devices are generally useful on many kinds of missions, and available either as independent (worn or hand-held) units, or integrated into armor/helmets.

Hostile Environment Mask

See *Ultra-Tech*, p. 176

This device can act as a filter or air mask, with an integrated mini-tank (10-minute supply), and fittings for an external oxygen supply (such as the air tanks on *Ultra-Tech*, pp. 176-177, or the one built into the commando tacsuit, p. 16). An integral pressure sensor and dedicated chemsniffer (*Ultra-Tech*, pp. 61-62) continually test atmospheric conditions as long as the mask is worn, automatically engaging the filter or air supply when toxic gasses or dangerously low pressure are detected – this provides the benefits of Filter Lungs (p. B55) and Protected Taste/Smell (p. B78) against any sudden gas-based attack. (Mode can also be manually controlled.)

It features smart electronics (above), and can communicate sensor and status info to a linked HUD or PTC (pp. 14-16) – atmospheric readings, remaining air supply, filter replacement status, etc.; high-priority info (e.g. “nerve gas detected!”) is instantly transmitted to all linked teammates’

PTCs, and *their* masks respond accordingly. A hostile environment mask is built into the tactical combat helmet (p. 17); as an independent unit, it provides DR 10 to the face, and seals with tactical goggles (p. 14) to cover the eyes as well. 2A/20 hr.

Basic device: \$400, 4.5 lbs.; *cutting-edge:* +\$400, -1.5 lbs.; *rugged:* +\$400, +1 lb.; *hardened/super-hardened electronics:* +\$150/\$300, +0.25 lbs.

Smart Devices

TL9 “smart devices” – including most of the equipment here – have tiny embedded computer chips, providing them with the features of “*Smartgun*” Electronics (p. B278): diagnostic systems that give +1 to repair skills, access control systems, HUD-formatted output, and the ability to establish short-range secure-links (p. 15) with a PTC (pp. 14-16).

Image-Enhanced Armor Shades

See *Ultra-Tech*, p. 60

In addition to protecting the eyes (DR 10), these stylish dark glasses are embedded with smart electronics (p. 13) and sophisticated micro-optics – they’re HUD-capable (*Ultra-Tech*, p. 24), provide Night Vision 8, and are polarized (Protected Vision). They’re common for covert ops who don’t want to be seen wearing tactical goggles (below), but need a HUD for their PTC output. A/10 hr.

Basic device: \$400, 0.25 lbs.; *cutting-edge*: +\$400, -0.1 lbs.; *rugged*: +\$400, +0.05 lbs.; *hardened/super-hardened electronics*: +\$300/\$600, +0.15 lbs.

Recharging

TL9 power cells are rechargeable, and a full tactical loadout requires a lot of power cells. However, the expected life of most of the equipment in this section is conveniently right around 20 hours, meaning that if all the gear is fully charged when the commando dons it, it will all last for probably about as long as he will before needing rest/recharge.

Even more conveniently, the equipment can be recharged without removing the power cells – all smart devices have power-jacks that allow them to plug into any standard power source to recharge. Equipment that’s physically connected (e.g., the PTC plugged into smart armor) can share a single power connection.

It takes 10 hours of uninterrupted power to fully recharge. If disconnected early, subtract (10 – number of hours charged) times two from the battery life of the partially charged gear.

Multi-Comm

See *Ultra-Tech*, p. 43

This is a handheld, helmet-mounted, or embedded communicator, which maintains an encrypted connection with other secure-linked (p. 15) multi-comms in range, intelligently selecting the best available communication mode for a given situation. It’s capable of infrared, laser, and radio comms, and can be set to intelligent-selection (default), single-mode (if the enemy is listening for one kind of signal but not another), comm silence (listen only, no outgoing signals or emissions – nor connection to TacNet), or quantum laser channel (ultra-secure point-to-point). If connected to neural input (such as in a tactical combat helmet, p. 17, or concealed neural headset, p. 17), the comm can transmit sub-vocalized messages. Standard use requires no skill roll, but getting fancy (bouncing signals, setting up a quantum channel, etc.) calls for Electronics Operation (Comm).

All multi-comms feature smart electronics (p. 13), chronometer (automatically syncs with secure-linked peers or server), and GPS receiver (*Ultra-Tech*, p. 74). A handheld unit also has an inertial compass (*Ultra-Tech*, p. 74-75), a datapad (*Ultra-Tech*, p. 23) for manual input/output, and can perform basic “smartphone” functions – run minor (Complexity 1 or 2) applications, browse the net, etc.

Many paramilitary and intelligence models have a “universal wireless passkey” that allows them to connect to any public or commercial cellular/wireless network in range. This doesn’t automatically hack into private or encrypted networks,

but allows the comm to use available wireless infrastructure to extend its range, make regular “phone calls,” connect to the global Internet, etc. *Small*: 4B/20 hr.; *tiny*: 4A/20 hr. (or powered from attached device). Add \$1,000 for wireless passkey.

Basic device (small): \$5,000, 0.8 lbs.; *cutting-edge*: +\$1,000, -0.3 lbs.; *rugged*: +\$1,000, +0.2 lbs.; *hardened/super-hardened electronics*: +\$1,250/\$2,500, +0.8 lbs.

Basic device (tiny): \$1,500, 0.1 lbs.; *cutting-edge*: +\$250, -0.05 lbs.; *rugged*: +\$250, +0.05 lbs.; *hardened/super-hardened electronics*: +\$750/\$1,500, +0.1 lbs.

Tactical Goggles/Visor

See *Ultra-Tech*, p. 61

These are armored (10 DR to the eyes), smart (p. 13), computer-enhanced hyperspectral-imaging optics. They provide 1-4× magnification, polarization (Protected Vision), and can display HUD output (*Ultra-Tech*, p. 24), including targeting information for any HUD-linked weapons, dynamic tactical readouts from secure-linked PTC, etc. Visors are integrated into tactical helmets (p. 17); goggles are worn separately (often with a hostile environment mask, p. 13, with which they can form a seal). 2B/20 hr.

Basic device: \$2,500, 0.75 lbs.; *cutting-edge*: +\$2,000, -0.25 lbs.; *rugged*: +\$2,000, +0.15 lbs.; *hardened/super-hardened electronics*: +\$2,000/\$4,000, +0.65 lbs.

COMPUTERS

Probably the most profound changes to battlefield technology at TL9 are the expanding roles and possibilities of computers, particularly *networked* computers.

Secure-linking (p. 15) allows more complete and dynamic battlefield communication than ever before, as tactical information is passed directly from computer to computer, analyzed and organized in microseconds, and relevant details (only) are projected directly into the soldier’s (computer-enhanced) field of vision.

Personal Tactical Computer (PTC)

The fundamental linchpin in the elite tactical gear considered here is the PTC: a dedicated computer that controls and coordinates an individual soldier’s smart equipment (p. 13) via secure-link (p. 15), runs his tactical and targeting software, and links him to his comrades and command in real time. All system readouts are sent to a HUD-capable device (e.g., tactical visor/goggles, above, or image-enhanced armor shades, above), or other linked video display (chameleon surface, etc.). If wearing a neural input receiver (e.g., tactical combat helmet, p. 17, or concealed neural headset, p. 17), subvocal commands are possible; otherwise the wearer must use vocal commands, a datapad projected onto a chameleon surface, or an external terminal.

A PTC is often strongly keyed to an individual user, and monitors his bio-functions when in contact with him, e.g., when worn inside his smart armor (treat as a biomonitor, *Ultra-Tech*, p. 197). The owner must authenticate biometrically (usually eye, thumb, and voice-print) in order to turn it on, and if it’s unexpectedly disconnected from his smart armor, or his armor is forcibly removed, it locks itself until re-authenticated.

However, it maintains secure-links with smart equipment, so re-authenticating to the PTC unlocks all linked equipment as well.

Hardware

See *Ultra-Tech*, p. 22-24

The PTC is a small computer (Fast; Complexity 5; High-Capacity), with integrated tiny multi-comm (p. 14). It has no external display, nor any physical interface beyond basic power and status indicators, biometric input, and self-sealing cable and power jacks, though it can be attached to any standard I/O devices. 2B/20 hr. The software adds \$20,150 to final hardware cost.

Basic device: \$3,000, 0.5 lbs.; *cutting-edge*: +\$2,000, -0.15 lbs.; *rugged*: +\$2,000, +0.1 lbs.; *hardened/super-hardened electronics*: +\$3,000/\$6,000, +0.5 lbs.

Software

See *Ultra-Tech*, p. 149-150

A standard PTC comes with a suite of embedded tactical software, all available at will to the authenticated, HUD-linked user. The software works together seamlessly and dynamically to enhance the user's situational awareness and tactical effectiveness.

IFF software (*Ultra-Tech*, p. 188) clearly identifies teammates in the HUD, and attempts to override fire-control (*without* spoiling a good kill) when a shot would accidentally hit an

ally – the maximum skill for *Hitting the Wrong Target* (p. B389) is 6 instead of 9, if that target is designated as a friend in the software (which all secure-linked teammates are, automatically). Complexity 2, \$500.

Silhouette (*Ultra-Tech*, p. 149) is loaded by default with profile databases for common civilian and military weapons, armor, and vehicles, as well as the designations, insignias, and uniforms of major national, private, and corporate militaries. At the GM's discretion, other databases may be available for virtually anything a team of TL9 commandos might need, but the PTC itself only has storage space for databases on three to four subjects.

When an object is viewed via HUD-enabled optics connected to the PTC, it can be *queried* against the profile database; this is a free action for the user (once per turn, though groups of identical objects can be queried together), but requires one second for the computer to accomplish. An oblique, long-distance, fleeting, or otherwise obscured view requires a Vision roll (at any relevant penalties, but taking into account advanced optic capabilities) to get a good enough look.

In most cases, if the GM rules that an object is in the database, the query is successful. If a query is successful, the object's identity (as known to the database author) is clearly displayed in the user's HUD; if the database has technical files on an item, he can call up instructions and schematics (a Ready maneuver in combat, plus at least 1d turns of Concentrating to scan) that give him +1 to any technical skill to operate or repair the device.

Secure-Link

Secure-linked devices have been configured and authenticated to have a semi-permanent, strongly encrypted wireless connection with one another. There are two basic kinds of secure-links considered here: the links between all multi-comms (p. 14) and PTCs (pp. 14-16) of the members of a single operative team or military unit, and possibly a TacNet Server (p. 16); and the link between the smart devices (p. 13) used by an individual commando, and his PTC, which controls and coordinates them.

A *team's* secure-linked communications use the best connected multi-comms to maintain an encrypted channel with all teammates in range. PTCs have an integral tiny comm, but if a small (helmet-mounted or handheld) unit is linked to the PTC, it will route communications through the larger device. TacNet software on linked PTCs uses this connection to continually sync tactical data, and the soldier themselves use it for secure voice/subvocal comms.

Secure-linking a *smart device* to a PTC hands over all device output and control to the PTC. Linked devices get the user's biometric key from the PTC; if it matches the data collected by the device's own recognition grip (*Ultra-Tech*, p. 150) or biometric scanner, the device unlocks. Thereafter, it behaves as though it had a transponder ring (*Ultra-Tech*, p. 150) – it will lock, not functioning at all, if taken away from the owner, but instantly return to full working order if he recovers it. The actual range of this kind of secure-link is several yards, but the software can

tell when the owner is holding the weapon, as opposed to when it's merely nearby.

The process of *establishing* either kind of secure-link requires a physical connection between the linked devices, to verify identity and create strong encryption; most of the time, a team's equipment will already be fully secure-linked before they gear up. Secure-linking new gear in the field requires rolls against Computer Operation and Electronics Operation (Security), and secure-linking *implanted* hardware requires an implant cable jack.

Trying to *crack* a secure-link – eavesdropping, attempting man-in-the-middle interference, etc. – is as for breaking *Secure Encryption* (*Ultra-Tech*, p. 47), but add 1 to the required Complexity of a computer attempting to break it.

Lockout!

The flipside of the PTC's persistent secure-link with smart equipment is that many systems allow a lockout code – often issued from a TacNet Server – which overrides and shuts down the PTC and *all* linked equipment of an individual soldier, or even an entire unit. This is generally provided as a safeguard against disloyalty – a unit who defects or otherwise fails to follow orders may find their gear locked out by command! (Even so, with physical access to the equipment, cracking into it is always an option – a few good Computer Hacking and Electronics Repair (Security) rolls should be able to “reset” the systems.)

If a PTC is connected to a TacNet Server (below), it can query the server for objects that aren't in its own databases. This takes the computer 1d *additional* seconds, during which time Silhouette can attempt other local queries; the GM determines what, if anything, the server's (potentially much larger) databases contain about the object. Complexity 5; \$2,000. Additional databases may cost anywhere from a few hundred dollars for common or hobbyist subjects (e.g., dog breeds), to hundreds of thousands of dollars for highly obscure or classified subjects (e.g. alien technology).

TacNet (**Ultra-Tech**, p. 149) communicates with teammates' (secure-linked) PTCs and/or the team's TacNet Server, synchronizing and analyzing tactical data. This includes Silhouette and Target Tracking data, filtered and prioritized in each soldier's HUD by TacNet, so that he has access to a fuller picture of the engagement without being overwhelmed by confusing or irrelevant information in his display. Complexity 5; \$10,000.

Targeting (**Ultra-Tech**, p. 149) software automatically loads the correct configuration and drivers for *any* linked smartgun, displaying a dynamic cross-hair, ranging information, ammo type and count, expected kill radius for area weapons, and other relevant weapon status, for a +2 to weapon skill as long as a HUD is used. Complexity 4; \$7,500.

Target Tracking (**Ultra-Tech**, p. 150) tries to intelligently paint, evaluate, and track threats (anyone shooting at the team, anyone the team is shooting at, etc.), and allows manual target painting (free action once per turn). It automatically attempts to use Silhouette to visually identify targets (one second per query, if Silhouette isn't already busy), and sends any relevant information to the user's HUD. Designated targets are also passed to linked PTCs and/or the TacNet Server, comparing their targeting information and threat assessments in order to create as complete a tactical picture as possible. By itself, the

TacNet Server

TacNet software (**Ultra-Tech**, p. 149) normally uses a peer-to-peer network – each PTC with an established secure-link (p. 15) shares relevant information with all teammates' PTCs, giving all users a bonus to Tactics when coordinating their actions (+1 to skill for the Complexity 5 software on a PTC).

A TacNet Server is a more sophisticated central system, run on heavier hardware (often a Fast or Genius Microframe, located in a command vehicle or forward base), which coordinates the information from all linked PTCs ("clients"), and returns a clearer picture of the entire battlefield to the leader *and* all connected soldiers. This gives all users an *additional* +1 to Tactics when coordinating, so long as they have a secure-link to the team's TacNet Server. The server can also host additional databases for Silhouette (p. 15), enabling clients to profile more kinds of things, can synchronize Target Tracking data (above) across the unit, and can allow someone using the TacNet Server locally (e.g., the unit commander) to view what any (or *all*, with multiple displays!) of his unit can see through their optics. Complexity 7; LC2; 20 times normal cost (\$200,000 at TL9).

software can track up to 100 targets; if connected to a TacNet Server, it can pull data on any targets being tracked by *any* teammate. Complexity 3; \$150.

DEFENSES

A suit of smart armor (see *Smart Devices*, p. 13) is generally fitted with an internal pocket and interface jack for the wearer's personal tactical computer (pp. 14-16), which provides the biometric lock with the user's authentication data. The PTC must be connected for the intelligent/powered features of the armor to function. Without an authenticated PTC, the armor is nothing but dumb DR and dead weight.

Commando Reflex Tacsuit

See **Ultra-Tech**, p. 178

Standard protection for a TL9 commando is the reflex tacsuit (flexible DR 10, or 20 vs. cutting and piercing damage), fitted with advanced trauma plates similar to those available for tactical vests (+35 DR vs. all damage types, to the torso and vitals), and studded with ammo pockets, gear slings, etc. The surface is woven with smart fibers that provide IR cloaking and radar stealth (**Ultra-Tech**, pp. 99-100; -4 to detect wearer with IR or radar), thermo-optic chameleon surface (**Ultra-Tech**, p. 99; Chameleon 2, Extended: Infrared, Half vs. Hyperspectral), near miss indication (**Ultra-Tech**, p. 188; +2 Vision to locate source of projectiles), personal radar/laser detector (**Ultra-Tech**, p. 188), and tactical ESM (**Ultra-Tech**, p. 62; +1 to detect radar and laser, +1 to dodge active target systems). Gripboot treads (**Ultra-Tech**, p. 75; +1 to Climbing, +2 on ice, +1/die to kicking damage) are also standard.

When sealed with the tactical combat helmet (p. 17) and pressurized, it provides the wearer with Pressure Support 1, Sealed, Temperature Tolerance 10, Vacuum Support, an internal oxygen supply (24 hours), scent masking (**Ultra-Tech**, p. 100; -4 to detect/track via scent), and waste-relief (**Ultra-Tech**, p. 187). 2C/20 hr.

Basic device: \$15,000, 30 lbs.; *cutting-edge:* +\$15,000, -10 lbs.; *rugged:* +\$15,000, +5 lbs.; *hardened/super-hardened electronics:* +\$5,000/\$10,000, +5 lbs.

Covert Reflex Suit

See **Ultra-Tech**, p. 172

A fully concealable ballistic armor bodysuit (flexible DR 4, or 12 vs. cutting and piercing damage), complete with (grip) boots, gloves, and hood, covers all locations other than the eyes (usually concealed by tactical goggles, p. 14, when in the full suit). The face covering can be removed to make room for a hostile environment mask (p. 13). The suit provides IR cloaking, radar stealth (both **Ultra-Tech**, pp. 99-100; -4 to detect wearer with IR or radar), and thermo-optic chameleon surface (**Ultra-Tech**, p. 99; Chameleon 2, Extended: IR), but these features only function if the armor isn't concealed by other clothing; they're at *half* effectiveness without all suit components worn, including the hood. 2B/20 hr.

Basic device: \$9,000, 20 lbs.; *cutting-edge:* +\$9,000, -7 lbs.; *rugged:* +\$9,000, +4 lbs.; *hardened/super-hardened electronics:* +\$4,000/\$8,000, +4 lbs.

Tactical Combat Helmet

See *Ultra-Tech*, p. 180

Similar to the space combat helmet, this is generally worn with the commando tacsuit (p. 16). Required to seal that suit against environmental hazards, this helmet provides DR 40 to the head and skull; the visor gives DR 30 to the eyes and face. It features a trio of mounted mini-flashlights (*Ultra-Tech*, p. 74; provide a 30-yard beam), integrated neural input headset (*Ultra-Tech*, p. 48), small multi-comm (p. 14 – without a datapad; use the visor’s HUD and neural input), hostile environment mask (p. 13), and tactical visor (p. 14). It provides Protected Hearing when worn, Protected Vision when the visor is down, and Protected Taste/Smell when the mask is in place. It can be fitted with psi-shielding (*Ultra-Tech*, p. 188; Mind Shield 3) in settings where there is such a thing. C/20 hr. Psi-shielding costs an extra \$1,000 (and they *will* try to up-sell you).

Basic device: \$10,000, 11 lbs.; *cutting-edge:* +\$5,000, -4 lbs.; *rugged:* +\$5,000, +2 lbs.; *hardened/super-hardened electronics:* +\$3,000/\$6,000, +1 lb.

COMMAND

Many of the functions of the PTC and its software are enhanced by the presence of a central coordinating unit – TacNet Server (p. 16) – which must be run on better hardware than any single soldier can carry around. The server also gives enhanced functionality to a commander, allowing him to monitor the status and position of all units, and generally get a superior tactical view of the situation.

Enter the *command vehicle*, which not only carries such extra equipment, but transports, deploys, and supports the team in combat.

Command Vehicle

See *Ultra-Tech*, pp. 225-229

The most common command vehicles at TL9 are the wheeled ATV (*Ultra-Tech*, p. 225), armored hovercraft (*Ultra-Tech*, p. 227), or utility vertol (*Ultra-Tech*, p. 229), though a supercav minisub (*Ultra-Tech*, p. 228) might show up in amphibious operations.

Common features of a command vehicle include a main-frame computer (*Ultra-Tech*, p. 22), running a TacNet Server,

Concealed Neural Headset

See *Ultra-Tech*, p. 48

A wireless neural input headset can be secure-linked (p. 15) to a PTC (pp. 14-16) in order to allow a covert operative to have full I/O access to his computer, without wearing a bulky combat helmet. This unit fits under hats, hoods, wigs, or even thick hair; properly worn, it’s not visible to casual observation, and gives +2 to Holdout when trying to conceal it, though EM sensors can pick up its wireless signal when in use. A/100 hr.

Basic device: \$250, 0.1 lbs.; *cutting-edge:* +\$250, -0.05 lbs.; *rugged:* +\$250, +0.05 lbs.; *hardened/super-hardened electronics:* +\$250/\$500, +0.1 lbs.

hosting additional Silhouette databases (p.15), and any other software the team or commander(s) might need; a *large* multi-comm unit (p. 14; see also *Ultra-Tech*, pp. 43-44), which maintains secure-links (p. 15) with the whole team, and can relay messages between team-members who are out of comm-range with one another; tactical sensor turrets (*Ultra-Tech*, p. 66), which can pass sensor information to the TacNet Server, and from there to the individual soldiers’ HUDs; custom recharger units (see p. 14), and spare parts for maintenance of the team’s gear; a transport ESU (*Ultra-Tech*, p. 198) and/or portable surgery (*Ultra-Tech*, p. 200) to treat casualties; and mounted heavy weapons or other combat systems, used in support of the team, or in defense if the command vehicle comes under attack. It might have a mobile lab (*Ultra-Tech*, p. 67), if the team’s job involves scientific analysis of gathered or captured specimens.

The cost of a command vehicle and its loadout are even more academic than other military-issued gear, and will vary even more than the standard devices given above – starting with the six-plus figure price tag of the vehicle itself. Individual characters will almost never have to foot the bill; hence, pricing a command vehicle is outside the scope of this topic.

ABOUT THE AUTHOR

W.A. Frick (Alex or Lex to the friends he keeps close, and the enemies he keeps closer) lives with a cat and a crazy Scottish lady. Neighbors say he mostly keeps to himself, and he has always seemed like the quiet type. His hobbies include *GURPS* (which he’s played and been the Game Master of for a decade and half), watching looped playback of *MST3K* and *The Prisoner*, and collecting rare web links.

Heavy Duty: Standing in front of you are Delta-6 Accelerator suits.

Ripcord: What does it accelerate?

Heavy Duty: You. It’ll make you run faster, jump higher, and hit harder than any of your enemies. Let’s suit up.

– *G.I. Joe: The Rise of Cobra*

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EIDETIC MEMORY

THE VREE

BY DAVID L. PULVER

The Skaru were a gentle, highly advanced race of pacifists with a vague resemblance to ambulatory catfish. A TL12 star-faring civilization, the Skaru's *second* contact was with the young but violent Vree, a race of dour, oviparous, and overly aggressive humanoids from the planet Tackuaraak ("great land of trees"). The Skaru's arrival in the Vree's skies created a shock sufficient to halt their Third War for Truth, a global religious conflict. Appalled at the squalor, war, and barbarity of the Vree homeworld, the Skaru were determined to help them evolve technologically and socially.

Almost a century later, the Vree had enough of being "evolved" and rose up against their peaceful mentors. The Great War of Destiny (as the Vree called it) was a swift, savage, and final uprising, in which Vree proved that the TL9 weapons of war they had stealthily assembled were (barely) effective at defeating opponents armed with TL12 equivalents of pepper spray. Three-quarters of the Skaru were slain, the dazed survivors reduced to humiliating slavery. So too were the Skaru's first client race, the slug-like, tentacled Kwo, who unfortunately for them had by then fully embraced Skaru pacifism.

The Vree were unable to sustain the TL12 Skaru-Kwo civilization, but in its ruins achieved a stable interstellar society. In some ways, the Skaru could be proud: They finally unified the quarrelsome Vree. Unfortunately, they also unleashed them on the universe, as the Vree's first victory gave them an appetite for interstellar holy war.

THE VREE

4 points

Vree are carbon-based mammalian omnivores. They evolved in a 1.06G gravity field on Tackuaraak, a world with an oxygen-nitrogen atmosphere and extensive tropical rainforests and deserts. They prefer a slightly hotter climate (by 10°) than humanity.

The Vree are similar in size and shape to a human, with their adults averaging between 5-6' tall and 100-220 lbs. Their skin is very lightly scaled, with females having a black-green pattern and males having a sandy-red-gold pattern. Vree hair is a long mass of skin-colored tendrils, often shoulder-length;

they have no obvious ears; the tendril-hair is actually a combination heat radiator and external ear.

A Vree's face has two eyes, a nose, and a mouth. This has lips similar to a human's, but two pairs of enameled ridges rather than individual teeth, giving them a strangely disquieting "smile." Their eyes are yellow or amber with no brows or lashes. Their voice boxes are sophisticated. Their voices are melodious, resembling birdsong with an occasional drum solos.

Vree are bisexual and oviparous. They enter their equivalent of puberty around the age of 15 and mature by age 20, living about 66 years on average. They usually form male-female pair bonds. Females lay a clutch of six to eight eggs (each weighs about 5 lbs.), which are incubated by males by day and females by night over a 60-day period. The split seems to be a defensive mechanism, as males are sand-colored and females blend with the night. Vree also share child-rearing duties in a similar fashion.

In pre-modern times, only a few eggs of each clutch survived to hatch, and only a few of their hatchlings lived to puberty. With modern technological incubation aids and nutrition, as well as defenses against predators, the Vree have undergone a huge population explosion. Attempts by the Skaru to mitigate this via drugs and genetic engineering ended after the Vree enslaved them. Today, holy war is now the main way the Vree control their excess population.

Preaching a holy war across the stars . . .

Mentally, Vree are similar to humans, but have an even greater tendency toward spiritual and mystical experience, possibly due to higher monomine levels in their biochemistry. Most internal conflicts among the Vree people are religious schisms, the result of particular prophets or mystics with their own new One True Way. Over time, Vree have developed complex, formalized religious rituals to keep this from tearing their society apart. Many of these involve music and song, which are intertwined in all aspects of Vree religion.

Vree mysticism tends to worsen as Vree age, with most Vree over 60 gradually sinking into a crazed delirium of mystical visions. (Instead of suffering IQ loss, aging Vree tend to accumulate spiritual-themed Delusion or Phantom Voices disadvantages). To prevent this from disrupting society, they have established a variety of customs that amount to disguised forms of ritual suicide (walking into the desert alone, climbing very tall trees while drunk, etc.), or, in more gentle times, various forms of hermitage. (Vree hermits traditionally cut their hair-tendrils to deafen themselves, and secrete themselves in high tree houses). Their Skaru patrons eventually provided the Vree with advanced drugs that modulated their brain chemistry, but many modern Vree disdain them, preferring the old ways.

Perhaps the most unusual element of Vree psychology is their near-perfect memories, especially of sounds and in particular of songs. Originally a way of finding and recognizing mates in sandstorm or jungle conditions, a Vree's eidetic memory has had several effects on their society. In fact, the Vree did not develop written language until very late in history (as an evolution of technical drafting during their industrial revolution). Today, reading is considered highly decadent (sort of like spending all one's time watching television), and their dominant religion bans consumption of most non-educational printed matter. Vree also hang onto to old grudges and remember old favors.

Vree Racial Template

4 points

Advantages: Eidetic Memory [5]; Voice [10].

Disadvantages: Disciplines of Faith (Ritualism) [-5]; Intolerance (Other Religions) [-5].

Quirks: Cutting Vree hair renders them Hard of Hearing if cut to shoulder length or Deaf if mostly shaved, until it regenerates after a month. [-1]

Notes: Many Vree are prone to religious Fanaticism or other Disciplines of Faith, and old Vree to Delusions or Phantom Voices of a mystical nature, but these are not *required* traits.

Taz na-Krey is mind-bogglingly complex.

VREE YAZRAK

There have been thousands of Vree cultures and religions in Tackuaraak history. Vree Yazrak is the name for the present Vree interstellar civilization: a homogenized culture that grew out of the shock and social disruptions of first contact with the Skaru, the latter's attempts to create a "peaceful" world society, and the secret and eventually organized rise of a cult of resistance aimed at overthrowing what came to be called Nazakayazrak ("life under the shadow of the godless").

The dominant religion of the Vree Yazrak is called Tazmak Voh ("the truth that comes in the storm"). It refers to a song that allegedly came in dreams, simultaneously, during a great thunderstorm, to six different Vree in different cities, the first Godsingers. They recognized each others' songs and began to spread them, which revealed the Vree's destiny to unite under one religion, overthrow the Skaru overlords, and spread among the stars.

Still, Tazmak Voh has roots in one of the more obscure older faiths, worship of a harsh mated pair of warrior/hunter gods called Krey Voh (literally "Storm Singer") who dwelt in a grove of trees that reached to the sky. Tazmak Voh elevated these gods from a minor regional deity to rulers and relegated all others to subsaspects of them, or attendant or evil spirits.

There are thousands of variations and subcults, but what is important, especially for aliens, is that elements drawn from the warrior code of Krey Voh became enshrined within the Tazmak Voh as a set of detailed strictures for daily life – the Taz na-Krey ("Song of True Commandments"). The reward for living a virtuous life is to grow wings and live as angels (or at least, some form of highly advanced woodpecker) among the upper branches of the Godtree after death. Those who die jek-Taz ("without truth") are doomed to a vampiric torment, entwined forever in its roots, having their life sucked out. (Which is also a metaphor for the existence of alien slaves, also called jek-Taz.)

It is this song cycle, expressed allegorically in a form of a lengthy martial epic, that serves as the key scripture of the Vree Yazrak and has set the current character of the Vree society: a warrior-focused theocracy whose goal is the spreading of their faith via an interstellar holy war. Today, the Taz na-Krey's 2,002 songs of commandment are memorized from childhood and lived as best they can by every Vree.

Much of these songs deal with fairly trivial matters, the organization of the Vree Yazrak's theocracy, or things of mainly historical interest, such as the now-concluded struggle with the Skaru. Others cover legal and moral strictures against theft, murder, egg-stealing, and so on, which would be familiar enough to humans, or easily followed.

Memorizing as much of the Song of Commandments as possible and living life in harmony with it is the race's definition of itself – Vree, or Godly. Those who have fully memorized it, and who teach and enforce it are the naz-Vree, or Godsingers, the exalted Vree priesthood. Among the Vree Yazrak, only Godly individuals have citizenship (Status 0 or better). It is the Godsingers who hold both political and religious power (Status and Religious Rank 3+).

Everyone who isn't at least trying to be Vree is known as jek-Vree, or godless, and thus either a slave (Status -1 or -2) or an enemy. This applies to other races as well. Vree are expected to be contemptuous of the jek-Vree, although they are also eager to win converts. It is through the teachings of Tazmak Voh that Krey Voh can assume many forms, and may even manifest among the jek-Vree once they cast away unbelief.

Holy Wars

It's up to the GM how much of a threat the Vree Yazrak is in a campaign. At a minimum, this civilization controls three solar systems – their own and that of the two pacifist ultra-tech races they enslaved. Otherwise, they could just be beginning their interstellar crusade, or they could rule a holy empire spanning hundreds of worlds, some partially or fully converted to Tazmak Voh (their faith), and others actively resisting it.

Holy war is nevertheless a crucial part of the Vree experience. Among the most important of the Taz na-Krey's many songs of commandment are the Kiv ep-Taz ("those four truths that struck like lightning"). These verses encourage all faithful to spread the faith by explaining how those who do not accept Tazmak Voh and live the Taz na-Krey are jek-Vree, and must be humbled in war and reduced to servitude, so that the superiority of the Taz na-Krey can be demonstrated.

The songs enjoin the Godly to go among the stars, even to the homeworlds of other races, and bring the Tazmak Voh, the truth in the storm, to them. Peoples that have yet to be converted are called Nazakayazrak, and it is the sacred duty of the Vree to both bring the truth to them as missionaries (who accompany Vree traders and diplomats), and, failing a willing embrace by them, to use force.

Vree Yazrak's employment of military force is largely conventional (see *Military Forces*, pp. 22-24). They rely on their numbers to build and crew large battle fleets, defeat the enemy in space with successive waves of attacks, and then land fanatical ground troops supported by orbital bombardment. Their ground forces consist of conventional TL10 tanks, armor, aerospace craft, and infantry mixed with various adaptations of relic TL12 civilian technology for military purposes, of which the most unusual are the child soldiers of the Little Sisters and Little Brothers (see p. 24).

Vree will use nukes and other weapons of mass destruction on military targets and in retaliation for attacks on their own territories, but otherwise are quite willing to accept high casualties to force the enemy to unconditional surrender. Fortunately for off-world unbelievers, *Song 1616* of the songs of commandment enjoins the Vree to not massacre any godless jek-Vree who surrender, "nor break their eggs or slaughter hatchlings, for many of them may yet find the truth."

The goal of their holy war is to establish conditions that will let them send in missionaries and establish their own temples. These take the form of sacred groves with giant trees – called the Uunvakaz Vree – of a dark purple-green 400'-tall species

native to Tackuaraak's northern forests. These "Godsgroves" (which contain not only the trees but other supporting animals and plants) are a necessary part of worship; Godsgroves are even found in large starships. Ideally, a Godsgrove is planted, and its thriving a good omen, but the Vree will construct domed habitats for use in hostile environments. Vree religious services tend to resemble endless classical operas rather than brief church services, and take place at the grove, though services will be televised as well. Smaller chapels also exist for outlying areas with wooden icons. Damaging a Godsgrove is, of course, a terrible offense, punished through hanging from the tree, and then burying in its roots. This is a favored means of execution for miscreants as well.

The Godsingers do make an effort to find converts. Individuals who study at a Godsgrove under the tutelage of a God-singer can become Tarvak Ayqut-jek-Vree, or "learning to be Godly." More importantly, this status can also be granted to an entire region or nation if its leaders agree to surrender to the Vree Yazrak. This involves abjuring any "false" gods, actively persecuting them with police forces, supporting the construction of multiple Godsgroves (which may cost hundreds of millions of dollars, depending on the local biosphere) and adding Vree cultural and religious teachings to their educational systems. Such collaborators also have to pay extensive tithes (about 12% of GNP). In exchange, Tarvak Ayqut-jek-Vree will become allied subject races, rather than slaves, and may trade with the rest of the Vree empire. Individuals can, if they master the Vree religion, eventually become Godsingers themselves and enter Vree politics.

Vree in the Campaign

GURPS Space: The Vree are intended as adversaries in a military space or mecha campaign. Because the Vree's goal is a missionary one – they would rather convert aliens by force than kill them outright – they have an interest in invading planets, landing ground troops, and occupying their foe's cities, rather than just splattering them with asteroids or nukes. If the Vree have been on the galactic stage for several decades or centuries, they may also have allied or subject races from worlds or colonies they have conquered or successfully converted, possibly including some humans. If they have only just met humans, the Vree may both appreciate a race that is almost as obsessed with gods as they are, while at the same time appalled at the huge number of "false" (non-Vree) religions on Earth that still remain in play. Some Vree might even be drawn to embrace those traditions with strong ritual elements.

GURPS Supers: A small force of Vree would make suitable alien scouts or invaders who arrive today. The Vree would likely make short work of present-day Earth's military forces, but what if the planet was defended by supers? There could also be an elite "Cardinal's Guard" unit of Vree (besides the Little Sisters and Little Brothers; p. 24) with TL12 or superscience gear left behind by Skaru or Kwo.

GURPS Reign of Steel: For a stranger conflict, have the Vree arrive in the future of *Reign of Steel*, perhaps

detected or contacted by Zone Paris's SETI search. The Zone Minds are unlikely to be interested in "attempts of alien meat intelligences to impose their religious delusions" (except possibly Tel Aviv), but they will violently resist any encroachment. The price of possible liberation from robots may be embracing an alien religion. Which side will the resistance join?

Yrth, Infinity, and Vree: The Vree's remnants of Skaru and Kwo technology could include devices whose exact capabilities and purposes the Vree have never understood, even after a few centuries of trying: TL12⁺ science that was still experimental at the time the War of Destiny broke out. Experiments with exotic Skaru "probability drive" technology in the hopes of achieving faster FTL speeds might instead send a Vree warship careening across space, time, or other dimensions. For instance, an attempt to use it for a long-range surprise raid against Earth might instead end up with the warship accidentally appearing in orbit (FTL drive totally burnt out) around any of Earth's Infinite Worlds, perhaps even appearing at Yrth. How would a small group of Godsingers and their supporting soldiers deal with concepts like magic? Or the faulty drive could send them to an alternate version of their own homeworld, where the War of Destiny failed and their race is a peaceful and integrated part of the Skaru-Kwo-Vree interstellar federation. This could also be interesting if prisoners or slaves are aboard!

However, one of the first teachings of the Godsingers is that oaths are vital, and a sung oath should not be broken. If leaders become Tarvak Ayqut jek-Vree, then double-cross the Vree, the punishment will be death, both for adults who follow them and their hatchlings (but not their eggs), which likely involves more strange fruit hanging from the Godsgrove trees. For this reason, Tarvak Ayqut governments may try to be “more Vree than the Vree” and actively persecute those who don’t collaborate.

On a practical level, then, the Vree offer carrot or stick: If people do not wish to convert, they can live as abject slaves, jek-Vree, with the Vree as overlords. If they agree to convert,

they become part of the Vree polity and enter a path to citizenship. This theoretically could be completed after spending character points in their spoken language and Theology. Easy, right? Well, unfortunately, no. In fact, learning to be Vree is very difficult, as all educational materials and processes are designed for people who possess Eidetic Memory, require at least Singing-14 to make the necessary ritual responses, and have a religious aversion to *writing anything down*. Would-be converts have been known to go mad; most of the Skaru chose slavery over submission. The vast majority of these races are stuck forever in the “learning to be Vree” phase.

Hard Notes in the Song of Commandments

One reason races end up stuck as subjects is the mind-boggling complexity and rigidity of the Taz na-Krey. Some are irrelevant to aliens, of course – for example, Song 69 has a long list of forbidden substances and practices deemed immoral, unhygienic, or decadent, only one of which (hats over 5.3” tall) are even recognizable. Few humans would lick Z’vark gum, a substance that can only be found high in a Godsgrove tree, for example; if they weren’t repelled by the smell, they’d probably end up violently ill rather than intoxicated and gluttonous like a Vree.

However, other songs could cause problems for humans or other races, as the Vree are unwilling to compromise for alien biology or psychology! Subject governments attempting to enforce these norms to ensure they keep their non-slave status could easily lead to resistance or revolt. Some of the more troublesome songs include the following.

Songs 33-34

Raise all eggs and hatchlings in the faith, and if any reject the faith as adults, cast them out, for they are no longer your kin.

Songs 55-71

A lengthy philosophical digression on how to live a godly life, from warrior codes of Krey Voh. It contains some specific grooming and dietary and behavioral requirements that all Vree follow to the letter.

- An adult’s tendrils must be coated with Xakru (a sacred paste prepared in a certain way and blessed). This is mostly just time consuming and requires spending money on imported herbs from the Vree homeworld.

- Before you sleep, recite at least eleven of the 127 verses of Ya-Krey-Savarz (“the Dream-Journey to Storms”). This will ensure Krey Voh comes to you in your dreams and guides your waking thoughts.

- Unless a priest grants you an exception (e.g., if infiltrating the ungodly) always pierce or braid into your hair a symbol of Krey-Voh (jagged double-forked lightning bolt, made of iron), so you may hear the gods’ voices.

- A godly diet should always include z’vah (a general term for grains, fruits, and vegetables), mob’ta (a general term for seafood), and squen (a common bug-like insect, eaten as a dietary staple in various ways, and considered excellent for one’s health), unless dire poverty prevents it, in which case charitable neighbors should, if possible, provide. Meat is Vav/Maj and only consumed by gravid females.

- The practice of *writing* words down is decadent and weakens the mind. Written works of the jek-Vree should be examined by a Godsinger, or failing that, by a committee of the Godly appointed by the government. If they are Rame two-Taz (“amusing lies or true knowledge”), they should be converted to song and memorized. If jek-Rame frop jek-Taz (“lacking in use, worthless lies, and ungodly excrement”), should be destroyed, possibly with the author as well.

Aliens who wish to be citizens (i.e., Vree) must also follow these to the letter. For example, the conquered Skaru – who loved reading, have no hair or tendrils (unless they wear some sort of wig or implant), find the squen mildly nauseating, and hate the very thought of holy war – struggle to meet these requirements. In centuries, only a few thousand of Skaru became “Godly”; most stay enslaved.

MILITARY FORCES

The Vree have a unified hierarchical military rank system that parallels their religious ranks. Military ranks are subordinate to equal or higher religious ranks.

Vree military forces are organized into naval and ground forces.

Thorns (Izva): The Vree ground forces and marines. Translated terms for Vree military units include hand-Thorn (squad; six Vree), square-Thorn (platoon; about 36 Vree), Venom (a company, about four platoons), and Battle (a regiment).

Star Wings (Azveyl Nie): The Vree have a modest aerospace tradition that developed into their spacefaring tradition. They have little naval tradition, as their storms are too violent to make large wet navies practical; coastal forces belong to the Thorns. Translated terms include Flock (squadron), World Wing (a local fleet), and Star Wing (an expeditionary fleet); the plural form, Star Wings, refers to the entire space navy.

Pious soldiers in good standing who have achieved Rank 3 or greater can transfer from the Thorns to the Godsingers if they have their superior's recommendation and successfully pass an examination. They will generally be granted a Religious rank that is one rank lower than their military rank, e.g., a Battle Singer becomes a Branch Keeper. Recommending someone to the Godsingers who then excels as a priest is one way for a military officer to get a useful patron and ally in political-religious circles. It's also a way to get rid of a pious but useless officer, or reward an old soldier who needs to retire.

Rank and Status Table

Level	Religious Rank	Military Rank
8	High Godsinger	War Singer
7	Great Godsinger (Old Grove)	War Master
6	Godsinger (Grove Keeper)	Battle Singer
5	Godsinger (Branch Keeper)	Battle Master
4	Godsinger (Seed Keeper)	Venom Singer
3	Godsinger (Root Keeper)	Venom Master
2	Godkeeper (assistant priest)	Thorn Singer
1	Root Singer (student priest)	Thorn Master
0	Vree (Godly)	Needle

Thorn Templars

These are ordinary Vree infantry.

Green Thorns: These are pious internal security divisions within the Thorns who answer directly to the priesthood. They are heavily politicized and often involved in squabbles between rival clerical factions. They also defend the Godsgroves and support allied governments. The security officer template (*GURPS Space*, pp. 232-233) is appropriate. Sonic weapons and tanglers are usually preferred. ETC pistols firing burrow darts are common, and are sometimes used for executions when hanging is impractical.

Black Thorns: These are the expeditionary forces of the Thorns, equivalent to Marines. Use the soldier template from *GURPS Space* (pp. 233-234). The Black Thorns also include the Little Sisters and Little Brothers armored units (see p. 24). Mechanized forces rely on the equivalent of hovertanks (see *Ultra-Tech*, p. 226). Black Thorn infantry are equipped at TL10, wear space armor, and typically carry TL10 laser rifles with 25mm underbarrel grenade launchers. Elite units (the Weeping Thorns) wear battlesuits and carry Gatling lasers. Godsingers attached to the Black Thorns are likely to be warrior-priests from a variety of cults within the more mundane religion; use the space knight template (*Space*, pp. 234).

Auxiliaries ("Sarkis")

Alien converts are required to provide contingents for the Holy War. These auxiliaries make up a significant part of any Vree force. They serve under Vree high command and are often used as cannon fodder, but will not be expended needlessly.

JUDGMENT-CLASS DESTROYER (VAAS NE'TREK) (TL10^)

This Vree warship is a typical workhorse of the Star Wings. It is designed for patrol, deep strike, and raiding missions. It is constructed with a 3,000-ton (SM +9) streamlined hull and driven by a fusion torch. The latter gives it sufficient thrust and delta-V to lift off from or land upon a terrestrial world.

The establishment in the *Judgment's* habitat is a chapel, and the open space is its Godsgrove. The hangar bay usually carries armored vehicles rather than shuttlecraft.

Judgment-class ships are named after dooms that have fallen upon non-Vree in the past, either victories of the Vree or acts of gods. For example, *Judgment of Tyvalk* is named after the fate of a famously decadent city – where reading was widely practiced! – that was obliterated by a volcanic eruption some 200 years before the Vree were contacted.

Front Hull System

[1-2]	Nanocomposite Armor (total dDR 40).
[3]	Tactical Array (comm/sensor 10).
[4]	Habitat (10 cabins, four-bed sickbay, five tons cargo, establishment, three bunkrooms).
[5]	Secondary Battery (10 fixed mount 28cm missile launchers).
[6]	Hangar Bay (100 tons).
[core]	Control Room (C8 computer, comm/sensor 8, six control stations).

Central Hull System

[1]	Nanocomposite Armor (dDR 20).
[2!]	Major Battery (100 MJ rapid fire UV laser turret).
[3-4]	Fuel Tanks (each with 150 tons of water with 7.5 mps delta-V).
[5!]	Major Battery (100 MJ rapid fire UV laser turret).
[6]	Open Space (0.1 acre).

Rear Hull System

[1]	Nanocomposite Armor (dDR 20).
[2!]	Stardrive Engines (FTL-1).
[3-4!]	Fusion Torch Engines (1G acceleration each with water reaction mass).
[6]	Engine Room (two workspaces).
[core]	Fusion Power Plant (two Power Points).

TL	Spacecraft	dST/HP	Hnd/SR	HT	Move	LWt.	Load	SM	Occ	dDR	Range	Cost
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PILOTING/TL10 HIGH-PERFORMANCE SPACECRAFT

10^	<i>Judgment-class</i>	100	-1/5	13	2G/15 mps	3,000	108.2	+9	32ASV	40/20/20	1x	\$357.5M
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The usual crew manning the vessel consist of six bridge crew (captain, pilot, navigator/sensor operator, a missile gunners/sensor operator, chief engineer), a medic, two turret gunners, and two technicians. In addition, the ship carries a Godsinger and a couple of squads of Black Thorn troopers to serve as a landing party.

LITTLE SISTER/LITTLE BROTHER (TL12)

These oversized combat walkers are car-sized four-legged bug-shaped machines that mass about 10 tons, but which are equipped with TL12 armor. They are assigned to their own special units in the Black Thorns and are used for reconnaissance and urban warfare, supporting conventional hovertanks, and in support of battlesuit and special ops missions. They are not intended to go head to head with heavy tanks or mecha! Some can actually maneuver *inside* larger spaceships, usually defending the Godsgrove or hanger deck.

The Little Sisters and Little Brothers have an unusual origin. The walkers are all at least a century old, dating back to the War of Destiny, when they started out as civilian craft – the Skaru's *Pylfrax*, a TL12 hostile-environment scout walker, intended for survey and rescue ops on that race's Venus-like colony of Yaso. When the Vree conquered the Skaru, they captured a few thousand of these formidable machines. Their hulls were designed for extreme pressures and temperatures, and while unarmed, they were better protected than anything of comparable size that Vree themselves could build.

The main obstacle to turning them into war machines was not weaponry – standard Vree weapons pods could be carried – but rather the control center. The *Pylfrax* controls used a direct neural interface built for Skaru brains, but using standard protocols that the Vree technicians could adapt to their own brain waves (mostly). However, the problem was that due to the smaller size of the Skaru (an adult averaging about 65 lbs., vs. 145 for a Vree) there was no room for a pilot! Worse, the Vree technology was not capable of modifying the TL12 software interfaces for remote control. Nor were the Vree up to the material task of enlarging its advanced hull.

With war machines needed for the ongoing holy war, the Vree tried a drastic solution. Many children had been orphaned during the war. A select cadre of 11-12-year-old Vree orphans within the right size and weight range were asked to volunteer for sacred service with the Thorn. They became the Little Sisters

and Little Brothers, a division of child soldiers operating the most advanced tactical weapons known to the Vree. Children serve for as long as they can fit in the machines; usually this is a term of three to four years. After this, the survivors – about half of them – become Big Brothers or Big Sisters for another three to four years, acting as mentors and communications operators for the unit. Upon coming of age, those that wish to may reenlist in the Thorns with automatic promotion to officers, and those that do not may retire into civilian life with honor.

Although the Little Brothers and Sisters vehicles are tough for their size and agility, especially for ex-civilian craft, they're not invulnerable, and anything that can kill a tank can deal with them. Moreover, the neural interface used to control them was not designed for Vree minds or for combat, and has a feedback loop. Every dHP of injury that the machine itself suffers inflicts 1 HP of injury on the user. Since the machines have some self-repairing living metal components and the child-pilots do not, this often results in the Little Brother or Little Sister machines going through a few generations of pilots.

Front Hull System

[1-4]	Exotic Laminate (dDR 40).
[5-6]	Robot Arm (two arms).

Central Hull System

[1-3]	Exotic Laminate (dDR 30).
[4!]	Robot Legs.
[5!]	Robot Legs.
[6!]	Major Battery (3 MJ handheld improved particle beam).
[core]	Control Room (C8 computer, comm/sensor 5, one control station).

Rear Hull System

[1-3]	Exotic Laminate (dDR 30).
[5!]	Robot Legs.
[6!]	Robot Legs.
[core]	De-Rated Super Fusion Power Plant (two Power Points).

Note that the handheld weapon is protected with only dDR 2.

A single pilot operates the vehicle.

It has the *Self-Healing* option (from *GURPS Spaceships 7*) allowing it to regenerate 1 dHP per week (1% of its dHP per day). This is useful, since the Vree lack the ability to repair damage to TL12 structures and internal systems on their own!

TL	Spacecraft	dST/HP	Hnd/SR	HT	Move	LWt.	Load	SM	Occ	dDR	Range	Cost
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DRIVING/TL12 (MECHA)

12^	<i>Little Sister</i> *	15	+3/5	12	10/20	10	0.1	+4	1ASV	40/30/30	-	\$2,650K
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*Little Sisters are ground units; Hnd/SR and Move refer to ground operations. Little Brothers are identical to Little Sisters except that they use a plasma beam instead of a particle beam.

ABOUT THE COLUMNIST

David L. Pulver is a Canadian freelance author. An avid SF fan, he began roleplaying in junior high with the newly released *Basic Dungeons & Dragons*. Upon graduating from university, he decided to become a game designer. Since then, David has written over 70 roleplaying game books, and he has worked as a

staff writer, editor, and line developer for Steve Jackson Games and Guardians of Order. He is best known for creating *Transhuman Space*, co-authoring the *Big Eyes, Small Mouth* anime RPG, and writing countless *GURPS* books, including the *GURPS Basic Set, Fourth Edition*, *GURPS Ultra-Tech*, and the *GURPS Spaceships* series.

MOBILE WORMHOLE LOGISTICS

BY ADRIAN TYMES

Food, fuel, ammunition, spare parts, and the like are the lifeblood of any military expedition. Sorting out how they get to the front lines, for soldiers to use or raiders to steal, can add realism to a setting. It can also be challenging enough that ignoring it is often called for in cinematic games. However, logistics is a well-known component of military strategy, and some players will want details of how it is handled, to incorporate them into their adventurers' plans or backgrounds. The *Overworld*-class troop transport – with its troop deployment vessels (TDVs) – is an ultra-tech approach that simplifies this age-old problem.

How many *Overworld*-class ships are present depends on the size of the army they support. One *Overworld* holds one battalion of ground forces, which is enough to put down a rebellion on a small colony in a nonmilitarized region of space. A fleet intended to invade a world with a population of billions will have thousands of these spaceships, along with air and space support and dedicated factory spaceships. By comparison, the U.S. Army in 2012 was approximately 250 battalions.

An *Overworld's* battalion is divided into six companies (typically three infantry, two armor, and one combat engineering). A commandant, major, or lieutenant colonel (Military Rank 5) commands the battalion, with a lower rank officer overseeing the operations of the *Overworld* itself. Each company is officially assigned one TDV, but if a company needs to relocate in a hurry, one of the two reserve TDVs can land near the destination and become the company's assigned TDV.

You will not find it difficult to prove that battles, campaigns, and even wars have been won or lost primarily because of logistics.

– General Dwight D. Eisenhower

Wormhole Logistics

An *Overworld* contains berths for eight wormholes, each linked to one of the TDVs it carries. During deployment, the

TDVs land while the *Overworld* stays in orbit or at some other safe distance (landing is possible but rarely preferred). The troops move out through the wormholes generated inside whichever TDVs made it to the ground intact. These wormholes are kept in vacuum and accessed through internal airlocks in case of atmosphere leak by either ship, airborne biological attacks, or stray munitions, as well as to make it difficult for would-be saboteurs without vacuum protection to sneak aboard.

The wormhole system includes eight 10-yard-wide wormholes and associated airlocks. The wormholes' top, port and starboard, and bottom sides are blocked off, giving a 7×7-yard-square portal, big enough to accommodate a single 100-ton (SM +6) vehicle. (The wormholes' closed-off areas can be accessed in an emergency via crawl spaces.) Deploying a retractable middle deck lets two 30-ton (SM +5) vehicles use the portal at the same time, one above the other; this can also accommodate 40 soldiers in battlesuits per airlock cycle, in two groups of 20. The controls to deploy or retract this deck on both sides of the wormhole can be triggered by anyone in the airlocks, in the TDV, or on the *Overworld's* bridge, in ascending order of priority. If deployed, the deck on the TDV's side will extend ramps to ground level when the airlock is open.

The TDVs are carried in the *Overlord's* hangar bays and cargo hold. It takes 10 man-hours to move a TDV from cargo to hangar bay or vice versa. Standard procedure is to launch three TDVs, unpack and launch three more, then unpack the final two into the front and rear hangar bays while the center bay opens onto the cargo holds, using its heavy equipment to assist internal deployment.

The *Overlord's* rear cargo holds contain 2,500 tons of vehicles, arms, and armor, plus 500 tons of supplies and spare parts. It takes roughly 25 man-hours to unpack the former, for a total of 75 man-hours plus time to launch the TDVs, including time to remanufacture the wormholes. Speed deployment is a common training drill for the soldiers an *Overworld* carries, and can be carried out in under 15 minutes from everything stowed away to ready for action or vice versa. Once the TDVs are unpacked, the empty center cargo hold becomes a staging area for troops deploying or returning through the wormholes.

Support services are provided aboard the troop transport on a triage basis, focused on the battalion's needs.

For instance, when more than 20 wounded need to be treated, the clinic is used for first-pass stabilization; those who just need rest after treatment are sent to their quarters, while those with more severe wounds are transferred to a dedicated hospital if one is available. Likewise, the machine shop's \$5,000/hour production capacity – from five minifac robofac – is used primarily for food, fuel, and ammunition (if those are not otherwise available), then for repairs, and then for manufacture of special equipment as necessary.

OVERWORLD-CLASS TROOP TRANSPORT (TL10[^])

This superscience interstellar ship is constructed with a 30,000-ton (SM +11) winged, streamlined hull just over 450 feet long.

Since the TDVs are the preferred means of abandoning ship if necessary, an *Overworld's* hangars are separated to prevent a single hit from destroying them all. In transit, three TDVs are carried in the hangar bays, with five more “crated” in the center cargo hold.

An *Overworld* does not have enough power for both its stardrive and jump gate systems, and may power at most one or the other at a time. The standard approach is to shut down the jump gates when using the stardrive, allowing the wormholes to collapse, then shift power to the jump gates and manufacture new wormholes upon arrival at the destination. (In some settings, wormholes cannot survive FTL transit anyway.)

Overworld-class ships are named for the brigades that they carry, such as “978th Armored” – or “978th Armored Headquarters,” if the ship must be referred to separately from the organization.

Front Hull Systems

- [1] Nanocomposite Armor (50 dDR).
- [2] Hangar Bay (1,000 tons capacity).
- [3] Half Fusion Reactor (1 Power Point) and half Habitat (ops center, 20-bed automated sickbay, five minifac robofac, five offices, and 30 mixed establishments).*

Front Hull Systems

- [4] Habitat (10 luxury cabins, 60 cabins, and 20-cell brig with total life support).*
- [5-6] Habitat (100 bunkrooms with total life support in each).*
- [core] Control Room (C9 computer, comm/sensor 10, 15 control stations)*

Central Hull Systems

- [1] Nanocomposite Armor (50 dDR)
- [2] Hangar Bay (1,000 tons capacity)
- [3-5] Large Cargo Hold (5,000 tons capacity)
- [6!] Jump Gate (wormholes and airlocks; see above)*

Rear Hull Systems

- [1] Nanocomposite Armor (50 dDR)
- [2] Hangar Bay (1,000 tons capacity)
- [3-4] Cargo Holds (1,500 tons capacity each)*
- [5!] Stardrive Engine (FTL-1)*
- [6] Antimatter Plasma Torch Drive (1G acceleration, ram rockets)*
- [core] Fuel Tank (1,500 tons antimatter-boosted hydrogen with 120 mps delta-V)

* Three workspaces per system.

The *Overworld* is streamlined, winged, and comes with artificial gravity, stealth, and digital chameleon hulls. All of the armor is hardened (p. B47; *GURPS Spaceships*, p. 29); attacks against it reduce the armor divisor by one step.

An *Overworld* runs with 15 bridge crew (including crew to coordinate sensor and communication feeds from the TDVs) and 33 technicians. It will usually carry 147 people for these roles, for three shifts while traveling between deployments, damage control in combat, and extra support when the companies are in the field. Rounding out the crew are 50 attendants (quartermasters, military police, chaplains, and so on) and 10 medics, who are collectively referred to as the “headquarters company.” The number of non-ship-crew soldiers carried depends on the battalion, but is typically 600 to 700. The brig can hold 80 prisoners.

<i>TL</i>	<i>Spacecraft</i>	<i>dST/HP</i>	<i>Hnd/SR</i>	<i>HT</i>	<i>Move</i>	<i>LWt.</i>	<i>Load</i>	<i>SM</i>	<i>Occ</i>	<i>dDR</i>	<i>Range</i>	<i>Cost</i>
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PILOTING/TL10 (HIGH-PERFORMANCE SPACECRAFT)

10 [^]	<i>Overworld-class</i>	200	-2/5	13	1G/120mps	30,000	11,102	+11	1,020ASV	50	1x	\$4.75B
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In atmosphere, an *Overworld* has Hnd/SR +2/6 and Move 10/1,250.

TROOP DEPLOYMENT VESSEL (TL10[^])

The TDV exists to dive into an atmosphere, dodge enemy fire, reach the ground, and deploy troops through its internal wormhole to secure the immediate area. Once on the ground, it serves as a command post and supply nexus for those troops, as well as an evacuation route if necessary. It is made with a winged, streamlined hull massing 1,000 tons (SM +8) and is a little over 200 feet long.

The vehicle-sized airlock (hangar bay) opens on both sides of the TDV, to allow faster entry and exit. For security, the airlock and center of the wormhole (a 7x7-yard square portal discussed in *Wormhole Logistics*, p. 25) are not internally accessible from the rest of TDV; someone coming through the wormhole normally must go out the airlock, move to one of the smaller airlocks near the front or rear, and enter there to reach the rest of the ship. In an emergency, the sides, top, and bottom of the wormhole can be accessed internally via crawl spaces that bypass the large airlock.

Every unit that is not supported is a defeated unit.

– Maurice de Saxe, *Mes rêveries*

Even these parts of a wormhole are in vacuum accessed via internal airlocks, so a TDV's crew is issued battlesuits to wear during flight (the same model as the battalion's other vehicle crews, for ease of maintenance and to promote unit cohesion).

The gunners operate the weapon batteries; the large gun is intended for artillery support, the lasers for point defense, and the small guns for any hostiles that get near. Autonomous programs with Gunnery-11 man the lasers and small guns, but these can be manually controlled if 40 spare gunners are on hand. A TDV can only power its wormhole and all guns for 24 hours without recharging its fuel cell, though the wormhole means the TDV can be refueled as needed (so long as the *Overworld* has reserves). When no danger is expected (or if the fuel runs out), both large guns and 10 of the lasers or small guns are powered down.

Standard doctrine is to man the pilot position at all times even if the TDV is not expected to move for a while. In practice,

when the TDV is parked, the pilot and commander often assist the other crew as needed.

TDVs are named for their battalion, with "TDV" then an arbitrary designator to distinguish the TDVs from one another, such as "978th Combined Arms TDV Alpha" – often shortened to "TDV Alpha" in actual use. When multiple battalions work together to form a brigade, the brigade's TDVs will be given distinct designators so that similar battalion names causes no confusion.

Science Deployment Vessel

Some TDVs are repurposed for survey missions, gathering data via sensors and acting as communications hub for many drones (and occasionally people) performing on-site surveys. The ECM is converted into a large enhanced science sensor/comm array (array level 10, as per a SM +9 vessel, taking all three spaces the ECM occupied). The forward weapons are removed to make room for a habitat with three labs, one each chemistry, geology, and physics. The rear weapons are replaced with another habitat containing two cages, two automeds, and a biology lab. The power plant is derated, only producing 3 Power Points, and the fuel cell is swapped for an engine room. The wormhole and vehicle airlock can be accessed internally in this variant, and mid-air shift changes are common.

Adventuring With Wormholes

- The heroes are part of or allied with an organization that employs an *Overworld*. Its TDVs land near interesting places around the world, or on different worlds. Travel from one plot-relevant location to another becomes a matter of a few minutes' walk, even though the rest of the world(s) remain far distant. (This ability is what the *Overworld* class is named for, from a similar concept in TL8+ video games.)

- The *Overworld* parks next to a complex of factories, either on a planet or a fleet of factory ships. Their products can be quickly shipped anywhere one of the *Overworld's* TDVs are located. This ease of shipment can be addictive to the merchants who own the factories, who may be reluctant to allow the *Overworld* to leave once its mission is complete, especially if manufacturing wormholes to replace the *Overworld* and TDVs takes specialized, hard-to-acquire equipment.

- Guerrilla resistance fighters wish to infiltrate the military fleet that is invading their world. Battleships or space fighters make conventional approach impossible, but if a way can be found to sneak on board a TDV, an *Overworld* at the core of the fleet can be reached from there. (This should not be easy unless the space fleet has incompetent or lazy security, or the infiltrators have special tricks.)

- A TDV lands near the party and starts disgorging soldiers, either friends or foes. Reinforcements do not stop until the TDV is disabled or destroyed, the *Overworld's* entire soldier and crew compliment has deployed (which takes longer than most battles), or their immediate objective is secured. While useful to provide the effect of infinite reinforcements without the plot complications that a literally infinite army can invoke, unloading into combat is a

desperation move or incompetence on the battalion commander's part – standard doctrine is to get the troops through safely, then attack with everyone at once – so this is best reserved for dramatic scenes.

- Not every *Overworld*-class ship is used for war. By filling its holds with sensors and mobile surveyors instead of rifles and tanks, an *Overworld* can host a planetary survey force. Such an *Overworld* replaces its bunkrooms with cabins, lowering Occupancy to 620, and uses the science deployment vessel variant for its TDVs, assigning 42 people per SDV in three shifts of 14. Since SDVs are unarmed, hostile wildlife or natives can force a SDV to flee, leaving anyone on the ground to blaze a path through the wilderness to a safe extraction point.

- A military squad whose TDV is destroyed must either hold out until another TDV can arrive, or fight their way to the secured area around another TDV. A squad whose *Overworld* is destroyed suddenly finds itself alone on a hostile world, and may be forced into guerrilla tactics to survive until offworld transport can be secured. Over-the-top campaigns might have such a squad pull off the original objective (conquest of the planetary government, suppression of rebellion, or more humanitarian goals such as disaster relief) by itself.

- While in transit, an *Overworld* is a town in space: Roughly 1,000 people each have a job to do at the destination, but nothing to do save prepare in the mean time. If discipline is lax or morale is suffering, cults can form, especially if a silver-tongued saboteur is trying to defeat the force before it arrives. Can a squad of military police restore order before it's time to pull the guns out?

Front Hull Systems

- [1] Nanocomposite Armor (15 dDR)
- [2!] Mixed Battery*† (One turret with one 14cm electromagnetic gun, 10 turrets with 2.5cm VRF electromagnetic gun; 10 turrets with 100 KJ VRF improved lasers)
- [3-5] Defensive ECM
- [6] Control Room (C8 computer, comm/sensor 7, four control stations)

Central Hull Systems

- [1] Nanocomposite Armor (15 dDR)
- [2-4] Large Hangar Bay (100 tons capacity)
- [5-6, core!] Large Jump Gate (100 tons capacity)

Rear Hull Systems

- [1] Nanocomposite Armor (15 dDR)
- [2!] Mixed Battery*† (One turret with one 14cm electromagnetic gun, 10 turrets with 2.5cm VRF electromagnetic gun; 10 turrets with 100 KJ VRF improved lasers)
- [3] Antimatter Power Plant† (four Power Points)
- [4] Fuel Cell† (one Power Point for 24 hours)
- [5-6] Antimatter Plasma Torch Drive (1G acceleration each, ram rockets)

Rear Hull Systems

- [core] Fuel Tank (15 tons antimatter-boosted hydrogen with 120 mps delta-V)

* Mixed battery systems consist of one medium battery weapon and 20 tertiary battery weapons; otherwise using stats common to all non-spinal weapon batteries for a given ship size.

† See *Science Deployment Vehicle* (p. 27) for changes specific to that ship.

TDVs are streamlined, winged, and come with stealth and digital chameleon hulls. They do not have their own artificial gravity, instead relying on the *Overworld's* or the planet's. All of the armor is hardened (p. B47; *GURPS Spaceships*, p. 29); attacks against it reduce the armor divisor by one step.

The normally forbidden core placement of the jump gate system reflects its internal position – only things inside a TDV can access its wormhole.

A standard TDV has a crew of six people: a commander, a pilot, a sensor operator, a communications officer, and two gunners. A science TDV requires a minimum crew of five (the gunners replaced with a technician), plus eight scientists and a medic, for a total of 14 crew. Away teams can be formed from the scientists and medic without hindering ship performance.

TL	Spacecraft	dST/HP	Hnd/SR	HT	Move	LWt.	Load	SM	Occ	dDR	Range	Cost
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PILOTING/TL10 (HIGH-PERFORMANCE SPACECRAFT)

10^	TDV-class	70	-1/5	12	2G/120mps	1,000	104.6	+8	46+0SV	15	–	\$349M
10^	SDV-class	70	-1/5	13	2G/120mps	1,000	101.6	+8	14+8ASV	15	–	\$348M

In atmosphere, a TDV has Hnd/SR +3/6 and Move 10/1,750.

ABOUT THE AUTHOR

Adrian Tymes is a jack of all trades and master of some, having done everything on Lazarus's list except die gallantly, though he hopes to avoid death for quite some time. He is something of a mad scientist, with a knack for reverse engineering the world.

He enjoys being inspired by science fiction, with results including multiple patents from robotics to nanotechnology, the first residential solar installation in his city, and research work that played a small part on the path to artificial retinas. He thrives in the Silicon Valley startup scene, finding problems and solving them.

FUTURE SOLDIER

BY KENNETH PETERS

The prevailing view of the future battlespace – that is, that conflict is, and will remain, essentially a human activity, in which human qualities of judgment, self-discipline and courage, the moral component of fighting power, will endure . . . It is difficult to imagine military operations that will not ultimately be determined through the physical control of people by people. Technology must not be allowed to displace human intent or the decision of a commander.

– Colonel Stephen Tetlow,
Incorporating Human Factors in Simulation (2000)

Ideally, every soldier should be a one-man force of destruction able to unleash meticulously planned and flawlessly executed operations to remove enemy threats, with no collateral damage or friendly fire. He should be backed by commanders who have full situational awareness of the battlefield and the

tools to gather data and disseminate information to their subordinates and peers quickly and securely. Their foes should be quickly detected, their capabilities and plans assessed and calculated, and then decisively neutralized through skillful maneuver and application of force, with no friendly casualties.

At least in theory. The reality is that even the ultra-tech equipment planned for future warfighters will not fulfill this objective, except in the fevered dreams of futurists and armchair generals. Nevertheless, new technology *will* make the individual soldier deadlier and more efficient in carrying out one of mankind's oldest professions: finding enemies and making them dead. This article builds off the technology from *GURPS High-Tech*, *GURPS Ultra-Tech*, and *GURPS Tactical Shooting* to describe a plausible, realistic TL9 soldier, complete with a suggested loadout.

POSTMODERN WARRIOR

Soldier modernization plan (SMP) studies date back to the 1970s (late TL7), when military and corporate interests began to realize some of the far-ranging possibilities of rapidly increasing computing power, composite materials, precise navigation, and new communication technologies. The U.S. experience in Iraq and Afghanistan added urgency to these programs, even as cost overruns and underperforming acquisition programs sank the most ambitious projects of the early 21st century.

All current and planned SMP programs address five main areas of improvement to some degree.

Command and Control (C2)

By late TL8 also referred to as C4I (short for *Command, Control, Communications, Computers, and Intelligence*), these are the cognitive tools, visualization services, protocols, and procedures that maximize tactical awareness – that is, access to a shared, clear, accurate, *relevant* “picture” of the combat zone. Broadly, these systems answer three key questions for the soldier: Where am I? Where is the enemy? And where are my allies? For the commander, it helps answer two additional vital questions: What does my boss want me to do? And how do I tell my subordinates what to do?

The keystone component of the future soldier's ability to send and receive information about the local state of military affairs is the 10-mile-range small radio (*Ultra-Tech*, p. 44). The *useful*

range of the radio is only one-mile due to the bandwidth requirements of the datalinks, ubiquitous low-level jamming, and signal saturation, so it's primarily used for intrasquad communication; the squad leader or a designated “radioman” carries a medium radio. Each soldier also has a tiny laser communicator (*Ultra-Tech*, p. 44) for keeping contact with airborne communication relays; line-of-sight is often at a premium due to ground clutter and aerosols, which makes it difficult to use secure communications between ground forces.

Lethality

Increasing the *direct* lethality of weapons through the use of *Ultra-Tech* explosives and firearms is useful (sometimes referred as “sharpening the spear”), but at TL9, the emphasis is on precision target acquisition to combine firepower more intelligently, reducing collateral damage and the risk of accidental fratricide (“friendly fire”).

For the individual soldier, the greatest increase in their lethality is not in their rifle or support missiles, but their personal sensors and ties to surveillance networks, smart weapons, and on-call intelligence analysts that allow them to mass at critical points and then move away to avoid any counterattack. This is reflected by the extremely high Acc values of their weapons, skill bonuses, and equipment that allows the soldiers to ignore or mitigate what would otherwise be penalties to their marksmanship.

Mobility

The widespread use of exoskeleton systems (*Ultra-Tech*, p. 181) helps the individual soldier to carry significantly more gear before suffering from body stress and excess fatigue, but it may shift the problems of soldier overloading from *weight* to that of *bulk*. A fully-loaded soldier wearing an exoskeleton, plus all of the equipment he could *technically* carry, will be too large to get into many vehicles or buildings and too unbalanced to climb over barriers or walk in broken terrain.

The items in the loadout below were selected so that, even should the exoskeleton fail, the carried load is no greater than what is expected from contemporary dismounted soldiers. However, some items in the main rucksack may need to be discarded to carry the 20 lb. deadweight of the exoskeleton sans batteries!

Heavy Loads

Soldiers may use supporting drones or be based out of “mothership” vehicles for resupply and recharging, but they can also use small cargo carriers, such as the robot mule (*Ultra-Tech*, p. 79) to transport extra gear or to use as an impromptu armed drone. However, it’s probably more pragmatic to simply overload one or two soldiers (who can quick-release the extra gear in an emergency) or issue a heavier exoskeleton to a designated “porter” (perhaps the heavy weapons team member) to allow him to carry more weight.

Survivability

As most of the weight of the soldier’s load is carried by the exoskeleton, very heavy personal armor *could* be worn, but probably will not be. Even with an exoskeleton, there are practical limits to how much mass can be packed onto a human-sized infantryman. The rifleman loadout uses heavy clamshell (*Ultra-Tech*, p. 176) worn over a reflex bodysuit as it meets an acceptable compromise between weight, protection, and cost. The armor can still be worn comfortably in case the exoskeleton fails, the torso armor protects against most fragmentation and TL9 small-caliber armor-piercing projectiles (e.g., the 7mmCL assault carbine, *Ultra-Tech*, p. 136), and is readily available for 1/6th the cost of powered combat armor (*Ultra-Tech*, p. 183). In any case, even a battlesuit would be of little use against TL9 heavy weapons.

In environments with heavy NBC threats or environmental extremes, the bodysuit may be swapped for a reflex tacsuit (*Ultra-Tech*, p. 178).

The bodysuit includes moisture-wicking inner layers as described in *High-Tech*, p. 64; see also p. 11 of *Ultra-Tech Too* in *Pyramid #3/51: Tech and Toys III*.

Sustainability

There isn’t room to fully discuss logistical factors for this loadout, or TL9 operations in general, but the need for soldiers to be supplied with the “Four Bs” (beans, bullets, bandages, and batteries) doesn’t change from their late TL8 cousins, although the proportions will differ.

The basic loadout ensemble uses a number of batteries in various shapes and sizes, but it’s likely that these will be dramatically simplified in a military system (see *Power Integration*,

p. 34). Furthermore, carrying a second set of batteries is standard, which extends the operational endurance of the soldier to two or more days – sufficient time for logistical support to reach forward and conduct a resupply.

SOFTWARE

Most software of military significance is LC2 and either not subject to normal intellectual property laws or licensed throughout the entire enterprise. Software costs are still listed for the use of adventurers and paramilitaries. For specific information on Complexity and cost, see *Ultra-Tech* (p. 25).

Battle Agent

Comprehensive battlespace management software is what separates a TL9 combatant from a late TL8 soldier loaded with disparate electronic devices. The torrent of information from the soldier’s sensors, software, and equipment, his squad members and support drones, and messages from command and control elements must be intelligently prioritized, or he risks becoming hopelessly confused and ineffective. In addition, reports must be filed quickly and accurately, and proper administrative procedures followed for checking equipment out, filing battle damage assessments and munitions-usage forms, kill reports, and paperwork for when a fellow soldier is wounded or killed. Also, one or more civilian observers and non-governmental organizations are probably keeping track of everything the soldier does, and will post any gaffes to the worldwide data network. Even if they are largely ignored by a media-overloaded populace, the management software can ensure that the soldier is kept informed of current rules of engagement and legal guidelines. All of this is overseen by the operating system of the future soldier’s wearable computer: the battle agent.

The battle agent is a weak dedicated AI (*Ultra-Tech*, p. 28) that serves as the soldier’s personal communications specialist, secretary, and advisor. While not capable of great insight and of low general intelligence (IQ 8), it’s quite skilled within the AI’s narrow range of programmed functionality. It does not directly operate any of the soldier’s weapons (e.g., targeting and firing missiles), but it can fly his drones and could be put in charge of a shoulder servomount (*Ultra-Tech*, p. 151) if one is installed. Here is an example battle agent that can be loaded on the soldier’s computer.

Joint Command and Control System (JCCS)

-83 points/\$3,000

ST 0 [0]; DX 10 [0]; IQ 8 [-20]; HT 0 [0].

Damage N/A; BL N/A; HP *; Will 8; Per 8; FP N/A.

Basic Speed 2.50; Basic Move N/A; Dodge N/A.

Disadvantages: Weak Dedicated AI [-83].

Skills: Administration (A) IQ+1 [4]-9; Computer Operation (E) IQ+1 [2]-9; Diagnosis (User) (A) IQ [2]-8; Electronics Operation (Communications) (A) IQ+1 [4]-9; Forward Observer (A) IQ [2]-8; Law (Military) (H) IQ [4]-8; Piloting (Light Airplane) (A) DX [2]-10.

* Based on hardware’s stats.

Ultra-Tech AI Costs

The IQ 8 weak dedicated AI (Complexity 5) that forms the core of the future soldier's computer operating system is \$1,000 at TL9. For trained/programmed AIs, each character point of skills beyond the basic template (*Ultra-Tech*, pp. 27-28) costs \$100. Talents and advantages are generally not available for purchase (however, see *Transhuman Space: Changing Times*, p. 60, for useful guidelines).

Countersnipe

This software fuses data from the soldier's sound detector, near miss indicator, ESM, and hyperspectral sensor to detect and locate enemy attackers. It picks out the multispectral and acoustic signature of projectile weapons and beam traces, immediately alerting the user to the type of weapon and attacker's location relative to the user (e.g., "Shot! 426 yards, 47°, elevation 10°."). It can also provide warning of missile launches that the sensors can see, although it will not be able to determine their target. Projectile/beam path and calculated shooter position is displayed on the HUD. Enemy location is automatically shared to the TacNet. In multi-weapon engagements, Countersnipe will prioritize high-caliber weapons (i.e., sniper rifles and heavy lasers) for display and engagement.

This system provides +4 to Vision rolls to pin down the exact location of enemy attackers. In cases where the GM decides that the system may fail, roll at 14 plus any applicable Vision or Hearing modifiers. For example, against projectile weapons, it rolls at 18 (+4 from the personal sound detector; see also *Near Miss Indicator*, p. 32) modified by the attacker's weapon type, ammunition, distance, suppressor modifier, etc. Complexity 3; five times normal cost. LC2.

Identify Friend or Foe

Ultra-Tech, p. 188

This software handles IFF interrogator (*Ultra-Tech*, p. 151) requests as well as synchronizes with the TacNet to automatically flag the user as friendly to nearby units.

Silhouette

Ultra-Tech, p. 149

Rarely loaded onto an individual soldier's system. Basic equipment for TL9+ Intelligence Analysis.

TacNet

Ultra-Tech, p. 149

Tactical Networks (TacNets) are intelligent battle management systems that coordinate messaging and datalinks between connected members, assisting users in developing and maintaining situational awareness in the ambiguity and chaos of military operations. At its most basic level, this software improves Tactics skill rolls for networked personnel.

TacShot

This is a Memory Augmentation (*Ultra-Tech*, p. 56) database for military personnel. Archived content includes a database of

military hardware, landmarks, a current list of suspected enemy combatants, local contacts, and other persons of interest (village elders, local police, allied officers, etc.). Additional information can be pulled from the TacNet (and through that, civilian biographical and database services). Also serves as an impromptu translation assistant by picking out signs, route markers, and other text. Complexity 4.

Targeting

Ultra-Tech, p. 149

A TL9 soldier can have a suite of Targeting applications ready to use, but only one or two are loaded at a time. Occasionally, the weapon itself may house an embedded Targeting program (+1 skill, \$500) on a tiny, dedicated, slow computer (Complexity 3, \$2.50, 0.05 lbs, 2A/20 hr.).

Specialized Targeting Programs: As an optional rule, Targeting programs can be tailored for a familiarity class. For example, sniper rifles for Guns (Rifle) are -1 Complexity. Those programs that only work for a *specific* weapon are -2 Complexity. At TL9 this reduces the cost of the +1 skill software to \$150 and \$50 respectively.

Translation

Ultra-Tech, p. 47

For giving commands or directives, every computer includes a database of pre-recorded messages at Native comprehension (in various languages) that can be played back through a bullhorn or the soldier's speakers. Complexity 0.

Sophisticated translation software is also available at TL9, but the average soldier only needs one or two local languages loaded, and rarely needs more than Broken comprehension to understand the gist of a conversation. Squad leaders and military anthropologists carry separate "pocket interpreters" with Native comprehension (including common dialects) that can deal with idiomatic terminology, imperfect tone, and poor enunciation. Translation software can also scan and translate documents and signs visible to the soldier's cameras.

Advanced TacNets

Considering that they are the Holy Grail of military command-and-control, TacNets have rather subdued game effects. A +1 or +2 to Tactics is widely beneficial, especially with the various options and uses for it in *GURPS Tactical Shooting* and *GURPS Mass Combat*, but the GM who wants extra detail may wish to use one or more of the following optional rules.

- The TacNet serves as a *complementary skill* (*GURPS Action 2: Exploits*, p. 5) for Area Knowledge, Camouflage, Expert Skill (Military Science), Intelligence Analysis, and Strategy. It has an effective skill of TL+3 (Complexity 5) or TL+5 (Complexity 6).
- Adds an equipment bonus to situational awareness checks (*Tactical Shooting*, p. 11) equal to its Complexity.
- Provides +1 to the battle strategy roll (*Mass Combat*, p. 36) if at least half of the friendly elements have a TacNet connection; +2 if they *all* do.

Near Miss Indicator

The NMI (*Ultra-Tech*, p. 188) is a highly refined version of the TL8 Acoustic Countersniper System (*High-Tech*, p. 207). For consistency with the countersniping rules from *Tactical Shooting* (pp. 27-28), increase the Vision bonus to +4; the system automatically determines direction and distance to each firer. Combined with GPS and TacNet, all friendly forces will share the detection bonus.

Visual Enhancement

Ultra-Tech, p. 56

Visual enhancement software performs image stabilization, glare reduction, subtle edge highlighting, color balancing, and other post-processing tricks to clean up what the soldier sees on his augmented reality overlay. Combined with the hyperspectral sensor, it can perform pattern recognition against known camouflage systems. This negates all TL8 camouflage bonuses, and halves the bonus for *Ultra-Tech* visual stealth systems (*Ultra-Tech*, pp. 98-100) that have had their particular quirks analyzed.

He reached over and tossed one of the tiny backported radios to Muslar, who examined it carefully.

"This has been modified. I see a disk mount and two ports," Muslar exclaimed.

"Quite correct. As you may recall, there is a tiny but powerful computer inside that does little apart from scrambling and unscrambling messages. We use them for quite a bit more."

– Robert Frezza, A Small Colonial War

THE ULTRA-TECH RIFLEMAN

This loadout represents a near-future infantryman armed with an assault rifle and a limited number of anti-tank/anti-fortification missiles. Others in his fire team or squad may carry heavier weapons, deploy more drones, or direct fire support more easily, but the rifleman has the greatest freedom of action and can still engage most targets with some degree of effectiveness.

READING LOADOUTS

Name: Only one loadout is provided here. You may wish to alter or expand this listing, with each variant having a descriptive name (e.g., "Future Soldier: Grenadier Loadout")

Total Cost and Weight: Just below the name are the total cost and weight of all the loadout's gear.

Gear: The list of equipment provides key details. They have a regular format.

- First, an italicized *Equipment Name*, including the number of items carried in lots (e.g., *30-Round Magazines* ×8) and any quality modifiers (e.g., *Fast, Hardened Small Computer*).

- Next comes a parenthetical page reference to consult for further information, such as a weapon's combat stats or tool modifiers. To conserve space, the page references use the following abbreviations: B means *GURPS Basic Set, Fourth Edition*; HT means *GURPS High-Tech* for Fourth Edition; TS means *GURPS Tactical Shooting*; and UT means *GURPS Ultra-Tech* for Fourth Edition. Page references without letters can be found in this magazine.

- After that is a [**Carrying Location**], which indicates where and sometimes how the item is transported. In some cases, multiple locations appear. Objects in quantity – especially ammunition – may be put in one location, up to the maximum amount that location can hold, or split among several locations.

- Location may be followed by rules details such as DR, damage stats, or skill modifiers.

- Each entry ends with the item's cost and weight. Costs listed in parentheses are included with another piece of gear, and listed for completeness sake. Items include the weight but not the cost of batteries.

Software

Each software entry ends with the software's Complexity and cost. Offline software can be swapped with another program using a Ready action.

Firearms Costs and Weights

The costs of all firearms with a detachable magazine include one empty magazine (*High-Tech*, p. 79); the empty magazine is listed separately with a cost of free. Weapon and magazine costs and weights are listed here empty. This help keep better track of the weight totals including spare magazines and specialty ammunition. Loaded weapon weights can be found in the respective weapon descriptions or tables.

Weapons from *High-Tech* list the cost for new empty magazines of standard quality. For *Ultra-Tech* weapons, magazine cost is derived from the guidelines on *High-Tech*, p. 155: Multiply WPS by five times the magazine capacity, and then add \$30 for a box magazine, or \$300 for a drum/helical drum.

THE GEAR

The loadout listed here consists of a base equipment set that can apply to any TL9 soldier, and an add-on package that specifically applies to the rifleman role within the fire team.

Equipment is further divided into a *fighting load*, *approach march load*, and *emergency approach march load* (some with rifleman-specific additions). These are baseline loadouts; soldiers may carry additional magazines, more drones and sensors, grenades, ammo for the fire team or squad support weapons, mission-specific items, etc.

Fighting Load (Assault Dress): This is the mission-essential combat equipment worn on the body and load-bearing vest. It includes the uniform (reflex suit in this case), body armor, water, weapon, and enough ammunition for immediate needs. During combat operations, logistics forces will push the soldier a quart of water, two meal packs, batteries (at least two D cells for the exoskeleton), and full ammunition load *each day*.

Approach March Load (Combat Dress): This is the fighting load, plus a small assault pack or lightly loaded rucksack. This is the typical load carried on patrols and other extended operations.

Emergency Approach March Load (Marching Order): This is a full load of equipment sufficient for extended field operations. It is usually only carried on long patrols when external transportation assets are not available. Most of this extra gear is stored at a staging site and logistics drop-point before engaging in patrols or combat. Some gear (notably, the missiles) may be carried with the approach march load after the rally point is established.

Ultra-Tech Rifleman Loadout (TL9)

\$67,977.25, 53.965 lbs.*

Base Fighting Load (\$29,635, 84.35 lbs.†)

- **Assault Boots** (p. UT173) [**Feet**]. DR 12/6; +4 (quality) to Hiking. \$150, 3 lbs.
- **Light Infantry Helmet** (p. UT176) [**Head**]. DR 18. \$250, 3 lbs.
 - **3D Pocketcam** (p. UT51) [**Helmet**]. +1 (quality) to Photography; includes 1xB cell. \$1,000, 0.25 lb.
 - **ESM Detector** (p. UT62) [**Helmet**]. +1 Dodge if detects targeting sensor; includes 1xA cell. \$250, 0.25 lb.
 - **Near Miss Indicator** (p. UT188, p. 32) [**Helmet**]. +4 to Vision to locate enemy fire; includes 1xA cell. \$1,000, neg.
 - **Tiny Laser Communicator** (p. UT44) [**Helmet**]. 5-mile range; includes 2xA cells. \$100, 0.05 lbs.
 - **Secure Encryption** (p. UT47) [**Communicator**]. \$500, neg.
- **Armored Shades** (p. UT176) [**Head**]. HUD; DR 10. \$100, 0.1 lb.
 - **Night Vision Glasses** (p. UT60) [**Shades**]. Night Vision 8 and 2x magnification; includes 1xA cell. \$250, 0.1 lb.
 - **Hyperspectral Goggles** (p. UT61) [**Shades**]. 1x magnification; includes 1xB cell. \$2,000, 0.6 lb.
- **Electronic Earplugs** (p. HT70; p. 11) [**Head**]. Protected Hearing; includes 1xT cell. \$25, neg.
- **Filter Mask** (p. UT177) [**Head**]. DR 10. \$100, 3 lbs.
- **Heavy Clamshell Armor** (p. UT176) [**Torso**]. DR45. \$900, 18 lbs.
 - **Fast, Hardened, High-Capacity Small Computer** (pp. UT22-23) [**Clamshell**].

Complexity 5; 10 TB storage; +3 HT to resist EMP; GPS functions; includes 2xB cells. \$6,000, 1 lbs.

- **Small Radio Communicator** (p. UT44) [**Clamshell**]. 10-mile range; includes 2xB cells. \$200, 0.5 lbs.
- **Good Load-Bearing Vest** (p. HT54) [**Torso**]. +1 (quality). \$150, 2 lbs.
 - **Bandage Spray Can** (p. UT197) [**LBV**]. \$15, 0.5 lb.
 - **Filtration Canteen** (p. UT75) [**LBV**]. \$180, 3 lbs.
 - **Flying Robobugs** x5 (p. UT111) [**LBV**]. Each includes 2xA cells. \$500, 0.05 lbs.
 - **Mini Flashlight** (p. UT74) [**LBV**]. Includes 1xB cell. \$10, 0.25 lb.
 - **Multi-Tool** (p. HT26) [**LBV**]. Improvised equipment. \$50, 0.5 lbs.
 - **Radiation Badge** (p. UT188) [**LBV**]. Includes 1xAA cell. \$100, neg.
 - **Superfine Large Knife** (p. UT163/p. B272) [**LBV**]. Damage sw (2) cut or thr+2 (2) imp. \$240, 1 lb.
- **Lower-Body Exoskeleton** (p. UT181) [**Legs**]. 70-lb. Payload; DR 8/0; includes 2xD cells. \$12,000, 30 lbs.†
- **Personal Sound Detector** (p. UT62) [**Torso**]. +4 to Hearing; 8x amplification; includes 1xA cell. \$1,000, 1 lb.
- **Reflex Suit** (p. UT172) [**All**]. DR 12/4; flexible armor. \$1,200, 8 lbs.
 - **Biomedical Sensors** (p. UT187) [**Reflex Suit**]. +1 (quality) to Diagnosis and Physician; includes 1xA cell. \$200, 0.2 lb.
 - **Knee and Elbow Pads** (p. HT71) [**Reflex Suit**]. DR 3. \$40, 1 lb.
 - **Programmable Camouflage** (p. UT99) [**Reflex Suit**]. +2 (quality) to Camouflage. \$1,000, 2 lbs.
- **Transponder Ring** (p. UT150) [**Hand**]. \$100, neg.
- **Three-Point Sling** (p. TS72) [**Torso**]. (\$50, 0.4 lb.)
- **Water Pack** (p. HT53) [**Torso**]. \$25, 5 lbs.

Rifleman Fighting Load (+\$3,826.25, +13.4 lbs.)

- **50-Round Magazine** [**Carbine**]. Free, 0.15 lbs.
- **50-Round Magazines** x3 [**LBV**]. \$110.25, 0.45 lbs.
- **Assault Carbine** (p. UT136) [**Sling**]. \$1,900, 5.9 lbs.
- **Compact Targeting Scope** (p. UT149) [**Carbine**]. Infravision; 4x magnification; includes 1xA cell; also see *Tactical Shooting: Tomorrow*, p. 10. \$1,000, 0.5 lbs.
- **Rounds 10mmCL APHC** x200 [**Magazines**]. Damage 7d(2) pi. \$216, 5.4 lbs.
- **Suppressor** (p. 11) [**Carbine**]. -1 Bulk; -6 to Hearing. \$600, 1 lb.

Ultra-Tech Firearm Options

Military-issue ranged weapons include the following features for +\$300, +0.4 lbs. (already added to weapon cost and weight). For a further explanation of these systems, see *Tactical Shooting: Tomorrow* (pp. 4-12).

- Accessory Rail** x2 (p. UT150) [**Weapon**]. (\$200, 0.4 lbs.)
- Diagnostic Computer** (p. UT151) [**Weapon**]. +1 to repair. (Free, neg.)
- HUD Link** (p. UT149) [**Weapon**]. +1 Acc within 300 yards. (Free, neg.)
- IFF Interrogator** (p. UT151) [**Weapon**]. (\$100, neg.)
- Multispectral Laser Sight** (p. UT149) [**Weapon**]. Multifunction device. (Free, neg.)
- Power Cell** (p. UT18) [**Weapon**]. Includes 1xB cell. (\$3, 0.05 lbs.)

Base Approach March Load (+\$172, +11.215 lbs.)

- *A Cells* ×3 (p. UT19) [**Pack**]. \$6, 0.015 lb.
- *B Cells* ×4 (p. UT19) [**Pack**]. \$12, 0.2 lb.
- *First Aid Kit* (p. UT198) [**Pack**]. +1 (quality) to First Aid. \$50, 2 lbs.
- *Good Waist Pack* (p. HT54) [**Torso**]. +1 (quality) to Hiking; holds 10 lbs. \$50, 0.5 lb.
- *Gun-Cleaning Kit* (p. HT160) [**Pack**]. \$20, 0.5 lbs.
- *Meal Packs* ×2 (p. UT73) [**Pack**]. \$4, 2 lbs.
- *Personal Basics* (p. B288) [**Pack**]. \$5, 1 lb.
- *Water Pack* (p. HT53) [**Pack**]. \$25, 5 lbs.

Base Emergency Approach March Load (+\$1,444, +21 lbs.)

- *D Cells* ×2 (p. UT19) [**Backpack**]. \$200, 10 lbs.
- *Expensive Plastic Folding Shovel* (p. HT26) [**Backpack**]. Damage sw+3 cut; -2 Axe skill. \$40, 1 lb.
- *Good Large Backpack* (p. HT55) [**Torso**]. +1 (quality) to Hiking; holds 100 lbs. \$1,000, 5 lbs.
- *Meal Packs* ×2 (p. UT73) [**Pack**]. \$4, 2 lbs.
- *Personal Tent* (p. HT57) [**Backpack**]. +1 to Survival. \$100, 1 lb.
- *Sleeping Bag* (p. HT56) [**Backpack**]. +1 to Survival. \$100, 2 lbs.

Rifleman Emergency Approach March Load (+\$17,000, +24 lbs.)

- *Hunter Missiles* ×2 (p. UT168) [**Backpack**]. 64mm warhead. \$5,000, 10 lbs.
- *Infantry Missile Launcher* (p. UT145) [**Backpack**]. \$2,000, 4 lbs.
- *HEMP Multispectral Homing IML Missiles* ×5 (p. UT155) [**Backpack**]. Skill 14; damage 6d×8(10) cr inc. + linked 8d cr ex [3d]. \$10,000, 10 lbs.

Base Software Suite (+\$15,900)

- *JCCS* (p. 30) [**Computer**]. Weak dedicated AI; IQ 8. Complexity 5, \$3,000.
- *Countersnipe* (p. 31) [**Computer**]. +4 to Vision to locate attackers. Complexity 3, \$500.
- *IFF Comm* (p. UT188; 31) [**Communicator**]. Complexity 2, \$500.

Combat Effectiveness (CE) can be defined as the ability of a (friendly) unit to rapidly and accurately sort and categorize detected objects (blue, white, red) and make a decision as to whether or not to employ deadly force against the identified object/target. Effectively applying the CE guarantees a minimum level of collateral damage and fratricide.

– Tapio Saarelainen,
*Optimizing the Performance
of a Dismounted Future
Force Warrior by Means
of Improved Situational
Awareness (2012)*

- *TacNet* (p. UT149; p. 31) [**Computer**]. +1 to Tactics. Complexity 5, \$10,000.
- *TacShot* (p. 31) [**Computer**]. \$300, Complexity 4.
- *Targeting (Guns (Rifle))* (p. UT149; p. 31) [**Computer**]. +1 to skill. Complexity 3, \$500.
- *Translator Program* (p. UT47; p. 31) [**Computer**]. Local language; Broken comprehension. Complexity 3, \$100.
- *Visual Enhancement* (p. UT56; p. 31) [**Computer**]. +1 to Vision. Complexity 4, \$1,000.

* Total weight: 153.965 lbs. Listed weight accounts for the exoskeleton Payload. If you remove the exoskeleton, this is consistent with the emergency approach march load for a late TL8 U.S. rifleman operating in Iraq or Afghanistan.

† Neither the 30 lbs. of the exoskeleton nor its Payload count as encumbrance if the exoskeleton has power. The 30 lbs. *has* been factored into the Base Fighting Load totals, however, in case the soldier has to carry an unpowered exoskeleton.

REFINING THE CONCEPT

The default loadout assumes that the soldier is using a collection of systems that share data but have their own power supplies and casings. Although not unreasonable or unrealistic, *GURPS* does have mechanics that help simulate design refinement and systems integration, which may appeal to those who want to tweak otherwise off-the-shelf designs.

POWER INTEGRATION

The future soldier loadout uses a lot of batteries in an entire range of sizes, from miniscule embedded AA cells to larger D cells that power the exoskeleton. Also, a few TL8 hitchhikers from *High-Tech* equipment are in the mix! This is cumbersome

to keep track of by players (much less actual logisticians!) and isn't a very fun resource management game ("Let's play *Battlefields & Batteries!*"). What's far more likely is that all of the components of the future soldier loadout will share a single, integrated data and power bus.

Battery Consolidation

The rifleman loadout uses 10.385 lbs. and \$235 worth of batteries above A cell-size that are not part of his weapon or carried drones. A single D cell can replace all of the A, B, and C batteries in the loadout and power the devices for a *week*. This adds 4.615 lbs., but is worth it for the extended endurance and supply simplification.

SYSTEMS INTEGRATION

By default, every item in the loadout is a standalone item that is strapped on and plugged in (see *Plug-In Gadgets* in *Ultra-Tech*, pp. 15-16), and otherwise ready to run (even the glasses are a compound device, with a clip-on hyperspectral imager and night vision lenses). This simplifies maintenance and acquisition, as each component can be removed for repair and refurbishment, be easily replaced or removed by different customers (or the troops themselves), and subcontracted out to more bidders.

However, it complicates logistics, *especially* if there are multiple models and manufacturers for a single component (“Oh, you have a Shiboshi Industries tactical computer? Don’t have the parts in for that model. Try again next week.”). It also makes tracking issued gear more complicated, creates multiple overlapping acquisition programs, and gives the poor soldier more items to be accountable for and possibly lose. And – almost as an afterthought to military planners and leadership – it all ends up being heavier for the soldier!

War has changed . . . Genetic control. Information control. Emotion control. Battlefield control. Everything is monitored and kept under control.

– Old Snake,
in *Metal Gear Solid 4:
Guns of the Patriots*

Combined Gadgets

The rules for *Combination Gadgets* (*Ultra-Tech*, p. 16) are an often-neglected way to reduce the weight (and associated bulk) of devices that share components, without requiring

expensive modifications and custom designs. The obvious targets for combination in the rifleman loadout are the clamshell and helmet systems, but an argument could also be made for integrating the suppressor and scope on the carbine to shave off valuable ounces. (Note that items with negligible weight still benefit from the $\times 0.8$ cost multiplier.)

Combined gadgets are a bit more difficult to maintain, but it’s common for military-spec gear to use line-replaceable modules or swap broken items with completely new ones while the maintenance depots or manufacturer diagnose and repair the specific issue. This may affect gear with an Equipment Bond, but such items shouldn’t be malfunctioning except in dramatic moments anyways.

Combined Clamshell (\$6,880, 20 lbs.): Combines the heavy clamshell armor with all [**Clamshell**] systems. Modifies fighting load by -\$220, -0.5 lbs.

Combined Helmet (\$2,680, 3.44 lbs.): Combines the light infantry helmet with all [**Helmet**] systems. Modifies fighting load by -\$420, -0.11 lbs.

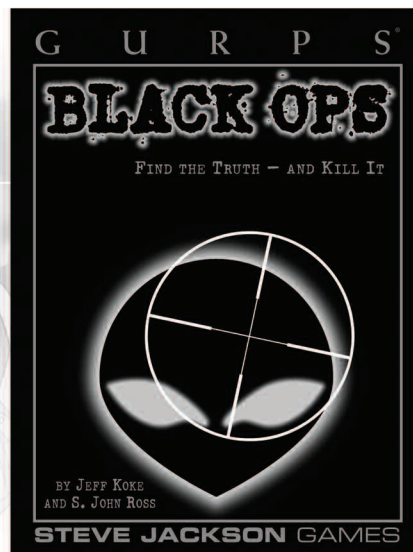
Combined Reflex Suit (\$1,952, 8.96 lbs.): Combines the reflex suit with all [**Reflex Suit**] systems. Modifies fighting load by -\$488, 2.24 lbs.

Combined Rifle (\$3,420, 8.92 lbs.): Combines the assault carbine with all [**Carbine**] and [**Weapon**] systems (except the magazine). Modifies rifleman fighting load by -\$380, -1.1 lbs.

Combined Shades (\$2,280, 0.76 lbs.): Combines the armored shades with all [**Shades**] systems. Modifies fighting load by -\$70, -0.04 lbs.

ABOUT THE AUTHOR

Kenneth Peters was a sergeant in the U.S. Marine Corps before returning to the real world. He was denied an opportunity to shoot at anything interesting during Operation Iraqi Freedom/Operation Enduring Freedom, but did become fairly proficient in Strategy (Logistics). He enjoys telling amusing stories about various Marine Corps shenanigans, including his personal experience with the famous BA-5590 battery issue (described in *High-Tech*, p. 13).



RANDOM THOUGHT TABLE

IN THE FUTURE, THERE WILL BE HUMANS

BY STEVEN MARSH, *PYRAMID* EDITOR

Regardless of what's going to happen in the future, it will likely involve humans (although I would direct all pedants to the box on this page). It's this humanity that forms the heart of much memorable military sci-fi.

But let's back up.

Bad science fiction is often noticeable by how much it strives to distance itself from the human experience. First-term writer workshops frequently encounter stories that begin something like: "*Gnoartar Bloodstarkiller awoke to the third-chime of Snar. The Three-Orb was high in the redsky, and the diamell factories chugged at 127 percentons.*" Such stories try hard to create a future that's different from the modern experience, thinking that it's the differences that make the future interesting.

However, in many cases that's wrong. What resonates in future stories are the aspects that are *the same* about our

modern lives. Whether it's the grumbling Vogon guards of *The Hitchhiker's Guide to the Galaxy*, the hero's timeless quest of the original *Star Wars* trilogy, or the struggle to triumph against the unfair world of *Gattaca*, science fiction often speaks to us when there's an undercurrent of, "The more things change . . ."

This is especially true in military SF. One recurring theme among the exploits of space marines is that their lives aren't that different from modern military folks. The waiting, the uncertainty of orders, the conflicting rumors, the camaraderie . . . all as applicable whether the enemies are ancient Persians or alien Phobosians.

Here, then, are some ideas to think about when structuring your futuristic military campaigns.

NOBODY KNOWS ANYTHING

It's common for those on the field of battle to be ignorant of the big picture. The long-term strategic goals of their faction, the willingness of higher-ups to sacrifice forces, and the general tenor of the war are all facts that might be kept from those in the field.

What's curious about human advancement is that – as our ability to gather and assimilate information around us has grown – our *reach* has continued to exceed our grasp. In the modern information age, many of us feel that we ought to be able to track down anyone of interest instantaneously . . . yet the search for Osama Bin Laden took years longer than many might have expected. Fidel Castro survived who-knows-how-many attempts on his life during his decades-long reign in Cuba. There are still regimes about which we seem to know very little, despite considerable interest and resources devoted to sorting that out.

What Do You Mean "Human"?!

Why am I so confident about the fact that humanity will be around in the future? Well, part of it is self-serving; if you're willing to bet me \$500 that humanity *won't* be around, then – by definition – I won't have to pay if I'm wrong.

However, *GURPS* is a universal system, and there's certainly nothing to stop the gamers from playing from the bugs' point of view in a *Starship Troopers*-style campaign. Still, even then, the insight in this essay will hopefully prove useful. After all, most aliens define themselves (or at least we as audience members define aliens) by how they *aren't* like humanity. Spock would just be a person with an attitude problem if he didn't remind us every 20 minutes about how non-human he is. Thus, look at the ideas here and see how you can turn them on their head, to emphasize the alien nature – either of the enemy, or of the alien protagonists the gamers want to portray.

The situation seems likely to stay this way because the number of things it's important to know will only increase in the future. During the 1930s, it was only vital to have an idea of where a few hundred thousand like-minded soldiers were amassing in a far-off country to eye their neighbors. In the 1950s, concern now encompassed both soldiers and nuclear weapons. In the 1970s, there were both of those plus guerrilla-tactic factions able to hold superpowers at bay. Today, we have all those plus *new* threats: biological, computational, economic, informational, and more.

Extend that into the future of a military SF world. Even if the threat is a unified force (bugs, Borg, bio-separatists, etc.), the possibilities that threat has open to it are likely to encompass possibilities we can barely fathom now. If your standard soldier in the field is worried about firefights, insurgents, and IEDs, a space marine might be worried about orbital bombardment, tactical nukes, holo-impersonations, warp ambushes, and who knows what else. As the number of possible threats increase, so too does the *lack* of information about each. (Have you definitively ruled out the possibility that someone in your house is a holo-impersonation?)

While it's likely that military (and especially heroic) agencies will be more resilient to acting on idle conjecture, rumors and speculation can still worm their way into fighting forces. This can be useful from a gaming standpoint. An otherwise-standard adventure can be spiced up with rumors ("It's quiet because they're *planning* something!"), objectives can shift mid-mission, and the situation can seem to grow more dire even as the heroes continue to win missions . . . or vice versa.

EVERYBODY'S UNDERFUNDED

Even in optimistic futures like the quasi-military world of the original *Star Trek*, folks on the front lines don't tend to get what they need. Although more-powerful weapons and defenses are shown in later *Star Trek* movies, they didn't seem to be an option for any of the crewmembers expected to beam down to an alien world with nothing more than an underpowered phaser and a red uniform.

Soldiers often find themselves lacking what they want, whether it's a dearth of luxuries that remind them of home, weaponry and protection that's underpowered compared to the opposition, or gear that's wildly inappropriate to the operational theater. ("A forest moon with an endless supply of tightly clustered trees? Equip the troops with *speeder bikes!*") Often these absences are for good reasons – it's impossible to prepare for all situations all the time – but human limitations are the root of many shortfalls.

For a military SF campaign, this can be a great way to remind the heroes what they're fighting for . . . and how desperate the situation is. A lighthearted adventure might revolve around a particularly prized – if trivial – resource. ("There are 6,300 crewmembers of this ship who'd kill us if they knew we had the last crate of cocoabars.") More serious situations might revolve around a lack of sufficient protection, ammo, or medical supplies. Particularly ragtag military operations often find themselves aboard ships where even basic lighting seems flickery and lacking.

As a great inversion of this trope, put the players in charge of outfitting themselves and their cohorts. Space marines who grumble about having incorrect standard gear may discover how hard it is to balance disparate needs and finite funds.

(Depending on the group, this is especially good to spring on them at the end of the adventure; that way, they can pore over spreadsheets and sourcebooks in the off-time between adventures.)

UNITED, YET INDIVIDUAL

Back in my retail gaming days I remember seeing gamers play a weekly *Warhammer 40,000* game in store. One person had an army that was painted more or less like the box; however, one figure's mostly blue features were broken up with tiny shocks and highlights of red, as if the figure had added its own accents to his outfit.

"Why is that guy painted differently?" I asked one week.

"Because he *wants* to be," was the awesome reply.

In fiction – much like real life – we tend to view our fighting forces as both homogenous interchangeable units *and* individuals. Both are understandable; obviously, everyone *is* an individual, but – depending on the scope of the story – it may or may not be important to emphasize that aspect.

Issues of individuality and unity can be a great theme for a military SF game. Depending on the tone of the future, there might be a greater push for homogeneity (if genetic or technological augmentation push everyone toward the same endgame) or individuality (if diversity has become the watchword of a transhuman or bio-diverse humanity). Similarly, unity or individuality can be what separates humanity from the opposition; "we are not bug-clones" or "we are not chaos-savages" are both powerful ideas to forge a cohesive fighting identity around.

Cut to . . .

As a good example between balancing between individual heroism and group cohesion, check out *GURPS Mass Combat*. With its rules, it's quite easy to zoom in and out between large-scale troop action and smaller individual scenes of derring-do.

Understanding the human side of futuristic conflicts will make all aspects of the campaign feel more alive. Elements that resonate with us modern gamers will make it feel more real, while portions that are different will feel more alien and futuristic.

As a footnote to my *Warhammer 40,000* story, I noticed that every player who went up against the army with the red-paint guy would target that figure with a vengeance – sometimes even at the expense of rationality or sensible tactics. The red guy might have died early and often, but being an individual may have saved many other members of his squad . . .

ABOUT THE EDITOR

Steven Marsh is a freelance writer and editor. He has contributed to roleplaying game releases from Green Ronin, West End Games, White Wolf, Hogshead Publishing, and others. He has been editing *Pyramid* for over 10 years; during that time, he has won four Origins awards. He lives in Indiana with his wife, Nikola Vrtis, and their son.

ODDS AND ENDS

THE WAR THINGS CHANGE . . .

Those running military science-fiction campaigns often find themselves trying to craft a flavor and tone for the series. It's an obvious piece of advice, but it should still be emphasized: Steal from history.

Historical sources are ideally suited for creating a believable tactical, strategic, and philosophical backdrop, primarily because history actually happened. All that's required is to assign one side of history to the heroes, the other side to the adversaries, and see how the pieces fall together.

For example, start with a galactic backdrop of a bunch of rival empires all in an intricate web of alliances (for example, the standard *Star Trek* universe). A seemingly minor incident sends factions into direct conflict, thanks to an intricate web of alliances between the factions. The heroes' sector has remained neutral, but the intergalactic warfare is all but assured to drag their agency into the fray at some point. In the meantime, the entire galaxy groans under the weight of the continued conflict.

Since we said the "trick" of what this tip is about, then it's fairly obvious this is a reimagined take on World War I. However, if the players don't know that this is the inspiration, and it's presented in an obfuscated way, then the connection isn't anywhere near as obvious.

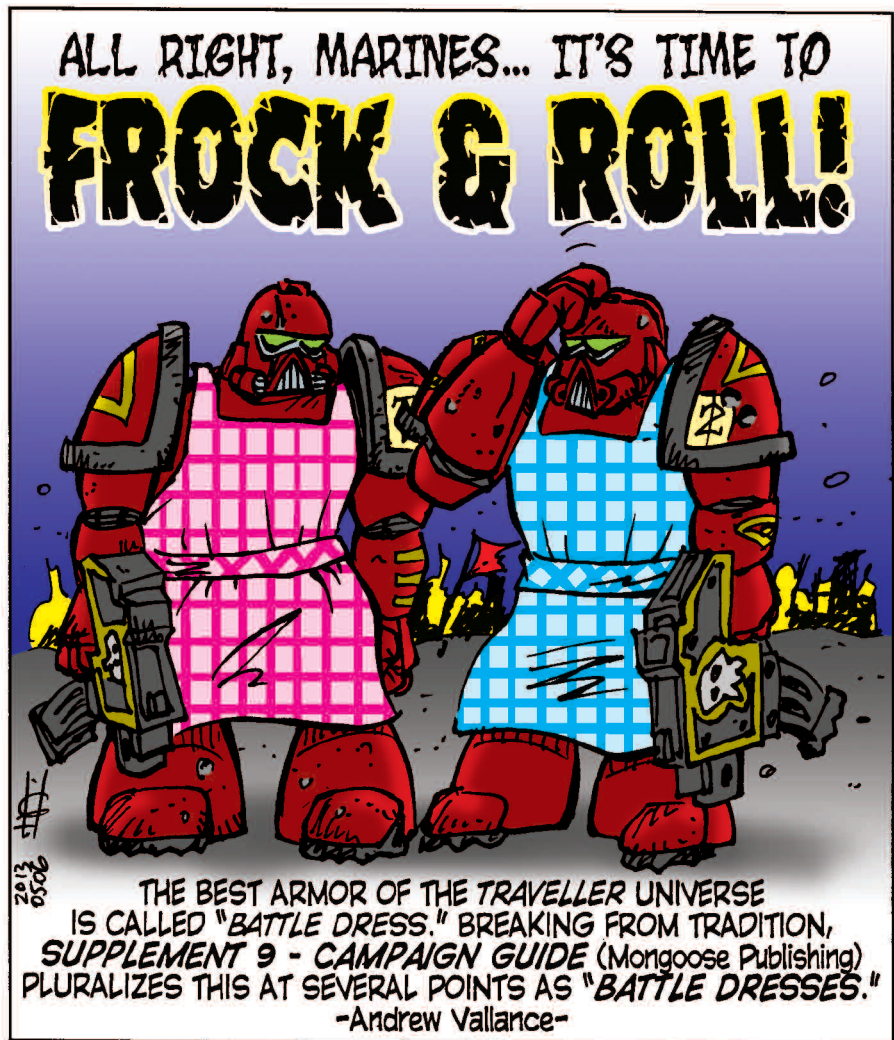
In addition, this technique works for individual conflicts, general practices, etc. The battle between stormtroopers and Ewoks parallels the struggle of American forces in Vietnam. The classic *Star Trek* episode "Balance of Terror" mimics submarine conflicts of WWII. There are parallels between the climax of *Saving Private Ryan* ("stop the doomsday tank with a desperate shot against its weak point") and the finale of *Star Wars: A New Hope*.

Once you've got the inspiration, you might even consider tweaking or even removing the original assumptions that got

you there. Maybe our World War I conflict started more similar to the Korean War, with military action initiated to keep the balance between two galactic superpowers.

MURPHY'S RULES

BY GREG HYLAND



Got a *Murphy's Rule* of your own? Send it to murphy@sjgames.com

ABOUT *GURPS*

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New supplements and adventures. *GURPS* continues to grow – see what’s new at gurps.sjgames.com, or visit www.warehouse23.com.

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Errata. Everyone makes mistakes, including us – but we do our best to fix our errors. Up-to-date errata pages for all *GURPS* releases are available on our website – see above.

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