Additions to the Mauloni Design System

by Paul Elliott (zozer@btinternet.com); using Joe Mauloni's original **Vehicles: Design and Operation** at: http://www.the-children-of-earth.org/CTRdl1.html

   Joe Mauloni has created a fantastic vehicle design and operations system for classic traveller that retains CT's fast and rules-light feel, without the overly complex calculations of *FF&S*, *GURPS Vehicles* or MGT's *Military Vehicles*. I love the design system, and here I attempt to provide additional rules for submarines and aircraft. My test designs have successfully included the 500 ton sub in The Traveller Book as well as a Gates Learjet, a Boeing 747-400, the Lake LA-4 Buccaneer seaplane and the F/A-18 Hornet!
   I've also written my own version of vehicle combat, particularly weapon penetration and damage (but still using all of Joe Mauloni's vehicle design rules and numbers). The vehicle stats stay the same, but are put to different uses.

Drive Table

Drive Type	TL	Space Req	Cost/Space
Submarine*	5	B x 0.25 (min.1)	Cr2000
Wings	5	B x 0.25 (min. 2)	Cr10,000

*Submarine power is often internal combustion; with battery reserve based on 50% of internal combustion space and cost.

Power Systems Table

Type	TL	Spaces Req	Cost: Space=1	Cost: Space=2+	Duration	Fuel
Jet Engine $	6	50% of drive (min. 1)	Cr100,00	Cr100,00	1 day	Hydrocarbons
Propellor $	5	50% of drive (min. 1)	Cr5,000	Cr15,000	1 day	Hydrocarbons

$ Performance enhancements to an aircraft are applied to the power system, not the drive system, as with other vehicles in the Mauloni rules.

Performance Table

Drive Type	Cruise	Max	Off-Road	Rough-Terrain
Submarine #	20kph	25kph	-	-
Jet	800kph	900kph	-	-
Propellor	200kph	300kph	-	-

Depth (m) = $(AF - 5)^3$

Accomodations Table

Exposed	-50% to space req.	No cost
Cramped (ie. coach)	-50% to space req.	No cost

Sensors (New)

Type	Range (km)	Cost	Bonus	Space
None	-	-	-	-
Basic	TL	Cr1000	-	-
Long Range	TL^2	Cr40,000	+2	1
Extended	TL^3	Cr300,000	+4	8

Communications (New)

Type	Range	Cost	TL
None	-	-	-
Basic	50km	Cr500	5
Long Range	500km	Cr5000	5
Extended	5000km	Cr15,000	7

Miscellaneous (New)

Type	TL	Cost	Spaces
Airlock (small)	6	Cr80,000	2
Airlock (large)	6	Cr200,000	4
Bunk (bunkbed and locker)	5	Cr750	1
Cabin (small)	5	Cr2500	4
Fuel Processor	8	Cr10,000	1
Amphibious Aircraft/Rotocraft Hull	5	Cr1000/space	10% of Body

Missile Design Rules

Missiles in this design system can be fired from missile racks on vehicles or spacecraft.

Price Factor	Guidance		Propulsion		Detonation	Warhead	
1	-		-		Contact	Small HE	
2	Command		Short		Proximity	Large HE	+1 sp
5	Semi-Active		Medium		Command	AP	
10	Passive IR (Short R)		Long	+1 sp	Intelligent		
10	Passive Radar (Short or Medium R)	+1 sp					
20	Active (TL 7-9)	+1 sp				Tactical Nuclear	+1 sp
20	Brilliant (TL 10)	+1 sp					

The cost of a missile is found by multiplying together the price factors for its component parts, and multiplying the result by C100. The standard Traveller missile is Semi-Active homing, Medium Range propulsion, Contact detonation and Small High Explosive warhead for Cr5000. Missiles have a base 'space' of 1, but certain design choices may incease space by +1. Multiple increases are possible to create rather large missiles.

Guidance
Command: launcher must steer missile to the target all the way (maximum range = Short)
Semi-Active: The missile locks on to signals bounced off the target by the launcher or the launching vehicle. The launcher must be scanning the target throughout the attack. Radar or laser paint.
Passive Homing: The missile homes in on emissions from the target, such as the heatseeking Sidewinder. They are self-homing. Some home in on radar emissions, and can be defeated if the target switches off radar (but in doing so cannot guide its own command or semi-active missiles). IR homers are limited to Short Range; radar homers are limited to Short or Medium Range)
Active Homing: Similar to semi-active, but they carry their own sensors and do not rely on the launching vehicle to paint a target with radar.
Brilliant: Full suite of sensors, able to carry out target recognition, assess threats and make autonomous attack choices.

Detonation
  Contact: Normal damage.
  Proximity: Half penetration, +2 to hit; good against softskin targets.
  Command: Specified on command from launcher, either contact or proximity.
  Intelligent: Can be preset to change attack configuration, proximity or contact, and if contact can look for weak points, +1 Penetration. All brilliant missiles must have intelligent detonation.

Warhead
HE: Penetration = TLx3 (space combat = 3 hits), burst TL metres
Large HE: Penetration =TLx3 (space combat = 4 hits), burst TL x 2 metres.
Armour Piercing (AP): Either small or large HE (select); Penetration TLx4 and reduces burst radius to 3m.
Tactical Nuclear: as High Guard nuclear missile (in space 2D + 6 hits)

Propulsion
Short: Range = ½TL km (Maximum range for ground-to-ground missiles)
Medium: Range = TL x 2 km
Long: Range = TL x 20km

For space combat, simple refer to the descriptor, 'medium range' etc.

Vehicle Combat and Operations

These are intended to be used as a radical variation to Joe Mauloni's vehicle combat rules.

VEHICLE USE

Losing Control: Roll on the Control Table when a stunt or dangerous manoeuvre is attempted, or driving faster than the maximum safe speed. Loss of control results in damage sustained; roll 2D on the Damage Table if Off-Road Speed, 2D+8 if Cruise Speed, 2D+12 if Max Speed.

CONTROL TABLE

Conditions	Max. Safe Speed	Control Roll
Ideal	Max Speed	5+
Normal	Cruise Speed	6+
Marginal	Off-Road or NOE Speed	7+
Dangerous	Rough Terrain or ¼ Cruise Speed	8+

DM's: +1 per level of vehicle skill, - self-imposed penalty for manoeuvres designed to shake a pursuer

Long Distance Travel: Roll 4+ to avoid a mishap each day. DM's: + vehicle skill; +2 if Dexterity 8+; also consult the Long Distance Modifier Table. A roll of 2 is always a mishap, and a roll of 12 is never a mishap, regardless of DM's.

If a rotorcraft or grav vehicle mishap occurs, roll 4+ on 2d6 to avoid crashing; in bad weather, roll 8+ to avoid crashing; and in extreme weather, roll 10+ to avoid crashing. If a watercraft mishap occurs in bad weather, roll 8+ on 2d6 to avoid sinking; in extreme weather, roll 10+ to avoid sinking.

LONG DISTANCE MODIFIERS

Max Speed/NOE	-2
Moderate (winds/rain)	-1
Bad (storm)	-3
Extreme (hurricane)	-6
Flat Off-Road (plains)	-2
Moderate Off-Road (hills)	-4
Difficult Off-Road (mountain)	-6

Tracked vehicles halve terrain DMs; air cushions halve flat & moderate off-road terrain and cannot pass thru difficult off-road terrain.

The exact nature of a mishap is left to the referee, but a suggested default is to roll 2D, with a result of 2-7 indicating an unforseen delay, and a result of 8+ indicating a Damaged result on the Damage Table. The delay might be run out of fuel, engine overheated, lost, impassable terrain, anything that does not involve damage to the vehicle.

VEHICLES IN COMBAT

To Hit: Vehicles vs Vehicles

A firing vehicle must roll 8+ to hit an intended target.

- + weapon skill
- +/- tech level difference (favour the highest TL unit)
- - 2 if target driver's makes vehicle roll (-4 if an aircraft, -2 if roll failed)
- - 3 if firing vehicle is evading
- Main Weapons: Distant (over 500m) -2
- Light Weapons: Very Long (over 250m) -2, Distant -4.

To Hit: Vehicles vs Personnel

Use the rules in Book 1 or Book 4; they will normally fire HE rounds from the main weapon. Use the rules provided in Mercenary. Vehicles often attack personnel with support weapons such as machineguns.

To Hit: Personnel vs Vehicles

Use the standard to hit rules found in Book 1. Treat vehicles as mesh armour (typically a -4 penalty against most slug-throwers). Do not provide a bonus for aiming at a large object.

To Hit: From the Air

Cannons and Unguided Rockets are light weapons that can be fired, fixed mounting, at long range (if up to 250m altitude) and at very long range if up to 500m altitude). Rocket Pods require 1 space, cost TL^2 x Cr100, have Pen = TL x2, blast radius of TLx3 and use range DMs as a light weapon.

Bombs are freefall, and receive -8 to attack, + pilot's aircraft skill, +1 per TL over 5. They have Penetration TLx3 and a burst radius of TLx20. If they miss, there is no penetration, but the target remains within the blast radius for Penetration = half TL. A single 500kg bomb may instead be represented by a similar massing cluster of smaller bombs. For infantry, everyone within the blast radius suffers damage on 7+. Those within one third the blast radius suffer 6D, everyone else hit suffers 3D damage.

Damage Dice

First compare the attacking weapon's penetration with the target vehicle's armour factor. Determine the damage dice.

Repairing Vehicles

Damaged and disabled vehicles can be repaired. Each vehicle has a number of Maintenance Points which determine how long a repair job will require.

SMALL ARMS PENETRATION

Slug throwers	Pen 1
Lasers	Pen 4
Plasma/Fusion Guns	Pen 8
HE rounds	Pen 4
HEAP rounds	Pen 8
HEAP Grenades	Pen 16

Damaged item: Each Mechanical roll (8+) will fix 1D Maintenance Points (in hours). Cost will be 2-12% of the damaged item.

Disabled vehicle: Each Mechanical roll (8+) will fix 1D Maintenance Points (in days). Cost will be 20% -120% of cost of the entire vehicle.

DAMAGE DICE

Pen. Half or Less	2d6-2
Pen. AF or Less	2d6
Pen. Over AF	2d6+4
Pen. Equal to Double AF	2d6+8
Pen. Equal to Triple AF	2d6+12

Rolling Damage

The attacker must roll the damage dice on the Damage Table.

DAMAGE TABLE

Roll   *Level*   *Effect*

9-   No damage   -

10+   **Damaged**

Vehicle suffers damage, knocking out a system; roll 1D: 1 Electronic system; 2,3 Crew-member suffers a 3D wound; 4,5 Drive or Power; 6 Weapon.

14+   **Disabled**

Drive and power disabled, vehicle halts. All crew must roll Dex or suffer 2D damage. Minor weapons may still work.

18+   **Destroyed**

All systems destroyed, vehicle on fire. Crew suffer 3D damage, roll each subsequent turn on Str or suffer 1D each turn. They may bale out with armour, life support and one weapon or item of gear.

Grav/rotorcraft destroyed, roll 12+ to avoid a crash (add Vehicle skill).

New Equipment

- **Mounted missile launchers**: Launcher cost is Cr 25,000. Available at TL6+. Space 1 or 2 missiles only. Can launch missiles in 1 round.
- **Man-portable versions** are available. Cost is equal to missile x5. Space 1 missiles only. Available at TL7+. Portable, but require three rounds to set up and launch.
- **Unguided portable rocket launchers** are available starting at TL6. These cost TL x Cr10, weigh TL x 1kg, and have the firing characteristics of a RAM HEAP grenade. Pen = TL x 2.

VEHICLE DESIGN

I use Joe Mauloni's excellent design rules published as **Vehicles: Design and Operation**. The penetration and armour values are used in the rules above, and the operation rules in this document are also re-written from Joe Mauloni's rulebook.