

VACC SUIT



Fully customizable TL 9 Space Suits for Traveller

TRAVELLER

Compatible Product

ZOZER

Requires the use of the Traveller[™] Main Rulebook, available from Mongoose Publishing

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Thanks to Russ Venlos

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PREFACE

VACC SUIT is a stand-alone product for Traveller, a working guide to the TL 8 and TL 9 space suit. These are the suits of today and tomorrow, the type of suits currently in development that will hopefully see action on Mars, a Near Earth asteroid or perhaps even further afield.

The rules in this book err on the side of realism because they are actually a part of the near future setting book **Orbital**, currently in production, which is filled with the technology of the next few decades. The solar system of **Orbital** is dangerous, and this raises the profile of the oft-ignored Traveller vacc suit. In this more-realistic setting the vacc suit becomes a miniature spacecraft upon which every traveller's life will depend.

Watch out for **Orbital**, which was released in December 2012. It continues the hard technological edge with rovers, orbital vehicles, details of the planets and moons, rules for building and operating deep space vehicles and of course complete information on creating characters, scenarios and campaigns for the 2100 AD setting. A political cold war fought between Earth and the colonists on Luna drives everything; exploration, settlement, technological development, it is the political will and the energy behind life in the solar system. A lot is happening and there are humans scattered all across the moons and planets. For the Traveller referee, the solar system resembles a typical subsector. Many of the adventures that could take place in a subsector can happen there too, but travel times are longer, ships more fragile, communications a little easier, and a polarized political world complete with mistrust, espionage and puppet governments dominates the stage.

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INTRODUCTION

Whether you live on Luna or Titan, Ida or Mercury, your space suit is more important to you than any mere piece of clothing. You spend hours in it every week and some people spend most of their working day inside a suit. Your suit is personal, customised to the way you work. Colloquially they are known as vacc suits (from their common use in the 'vacuum' of outer space), but these suits are able to operate on the dusty, rocky surface of Luna, on chilly ice sheet environments like Enceladus, in the staggeringly cold temperatures of a world like Titan, in fierce dust storms on Mars and in many other hostile places besides.

Vacc suits are complex. Each is a self contained space vehicle in its own right, with a breathable atmosphere, pressure regulation, heating and cooling controls, drinking water, 10km radio and TV camera communications, 5m range flashlight, limited micrometeoroid and radiation protection and the ability to do all that in a low pressure environment that threatens to turn your suit into a balloon.

Rather than present player characters with a single off-the shelf vacc suit, **Orbital**, like the suit manufacturers themselves, offer customizable suits for the hard-working spacer who has exacting needs. Players should design their suits as soon as they have designed characters, or else simply pick up the soft suits installed as standard on most newly built space vehicles.

VACC SUITS & ACTION PENALTIES

Suits are bulky and constraining. All suits begin with a basic penalty to all physical actions taken while in the suit. Added extras further increase general encumbrance, and can further increase this action penalty. Training and experience counts for a lot, though. The wearer can use his Vacc Suit skill to cancel out the action penalty DMs up to his level in that skill. For example, a wearer with Vacc Suit 2 inside a soft suit (action penalty -4) only suffers a -2 when attempting physical tasks.

Soft Suit (TL 8): The soft suit is the standard Traveller vacc suit available at TL 8. Used at one time for spacewalks (Extra Vehicular Activities, or EVAs), the soft suit is now relegated for use as an emergency pressure suit worn by space vehicle crews. Although bulky when pressurized, there are no action penalties when reclined in an acceleration couch, operating controls or computers. Unpressurized, it is quite comfortable, utilitarian and easy to wear. Although it is possible to carry EVAs in the pressurized soft suit, the -3 Action Penalty (AP) make it inferior to the TL 9 hard suit. The soft suit is used to provide life support and mobility within a spacecraft or on a world surface for up to 6 hours. It is a bulky soft suit with a helmet and backpack PLSS (Portable Life Support System). It provides Protection 4, masses 24kg and Costs Cr7,000. It cannot be customized. All actions carried out in a pressurized soft suit are done so with a -4 action penalty.

Hard Suit (TL 9): The hard suit is capable of maintaining its shape and flexibility while pressurized (unlike the soft suit). This makes it ideal for all EVAs in zero gravity and on a world's surface. With fewer APs, both movement and work are made much easier. However, hard suits are not ideal for long-term wear, being uncomfortable for any duration of 6 hours or more. Some DSV crews employ hard suits for EVAs, while using soft suits for all intra vehicle activity. Most crews have switched to hard suits and dress casually while on board, resorting to their suits during any period of danger (rendezvous, fly bys, atmospheric

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braking, EVAs, dockings and other situations in which there may be an unexpected decompression through hull puncture).

The hard suit is a modular design, and although once built cannot be altered, it can be tailored by the manufacturer to suit the needs of the customer. Weights, costs and life support duration are all defined by the buyer. Any hard suit is more expensive than a soft model, but the player character gets what they *want*.

BUILDING A SUIT

To build a hard suit, select a suit design, select a PLSS and then choose up to three options that make your suit unique. Total the weight, the cost and make a note of any penalty assigned to any actions taken when in the suit. A suit is made up of several components: a torso assembly, a helmet and limbs. Select the basic suit design from the table below.

Suit Design	Description	Action Penalty	Mass (kg)	Cost (Cr)	Base Protection
Full Hard Suit	Hard shell suit with rotating joints	-1	16	9,000	4
Semi Hard Suit	Hard shell torso with flexible arms and legs	-2	14	7,000	3

Next, select the type of PLSS that will be worn with the suit. The PLSS includes oxygen, pressure regulation systems, and unlike Apollo and ISS systems which cooled their suits with a sublimator (which only works in a vacuum), these TL 9 PLSS employ a water membrane evaporation cooler that chills the wearer using the same principle as sweating. It works fine on Mars, Titan and other worlds with an atmosphere. Another TL 9 innovation is the way in which the PLSS dumps wasted carbon dioxide every few minutes, rather than collect it within lithium hydroxide/metal oxide scrubbers, a method used by the old TL 7 and 8 suits. Who wants to have to constantly replace those CO₂ scrubbers?

PLSS	Duration (hrs)	Mass (kg)	Cost (Cr)
A	6	7	3,000
B	9	8	5,000
C	12	12	10,000

All suits have 3 customizable slots that can be used to build in extra features. Select up to three from the table below. Once chosen add the combined weights, this total may adversely affect the suit's action penalty: if 4kg+ then apply a DM of -1 to the action penalty, if 7kg then apply a DM of -2 to the action penalty and if 10kg then apply a DM of -3 to the action penalty. Note that even the 'cosmetic' option called Baospace Fashion also takes up a full slot, that futuristic ergonomic design takes up valuable space.

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Feature	Description	Cost (Cr)	Mass (kg)
Ablative Outer Layer	Protection 6, from lasers		2
Atmosphere Tester *	Provides detailed chemical analyses	500	1
Baospace Fashion	A sleek, tailored and futuristic look	2000	-
Binoculars*	Fold-down vision aids, with laser range finder	800	1
Climbing Harness	Integral harness with rings and attachment points for rope climbing and rapelling	250	-
Collapsible Helmet	Helmet folds back and slots into hard torso shell; for the hard or mixed suit only	500	-
Comms, Long Range *	Extends radio range out to 50km	250	-
Crampons*	Extending boot spikes for stability on icy terrain	200	1
Extended Life Support*	Extend PLSS duration to 18 hours	10,000	4
Flashlights*	Twin helmet-mounted flashlights, illuminating up to 20m	200	-
Flare Damper	Magnetic field generator that can protect against solar flares, but saps power from the PLSS at a rate of 5 minutes per PLSS hour	1000	3
Inertial Locator *	Indicates direction and distance travelled from a starting location	1,200	1.5
Mag Boots *	Allow walking on metal hulls and deckplates in zero-G	200	2
Power Pack	Extra power source with cables, for running equipment etc. as an emergency back-up	1000	2
Radiation Counter *	Provides warnings of radiation threats	200	-
Resistant Outer Layer	adds +2 to suit Protection	1000	3
Zero-G Tool-Belt *	With zero-G tools attached	500	2
Spotlight *	Powerful helmet-mounted spotlight, illuminating up to 50m	1000	1
Thruster Unit	PLSS-mounted thrusters providing limited movement in zero-G for a total of 10 minutes	1000	4
Wrist-Mounted Computer *	as Computer/1	1000	1

* These components can be fitted to the Hostile Environment Suit (see below)

HOSTILE ENVIRONMENT SUITS

Most vacc suits are able to cope with vacuum and with extremes of temperature from 120°C down to -100°C. There are more hostile environments, the Jovian moons are bathed in radiation, Titan's atmosphere is a chilly -180°C, Mercury's dayside surface is a boiling 427°C, and on Venus a visitor suffers the heat of Mercury with the added peril of being crushed by 92 atmospheres! Only one suit has so far been widely marketed that can cope with all of these hazards, and that is the Aerodyne HEV-X manufactured on Earth for use on Mercury. With the failure of that colonisation effort, the Earth Union sold on suits to other worlds, and even struck up a deal to export them to the Luna Republic. This is the TL 9 Hostile Environment Suit appearing on TMB p.87.

It is a hard-suit with heat-shielding, radiation protection and flare damper (see above). To prevent flash explosions should the radiators on the PLSS accidentally touch super-cold surfaces, they are carefully shielded. The visor can screen out UV radiation and allow vision even on Mercury's dayside. Finally, the suit is resistant to flame and extremely toxic atmospheres. It is coated with a distinctive gold, mylar film for temperature reduction. The HEV-X provides Protection 7, masses 27kg and Costs Cr16,000. A difficult beast to operate, the Aerodyne HEV requires a minimum skill of Vacc Suit 2 and has an action penalty of -4. The PLSS operates for 6 hours.

PRE-BREATHING (Hard Science Option!)

It is possible to reduce the AP on the soft suit, making it much less of a cow to work in. Pressure inside can be lowered, lessening the ballooning effect. However, with less air comes less oxygen and the wearer will need to switch the air to 100% oxygen, or risk blacking out. AP is reduced to a more manageable -2. The downside is significant, leaving the airlock under such partial pressures will usually result in decompression sickness ('the bends'). To prevent this the space-walker can either spend 8 hours slowly depressurizing in the airlock, or pre-breathe pure oxygen for 4 hours before he begins the EVA in his partial-pressure suit.

The Bends: Symptoms of the bends (deep pain, confusion, fatigue) occur in 1d6 hours. The spacer makes a Difficult (-2) End roll, and if successful suffers 3d6 damage. If unsuccessful, the bends are almost certainly fatal (6d6 damage). Quick medical care (Medic 6+) with oxygen mask and medkit, can reduce damage by 6 points.

Treat the Bends: Medic, 1-6 hours, Routine (+0)

SUIT COLOURS

Early explorers on Mars soon discovered that they needed to identify each other while out on the Martian surface and wearing heavy pressure suits. A form of identification was created. The back of the suit's helmet became a place to put a personal logo or custom paint job, this large space could be seen from a distance and instantly identify the wearer. Since most designs wrap around the top and sides too, identification is often possible from the sides and front also. Designs might be chequered patterns, solid colours, geometric shapes, coloured letters, pictures, logos or anything else that is colourful and recognizable from a distance. It's not just scientists and explorers that practice this custom, but miners, engineers, construction workers - almost everyone! Passengers, visitors, and temporary crew-members hire or borrow TL 8 soft suits that have blank helmet backs with simple stencilled numbers for ID. The players with customized suits might want to create their own custom logo (just draw round a coin and grab some colouring pens or pencils..).

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Teams or personnel grades are usually identified with coloured arm-bands. For example, on a construction site, managers have red arm-bands, workers blue armbands, and scientists green armbands. Stencilled numbers on these armbands denote the wearer's actual site ID number.

LIFE INSIDE THE SUIT

It goes without saying that a vacc suit can be bulky and uncomfortable, but there are some comforts. A full-body garment is worn beneath the suit that includes a water-cooled layer, but warm water can instead be sent through the system as the suit detects a change in the outside temperature. Drinking water, typically a litre or two, is included and a drinking tube is fixed close to the wearer's mouth. He or she can also mount a foodstick into a nearby housing, giving the wearer a chance to eat something if in the suit for several hours. Urine is processed in thigh pockets and sent to the PLSS for recycling as drinking water. And if you need to defecate, then the suit holds it in place, that's all it can do. Even the best of the TL 9 units can't reprocess that stuff. Go before you put the suit on.

A TL 8 suit will include gauges on wrists and chest that allow the wearer to check battery life, pressure, temperature, air and the PLSS system. At TL 9 these are integrated into a Heads Up Display that appears on the wearer's faceplate. Comms are all voice activated, with a wrist mounted manual control as a back-up. Controls for the PLSS are also mounted on the same wrist controller.

It is standard practice to switch on the helmet cam when working, it means you aren't alone, comrades inside the base or DSV can give you guidance and advice, and everything you see is recorded for later analysis. A small light illuminates the wearer's immediate working area.

The PLSS can be recharged (air, water and electricity) at dedicated connectors within inside airlock. Other places, such as mining facilities, may have large banks of connectors in an EVA prep hall for many users to top up their PLSS at once. Every acceleration couch in a spacecraft includes an umbilical allowing the wearer to take-off the PLSS (it gets in the way when laying in the couch) and rely on air from the vehicle if needed. Most crewman take off the helmet once aboard, but keep the suit on.

BREACH!

Hard suits and HEV suits in **Orbital** are self-repairing as stated in the box-out TMB p.88. But they aren't magical. Once a suit is breached (perhaps from colliding with a piece of sharp debris while the wearer is repairing a drive) it takes 1-3 turns for the suit to repair the tear.

In the first turn the wearer suffers 1 pt of damage, in the second turn he suffers 2 pts of damage and in the third turn he suffers 4 pts.

For larger breaches, the damage is instant and often fatal, depending on the environment. A breach on Mars can be handled with the suffocation rules (TMB p.142), other worlds should factor in temperature (TMB p.74).

To repair a major breach: Vacc Suit, 10-60 seconds hours, Difficult (-2) or Very Difficult (-4) if repairing one's own suit. All suits include a suit repair kit.

GETTING IT ON

TL 7 and 8 soft suits are only partially pressurized so they don't balloon, and circulate 100% oxygen to compensate for the thin atmosphere. Getting into one requires the wearer pre-breathe oxygen to reduce nitrogen in the bloodstream. TL 9 hard suits are able to circulate a normal spacecraft cabin-type atmosphere at normal pressures due to innovations in suit materials, keeping them flexible while preventing them from ballooning. Player characters can take their helmets off in the cockpit without suffering the bends. It is possible to climb inside a vacc suit while wearing normal clothes, but they'd better be tight fitting, the urine connections won't work and without the water-cooled full body garment, any movement becomes hot and sweating. Increase the action penalty by -1 every 2 hours.

Putting on a suit requires 10 minutes if help is available, 15 minutes if it isn't. Taking the suit off takes 3 minutes. It is possible to do either of these a lot faster in an emergency! To speed up the process use the tasks below (do *not* factor in the suit's action penalty).

Putting on a vacc suit while under stress: Vacc Suit, 1-6 mins, Difficult (-2)

Taking off a vacc suit while under stress: Vacc Suit, 10-60 seconds, Difficult (-2)

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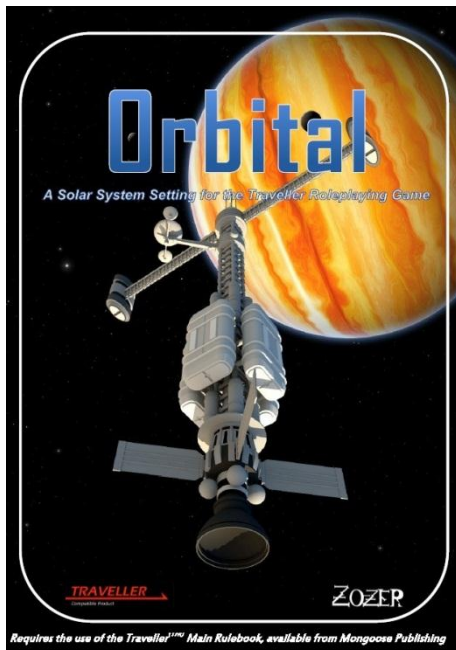
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*If you liked **Vacc Suit**, then you are sure to enjoy **Orbital**!*



Orbital is a science fiction setting for Traveller with a fairly realistic (TL 9) feel that is set within our own solar system. The Earth is locked in a Cold War with the people of Luna. Both face off, 400,000 km apart, threatening mutual annihilation whilst they compete to colonise the moons of Jupiter and Saturn. Older colonies such as Mars and Mercury are independent and caught up in this struggle for solar system supremacy. Spacecraft use nuclear thermal rockets and create gravity by spinning pods or centrifuges, this is spaceflight as envisaged today!

In keeping with the near-future and hard-science fiction themes, role-playing campaigns focus on real people doing real jobs. The game has rules, technology and advice to allow scenarios based around deep space haulage, asteroid mining, salvage, rescue and exploration.

Should the referee and players decide to stick with the default campaign premise for **Orbital**, then the player characters will be spacers, the rough and tough crew of a deep space vehicle owned by a corporation that leases its spacecraft out to agencies, individuals and corporations. Like the crew of a

salvage or heavy lift ship today, the characters will find themselves engaged in diverse, challenging and dangerous jobs with every mission.

One month may involve dropping a cargo of habitat modules into the Martian atmosphere, a few months later it could be salvaging a robotic drilling rig in the asteroid belt that has come to the end of its useful life. The emphasis is on 'being in space', working in space and dealing with all of the challenges that operating in the solar system throws at them. The referee can put all kinds of obstacles in the way of PCs, making the outcome of a mission always uncertain. It will be ingenuity, resourcefulness, skill and bravery that will see them right in the end – or alternatively, asphyxiated, frozen, irradiated, boiled, depressurized or out of a job!

Orbital features:

- History of events up to 2100 AD and the causes of the Cold War
- Organisations; 35 corporations, crime gangs, NGOs and agencies
- Guidance on creating suitable TL 9 characters
- Rules for designing and operating deep space vehicles
- Hardware and how it works; from vacc suits to rovers, lunar landers to mass drivers, airlocks, oxygen mining units and plenty more
- Habitats, space stations, outposts and O'Neill colonies
- Ways to Die in Space
- How to Establish a Colony
- Rules for striking it rich as a Belt miner
- UWP stats for all significant bodies in the solar system
- Complete write-ups for all the planets and main moons
- How to run a game of **Orbital**; what do characters do?
- NPCs and plot ideas
- Alien ruins on Mars, SETI transmissions ... options for aliens in **Orbital**
- Reviews of movies, books and online resources that add to the game