GURPS Fourth Edition

SPACESHIPS™

BY DAVID L. PULVER

STEVE JACKSON GAMES

Three, two, one . . . Blast off!

GURPS Spaceships is the companion to ***GURPS Space***, presenting rules for TL7-12 spacecraft, from tiny lifeboats to giant dreadnoughts. It covers spaceship design, travel, and operations, along with a (mapless) space combat system.

The ship design and operation rules in ***GURPS Spaceships*** are more abstract than those found in ***GURPS Vehicle Design*** or ***GURPS Traveller: Interstellar Wars*** . . . but they're *much* faster, with a minimum of math and a maximum of colorful options. It takes only minutes to build even the largest spaceship . . . and wrapped around the design system are basic space travel and combat systems to get you into space right away.

GURPS Spaceships is the core book in a series whose other volumes present examples of ready-to-use spacecraft and comprehensive rules for commercial space flight, warfare, exploration, ports, industry, and other aspects of space travel.

GURPS Spaceships *requires only the* ***GURPS Basic Set****, but* ***GURPS Space*** *is highly recommended for its guidelines on stardrives, characters, campaigns, and settings.*

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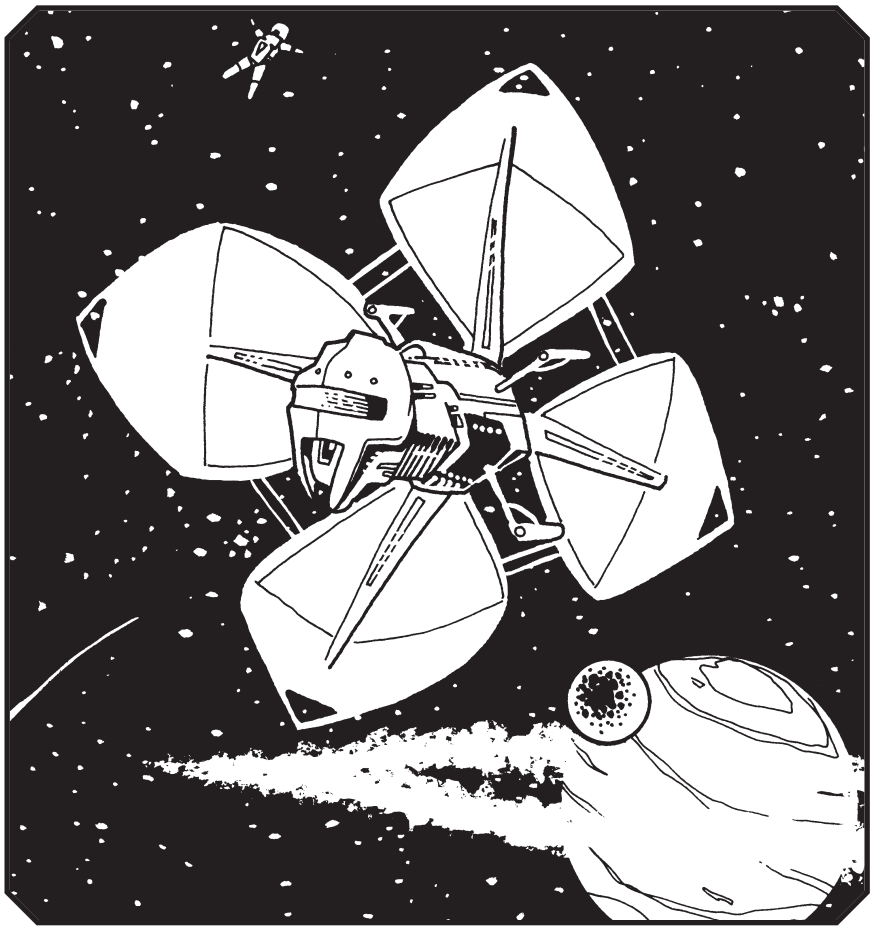

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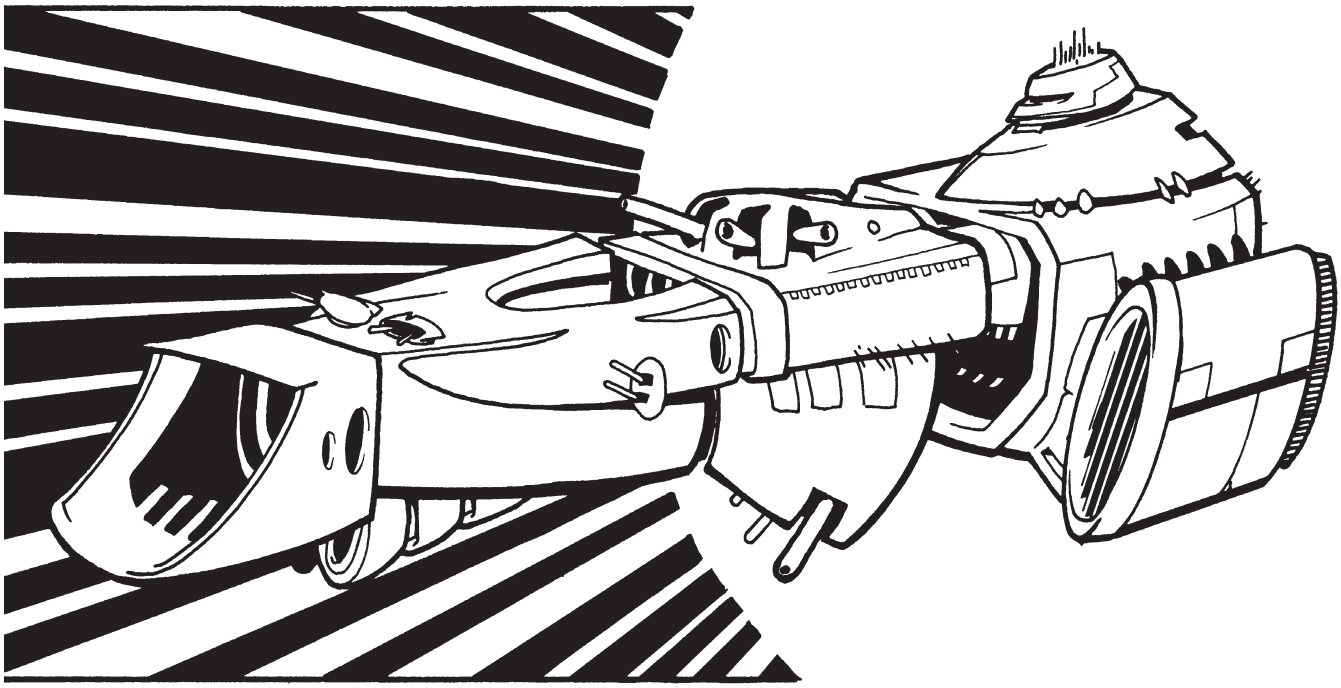

Introduction

This book describes how spacecraft are designed and explains what the systems built into them do. Several examples of spacecraft from different tech levels are also provided, along with rules for space flight and a basic space combat system.

Why a new system for describing spacecraft? ***GURPS*** has had several spaceship creation systems, but they were intended for gamers who wanted to spend hours building a single ship. If you enjoy that level of detail, ***GURPS Vehicle Design System*** and ***GURPS Traveller: Interstellar Wars*** are recommended. This system is more abstract, but it's also faster. The design rules are tightly integrated into the mechanics for space combat, simplifying procedures for character actions, power allocation, and hit location.

Publication History

GURPS Spaceships includes revised and expanded versions of the space travel rules that first appeared in ***GURPS Space*** (by William Barton and Steve Jackson) and the ship combat rules that David Pulver added to ***GURPS Space,*** *Third Edition.*

About the Series

GURPS Spaceships is the core book in the ***GURPS Spaceships*** series, which supplements ***GURPS Space*** campaigns by providing ready-to-use spacecraft descriptions and rules for space travel, combat, and operations. The series includes ***Traders, Liners, and Transports***; ***Warships and Space Pirates; Fighters, Carriers, and Mecha; Exploration and Colony Spacecraft; Mining and Industrial Spacecraft; Divergent and Paranormal Tech***; and ***Transhuman Spacecraft.***

Each volume provides spacecraft descriptions and supplementary rules. For example, trade and passengers are covered in ***Traders, Liners, and Transports,*** and hex-grid combat is covered in ***Warships and Space Pirates.***

About the Author

David L. Pulver is a freelance writer and game designer based in Victoria, British Columbia. He is the co-author of the ***GURPS Basic Set,*** *Fourth Edition* and author of ***Transhuman Space*** and numerous other roleplaying games and supplements.

About *GURPS*

Steve Jackson Games is committed to full support of ***GURPS*** players. We can be reached by e-mail: **info@sjgames.com**. Our address is SJ Games, P.O. Box 18957, Austin, TX 78760. Resources include:

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Internet. To discuss ***GURPS*** with our staff and your fellow gamers, visit our forums at **forums.sjgames.com.** You can also join us at **facebook.com/sjgames** or **twitter.com/sjgames.** Share your campaign teaser in 140 characters or fewer with #GURPShook on Twitter. Or explore that hashtag for ideas to add to your own game! The web page for the ***GURPS Spaceships*** series can be found at **gurps.sjgames.com/spaceships.**

Gamer and Store Finder (**gamerfinder.sjgames.com**): Connect with other people and places playing our games. Add yourself to our database so they can find you as well!

Bibliographies. Bibliographies are a great resource for finding more of what you love! We've added them to many ***GURPS*** book web pages, with links to help you find the next perfect element for your game.

Errata. Everyone makes mistakes, including us – but we do our best to fix our errors. Errata pages for ***GURPS*** releases are available at **sjgames.com/errata/gurps**.

Rules and statistics in this book are specifically for the ***GURPS Basic Set,*** *Fourth Edition.* Page references that begin with B refer to that book, not this one.

Factory (TL8) [Any!]

This is an industrial system capable of fabricating spare parts or other goods. Use Machinist skill to operate it. The $/hr entry on the table shows the production capacity in dollars per hour worth of goods it can assemble, if provided with appropriate blueprints. Factories are unavailable for small SM+5 craft.

Fabricator (TL8): A high-tech machine shop. Requires component parts equal in mass and costing 40% of the good's value.

Robofac (TL10): As above, but faster and capable of self-operation with its own Machinist-14 skill.

Nanofactory (TL11): A "cornucopia" capable of manufacturing goods from raw materials (carbon, metals, etc.). Requires only an equivalent mass in raw materials.

Replicator (TL12^): A nuclear synthesis machine capable of transforming one element into another, and creating goods from transmutation of bulk matter. The table shows the *pounds* of goods each system can replicate per hour from an equivalent mass of bulk matter (which can be stored as cargo or fuel).

Factory Table

SM	***+6***	***+7***	***+8***	***+9***	***+10***	***+11***	***+12***	***+13***	***+14***	***+15***
$/hr	5k	15k	50k	150k	500k	1.5M	5M	15M	50M	150M
lbs./hr*	0.5	1.5	5	15	50	150	500	1,500	5,000	15,000
Workspaces	0	0	0	0	1	3	10	30	100	300
Cost ($)	5M	15M	50M	150M	500M	1.5B	5B	15B	50B	150B

Multiply $/hr. by 2 for robofacs or 20 for nanofactories.

* Replicators use this statistic (instead of $/hr).

Multiply cost by 2 for robofacs, 4 for nanofactories, or 20 for replicators.

Repair Skill: Mechanic (Machine Tools) for Fabricator, Mechanic (Robotics) for Robofac, Mechanic (Nanomachines) for Nanofactory, Electronics Repair (MT) for Replicator.

Force Screen (TL11^) [Any!]

This system generates a protective force field around the *entire* vessel – it protects all hull sections, not just the one it is installed in. It is rated for the *semi-ablative* (p. B47) dDR that it provides. The table shows the field's dDR and the cost per (high-energy) system. Subtract force screen dDR first, then any armor dDR on the hull section struck.

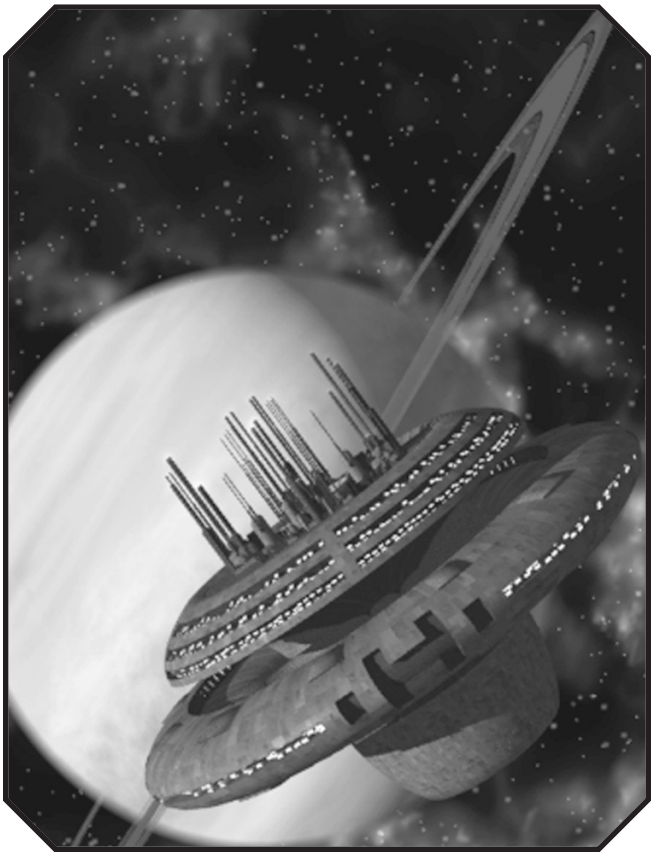
A force screen regenerates 10% of its lost dDR every second, provided it is powered up. During space combat turns (which represent several seconds to several minutes) the screen is assumed to completely regenerate lost dDR each turn, but it offers reduced protection against repeated attacks *during* the turn.

A spacecraft may only have one force screen up at any one time. Screens may be light or heavy:

Light Force Screen: A relatively inexpensive design; use the listed dDR.

Heavy Force Screen: A high-power screen; it may function as a light screen, or it can *double* the dDR by using a second Power Point to reinforce the field.

The screen only provides protection while powered up. For more or less powerful screens and other options, see *Force Screen Variants* (p. 32).



Force Screen Table

SM	***+5***	***+6***	***+7***	***+8***	***+9***	***+10***	***+11***	***+12***	***+13***	***+14***	***+15***
TL11^ dDR	20	30	50	70	100	150	200	300	500	700	1,000
TL12^ dDR	30	50	70	100	150	200	300	500	700	1,000	1,500
Cost ($)											
Light screen	500K	1.5M	5M	15M	50M	150M	500M	1.5B	5B	15B	50B
Heavy screen	1.5M	5M	15M	50M	150M	500M	1.5B	5B	15B	50B	150B
Workspaces	0	0	0	0	0	1	3	10	30	100	300

Repair Skill: Armoury (Force Shields).

Solar System Travel Table

Planet	*Orbital Radius*	*Orbital Velocity*	*Orbital Period*	*G*	*Escape Velocity*
Sun	–	–	–	28G	383 mps
Mercury	0.39 AU	29.6 mps	0.24 yr.	0.38G	2.7 mps
Venus	0.72 AU	21.8 mps	0.62 yr.	0.91G	6.4 mps
Earth	1 AU	18.5 mps	1 yr.	1G	6.96 mps
– Luna	1 AU	–	–	0.16G	1 mps
Mars	1.5 AU	15.1 mps	1.88 yr.	0.38G	3.1 mps
Ceres*	2.8 AU	11.3 mps	4.6 yr.	0.03G	0.32 mps
Jupiter	5.2 AU	8.1 mps	11.9 yr.	2.36G	37 mps
Saturn	9.6 AU	6 mps	29.5 yr.	0.92G	22 mps
Uranus	19 AU	4.2 mps	84 yr.	0.89G	13.2 mps
Neptune	30 AU	3.4 mps	165 yr.	1.19G	14.6 mps
Pluto*	39 AU	2.9 mps	248 yr.	0.067G	0.68 mps
Oort Cloud*	about 20,000 AU	0.59 mps	2,800,000 yr.	neg.	neg.

* Ceres is the largest main belt asteroid. Pluto is a large Kuiper Belt object. Oort cloud statistics are typical of long-period comets; short-period comets have orbital radii of 2 to 52 AU and orbital periods of 3 to 370 years.

Newtonian Space Flight and Delta-V

The top speed of a spacecraft that uses a reaction drive is really its "delta-V": the maximum change of velocity it can perform before running out of reaction mass (rocket fuel, etc.). Each acceleration or deceleration "costs" a fraction of this delta-V.

The important spacecraft statistics are the acceleration of the reaction drive engines and the fuel tank's delta-V reserve of reaction mass for those engines.

The GM will want to know how far the destination is, in miles or AU, as well as the escape velocity (in mps) and gravity (in G) of the origin or destination worlds.

Example: The *Princess of Helium* is a passenger liner with a fusion torch drive. She's presently in Mars orbit. She has enough reaction mass in her fuel tanks to give the ship a delta-V reserve of 55 mps, and her drive has a 1G acceleration using her fusion torch engines. She's bound for Earth, which at this time we'll assume is about 1.5 AU from Mars.

Getting into Space

To take off from a planet and reach a *low orbit* around a body requires a delta-V equal to 80% of the planet's escape velocity. This is 5.6 mps for Earth orbit. The spacecraft's acceleration must exceed gravity (1G, for Earth), or it must have wings (in atmosphere) or contragravity lifters.

To reach low orbit around a celestial body and then break orbit, escaping its pull of gravity, requires a delta-V equal to escape velocity. This is about 7 mps for Earth. The spacecraft's acceleration must also exceed gravity (1G, for Earth), or it must be winged (in atmosphere) or have contragravity lifters.

A spacecraft that is *already* in low orbit uses delta-V equal to about 30% of escape velocity to break orbit. This is about 2 mps to leave Earth orbit.

A winged or contragravity lifter-equipped spacecraft with jet engines (or reaction engines with the ram-rocket design feature) in a very thin or denser atmosphere (p. B249) needs less delta-V to reach orbit or escape velocity. First calculate air speed (see Air Performance, p. 35) using *only* the jet engine or ram-rockets; then divide mph by 3,600 (giving air speed in mps); then subtract this from required delta-V.

If escape velocity of other planets is not known, values can be determined from a planet's mass and radius relative to Earth. Multiply the above velocities by the square root of (Me/Re), where *Me* is mass in Earth masses and *Re* is planetary radius in Earth radii.

Stars and Escape Velocity: The sun's escape velocity is 383 mps. For other stars and remnants such as neutron stars or black holes, multiply this velocity by the square root of (Ms/Rs), where Ms is the mass in solar masses and Rs is the radii in solar radius.

Time required is to lift off or break orbit:

T = dV × 0.045/A.

T is time in hours.

dV is the total delta-V required.

A is the spacecraft's acceleration in G.

Example: The *Princess of Helium* is orbiting Mars and wants to break orbit. This requires 30% of Mars escape velocity. The escape velocity of Mars is 3.1 mps (see table), so she needs 0.93 mps. She reduces the reaction mass in her tanks from 55 mps to 54.07 mps. She could accelerate at full 1G, but since her passengers are from Mars, she decides to use less than that: a gentle 0.5G, intermediate between Earth and Mars gravity. Accelerating at 0.5G, time required is 0.93 × 0.045/0.5G = 0.084 hours, or about 5 minutes. After a brief acceleration, she's free of Mars' gravity!

Space Travel with Reaction Drives

Orbital maneuvers, or interplanetary travel once a spacecraft has escaped orbit, require accelerating to the desired cruising velocity, coasting through space, then decelerating to the velocity required to orbit the destination.

To plot a space journey for a reaction drive-propelled spacecraft, decide how much of the spacecraft's delta-V reserve will be used to accelerate. This delta-V is the cruising velocity. An equal amount, minus the destination's own escape velocity, must then be used to decelerate, unless the spacecraft is to fly past or impact the destination.

When Not To Use These Rules

These rules are intended to handle battles at great distances, often involving large crews. Don't use them where standard one-second combat turns and range calculations in yards are more appropriate! E.g., if a spaceship is strafing a party of adventurers on the ground, fighting an airplane, or boarded, feel free to switch to the standard ***GURPS Basic Set*** vehicle rules. Refer to the vessel's short-form statistic block (multiplying dDR by 10 and dST/HP by 10 to get the unscaled values) and use *Weapons in Ordinary Combat* (p. 66).

Action During a Turn

On a spacecraft's turn, all player characters aboard, and any NPCs performing important roles, take their own turns, organized as shown below.

During the spacecraft's turn, PCs and other key characters decide what duties they'll perform, if they differ from last turn. If characters are moving about the vessel or staying put, this is also resolved now (including boarding of small craft).

Characters aboard a single spacecraft take their own individual turns in the order shown below. Following this ensures that the commander's skill rolls for handling the ship can affect the crew, that the engineer provides power to drives and weapons so the pilot and gunners can use them, and so on. However, this isn't a war game – the GM should feel free to vary the sequence as dramatically appropriate!

Characters may perform a single task without penalty, or, since each turn represents a lengthy period, may combine multiple tasks at a penalty; see *Multitasking* (p. 50). There's no need to try and do every task, e.g., the single crew member on a space fighter might decide to perform only a piloting and a gunnery task, ignoring everything else. Similarly, a space station or vessel that's out of fuel may omit piloting tasks.

1. Command Tasks: One character acting as commanding officer (and optionally one acting as executive officer) may perform *Command Tasks* (p. 50).

2. Engineering Tasks: One character acting as chief engineer may allocate power (if necessary) and optionally perform an extra action from the *Engineering Tasks* (p. 51).

3. Navigation Tasks: One character serving as navigator may perform *Navigation Tasks* (p. 52).

4. Piloting Tasks: One character serving as pilot may perform *Pilot Tasks* (p. 53). At the start of this phase, any attack vector or collision course results achieved by another spacecraft against the pilot's vessel are removed (but engagement or rendezvous results will remain) – see *Range* (p. 57). If no one is performing a pilot task, the spacecraft performs an Uncontrolled Drift (p. 56). If a collision course result is achieved, the pilot may opt to attempt a collision attack, but need not do so.

5. Electronics Operation Tasks: All characters acting as sensor or comm operators can perform *Communications Tasks* (p. 53) or *Sensor Tasks* (p. 52) for the systems they control.

6. Gunnery Tasks: All characters controlling functional weapons may perform *Gunnery Tasks* (p. 53), or may alternatively delay performing tasks until Step 7, after the piloting tasks have been performed and the range has (possibly) changed.

7. Crew Tasks: Other crew members may perform tasks or other actions. The only activities given special rules here are *Damage Control Tasks* (p. 54), but there are plenty of opportunities for other activity. Medics can treat the injured in their system, stewards can try to calm passengers, boarding parties can rally at airlocks or fight aboard ship, passengers can hide in cabins, don space suits, or try to hijack the ship, etc.

Character Actions

Since each turn is longer than one second, characters don't take maneuvers. Instead, they perform *tasks* that represent multiple maneuvers over a period of time.

Character actions are divided into several task categories, such as Command or Gunnery, which determine when tasks are performed. These are often assigned to specific people (e.g., the pilot performs Piloting tasks) but a title isn't necessary, e.g., the ship's cook could run to a control station and take over the ship's helm.

Sapient computer programs (see ***GURPS Ultra-Tech***) that are running on the spacecraft's computer network may perform certain tasks, if so noted. Aside from existing in the computer network, they use the same rules as other characters.

Multitasking

Characters can try to perform more than one *different* task in a turn, with certain restrictions. A character can only perform those tasks possible from the system he spent the entire turn in. The same task can't be performed multiple times in a turn.

There is a skill penalty for multitasking, which is applied to *all* tasks:

- -2 per added task after the first, if it's part of the same category, e.g., two different Command tasks.
- -4 per added task after the first of a different category, e.g., both a Command and a Piloting task.

If a character will multitask, indicate it when they perform the *first* task, so that the penalty can be applied to *all* tasks they perform during the turn.

Command Tasks

"Chief engineer, I need those engines on line now! Get me more power!"

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